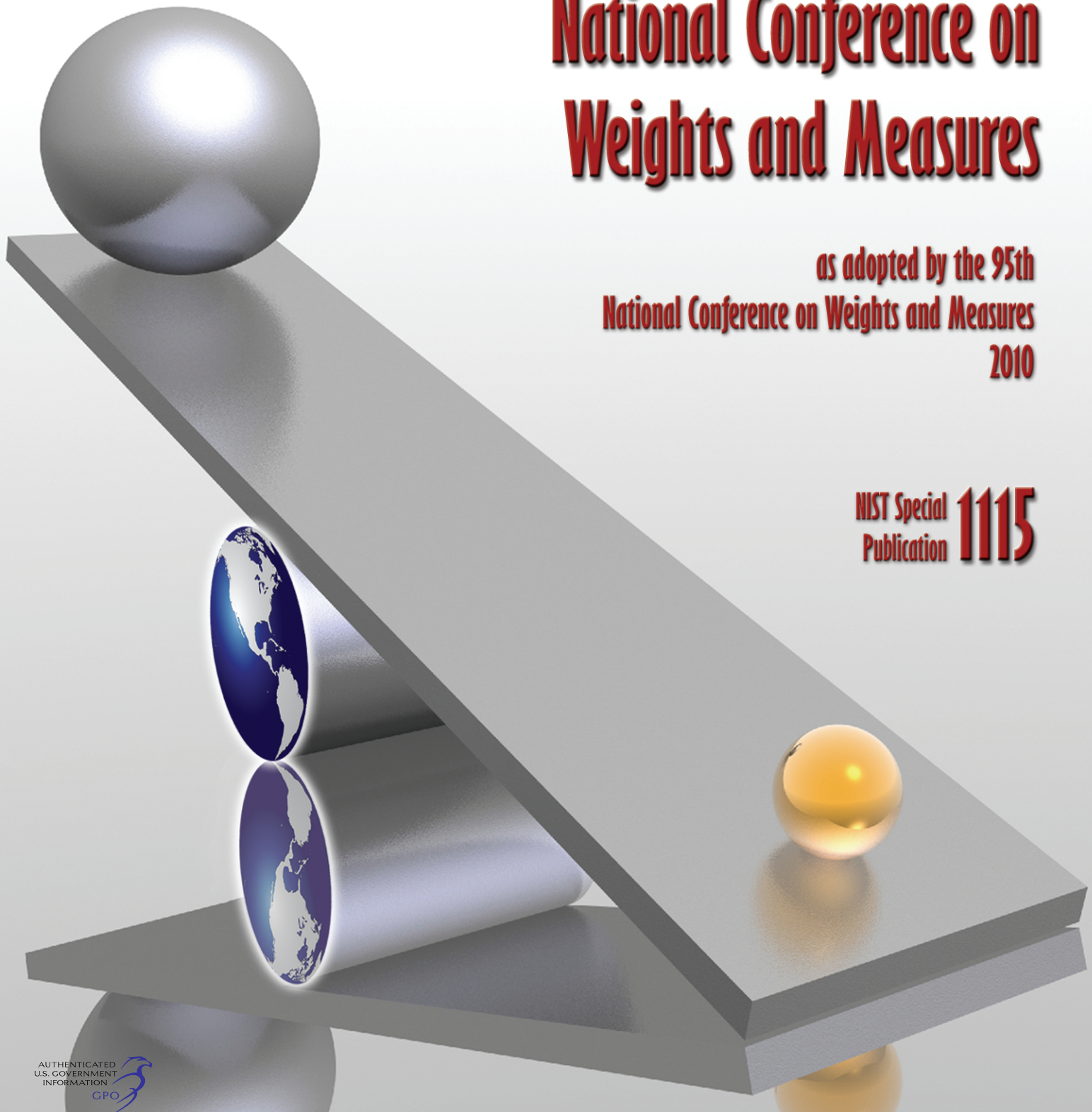
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Report of the 95th National Conference on Weights and Measures

as adopted by the 95th
National Conference on Weights and Measures
2010

NIST Special Publication 1115



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U.S. GOVERNMENT
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Report of the 95th National Conference on Weights and Measures

St. Paul, Minnesota – July 11 through 15, 2010
as adopted by the 95th National Conference on Weights and Measures 2010

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The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology and is attended by officials from various states, counties, and cities, as well as representatives from the U.S. Government, other nations, industry, and consumer organizations.

Abstract

The 95th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 11 - 15, 2010, at the Crowne Plaza St. Paul Riverfront, St. Paul, Minnesota. The theme of the meeting was "Breaking Molds to Shape the Future."

Reports by the NCWM Board of Directors, Standing Committees, and Special Purpose Committees constitute the major portion of this publication, along with the addresses delivered by Conference officials and other authorities from government and industry.

Special meetings included those of the Scale Manufacturers Association, Meter Manufacturers Association, Gasoline Pump Manufacturers Association, American Petroleum Institute, National Association of State Departments of Agriculture, the Industry Committee on Packaging and Labeling, and Associate Membership Committee.

Key words: laws and regulations; legal metrology; meters; scales; specifications and tolerances; training; type evaluation; uniform laws; weights and measures.

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WASHINGTON: 2010

National Conference on Weights and Measures

Annual Report of the 95th NCMW

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Past Chairmen of the Conference

44th	1959	C. M. Fuller, CA
45th	1960	H. E. Crawford, FL
46th	1961	R. E. Meek, IN
47th	1962	Robert Williams, NY
48th	1963	C. H. Stender, SC
49th	1964	D. M. Turnbull, WA
50th	1965	V. D. Campbell, OH
51st	1966	J. F. True, KS
52nd	1967	J. E. Bowen, MA
53rd	1968	C. C. Morgan, IN
54th	1969	S. H. Christie, NJ
55th	1970	R. W. Searles, OH
56th	1971	M. Jennings, TN
57th	1972	E. H. Black, CA
58th	1973	George L. Johnson, KY
59th	1974	John H. Lewis, WA
60th	1975	Sydney D. Andrews, FL
61st	1976	Richard L. Thompson, MD
62nd	1977	Earl Prideaux, CO
63rd	1978	James F. Lyles, VA
64th	1979	Kendrick J. Simila, OR
65th	1980	Charles H. Vincent, TX
66th	1981	Edward H. Stadolnik, MA
67th	1982	Edward C. Heffron, MI
68th	1983	Charles H. Greene, NM
69th	1984	Sam F. Hindsman, AR
70th	1985	Ezio F. Delfino, CA
71st	1986	George E. Mattimoe, HI
72nd	1987	Frank C. Nagele, MI
73rd	1988	Darrell A. Guensler, CA
74th	1989	John J. Bartfai, NY
75th	1990	Fred A. Gerk, NM
76th	1991	N. David Smith, NC
77th	1992	Sidney A. Colbrook, IL
78th	1993	Allan M. Nelson, CT
79th	1994	Thomas F. Geiler, MA
80th	1995	James C. Truex, OH
81st	1996	Charles A. Gardner, NY
82nd	1997	Barbara J. Bloch, CA
83rd	1998	Steven A. Malone, NE
84th	1999	Aves D. Thompson, AK
85th	2000	G. Weston Diggs, VA
86th	2001	Lou Straub, MD
87th	2002	Ron Murdock, NC
88th	2003	Ross J. Andersen, NY
89th	2004	Dennis Ehrhart, AZ
90th	2005	G. Weston Diggs, VA
91st	2006	Don Onwiler, NE
92nd	2007	Michael Cleary, CA
93rd	2008	Judy Cardin, WI
94th	2009	Jack Kane, MT

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2009-2010 Organizational Chart

National Conference on Weights and Measures (NCWM) Board of Directors			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Chairman	Randy Jennings	Tennessee	2010
Chairman-Elect	Tim Tyson	Kansas	2010
NTEP Committee Chair	Judy Cardin	Wisconsin	2010
Treasurer	Richard Cote	New Hampshire	2010
Active Membership - Western	Kirk Robinson	Washington	2012
Active Membership - Central	Steven Malone	Nebraska	2010
Active Membership - Southern	Stephen Benjamin	North Carolina	2013
Active Membership - Northeastern	Michael Sikula	New York	2014
At-Large	Mark Coyne	City of Brockton, Massachusetts	2011
At-Large	Stephen Langford	Cardinal Scale Manufacturing, Co.	2013
Associate Membership	Robert Murnane, Jr.	Seraphin Test Measure	2010
Honorary NCWM President	Dr. Patrick D. Gallagher	NIST, Director	NA
Executive Secretary	Carol Hockert	NIST, Weights and Measures Division	NA
Executive Director	Don Onwiler	NCWM Headquarters	NA
Board of Directors Advisor	Gilles Vinet	Measurement Canada	NA
NTEP Administrator	Jim Truex	NCWM Headquarters	NA

National Type Evaluation Program Committee (NTEP)			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	Judy Cardin	Wisconsin	2010
Member	Randy Jennings	Tennessee	2011
Member	Kirk Robinson	Washington	2012
Member	Michael Sikula	New York	2014
Member	Tim Tyson	Kansas	2012
NTEP Administrator	Jim Truex	NCWM Headquarters	NA

Finance Committee			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	Tim Tyson	Kansas	2011
Member	Robert Murnane, Jr.	Seraphin Test Measure	2010
Member	Kurt Floren	Los Angeles County	2011
Member	Richard Cote	New Hampshire	2011
Executive Director	Don Onwiler	NCWM Headquarters	NA

Laws and Regulations Committee (L&R)			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	Joe Benavides	Texas	2011
Member	Terence McBride	Memphis, Tennessee	2010
Member	John Gaccione	Westchester County, New York	2012
Member	Jonelle Brent	Illinois	2013
Member	Raymond Johnson	New Mexico	2014
Associate Membership Representative	Rob Underwood	Petroleum Marketers Association of America	2013
Canadian Technical Advisor	Doug Hutchinson	Measurement Canada	NA
NIST Technical Advisor	David Sefcik	NIST, Weights and Measures Division	NA
NIST Technical Advisor	Lisa Warfield	NIST, Weights and Measures Division	NA

Professional Development Committee (PDC)			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	Ross Andersen	New York	2010
Member	TBD		2011
Member	Stacy Carlsen	Marin County, California	2012
Member	Julie Quinn	Minnesota	2013
Member	Dale Saunders	Virginia	2014
Associate Membership Representative	Steven Grabski	Walmart Stores, Inc.	2013
Safety Liaison	TBD		
Technical Advisor	TBD		

Specifications and Tolerances Committee (S&T)			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	Brett Saum	San Luis Obispo County, California	2010
Member	Douglas Deiman	Alaska	2011
Member	Steve Giguere	Maine	2012
Member	Kenneth Ramsburg	Maryland	2013
Member	Paul Moyer	Nebraska	2014
Canadian Technical Advisor	Ted Kingsbury	Measurement Canada	NA
NIST Technical Advisor	Tina Butcher	NIST, Weights and Measures Division	NA
NIST Technical Advisor	Steven Cook	NIST, Weights and Measures Division	NA

Nominating Committee			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	Jack Kane	Montana	2010
Member	Ross Andersen	New York	2010
Member	Judy Cardin	Wisconsin	2010
Member	Dennis Ehrhart	Arizona	2010
Member	Thomas Geiler	Barnstable Regulatory Services, Massachusetts	2010
Member	Maxwell Gray	Florida	2010
Member	Steven Malone	Nebraska	2010
Credentials Committee			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Committee Chair	David Pfahler	South Dakota	2010
Member	James Cassidy, Jr.	City of Cambridge, Massachusetts	2011
Member	Kevin Upschulte	Missouri	2012
Coordinator	Thomas Geiler	Barnstable Regulatory Services, Massachusetts	2010
Appointive Officials			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Chaplain	Stephen Langford	Cardinal Scale Manufacturing, Co.	2010
Parliamentarian	Louis Straub	Fairbanks Scale, Inc.	2010
Presiding Officer	Clark Cooney	Oregon	2010
Presiding Officer	Maxwell Gray	Florida	2010
Presiding Officer	Douglas Deiman	Alaska	2010
Presiding Officer	Jill Paxton	Iowa	2010
Sergeant-at-Arms	Kathleen Sundt	Minnesota	2010
Sergeant-at-Arms	Richard Tretter	Minnesota	2010
Associate Membership Committee			
OFFICE	**NAME**	**AFFILIATION**	**TERM ENDS**
Chair	Paul A. Lewis, Sr.	Rice Lake Weighing Systems, Inc.	2014
Vice Chair	Robert Murnane, Jr.	Seraphin Test Measure	2014
Secretary/Treasurer	Darrell Flocken	Mettler-Toledo, Inc.	2013
Member	Christopher Guay	Procter and Gamble, Co.	2010
Member	Thomas Herrington	Nestlé USA-Prepared Foods Division	2010
Member	Rob Underwood	Petroleum Marketers Association	2010
Member	Steven Grabski	Walmart Stores, Inc.	2011
Member	Kathleen Madaras	Fuel Merchants Association of New Jersey	2011
Member	Doug Biette	Sartorius North America	2012
Member	Michael Gaspers	Farmland Foods, Inc.	2013

National Type Evaluation Technical Committee (NTETC) Belt-Conveyor Sector		
OFFICE	**NAME**	**AFFILIATION**
Chair	Bill Ripka	Thermo Fisher Scientific
Technical Advisor	John Barton	NIST, Weights and Measures Division
NTEP Administrator	Jim Truex	NCWM Headquarters
Public Sector Member	Tina Butcher	NIST, Weights and Measures Division
Public Sector Member	Ken Jones	California
Public Sector Member	Stephen Patoray, CAE	USDA, GIPSA, Packers and Stockyards Program
Private Sector Member	Rafael Jimenez	Association of American Railroads Transportation Technology Center, Inc.
Private Sector Member	Lars Marmsater	Merrick Industries, Inc.
Private Sector Member	Peter Sirrico	Thayer Scale / Hyer Industries
Private Sector Member	Thomas Vormittag	

NTETC Grain Analyzer Sector		
OFFICE	**NAME**	**AFFILIATION**
Chair	Cassie Eigenmann	DICKEY-john Corporation
Co-Technical Advisor	John Barber	J B Associates
Co-Technical Advisor	G. Diane Lee	NIST, Weights and Measures Division
NTEP Administrator	Jim Truex	NCWM Headquarters
Public Sector Member	Randall Burns	Arkansas
Public Sector Member	Tina Butcher	NIST, Weights and Measures Division
Public Sector Member	Karl Cunningham	Illinois
Public Sector Member	Thomas Hughes	Missouri
Public Sector Member	Richard Pierce	USDA, GIPSA Technical Services Division
Public Sector Member	Edward Szesnat, Jr.	New York
Public Sector Member	Cheryl Tew	North Carolina
Private Sector Member	James Bair	North American Miller's Association
Private Sector Member	Martin Clements	The Steinlite Corporation
Private Sector Member	Victor Gates	Shore Sales Company
Private Sector Member	Andrew Gell	Foss North America
Private Sector Member	Charles Hurburgh, Jr.	Iowa State University
Private Sector Member	David James Krejci	Grain Elevator and Processing Society
Private Sector Member	Jess McCluer	National Grain and Feed Association
Private Sector Member	Thomas Runyon	Seedburo Equipment Co.

NTETC Measuring Sector		
OFFICE	**NAME**	**AFFILIATION**
Chair	Michael Keilty	Endress + Hauser Flowtec AG, USA
Technical Advisor	Tina Butcher	NIST, Weights and Measures Division
NTEP Administrator	Jim Truex	NCWM Headquarters
Public Sector Member	Ross Andersen	New York
Public Sector Member	Dennis Beattie	Measurement Canada
Public Sector Member	Jerry Butler	North Carolina
Public Sector Member	Michael Frailer	Maryland
Public Sector Member	James (Steve) Hadder	Florida
Public Sector Member	Stephen Patoray, CAE	USDA, GIPSA, Packers and Stockyards Program
Public Sector Member	Dan Reiswig	California
Private Sector Member	Marc Buttler	Emerson Process Management – Micro Motion, Inc.
Private Sector Member	Rodney Cooper	Tuthill Transfer Systems
Private Sector Member	Maurice Forkert	Tuthill Transfer Systems
Private Sector Member	Mike Gallo	Cleanfuel USA
Private Sector Member	Paul Glowacki	Murray Equipment, Inc.
Private Sector Member	Alejandro Gutierrez	Meggitt Fueling Products, Whittaker Controls
Private Sector Member	Michael Guidry	Tuthill Transfer Systems
Private Sector Member	Gordon Johnson	Gilbarco, Inc.
Private Sector Member	Yefim Katselnik	Dresser Wayne
Private Sector Member	Douglas Long	RDM Industrial Electronics
Private Sector Member	Andrew MacAllister	Daniel Measurement and Control
Private Sector Member	Wade Mattar	Invensys/Foxboro
Private Sector Member	Richard Miller	FMC Technologies Measurement Solutions, Inc.
Private Sector Member	Andre Noel	Neptune Technology Group, Inc.
Private Sector Member	Henry Oppermann	Weights & Measures Consulting
Private Sector Member	Johnny Parrish	Brodie International
Private Sector Member	Richard Tucker	RL Tucker Consulting, LLC

NTETC Software Sector		
OFFICE	**NAME**	**AFFILIATION**
Co-Chair	Norman Ingram	California
Co-Chair	James Pettinato	FMC Technologies Measurement Solutions, Inc.
Technical Advisor	Doug Bliss	Mettler-Toledo, Inc.
Secretary	Teri Gulke	Liquid Controls, LLC
NTEP Administrator	Jim Truex	NCWM Headquarters
Public Sector Member	Dennis Beattie	Measurement Canada
Public Sector Member	William Fishman	New York
Public Sector Member	Michael Frailer	Maryland
Public Sector Member	Stephen Patoray, CAE	USDA, GIPSA, Packers and Stockyards Program
Public Sector Member	Edward Payne	Maryland
Public Sector Member	John Roach	California
Public Sector Member	Ambler Thompson	NIST, Weights and Measures Division
Private Sector Member	John Atwood	Tyson Foods
Private Sector Member	Kevin Detert	Avery Weigh-Tronix
Private Sector Member	Cassie Eigenmann	DICKEY-john Corporation
Private Sector Member	Andre Elle	Endress + Hauser Flowtec AG, USA
Private Sector Member	Andrew Gell	Foss North America
Private Sector Member	Travis Gibson	Rice Lake Weighing Systems, Inc.
Private Sector Member	Keith Harper	Gencor Industries, Inc.
Private Sector Member	Tony Herrin	Cardinal Scale Manufacturing Co.
Private Sector Member	Gordon Johnson	Gilbarco, Inc.
Private Sector Member	Paul A. Lewis, Sr.	Rice Lake Weighing Systems, Inc.
Private Sector Member	Michael McGhee	Itron, Inc.
Private Sector Member	Richard Miller	FMC Technologies Measurement Solutions, Inc.
Private Sector Member	Michael Parks	Vulcan Materials Company
Private Sector Member	Mike Roach	VeriFone
Private Sector Member	Robin Sax	CompuWeigh Corporation
Private Sector Member	Scott Szurek	Emerson Process Management
Private Sector Member	David Vande Berg	Vande Berg Scales

NTETC Weighing Sector		
OFFICE	**NAME**	**AFFILIATION**
Chair	Darrell Flocken	Mettler-Toledo, Inc.
Technical Advisor	Steven Cook	NIST, Weights and Measures Division
NTEP Administrator	Jim Truex	NCWM Headquarters
Public Sector Member	L. Cary Ainsworth	USDA, GIPSA
Public Sector Member	Ross Andersen	New York
Public Sector Member	William Bates	USDA, GIPSA, FGIS
Public Sector Member	Luciano Burtini	Measurement Canada
Public Sector Member	Tina Butcher	NIST, Weights and Measures Division
Public Sector Member	Terry Davis	Kansas
Public Sector Member	Ken Jones	California
Public Sector Member	Jack Kane	Montana
Public Sector Member	Stephen Patoray, CAE	USDA, GIPSA, Packers and Stockyards Program
Public Sector Member	Edward Payne	Maryland
Public Sector Member	Dan Reiswig	California
Public Sector Member	Juana Williams	NIST, Weights and Measures Division
Private Sector Member	Steven Beitzel	Systems Associates, Inc.
Private Sector Member	Doug Biette	Sartorius North America
Private Sector Member	Greg Bredahl	Thermo Fisher Scientific
Private Sector Member	Neil Copley	Thurman Scale Co.
Private Sector Member	Mitchell Eyles	Flintec, Inc.
Private Sector Member	Robert Feezor	Scales Consulting and Testing
Private Sector Member	Scott Henry	NCR Corporation
Private Sector Member	Rafael Jimenez	Association of American Railroads Transportation Technology Center, Inc.
Private Sector Member	Stephen Langford	Cardinal Scale Manufacturing, Co.
Private Sector Member	Paul A. Lewis, Sr.	Rice Lake Weighing Systems, Inc.
Private Sector Member	L. Edward Luthy	Stock Equipment Company/Schenck Process Transport N.A.
Private Sector Member	Nigel Mills	Hobart Corporation
Private Sector Member	Louis Straub	Fairbanks Scales, Inc.
Private Sector Member	Jerry Wang	A&D Engineering, Inc.
Private Sector Member	Walter Young	Emery Winslow Scale Company

Western Weights and Measures Association (WWMA) www.westernwma.org					
States	Alaska Arizona California	Colorado Hawaii Idaho	Montana Nevada New Mexico	Oregon Utah Washington	Wyoming
Contact	Raymond Johnson New Mexico Department of Agriculture			(575) 646-1616 rjohnson@nmda.nmsu.edu	
Annual Meeting	September 27 - 30, 2010			Olympia, Washington	
Central Weights and Measures Association (CWMA) www.cwma.net					
States	Illinois Indiana Iowa	Kansas Michigan Minnesota	Missouri Nebraska North Dakota	Ohio South Dakota Wisconsin	
Contact	Jonelle Brent Illinois Department of Agriculture			(217) 785-8301 jonelle.brent@illinois.gov	
Annual Meeting	May 16 - 20, 2010			Springfield, Illinois	
Interim Meeting	September 12 - 15, 2010			Rock Island, Illinois	
Southern Weights and Measures Association (SWMA) www.swma.org					
States	Alabama Arkansas Delaware District of Columbia	Florida Georgia Kentucky Louisiana	Maryland Mississippi North Carolina Oklahoma	South Carolina Tennessee Texas US Virgin Islands	Virginia West Virginia
Contact	Derek Underwood South Carolina Department of Agriculture			(803) 734-7321 derekmunderwood@bellsouth.net	
Annual Meeting	October 3 - 6, 2010			TBD	
Northeastern Weights and Measures Association (NWMA) www.newma.us					
States	Connecticut Maine Massachusetts	New Hampshire New Jersey New York	Pennsylvania Rhode Island Vermont		
Contact	John Walsh Town of Framingham			(508) 532-5480 jbw@framinghamma.gov	
Annual Meeting	May 10 - 13, 2010			Groton, Connecticut	
Interim Meeting	October 13 - 14, 2010			Norwich, Connecticut	

President's Address
National Conference on Weights and Measures
St Paul, Minnesota
July 13, 2010

Dr. Patrick Gallagher
NIST, Director

Dr. Gallagher talked about the many challenges facing the weights and measures community. He summarized the changes associated with the realignment at NIST, and the potential impact it would have on NCWM members and NIST stakeholders. His closing remarks were focused on working together towards a brighter future for the legal metrology community and for the nation as a whole.

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Chairman's Address
95th National Conference on Weights and Measures
St. Paul, Minnesota
July 13, 2010

Mr. Randy Jennings
Executive Assistant
Tennessee Department of Agriculture

Good morning; I am honored to have this opportunity to speak to you as Chairman of the 95th Annual Meeting of the National Conference on Weights and Measures (NCWM).

The past year has once again been eventful for the NCWM, and certainly challenging for me as Chairman. Some of those challenges came at me a bit quicker than I would have wished for. As I was making my New Chairman's Address at the close of our meetings last year, little did I know that during those very moments I was receiving e-mails from a minority alliance of concerned NCWM stakeholders advising me that the direction the NCWM was moving in was fundamentally flawed, and that I was now personally liable for taking any and all corrective actions necessary to avoid further consequences. I don't have to say, these were not the "congratulations" messages that I was hoping for as I scrolled through messages while waiting at the airport for my flight back home. Looking back, I should not have been surprised that my term would begin with something controversial to manage, as I cannot recall a period in our recent history that has permitted any of the NCWM officers to slow down. Having said this, I will begin by pointing out a few of the more significant accomplishments that the organization has made this year.

We had a complete and successful launch of phase one of the Verified Conformity Assessment Program (VCAP) component of the National Type Evaluation Program (NTEP). With this step forward, NTEP has now officially integrated a production meets type component to the program. As you know by now, phase one is focused on load cells, with the strategy remaining to expand the program in the future to other devices that are subject to influence factors. To date approximately 15 VCAP audits, representing the majority of load cell certificate holders, have been submitted to NTEP for review. The audits have taken place at manufacturing facilities located in the United States, Israel, Sri Lanka, and China. Many sets of eyes are evaluating our success in this program, as we are most certainly leading the legal metrology world in the area of device conformity assessment. I want to take this opportunity to thank or NTEP Administrator, Mr. Jim Truex, and NTEP Committee Chair Ms. Judy Cardin for their efforts in moving this program forward in a very professional manner.

I am also pleased to say that the Board of Directors has approved the implementation of an online canvassing system that will be used annually to gather stakeholder input on all items that are on the agenda in Publication 16. Every member of the NCWM will have the opportunity to log into the system, review items of interest, and enter an initial position along with any qualifying statements or supporting data. This web based initiative will substantially reduce barriers for participation in the standardization process, and provide Standing Committees and Task Groups with untapped resources that exist within our broad membership base. This tool is not intended to replace the dialogue that exists as a product of our open hearing process— conversely, it is anticipated that this will enhance that process by receiving additional input that can be fully vetted in the open hearing and voting process that is the hallmark of our Annual Meeting. I applaud the Board for embracing this new program and look forward to this application becoming an integral component in our pursuit of developing standards using a consensus building process.

This year we also took a very close look at our Standing Committee structures in an effort to ensure that the workloads being placed on the committees were at a reasonable level. This process began with a concept of splitting the Specifications and Tolerances (S&T) Committee into two separate Standing Committees: one for weighing and one for measuring devices. Other options, such as creating Subcommittees for weighing and measuring that would report to the Standing Committees were also considered. Mr. Steve Malone, Mr. Mark Coyne, and Ms. Carol Hockert worked together to evaluate the past workloads of the standing committees, reviewed the format for our meetings, and essentially worked to uncover any reasonable approaches for either spreading out the workload or providing more time during normal business hours for the committees to work. Based on their reports to the board,

coupled with the feedback that was received during the open hearing process, it was determined that the best path forward at this time would be to encourage the Standing Committee Chairmen to take complete advantage of options such as forming Task Groups to focus on Developing and Informational items. I am encouraged to see that the Standing Committees have recently formed two important Task Groups: a group for Price Posting and Computing Capability and Requirements for Retail Motor-Fuel Dispensers chaired by Mr. Jeff Humphreys and vice-chaired by Ms. Fran Elson-Houston, and a Printer and Toner Cartridge group led by Ms. Vicky Dempsey. I am confident that this will expedite the review process for these items, and at the same time reduce the time that otherwise would be required by the Standing Committees to guide these items down the correct path.

There were numerous other initiatives undertaken this year, but, in the interest of time, I will not elaborate further. However, I do want to briefly point out the incredible work that has been done by the Professional Development Committee on the National Certification Program that will be officially launched very soon. Mr. Ross Anderson and his team have performed beyond expectations and the value that this program will add to our organization over the years cannot yet be fully appreciated. I also want to recognize Ms. Lindsay Hier of NCWM staff for doing a terrific job launching the new NCWM website, and recently setting up a portal to capture Initial Verification inspection data that has the potential to benefit all of our stakeholders. This behind the scenes work is very crucial to our image and functionality.

Having had the opportunity to talk a bit about this past year, I'll move to my perspective on the future of weights and measures. Looking back at addresses given by past Chairmen, I see a common word that almost always plays a central theme - change. Woodrow Wilson said, "If you want to make enemies, try to change something." On the other hand, Winston Churchill took the approach, "There is nothing wrong with change, if it is in the right direction." I think both of these statesmen were on target with their quips and complemented one another. I can make that assessment honestly as a result of being part of many changes in this organization since joining the Board of Directors in 2006. Along the way, we may have ruffled a few feathers, but I think we have ultimately gone in the right direction.

But regardless of the changes and advancements we have made in recent years, I believe we will have to continue the quest of change in order to persist as an organization that is responsible for producing technically sound standards in a timely manner that meet society's current needs. This pursuit of open mindedness for change is the essential basis for the theme that I selected for this year, "Breaking Molds to Shape the Future."

I'm sure that everyone will agree that the NCWM is only as strong as our participating members. While we have maintained a strong overall membership base despite the struggling economy, it is the ability of our members to actively participate in the standards setting process that is of most concern to me. State and local governments, as well as many industry sectors, are facing revenue shortfall issues that are dramatically impacting their organizations. This directly affects our members' ability to take part in the traditional NCWM process. The issues that are coming before us are increasingly complex, and when new standards are accepted and published, both regulatory officials and industry management that were not a part of the process find it difficult to both enforce and comply with those rules.

So, what can the NCWM do now to shape the future for weights and measures? I believe that we must continue to look for ways to utilize technology to encourage member participation in the standards development process. I mentioned earlier that two task groups working under the Standing Committees have been formed. We have to promote support for the Conference in this manner, not only to provide for a manageable Standing Committee workload, but to bring more stakeholders directly into the process. These Task Groups can be formed with web based meetings as the central method for conducting business, reducing the need for travel. Managed correctly, this can be a very effective way for us to achieve many of our goals. We also need to begin to investigate new methods for training weights and measures officials. The NIST Weights and Measures Division have traditionally provided high quality training for inspectors and technicians; however, it is becoming increasingly difficult for many jurisdictions to participate due to the inherent costs. State-of-the-art web based training modules have been discussed and are used in some industry sectors. The NCWM will have to play a central role along with our NIST and industry partners to make this an option for weights and measures. It would not happen overnight, but if we begin and continue to pursue this concept, the effort will reap many rewards. I also believe that there will be a time when the organization will have to reevaluate the voting system that is currently in use. I am not suggesting that anything should replace the actual meetings that are necessary to make final determinations, but there are

alternatives that can ensure that a quorum will always be met, and, at some point, we will have to be able to discuss those options with an open mind.

And finally I will ask, "What do we do at home with our programs to prepare for the future?" Many Weights and Measures managers are struggling to maintain their programs at a level that will provide adequate protection for both the consumer and competing industry. For years, we have been asked to do more with less. The new trend seems to be to significantly reduce or eliminate inspection activities that are considered to provide the least benefit to consumers and concentrate on the most high profile programs. This afternoon you will have the opportunity to see a presentation on Risk Based Inspection Schemes. Many of us have already implemented this approach into components of our programs, and it can offer an attractive option to the alternative when developed with the aid of statisticians and historical data. Additionally, as the NCWM rolls out new initiatives designed to solicit your participation by providing input mechanisms, certification testing, and training, I encourage you to embrace those tools as a new way of achieving your goals and contributing to the future of both your programs and the NCWM. We are most certainly facing challenging times, but we will find the solutions that will ultimately lead to even greater uniformity and equity in the marketplace.

In closing, I will say that I am confident we will witness new and exciting steps forward within our organization in the coming years, and it will all be due to the many hours of dedicated service and cooperation between our volunteer members, officers, our friends at Measurement Canada, the Associate Membership, and of course the support staff at both the NIST Weights and Measures Division and the NCWM central office. It truly takes a team effort to keep this organization moving onward. I have been fortunate to be surrounded by a gifted group of individuals that have helped to keep us on the right path, and it is comforting to know this room is full of talented people that will be there for us in the future.

Serving as Chairman of the NCWM is a true honor. Thank you all for your support and for providing me with this very special privilege this year.

New Chairman's Address
95th National Conference on Weights and Measures
St. Paul, Minnesota
July 15, 2010

Mr. Tim Tyson
Director, Weights and Measures Division
Kansas Department of Agriculture

First off, I want to thank the members of the NCWM for the honor to serve as your Chairman of this Conference; I accept this responsibility and only hope to do as well as those that have served before me. As I look around this room, and as I think of all the truly dedicated people I have met throughout this past year in all the regions, I am humbled to be standing before you today as Chairman.

One of the good decisions the Board has made over the years was to have the Chair-Elect travel with the Chairman to all the regional meetings. This has given me a better understanding of the makeup of the Conference. I have learned from the different regions about the various ways the meetings are structured and how they accomplish the work that comes to the Conference. As Chair-Elect, you get to know good people. Many of whom do not get to come to the national meetings, yet do a lot of the work at the regional level. I want to thank all of the people in the regions for the fine work they do.

As I stand before you, I marvel at where the conference has come in the last couple of years, from the management company structure that we had for 10 years to the self management that we have today. It is a testament to the dedication and hard work to better our Conference for the future.

Talking with everyone this week, we have heard of the budget struggles of all of our states and programs. Just the other day an inspector asked the Lord for help. He said, "Lord, is it true that in your scale a thousand years is like a minute?" The Lord said, "Yes it is." "And, is it true that in your weights and measures, a thousand dollars is like a penny?" Again, the Lord said, "Yes, but American dollars, not Canadian." The man then said, "Lord, our Weights and Measures program could use a penny." And the Lord said, "In a minute."

This week we have talked about the National Certification Program, the new Board member orientation and new committee orientation, the committee chair training, and e-library of training materials on our website, and we have discussed the seafood initiative that many states participated in. All of these items have one thing in common "education" – education for service technicians, education for inspectors, education for the conference members, and education for the media.

This brings me to the theme for next year, *Educating Today for Tomorrow*. Through education we can only benefit. These benefits include certification of our inspectors and education of the media that will benefit this Conference through increased efficiency of our committees. I look forward to the next year and working with all of you to achieve these things.

Now I would like to take this opportunity to make my standing committee appointments.

- Specifications & Tolerances Committee, Mr. Brett Gurney, Utah
- Laws and Regulations Committee, Mr. Tim Lloyd, Montana
- Professional Development Committee two appointments, for a one-year term, Mr. Ed Williams, California, and for a full term Ms. Cheryl Ayer, New Hampshire
- Annual Committees:
    - Nominating Committee:
      Mr. Randy Jennings, Chair, Tennessee
      Ms. Judy Cardin, Wisconsin
      Mr. Tom Geiler, Barnstable, Massachusetts

Mr. Max Gray, Florida
Mr. Charles Carroll, Massachusetts
Mr. Steve Malone, Nebraska
Mr. Joe Gomez, New Mexico

- Credentials Committee:
  Mr. Mahesh Albuquerque, Colorado
  And as Coordinator, Ms. Vicky Dempsey, Montgomery County Ohio

- Presiding Officers for next year's Conference in the Big Sky State will be:
  Mr. Tim Chesser, Arkansas
  Mr. Nick Brechun, Colorado
  Mr. Jack Walsh, Framingham, Massachusetts
  Ms. Shelly Miller, Wisconsin

- Parliamentarian, Mr. Lou Straub, Fairbanks Scales

- Chaplain, Mr. Steve Langford, Cardinal Scale

- Sergeants-at-Arms:
  Mr. Don Reimer, Montana, and
  Mr. Randy Jones, Montana

Again, I would like to thank all of the committees for the work they did this week, and I also want to thank all of the appointees for their dedication to serve the Conference in the coming year. I look forward to working with you in the next year. Let's make it a good one. Thank you.

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NCWM 2010 Annual Meeting Honor Award Recipients

Full Name	Organization	State	No. of Years
Brett Gurney	Utah Department of Agriculture and Food	UT	10
Dennis Kolsun	H.J. Heinz Co.	PA	10
Stephen Patoray	USDA, GIPSA, Packers and Stockyards Program	CO	10
Mark Buccelli	Minnesota Weights and Measures	MN	15
Georgia Harris	NIST, Weights and Measures Division	MD	15
Robert McGrath	Boston ISD Weights and Measures	MA	15
Pete O'Bryan	Foster Farms	CA	15
Gordon Johnson	Gilbarco, Inc.	NC	20
Henry Oppermann	Weights and Measures Consulting	LA	30
Jim Truex	National Conference on Weights and Measures	OH	30
Steve Malone	Nebraska Department of Agriculture	NE	35

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Report of Board of Directors

Randy Jennings
Executive Assistant
Tennessee Department of Agriculture

Reference
Key Number

100 INTRODUCTION

The Board held its quarterly Board of Directors (BOD) meeting on Saturday, July 10, 2010, and continued that meeting during work sessions throughout the remainder of the Annual Meeting. The BOD and the National Type Evaluation Program (NTEP) Committee invited members to dialogue with the BOD on the following issues: Improving Standards Development, Mutual Acceptance Arrangements, Increasing Efficiency and Effectiveness, and participation internationally, i.e., OIML, CFTM, APLMF, and USNWG.

Table A identifies the agenda items in the Report by reference key number, item title, and page number. An item marked with an **"I"** after the reference key number is an informational item. An item marked with a **"V"** after the reference key number is a voting item. Table B lists the appendices to the Report, and Table C shows the results of voting items.

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Table A
Table of Contents

Reference Key Number		Title of Item	Page
100		**INTRODUCTION**	**1**
100-1	W	NCWM Automatic Temperature Compensation (ATC) Steering Committee	**2**
100-2	I	Membership and Meeting Attendance	**2**
100-3	I	NCWM Newsletter and Website	**3**
100-4	I	Meetings Update	**3**
100-5	I	Participation in International Standard Setting	**4**
100-6	I	Efficiency and Effectiveness	**4**
100-7	V	Bylaws Amendment: Article I, Article IX, and Article X – Establish NCWM as a Nebraska Corporation	**7**
100-8	V	Bylaws Amendment: Article I, Section 6 – Resolution of Disputes and Mediation	**9**
100-9	I	Strategic Planning	**9**
100-10	I	Financial Report	**10**

Table B
Appendices

Appendix	Title	Page
A	Report on the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations	A1
B	Associate Membership Committee (AMC) Agenda and Meeting Minutes	B1

Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
100-7 Hand Count of Membership	Yea: 94 Nay: 0				Adopted
100-8	Voice Vote				Adopted
Final Report	Voice Vote				Adopted

Details of all Items
(In order by Reference Key Number)

100-1 W The NCWM Automatic Temperature Compensation (ATC) Steering Committee

(This item was withdrawn.)

The ATC Steering Committee was formed in 2007 to assist the National Conference on Weights and Measures (NCWM) in forming a consensus on issues before the Specifications and Tolerances (S&T) Committee and the Laws and Regulations (L&R) Committee. The Board receives quarterly activity reports from the Chair of the ATC Steering Committee. In addition, they review future Steering Committee activities and related NCWM work on this issue.

To date, the Steering Committee has forwarded numerous recommendations to the standing committees to assist them in the development of their respective agenda items. Following the 2008 Annual Meeting, the Steering Committee was asked to provide responses to comments and questions that were received by the S&T Committee during its open hearings. The responses were provided to the S&T Committee for consideration at the January 2009 NCWM Interim Meeting.

Based on actions taken by the L&R Committee at the 2009 Annual Meeting, the Board of Directors has chosen to discontinue the ATC Steering Committee, and this item is withdrawn. Members of the Board expressed great appreciation for the work of the Steering Committee for the meetings and the charge given to it when it was formed in 2007. Specific praise was given for the meeting the Board conducted in Chicago, Illinois, that year and the recommendations that followed.

100-2 I Membership and Meeting Attendance

The Board continues to assess avenues for improving membership and participation at Interim and Annual Meetings. Membership and attendance are driven to some degree by the items on the agendas and by the economy. It is important that the NCWM be active in notifying potential stakeholders of agenda items that may be of interest and warrant their attention. This effort will have an impact on both membership and attendance.

The attendance at the 2010 Interim Meeting was exceptional with 148 registered attendees. However, membership has declined again this year, primarily in the category of state government members. This is viewed as a direct impact of budget cuts.

The following is a comparison of the NCWM membership levels for the past six years.

The NCWM Membership Report						
	June 2010	**June 2009**	**June 2008**	**June 2007**	**June 2006**	**June 2005**
Associate	817	822	848	863	837	828
Foreign Assoc	53	53	56	53	61	41
Federal Gov't	12	10	9	9	13	12
NIST	12	14	15	14	12	9
State Gov't	564	696	831	825	812	847
Local Gov't	524	558	554	565	492	490
Int'l Gov't	12	24	22	31	23	31
Retired	197	196	232	221	215	225
Total	**2191**	**2373**	**2567**	**2581**	**2465**	**2483**

100-3 I The NCWM Newsletter and Website

The Board continuously considers ways to monitor and improve the content of the newsletter and website. Members are encouraged to bring ideas and articles forward for inclusion in newsletters. Of particular interest are articles that would be pertinent to field inspectors and the service industry.

In the fall of 2009, the NCWM contracted with a new vendor to redesign and host our website. This new site provides e-commerce through PayPal and a new "shopping cart" feature that allows visitors to pay fees for membership, meeting registration, publication orders, NTEP applications, and NTEP maintenance fees online. With the new e-commerce features, the site gives each member control of their log-in password for improved security. We have also added the NCWM Policy Manual and approved minutes from BOD meetings to the "Members Only" section.

The website continues to be a work in progress. Many good suggestions were offered at the 2010 Interim Meeting and were incorporated into both the NCWM site and the regional sites that are hosted and maintained by the NCWM.

Ms. Lindsay Hier, Project Coordinator for the NCWM, serves as the Webmaster. Comments and suggestions for improvements to the newsletters and website should be directed to the NCWM at (402) 434-4880 or via e-mail at info@ncwm.net.

100-4 I Meetings Update

Interim Meetings

January 23 - 26, 2011	The Fairmont Dallas, Dallas, Texas
January 22 - 25, 2012	Monteleone, New Orleans, Louisiana
January 27 - 30, 2013	Charleston, South Carolina

Annual Meetings

July 11 - 15, 2010	Crowne Plaza St. Paul Hotel, St. Paul, Minnesota
July 17 - 21, 2011	Holiday Inn Downtown at the Park, Missoula, Montana
July 15 - 19, 2012	Holiday Inn by the Bay, Portland, Maine
July 2013	TBD in the Southern Region

The 2010 Interim Meeting was very well attended this year and included an interesting array of new items for consideration for the standing committees. The 2010 Annual Meeting was held at the Crowne Plaza in historic downtown St. Paul, Minnesota, on the Mississippi riverfront. It was a terrific setting for our attendees, and we had a unique Wednesday evening outing.

The 2011 Interim Meeting will be held at the Fairmont Dallas in Dallas, Texas. This hotel is set in the heart of downtown Dallas, surrounded by arts, shopping, dining, and entertainment. The 2011 Annual Meeting will be at the Holiday Inn Downtown in Missoula, Montana. The hotel is adjacent to the Clark Fork River and within easy walking distance to the downtown district, where attendees can enjoy food and entertainment that cater to tourists, the college crowd, and locals.

The 2012 Interim Meeting site has been narrowed down to New Orleans, Louisiana. The 2012 Annual Meeting will be held in Portland, Maine.

The 2013 Annual Meeting will be held at a location to be determined in the Southern Region. The SWMA is asked to provide suggestions of cities and properties to the NCWM. It is not necessary for members to enter into negotiations with hotels. Members may obtain site selection criteria from Ms. Shari Tretheway, the NCWM Office Manager, at (402) 434-4880 or e-mail to shari.tretheway@ncwm.net.

100-5 I Participation in International Standard Setting

Dr. Charles Ehrlich and other NIST Weights and Measures Division (WMD) staff briefed the Board and members of the NCWM on key activities of the International Organization of Legal Metrology (OIML) and regional legal metrology organizations during open hearings at the 2010 Interim Meeting (see Appendix A).

Of particular interest is the International Committee of Legal Metrology (CIML) Meeting to be held at the Doubletree Hotel in Orlando, Florida, September 20 - 24, 2010. Dr. Ehrlich extended an invitation to the NCWM to provide a keynote address to the assembly to welcome them and provide a brief overview of the legal metrology system in place in the United States. Those interested in attending should contact Dr. Ehrlich, NIST at (301) 975-4834 or Ms. Lisa Warfield, NIST at (301) 975-3308 for more information. Interested vendors should contact Mr. Bob Murnane, Seraphin Test Measure at (609) 267-0922.

100-6 I Efficiency and Effectiveness

The Board is examining methods of efficient use of the NCWM resources that will promote effective service to its members and stakeholders. The Board welcomes member feedback on ideas to increase the effectiveness of the Conference.

Regional Support

Regional Website Hosting: Currently, the Southern and Central regional association websites are hosted through the NCWM. Due to interest expressed by Northeastern and Western members to host their sites as well, the NCWM received pricing from our web host to include them. The development cost is $4,000 per region, if they use either a similar or the same template as the Southern and Central sites. Each region has the ability to customize menu options and color design. At the January 2010 Board Meeting, the Board agreed to fund the development of the two remaining regions' websites if they would like to be hosted through the NCWM. The NCWM would also absorb any cost in hosting fees as it does with the two regions already using this service. This offer was forwarded to the regional President/Chairman of the Northeastern and Western for a response due by July 31, 2010. They would be subject to the Regional Website Maintenance Policy outlined below.

The NCWM announced at the 2010 Annual Meeting that the Western and Northeastern Weights and Measures Associations have accepted the NCWM's offer to develop and host new regional websites for them. The Northeastern site has launched. The Western site is now being developed. All four regions' websites will now be hosted and maintained by the NCWM.

Regional Website Maintenance: In the past, regions whose sites were hosted through the NCWM have paid the NCWM an hourly rate for updates to the content. This has caused the regional associations to economize by requesting updates to information posted on their sites only once or twice per year.

At the May 2009 Board Meeting, the Board adopted the following policy for hosting regional websites that incorporates an annual flat fee for the NCWM staff services to post updates.

1. The NCWM will invoice the Treasurers of participating regional associations annually during the month of January in the amount of $200 for the hosting and maintaining of regional association websites.

2. Hosting fees will pertain to any routine website maintenance and updates that are performed in-house.

3. A bid will be provided to the regional association for any requested services that would involve fees outside the scope of normal maintenance. Additional costs for these services will be assessed to the regional association.

4. The NCWM will contact the regional representative for each participating regional association on a quarterly basis requesting any updates to their respective web pages.

Shopping Cart Service for Regional Websites: The NCWM has also received bids from its new web host to add shopping cart services for online membership dues and meeting registrations to the regional sites hosted by the NCWM. The development cost is $3,500 per region, and if the regional associations choose to incorporate these features through their NCWM-hosted sites, it would be through the NCWM PayPal account. The funds would then be transferred to the region's bank account minus credit card fees, which are currently about 3.5 %. The Western Weights and Measures Association have chosen to incorporate the online payment feature into their website, which is now under development.

Administrative Support to the Regions: The NCWM was asked to consider providing administrative services to the regions. This would reduce burdens on the Secretary/Treasurer who volunteers those services to the region. It would also enable acceptance of credit card payments for membership and meeting registrations using the NCWM's merchant services. Credit card fees would apply, which are currently about 3.5 %. At the January 2010 Board Meeting, a fee schedule was approved that would apply to regions who request the NCWM administrative services for membership invoicing, meeting registration, database maintenance, and monthly reporting. These services, including credit card processing, are available whether or not a region elects to add the shopping cart feature to their website as mentioned above. The shopping cart feature would simply be an added enhancement to the administrative process and a customer convenience.

Staffing

NCWM Staff: The new management structure at the NCWM is providing significant cost savings. These savings, combined with the benefit of full-time dedicated staff, has enabled the Board of Directors to consider dramatic enhancements to its level of service and effectiveness. More information can be found in the NCWM strategic plan made available at www.ncwm.net in the "Members Only" portion of the website.

Meetings: The Board has considered options for meeting staffing, including the use of volunteer assistance from the local jurisdiction, as a means of conserving meeting costs. Last year, volunteer assistance was used in combination with the NCWM staff. The Board has recognized that the number of the NCWM staff at meetings in 2009 was less than under previous management so cost savings are realized, if the Board continues at the current level. The Board also discussed the benefits of having the NCWM staff present at meetings to maintain the professional image of the organization at these national events. The Board's decision is to support the level of staffing that was used in 2009. The Executive Director will assess staffing needs on an ongoing basis to ensure an appropriate level of professional service at the NCWM events without undue cost.

Standing Committee Structure

Specifications and Tolerances Committee: The Board has explored the possibility of splitting the S&T Committee into two separate standing committees, one for measuring instruments and one for weighing instruments. Historically, the agenda of the S&T Committee has been very demanding. By dividing the committee into more specialized groups, it would:

- reduce the number of agenda items for a standing committee;
- allow the committees to give more attention to the items that are on their respective agendas;
- provide specialized expertise to each standing committee; and
- expedite the standards development process.

The Board envisions that General Code items and codes that do not fall clearly into weighing or measuring would be addressed by some form of a joint committee.

At the Fall 2009 Board meeting, a small group was formed to review ideas and options on the S&T Committee structure. This work group reported back to the Board at the 2010 Interim Meeting. A review was made of the past workload of the S&T Committee. The work group noted that the format of the Interim Meeting was modified in recent years to be a day shorter and to have consecutive open hearings instead of concurrent open hearings. These format changes reduced the amount of time the committees have to develop their agenda items. The Board also discussed the use of Informational and Developing status for items, noting that it may be helpful to set out some guidelines in how these categories of items are ultimately developed to reduce some of the burden for the committees. The Board continues to consider options including committee structure, use of subcommittees, changes to meeting format, and a structured approach for Informational and Developing items.

Work Session Protocol: The NCWM standing committees have historically refrained from accepting comments from observers during their committee work sessions at Interim and Annual Meetings. The rationale has been that all meeting attendees should benefit from stakeholder input during open hearings. However, there are times when an observer could offer technical clarifications that would make a committee's work session more productive, and its decisions more informed. Past policy has made observers hesitant to raise their hand because the perception exists that it is unacceptable. Likewise, committee chairs have been reluctant to call on observers for assistance.

At the January 2010 Board Meeting, the following policy was adopted and implemented for the Interim Meeting that followed. This policy change enables standing committees to accept input from observers in an appropriate manner during work sessions, allowing the committees to work more efficiently without circumventing due process.

The following policy was adopted:

- Committee chairs may only accept contributions from observers for technical clarification during their work sessions.
- Observers shall not dominate discussions, restate positions from the open hearings, or provide new positions.
- Committees shall communicate any new information received during work sessions in their addendums so other attendees have an opportunity to respond.
- For consistency, the following prepared statement shall be read out loud by the committee chair at the beginning of each work session and throughout as deemed necessary:

  "This is a work session of the standing committee. Observers who wish to contribute technical clarification to assist in the committee's decision process shall raise their hand to be recognized by the committee chair. No opinions or positions will be heard from observers during the work session and should be stated publicly during open hearings."

100-7 V Bylaws Amendment: Article I, Article IX, and Article X – Establish the NCWM as a Nebraska Corporation

(This item was adopted)

Purpose: Provide continuity to the Corporation by changing its corporate status from Virginia to Nebraska now that its headquarters is located in Nebraska.

Proposal: Amend Articles, I, IX, and X by removing references to the Commonwealth of Virginia and the Virginia State Corporation Commission and replacing them with references to the State of Nebraska and the Nebraska Secretary of State, as follows:

Article I – General

Section 1 – Corporate Status

This Corporation shall be known as "The National Conference on Weights and Measures, Inc.", hereinafter called the "Corporation," and is incorporated under the laws of the ~~**Commonwealth of Virginia**~~ **State of Nebraska** as a ~~**Virginia Nonstock**~~ **Nebraska Domestic Nonprofit** Corporation.

Article IX – Committees

Section 5 – Duties and Fields of Operation of the Board of Directors and Committees

A. Board of Directors

The Board of Directors is the governing body of the Corporation and is authorized to make all decisions relating thereto, including but not limited to the following:

1. conducts the business of the National Conference on Weights and Measures, Inc., as a Corporation, which at a minimum includes ~~**(a)**~~ overseeing the preparation **and filing** of the ~~**annual**~~ **biennial** report **and fee** ~~**for filing**~~ with the ~~**Virginia State Corporation Commission**~~**Nebraska Secretary of State** in compliance with ~~**Va. Code §13.1-936**~~ **Nebraska Rev. Stat. Section 21-301.** ~~**and (b) payment of the annual registration fees prescribed in Va. Code §13.1-936.1(insert statute here);**~~

2. reviews and approves the budget;

3. selects the place and dates, and also fixes the registration fee for each meeting of the Corporation;

4. fixes the annual membership fee; and

5. advises the responsible individual or organization, as designated by the Chairman, with respect to the programs for the meetings of the Corporation and its committees, and makes recommendations to the Corporation, the Corporation officers, and the committee chairmen.

Article X – Voting System

Section 9A – Voting – Technical Issues

At the conclusion of debate (if authorized) on a motion, there shall be a call for the vote by voice vote, a show of hands, standing, or electronic count.

A. Motion Accepted If:

1. a minimum of 27 members of the House of State Representatives votes Yea;

and if

2. a majority of the members of the House of Delegates votes Yea (a minimum of 27 Yea votes[1] required);

and, in the case of motions relating to business items, if

3. a majority of the members of the House of General Membership votes Yea (a minimum of 27 Yea votes required).[1]

B. Motion Rejected If:

1. a minimum of 27 members of the House of State Representatives votes Nay;

and if

2. a majority of the members of the House of Delegates votes Nay (a minimum of 27 Nay votes required);[1]

and, in the case of motions relating to business items, if

3. a majority of the members of the House of General Membership votes Nay (a minimum of 27 Nay votes required).[1]

C. Split Vote:

When a split vote is recorded, or the minimum number of votes supporting or opposing an issue is not obtained in the House of State Representatives, the issue is returned to the Standing Committee for further consideration, except when there is a split vote on approval of the ~~**annual**~~ **biennial** report for filing with the ~~**Virginia State Corporation Commission**~~**Nebraska Secretary of State**. In the case of a split vote on the filing of the ~~**annual**~~ **biennial** report, the vote of the Chairman on the filing of the report shall prevail.

Except for the ~~**annual**~~ **biennial** report, the Committee may drop the issue or reconsider it for submission the following year. The issue cannot be recalled for another vote at the same Annual Meeting.

Discussion: In 1997, the NCWM formed into a nonprofit corporation. The NCWM's legal counsel at the time was a resident of the Commonwealth of Virginia. It was not known at that time where the NCWM's headquarters would be located, so the NCWM filed for incorporation in Virginia. Soon after, the NCWM contracted with a company in Maryland for association management services. From 1998 through September 2008, the NCWM's headquarters were located in Maryland. In 2008, the NCWM transitioned to contracted management and hired staff. A new office was opened in Nebraska. Considering these recent changes in location and management structure, the NCWM asked legal counsel to provide a review and recommendations for the Bylaws, Articles, and other documents. Through this process, it has been determined that it is in the NCWM's best interest to become a Nebraska Corporation as a means of streamlining and providing continuity to the organization. Nebraska statutes provide provisions for this change of status that will allow the original corporation to stay intact, retaining the current federal EIN number.

[1] If the minimum number of votes required to pass or fail an issue is not cast in the House of Delegates or the House of General Membership, the issue will be determined by the vote of the House of State Representatives.

100-8 V Bylaws Amendment: Article I, Section 6 – Resolution of Disputes and Mediation

(This item was adopted)

Purpose: Establish a mediation process in the NCWM Bylaws that fosters amiable dispute resolution through free exchange of ideas.

Proposal: Amend Article I by adding a new Section 6 as follows:

Section 6 – Dispute Resolution

All members and entities acknowledge that the open discussion of any disputed matter may lead to positive resolution. Upon completion of any applicable administrative appeal procedure, all members and entities shall be required to submit any grievance or claim to the mediation process set forth in this section before filing any lawsuit. Conclusion of the mediation process is a mandatory condition precedent to the filing of any litigation against or involving the NCWM, and its directors, officers, employees, and agents. No person or entity shall have legal standing to file any lawsuit against or involving the NCWM and its directors, officers, employees, and agents unless and until the mediation process has been completed.

The mediation process includes the following: the specific grievance or claim and supporting information shall be discussed by the aggrieved party and the NCWM at the staff level; if the matter is not resolved within 30 days of the completion of the staff level discussions, the aggrieved party and the NCWM shall schedule a face-to-face meeting at a mutually acceptable location. The Board of Directors of the NCWM shall determine at its discretion the number and identity of the NCWM representatives attending the face-to-face mediation. The Chief Executive Officer or designated representative of the aggrieved entity shall attend the face-to-face mediation with such other persons as the aggrieved party identifies, not to exceed three representatives. The NCWM and the aggrieved entity shall designate a mutually acceptable, independent mediator to conduct the mediation. The mediator shall provide a written report on the mediation to the parties within 30 days following the face-to-face mediation session(s). The mediator shall determine in such report if the dispute or grievance has or has not been resolved in a mutually accepted manner. The receipt of the mediator's report shall be the conclusion of the mediation process.

Discussion: The NCWM has always favored the free exchange of ideas and the opportunity to be heard in an appropriate, professional setting. The proposed Bylaw adds a further opportunity for exchange of ideas before an independent mediator. The mediation process is a prerequisite to any litigation being brought against the NCWM and its directors, officers, employees, and agents.

100-9 I Strategic Planning

The NCWM Strategic Plan will be updated and revised on a continual basis as goals are met, changed, or added. The purpose of the strategic plan is to ensure the organization is moving forward and in the right direction. The plan is available on the NCWM website at www.ncwm.net under the "Members Only" tab.

Five primary goals are contained in the strategic plan.

1. Enhance the NCWM as a national and international resource for measurement standards development.
2. Promote uniform training for individuals involved in weights and measures.
3. Continue to improve the NTEP.
4. Expand the role of the NCWM as a resource for state and local weights and measures programs.

5. Ensure financial stability of the NCWM.

National Certification Program: The Board is continuing to refine the strategies and measurements for meeting these goals. One of the strategies for the second goal is the implementation of a National Certification Program for weights and measures officials. This strategy has been placed as a top priority. In January 2010, the Board designated Mr. Tim Tyson and Mr. Richard Cote to liaison between the Board and the Professional Development Committee (PDC) in finalizing this project for launch this year. More details are available in the PDC report.

Viable Support for NTEP Laboratories: Another strategy of high priority is to maintain viable support for NTEP laboratories under the third goal. The Board will be monitoring the number of full-time employees associated with the authorized laboratories and will continue to track evaluation time and backlog statistics to ensure that NTEP evaluations can be completed in a timely manner.

Online Position Forum: A third priority item is a proposal to develop a web-based system that enables participation by members, including those who may not be able to attend the NCWM Annual Meetings. It is not a voting system. It is only a method to present positions, opinions, and supporting documents. The system would require log-in as a member. After selecting an item, the user would select of one of the following positions:

- Support as written.
- Support but with suggestions and comments.
- Oppose with comments.
- Neutral with comments.
- Neutral without comments.

Position comments would be accepted until a predetermined closing date. Entries would be posted on the website for membership access following the closing date. These postings would be archived on the website for future reference. Members and non-members could continue to submit comments or positions in writing in the traditional manner.

This web-based system would promote participation by those who cannot attend meetings, and when they view others' comments, they may realize the importance of attending to defend/advance their position.

100-10 I Financial Report

The NCWM operates on a fiscal year of October 1 through September 30. The net cost of the management transition for fiscal year 2007 - 2008 was approximately $155,000. This cost included obtaining office space, furniture, computers and other equipment, office supplies, salaries, etc. The net surplus for the last fiscal year of 2008 - 2009 was over $236,000. This surplus can be attributed to two major factors: 1) the new management structure is more cost efficient, and 2) the NCWM received a record number of NTEP applications during that 12-month period.

The budget for the current fiscal year is conservative toward revenues, yet projects a net surplus for the year. The Board of Directors anticipates adequate resources to fund new initiatives currently under consideration.

The following is the balance statement as of June 30, 2010.

ASSETS	June 30, 2010
Current Assets	$
Checking/Savings	
Associate Member Fund	6,952.68
Certificates of Deposit	792,016.81
Checking	38,738.40
Savings	144,401.83
Total Checking/Savings	982,109.72
Accounts Receivable	150.00
Other Current Assets	60,839.85
Other Assets	
TOTAL ASSETS	$ **1,043,099.57**
LIABILITIES & EQUITY	
Liabilities	
Current Liabilities	2,633.44
Total Liabilities	2,633.44
Equity	
Unrestricted Net Assets	784,771.17
Net Income	255,694.96
Total Equity	1,040,466.13
TOTAL LIABILITIES & EQUITY	$ **1,043,099.57**

Mr. Randy Jennings, Tennessee, NCWM Chairman
Mr. Tim Tyson, Kansas, Chairman-Elect
Ms. Judy Cardin, Wisconsin, NTEP Chairman
Mr. Richard Cote, New Hampshire, Treasurer
Mr. Michael Sikula, New York, Northeastern Regional Representative
Mr. Steven Malone, Nebraska, Central Regional Representative
Mr. Stephen Benjamin, North Carolina, Southern Regional Representative
Mr. Kirk Robinson, Washington, Western Regional Representative
Mr. Stephen Langford, Cardinal Scale, At-Large
Mr. Mark Coyne, Brockton, Massachusetts, At-Large
Mr. Robert Murnane, Seraphine Test Measure, Associate Membership

Mr. Gilles Vinet, Measurement Canada, Advisory
Ms. Carol Hockert, Chief, NIST, Weights and Measures Division, Executive Secretary
Mr. Jim Truex, NTEP Administrator
Mr. Don Onwiler, NCWM, Executive Director

Board of Directors

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Appendix A

Report on the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations

Weights and Measures Division, NIST

INTRODUCTION

The Weights and Measures Division (WMD) of the National Institute of Standards and Technology (NIST) is responsible for coordinating U.S. participation in the International Organization of Legal Metrology (OIML) and other international legal metrology organizations. Learn more about OIML at the website (www.oiml.org) and about NIST Weights and Measures Division at the WMD website (www.nist.gov/owm). Dr. Charles Ehrlich, Group Leader of the International Legal Metrology Group (ILMG), can be contacted at charles.ehrlich@nist.gov or at (301) 975-4834 or by fax at (301) 975-8091.

Please note:

- *OIML publications are available without cost at http://www.oiml.org.*
- *The United States will host the annual meeting of the International Committee of Legal Metrology (CIML) in Orlando, Florida, September 20 - 24, 2010.*

Table A
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Table B
Glossary of Acronyms

BIML	International Bureau of Legal Metrology	ILMG	International Legal Metrology Group
B	Basic Publication	IR	International Recommendation
CD	Committee Draft[1]	IWG	International Work Group
CIML	International Committee of Legal Metrology	MAA	Mutual Acceptance Arrangement
CPR	Committee on Participation Review	MC	Measurement Canada
D	Document	OIML	International Organization of Legal Metrology
DD	Draft Document[2]	R	Recommendation
DR	Draft Recommendation[2]	SC	Technical Subcommittee
DoMC	Declaration of Mutual Confidence	TC	Technical Committee
DV	Draft Vocabulary[2]	WD	Working Draft[3]
IEC	International Electrotechnical Commission	USNWG	U.S. National Work Group

[1] CD: a draft at the stage of development within a Technical Committee or Subcommittee; in this document, successive drafts are numbered 1 CD, 2 CD, etc.

[2] DD, DR, and DV: draft documents approved at the level of the Technical Committee or Subcommittee concerned and sent to BIML for approval by CIML.

[3] WD: precedes the development of a CD; in this document, successive drafts are number 1 WD, 2 WD, etc.

Details of All Items
(In Order by Reference Key Number)

I. Report on the Activities of the OIML Technical Committees

This section reports on recent activities and the status of work in the OIML Technical Committees (TCs) and Technical Subcommittees (SCs) of specific interest to members of the NCWM. Also included are schedules of future activities of the Secretariats, the U.S. National Work Groups (USNWGs), and the International Work Groups (IWGs) of the Committees and Subcommittees.

TC 3/SC 5 "Conformity assessment" (United States and BIML)
The Subcommittee held a meeting in May 2008 to discuss the revision of the documents B 3 (Certificate System) and B 10 (MAA). A 2 CD of B 3 and a first CD of B 10 were sent to TC 3/SC 5 members in December 2009 with responses due by the end of April 2010. The meeting included discussion of a working draft (WD) of a new document on the incorporation of measurement uncertainty into conformity assessment decisions in legal metrology. In April 2009, the Secretariat distributed the 1 CD of a new document entitled "The role of measurement uncertainty in conformity assessment decisions in legal metrology." International comments on this document have been received and are being used to develop the 2 CD. A meeting of the MAA Committee on Participation Review (CPR) was held in June 2009 in Berne, Switzerland (please see the MAA section in the NTEP report of this publication for more details). A meeting of the TC 3/SC 5 Subcommittee is scheduled for October 2010 in Paris, France. For more information on the activities of this Subcommittee, please contact Dr. Charles Ehrlich at (301) 975-4834 or at charles.ehrlich@nist.gov.

TC 5/SC 1 "Environmental conditions" (Netherlands)
The Secretariat has started the revision cycle of D 11 "General requirements for electronic measuring instruments," and a working draft should be available late in 2010. This is a very important document in the OIML system and is used by all of the OIML TCs as a general reference for technical and testing requirements on all electronic

instruments. The OIML Expert Report E 5 "Overview of the present status of the Standards referred to in OIML D 11 – General Requirements for Electronic Measuring Instruments" (first edition, 2004; second edition, 2008) has just been revised again, and was published in February 2010. The document updates all of the International Electrotechnical Commission (IEC) references for testing requirements in D 11. Please contact Mr. Ralph Richter at (301) 975-3997 or at ralph.richter@nist.gov, if you would like further information on this project.

TC 5/SC 2 "Software" (Germany and BIML)
The new OIML Document D 31 "General requirements for software-controlled measuring instruments" was published in December 2008 and will serve as guidance for software requirements in International Recommendations by OIML TCs. The United States participated in the technical work on this document and submitted votes and comments on several drafts of the document. A new project on software verification was also approved by the CIML, and the United States is waiting for the first draft of this document. The ILMG participated in the NCWM Software Sector meetings in Columbus, Ohio, in March 2009 and in Sacramento, California, in March 2010. Please contact Dr. Ambler Thompson at (301) 975-2333 or at ambler@nist.gov, if you would like to discuss OIML software efforts.

TC 6 "Prepackaged products" (South Africa)
Discussions continue on the issue of developing an OIML International Quantity Mark, referred to as an IQ Mark. The IQ Mark, designed to eliminate trade barriers, would be a program that would allow for an international system of acceptance of prepackaged goods. Receiving countries want imported packages to meet all of their requirements and packers in exporting countries want to ensure prepackages will not be rejected after arriving in the destination country. Such a program would also require that participants meet specific requirements in order to participate in a program for quantity control and marking of prepackaged goods.

The United States is participating in a work group that is developing guidelines on good manufacturing practices and additional documentation for selected criteria that would be used in the IQ Mark's accreditation programs. It was agreed that all members of the TC 6 would send out a questionnaire to all current stakeholders, including industry, and federal and state agencies seeking input to specific questions. NIST WMD surveyed U.S. industry, including the largest manufacturers of packaged goods, and found no support for the IQ Mark effort. The United States believes the effort to manage and certify quality control systems will add costs to all participating suppliers. Even though there is significant opposition to the IQ Mark effort from several countries (including the United States), the TC continues to move forward with this project under the premise that such a voluntary system would be of great value to developing countries. Meetings of TC 6 were held in March 2009 and March 2010 in South Africa. The United States voted "no" on the 2 CD of the IQ-mark document in May 2010 and encouraged the Secretariat to stop the project in favor of revising other TC 6 recommendations. Please contact Mr. Ken Butcher at (301) 975-4859 or at kenneth.butcher@nist.gov, if you would like more information about the work of this Subcommittee or to participate in any of these projects.

TC 8 "Measurement of quantities of fluids" (Switzerland)
The CIML has approved projects to revise the following TC 8 documents: R 63 "Petroleum measurement tables" (1994) and R 119 "Pipe provers for testing of measuring systems for liquids other than water" (1996). Both of these documents are important for other OIML Recommendations involving liquid measurement. Please contact Mr. Ralph Richter at (301) 975-3997 or at ralph.richter@nist.gov, if you would like copies of the documents or to participate in any of these projects.

TC 8/SC 1 "Static volume and mass measurement" (Austria and Germany)
Two revised Recommendations, OIML R 71, "Fixed storage tanks," and R 85, "Automatic level gages for measuring the level of liquid in fixed storage tanks," were published in January 2009. The United States, however, had serious opposition to the inclusion of specialized tanks (including pressurized tanks and non-vertical tanks) in the scope statements of both R 71 and R 85 because the requirements in the Recommendations did not fully reflect this inclusion. The United States now chairs an IWG that is drafting new sections of R 71 and R 85 that will include the specific requirements for specialized tanks. OIML R 80-1, "Road and rail tankers, metrological and technical requirements," was published in May 2009. OIML R 80-2, "Road and rail tankers, test methods," is being developed. The revisions to R 71 and R 85 and the development of R 80-2 were discussed at a Subcommittee

meeting in Vienna, Austria, in October 2009. Please contact Mr. Ralph Richter at (301) 975-3997 or at ralph.richter@nist.gov, if you would like copies of the documents or to participate in any of these projects.

TC 8/SC 3 "Dynamic volume and mass measurement for liquids other than water" (United States and Germany)
OIML R 117-1, "Dynamic measuring systems for liquids other than water, Part 1: Metrological and technical requirements" was published in March 2008. The revision incorporates new instrument technologies and includes a merger with OIML Recommendations R 86, "Drum meters," and R 105, "Mass flowmeters." The ILMG has worked closely with the USNWG, Canada, Germany, and the Netherlands on this effort. Meetings of the USNWG on flowmeters were held during the NCWM Annual Meeting in July 2009, in San Antonio, Texas. Subcommittee work is continuing on the development of R 117-2, "Test methods," and R 117-3 "Test report format." Meetings of the IWG for the development of R 117-2 were held in Vienna, Austria, in April 2009; in Boras, Sweden, in January 2010; and at NIST in Gaithersburg, Maryland in May 2010. The IWG for the development of R 117-2 has also held several international webinars to accelerate the work on this high priority document. A first committee draft of R 117-2 is planned for later in 2010. If you have any questions or would like to participate in the next phases of this project, please contact Mr. Ralph Richter at (301) 975-3997 or ralph.richter@nist.gov.

TC 8/SC 5 "Water Meters" (UK)
OIML, ISO, and CEN are working together to harmonize requirements for water meters using OIML R 49 "Water meters intended for the metering of cold potable water and hot water" Parts 1, 2, and 3 as the base document. A joint meeting of the three organizations was held in May 2009 in Ottawa, Canada. Based on submitted comments and decisions made in Ottawa, the Joint Working Group distributed the 1 CD of the harmonized document in December 2009. This document was circulated to interested U.S. parties, and U.S. comments were sent back to the Secretariat in April 2010. International comments on the 1 CD were discussed at a joint meeting of the three organizations in April 2010 in Paris, France. The American Water Works Association (AWWA) Committee on Water Meters is assisting in these efforts. Please contact Mr. Ralph Richter at (301) 975-3997 or at ralph.richter@nist.gov, if you would like copies of documents or to participate in this project.

TC 8/SC 6 "Measurement of cryogenic liquids" (United States)
Members of the Subcommittee and U.S. stakeholders decided that there is sufficient justification for revising R 81, "Dynamic measuring devices and systems for cryogenic liquids." Responses received by the Secretariat indicated that a revision of R 81 was justified to update: (1) electronic tests in accordance with the latest edition of OIML D 11 (2004) and/or the latest IEC and ISO standards; (2) technical requirements to include new developments in hydrogen measurements; (3) Annex C to include current recommendations for density equations; and (4) existing sections into three distinct parts similar in format to recently-developed OIML Recommendations. The Secretariat will ask members of TC 8/SC 6 and the USNWG to review and formally comment on the first draft of the revised R 81. To obtain more information or to participate in this project, please contact Ms. Juana Williams at (301) 975-3989 or juana.williams@nist.gov.

TC 8/SC 7 "Gas metering" (Netherlands)
The Secretariat has distributed the first committee draft (1 CD) of OIML R 137-1 and R 137-2, "Gas meters; Part 1: Metrological and Technical Requirements, and Part 2: Metrological controls and performance tests." U.S. comments were developed in cooperation with the measurement committees of the American Gas Association (AGA) and returned to the Secretariat in February 2010. This document is especially important to U.S. interests because the ANSI B 109 Committee on gas measurement is using OIML R 137 to create a new performance-based standard for gas meters in the United States. A meeting of the work group developing this new standard "ANSI B 109.zero" was held in Tucson, Arizona, in February 2010. A meeting of TC 8/SC 7 to discuss international comments on the 1 CD of R 137 was held in June 2010 in the Netherlands. Please contact Mr. Ralph Richter at (301) 975-3997 or ralph.richter@nist.gov, if you would like to obtain a copy of any gas measurement documents or if you would like to participate in the work of this Subcommittee.

TC 9 "Instruments for measuring mass" (United States)
The CIML has approved a new work item to begin revision of OIML R 60:2000 "Metrological regulation for load cells." It is anticipated that this revision will cover everything from the basic principles of R 60 (e.g., tolerances and accuracy classes) to exploring the addition of new requirements. The United States plans to send a new draft of R 60 to TC 9 members for comment in 2010. For more information on these efforts, please contact Mr. John Barton at (301) 975-4002 or john.barton@nist.gov.

TC 9/SC 2 "Automatic weighing instruments" (United Kingdom)
The Recommendation R 134-1, "Automatic instruments for weighing road vehicles in motion – total load and axle weighing," has been approved by the CIML and was published in October 2009. U.S. comments concerning terminology and document scope were incorporated in the document. The test report format of this document, R 134-2, has been approved by the Subcommittee and was also published in October 2009. To receive a copy of these documents or to obtain more information on the work of this Subcommittee, please contact Mr. Richard Harshman at (301) 975-8107 or at harshman@nist.gov.

It is anticipated that the DR of OIML R 106 Parts 1 and 2, "Automatic rail-weighbridges," will receive final CIML approval in 2010. U.S. vote and comments on a revised DR of R 106 were returned to the Secretariat in April 2010. To receive copies of these documents or to obtain more information on the work of this Subcommittee, please contact Mr. John Barton at (301) 975-4002 or john.barton@nist.gov.

TC 17/SC 1 "Humidity" (China and United States)
In October 2008, the Secretariat of TC 17/SC 1 was jointly allocated to China and the United States. The Co-secretariats are working with a small IWG to revise OIML R 59 "Moisture meters for cereal grains and oilseeds." All drafts have been distributed to the USNWG, which for the most part is a subset of the NTEP Grain Sector. The 5 CD of OIML R 59 was distributed to the Subcommittee in February 2009. A 6 CD is being developed based on international comments received on the 5 CD, and a meeting of TC 17/SC 1 is scheduled for October 2010 in Orlando, Florida. Please contact Ms. Diane Lee at (301) 975-4405 or at diane.lee@nist.gov if you would like to participate in this IWG.

TC 17/SC 8 "Quality Analysis of Agricultural Products" (Australia)
This Subcommittee was formed to study the issues and write a working draft document "Measuring instruments for protein determination in grains." Australia is the Secretariat. At a TC 17/SC 8 meeting hosted by NIST, the Subcommittee discussed comments concerning the maximum permissible errors (MPEs) and harmonization of the TC 17/SC 8 Recommendation for protein with the TC 17/SC 1 Recommendation for moisture. The Secretariat distributed a 2 CD of the document in February 2010. International comments on the 2CD are being compiled and will be discussed at a meeting of TC 17/SC 8 that is scheduled for October 2010 in Orlando, Florida. Please contact Ms. Diane Lee at (301) 975-4405 or at diane.lee@nist.gov, if you would like to participate in this IWG.

OIML Mutual Acceptance Arrangement (MAA)
The report on the OIML Mutual Acceptance Arrangement (MAA) has moved. It can now be found in the NTEP section of this document. For further information on the MAA and its implementation, please contact Dr. Charles Ehrlich at charles.ehrlich@nist.gov or at (301) 975-4834 or by fax at (301) 975-8091.

II. Report on the 44th CIML Meeting in Mombasa, Kenya, October 2009

The International Committee of Legal Metrology (CIML) opened with an address given by Mr. Alan E. Johnston, CIML President.

The Committee welcomed the Dominican Republic and the Union Economique et Monetaire de l'Ouest Africain (UEMOA) as new Corresponding Members. The approval of UEMOA, a group of West African countries, represents a new type of arrangement for Member States, but this type of corresponding membership is still under review by the CIML. It was again noted that the Committee wants to continue to raise the level of awareness of the advantages of OIML Membership in order to encourage the widest possible participation in the International Legal Metrology System.

The Committee expressed its appreciation for the strong level of interaction and cooperation between the BIML and the International Bureau of Weights and Measures (BIPM). The Committee asked the Director of the BIML to prepare a draft report on the relationship between the two Organizations and to encourage further discussion on this relationship during the 45th CIML Meeting. This report should be mainly strategic in nature and should consider the point of view of the stakeholders of both organizations.

The Committee expressed its appreciation for the continued cooperation with the International Laboratory Accreditation Cooperation (ILAC) and the International Accreditation Forum (IAF). In order to develop this cooperation at a national level, CIML Members were invited, within their applicable national legal framework, to contact their National Accreditation Bodies and promote the use of appropriate technical and metrological experts and lead assessors, and the associated requirements in the OIML Systems in accreditation or peer assessment, wherever appropriate.

The Committee instructed the Bureau to start a revision of the OIML/IEC Memorandum of Understanding (MoU) and develop cooperation with the IEC similar to that followed for the revision of the OIML/ISO MoU.

The Committee took note of the progress on several projects at the BIML. The revision of Part 1 of the Directives for OIML Technical Work has advanced, and the Committee requested that the Bureau and the IWG for this effort plan to complete this revision with a view to submitting it to the CIML for approval at its meeting in 2010. The Committee also expressed its appreciation for the training provided to TC/SC Secretariats and instructed the Bureau to continue to develop formats and templates for use by the TC/SC Secretariats.

The Committee approved the following publications:

- Amendment to R 138, "Vessels for commercial transactions;" and
- R 143, "Instruments for the continuous measurement of SO2 in stationary source emissions."

The Committee took note of the re-confirmation of the following publications:

- R 14, "Polarimetric saccharimeters graduated in accordance with the ICUMSA International Sugar Scale;"
- R 48, "Tungsten ribbon lamps for the calibration of radiation thermometers;"
- R 75-1, "Heat meters. Part 1: General requirements; Part 2: Type approval tests; Part 3: Test Report Format;"
- R 84, "Platinum, copper, and nickel resistance thermometers (for industrial and commercial use);" and
- R 124, "Refractometers for the measurement of the sugar content of grape musts."

The Committee approved the withdrawal of the following publications:

- R 70, "Determination of intrinsic and hysteresis errors of gas analyzers;"
- R 73, "Requirements concerning pure gases CO, CO_2, CH_4, H_2, O_2, N_2 and Ar intended for the preparation of reference gas mixtures;" and
- D 7, "The evaluation of flow standards and facilities used for testing water meters."

The Committee approved the following new work items:

- TC 3/SC 5, Revision of D 30, "Guide for the application of ISO/IEC 17025 to the assessment of Testing Laboratories involved in legal metrology;"
- TC 6, Revision of R 87, "Quantity of product in prepackages;"
- TC 6, New publication on methods to determine the actual quantity of product in prepackages (drained weight, etc.) in collaboration with WELMEC WG 6;
- TC 8, Revision of R 63, "Petroleum measurement tables;" and
- TC 8, Revision of R 119, "Pipe provers for testing of measuring systems for liquids other than water."

The Committee approved the launching of a new DoMC that will be based on OIML R 118, "Testing procedures and test report format for pattern examination of fuel dispensers for motor vehicles" (edition 1995). This new DoMC will be limited to fuel dispensers and will include all of the requirements of OIML R 117-1 (edition 2007) as additional requirements.

The CIML meeting included a seminar on "Priorities for Legal Metrology for Trade," and the issue of international standards to facilitate trade was a significant issue. The Committee noted that:

- the increasing importance of prepackaged foods and beverages in global trade now accounts for more than 75 % of agri-foods exports; and

- developing country exports are particularly disadvantaged by having to conform to a multiplicity of international requirements.

The Committee noted that the term of the current BIML Director will expire in December 2010. The Committee decided to advertise the position of Director of BIML in 2010 with the aim of either appointing a new Director or reappointing the present Director.

The Committee also noted that the election for the position of CIML President will be held in 2010 and reminded CIML Members that candidacies must be sent to the Bureau before the end of May 2010.

The CIML established a small work group to study a proposal to restructure the BIML Pension Plan according to a "modern accountancy" scheme, which could have a significant impact on the financial statement of the BIML.

III. Future OIML Meetings

The United States is excited to be hosting the 45th CIML Meeting in Orlando, Florida, September 20 - 24, 2010. Dr. Charles Ehrlich made a presentation on plans for this meeting, including a scheduled presentation on "Metrology at NASA." Please contact Dr. Ehrlich at (301) 975-4834 or at charles.ehrlich@nist.gov**,** if you would like to attend the CIML meeting as an observer.

The Committee thanked and accepted the invitation of the Czech Republic to hold the 46th CIML Meeting in the Czech Republic. The meeting is planned for October 9 – 14, 2011 in Prague.

IV. Regional Legal Metrology Organizations

Meeting of the Inter-American Metrology System (SIM) General Assembly and the SIM Legal Metrology Work Group (LMWG)
The SIM General Assembly was held in Lima, Peru, during the last week of October 2009. Dr. Humberto S. Brandi, Director of Scientific and Industrial Metrology (SIM) at INMETRO Brazil, is the SIM President. Marcos Senna (senna@inmetro.rs.gov.br), also of INMETRO in Brazil, serves as the Chairman of the SIM Legal Metrology Work Group (LMWG). Training sessions of the SIM LMWG were held in March 2009; course topics included: non-automatic weighing instruments, liquid fuel dispensers, electrical energy meters, and taximeters. The organization is working to build capacity in legal metrology for SIM member countries. Please contact Dr. Ambler Thompson at (301) 975-2333 or at ambler@nist.gov for more information.

Asia-Pacific Legal Metrology Forum (APLMF) Meeting
The 16th APLMF meeting was held in Chiang Mai, Thailand (a one-hour flight north of Bangkok). The Peoples Republic of China holds the Presidency and Secretariat of the APLMF. Mr. Pu Changcheng, APLMF President and Vice Minister of AQSIQ, chaired the meeting. The APLMF activities are facilitated through its seven work groups. The most active is the work group on Training Coordination chaired by Australia.

There were two training courses and two workshops given by the APLMF this year. The training courses, covering requirements in select OIML Recommendations and offered primarily to assist the developing countries in the APLMF, were on prepackaged goods and electricity meters. The Workshops were on 1) Product Safety, Food Safety, and Agricultural Metrology, and 2) Legal Metrology of Speedometers. Workshops planned for 2010 include training on gas meters, mass flow meters, electronic weighing instruments, and software-controlled measuring instruments. Future priorities for the APLMF training courses also include OIML R 117 (flow meters for liquids other than water), R 126 (Breathalyzers), and R 91 (Radar Devices). While feedback from the previously-held training courses has been positive, it is becoming clear that in order to continue to receive funding for the training, the APLMF needs to do a more thorough job of assessing and documenting the impact of the training courses on the economies that receive the training.

The United States was represented by Dr. Charles Ehrlich, who serves as Chairman of the APLMF Work Group on Mutual Recognition Arrangements. Dr. Ehrlich gave an extensive report and update on the OIML Mutual Acceptance Arrangement (MAA).

Appendix B

Final Report of the NCWM Associate Membership Committee

July 12, 2010
St. Paul, Minnesota

CALL TO ORDER

Chairman Paul Lewis called the meeting to order at 6:00 p.m.

MINUTES

A copy of the January 2010 meeting minutes was distributed. These minutes were reviewed and a motion was made by Mr. Steve Grabski and seconded by Mr. Paul Hoar to approve the minutes as written. With no further discussion the minutes were approved.

FINANCIAL CONDITION

A copy of the financial report was distributed. Chairman Lewis reviewed the deposit/disbursements and reported a current balance of $6,952.68 as of July 9, 2010. Mr. Robert Murnane made a motion to accept the Financial Reports; the motion was seconded by Mr. Pete O'Bryan. With no other discussion, the Financial Report was accepted.

BOARD OF DIRECTORS REPORT

Mr. Murnane, the Associate Membership Representative on the NCWM Board of Directors gave a report concerning BOD activities:

- VCAP – it was reported that load cell manufacturers are slightly behind schedule on their implementation plans and third party audits. While this is something they will continue to watch, the Board members do not believe this is a problem at this time.

- The Board members commented that the progress of the Professional Development Committee (PDC) has been very good, and they believe the Committee has a great package to offer the NCWM Members.

- The NCWM is considering increasing the use of sub-committees and workgroups to assist in the work of the standing committees.

Mr. Murnane mentioned that additional information on the activities of the Board of Directors can be found in the final conference report.

PROFESSIONAL DEVELOPMENT REPORT

Mr. Grabski**,** the Associate Membership Representative on the PDC, gave a report about the Committee's activities.

- The beta testing of the National Certification Program test has been completed

- Review of the results indicated that a change to the pass/fail level may need to be adjusted lower than the current level. This conclusion was based on several factors learned during the review process. This will be discussed in more detail during the opening committee meeting on Tuesday.

Mr. Grabski encouraged everyone to attend the PDC opening hearing to learn more about the progress the Committee has made.

LAWS & REGULATIONS REPORT

Due to conflicting committee meeting times, Mr. Rob Underwood, the Associate Membership Representative, was not able to provide his report on L&R activities.

AMC FUND DISBURSEMENT REPORT

Chairman Lewis reported on the disbursement

- The committee received letters from the Southern Weights and Measures Association (SWMA), Central Weights and Measures Association (CWMA), and Northeastern Weights and Measures Association (NEWMA) thanking the AMC for the $2,000 donation to their individual training funds. (It must be noted that the WWMA has not met since receiving the funds.)

- Ohio requested $1,000 for the expenses associated for a NIST Trainer and printer material. There were several question related to this request that could not be answered during the meeting. Mr. Murnane agreed to talk to NIST and Ohio; the answers would be distributed to the Committee members and, if appropriate, an e-mail ballot would be included.

FILLING VACANT POSITIONS

Associate Membership Committee nominees – five- year term

- Mr. Christopher Guay – Procter and Gamble

- Mr. Rob Underwood – Petroleum Marketers

- Mr. Tom McGee – PMP Corporation

- Mr. Paul Hoar – Agri Fuels, LLC/NBB will complete the remaining two-year term of Mr. Doug Biette

See the updated AMC Members and Officers list, located at the end of this document, for a complete list of AMC members.

CURRENT STANDING COMMITTEE REPRESENTATIVES

- Mr. Rob Underwood – Petroleum Marketers; represents the AMC on the Professional Development Committee. Expires July 2013.

- Mr. Steven Grabski – Wal-mart; represents the AMC on the Laws & Regulations Committee. Expires July 2013.

Mr. Murnane will work with the NCWM Staff to update the AMC Membership Committee information in the conference report.

OLD BUSINESS

Changes to the Bylaws and Guidelines for Selection and Approval of Training Funds documents were reviewed. Mr. Murnane made a motion to accept these changes; the motion was seconded by Mr. Stephen Langford. With no other discussion, Chairman Lewis called for a voice vote. Unanimous support was heard and the changes were approved.

NEW BUSINESS

Mr. Hoar introduced the idea that AMC members should contribute training documents and test forms to expand the current list. It was agreed that this was a good idea, and it was stated that the NCWM would accept documents from all members. It was also stated that the NCWM will add a disclaimer to the information before publishing.

Chairman Lewis proposed expanding the current AMC Policy regarding the use of AMC funds associated with Train-the-Trainer expenses, but only reimburse the state after the new trainer had conducted at least one class in his or her jurisdiction. Several individuals voiced concerns regarding this proposed change. The concerns were that the Train-the-Trainer program has no requirements related to the selected individuals' abilities and that jurisdictions may not have the funds available for the initial expense. Chairman Lewis agreed and closed the discussion.

Two additional suggestions were presented, which the membership felt was worth additional discussion at the January AMC meeting. These suggestions were:

- Mr. McGee suggested the members consider funding the cost of a trainer to conduct a training session at the regional level.

- Mr. Hoar suggested creating a list of Subject Matter Experts in identified areas that the Standing Committees could call on for assistance in agenda matters. The list could include both the NCWM members and non-members.

There was also a brief discussion regarding putting unused AMC funds into a CD. This was not supported by most members because of low interest rate and the loss of available access to support a request.

The AMC would like to thank Mr. Murnane for representing the associate members on the Board of Directors for the last three years. In addition, the associate members would like to congratulate Mr. Johnson on his nomination and acceptance for a three-year term on the Board replacing Mr. Murnane.

The AMC would also like to thank Mr. Lewis for his leadership as Chairman for the last two years and welcome Mr. Guay as the new Vice Chairman.

ADJOURNMENT

With no further new business, Chairman Lewis adjourned the meeting at 6:48 p.m.

Respectfully submitted,

Mr. Darrell Flocken, Secretary, AMC

AMC Members and Officers Effective July 13, 2010:

Chair: Bob Murnane
Vice Chair: Chris Quay
Sect/Treas: Darrell Flocken

MEMBERS

Kathleen Madaras:	2011	Robert Murnane:	2014
Paul Hoar:	2012	Chris Guay:	2015
Darrell Flocken:	2013	Rob Underwood:	2015
Michael Gaspers:	2013	Steven Grabski:	2015
Paul Lewis:	2014	Tom McGee	2015

The following individuals were in attendance:

Chad Brown – Walmart
Marc Buttler – Emerson
Darrell Flocken – Mettler Toledo
Kevin Fruechte – Avery Weigh-Tronix
Steven Grabski - Wal-Mart
Jim Hewston – Scale Source
Ann Hines – ARK Oil Marketers
Paul Hoar - Agri Fuels, LLC / NBB
Sam Jalahej – TOTALComp, Inc.
Gordon Johnson – Gilbarco, Inc.
Stephen Langford – Cardinal Scale Manufacturing Co.
Russell Langston – Ozark Meter
Emily LeRoy – TN Fuel & Convenience Store Association
Paul Lewis – Rice Lake Weighing Systems
Tom McGee – PMP Corporation
Robert Murnane – Seraphin Test Measure
Pete O'Bryan – Foster Farms
Henry Oppermann – W&M Consulting
Dan Peterson – Yokawa Corp. of America
Michael Pinagel – Walmart
Bob Reinfried – SMA
Rebecca Richardson – MARC IV Consulting
Dick Shipman – Rice Lake Weighing Systems
Louis Straub – Fairbanks Scales
Richard Suiter – R. Suiter Consulting
Rob Underwood – Petroleum Marketers
Lisa Weddig – Better Seafood Board
Curt Williams – CPWilliams Energy Consulting

Mr. Paul Lewis, Rice Lake Weighing Systems, Chair (2014)
Mr. Robert Murnane, Jr., Seraphin Test Measure, Vice Chair (2014)
Mr. Darrell Flocken, Mettler-Toledo, Inc., Secretary/Treasurer (2013)

Mr. Chris Guay, Procter & Gamble (2010)
Mr. Thomas Herrington, Nestlé USA-Prepared Food Division (2010)
Mr. Rob Underwood, Petroleum Marketer's Assoc. (2010)
Mr. Stephen Grabski, Wal-mart Stores, Inc. (2011)
Ms. Kathleen Madaras, Fuel Merchants Association of New Jersey (2011)
Mr. Doug Biette, Sartorius North America (2012)
Mr. Michael Gaspers, Farmland Foods, Inc. (2013)

ASSOCIATE MEMBERSHIP COMMITTEE

Report of the Laws and Regulations Committee

Joe Benavides, Chairman
Austin, Texas

Reference
Key Number

200 INTRODUCTION

This is the report of the Laws and Regulations Committee (hereinafter referred to as the "Committee") for the 95th Annual Meeting of the National Conference on Weights and Measures (NCWM). It is based on the Interim Report offered in the NCWM Publication 16, "Committee Reports," testimony at public hearings, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting. The Informational items presented below were adopted as presented when this report was approved.

Table A identifies the agenda items in the Report by Reference Key Number, title, and page number. The first three digits of the Reference Key Numbers of the items are assigned from the subject series listed below. Voting items are indicated with a "**V**" after the item number. Items marked with an "**I**" are Informational. Items marked with a "**D**" are Developing items. The developing designation indicates an item has merit; however, the item is returned to the submitter for further development before any further action is taken by the Committee. Items marked "**W**" have been Withdrawn from consideration. Table B lists the appendices to the report, Table C provides a summary of the results of the voting on the Committee's items and the report in entirety, and Table D provides a list of acronyms used in this report.

This report contains recommendations to amend National Institute of Standards and Technology (NIST) Handbook 130, 2010 Edition, "Uniform Laws and Regulations," or NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Fourth Edition (January 2005). Proposed revisions to the handbook(s) are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **underlining** information to be added. New items proposed for the handbooks are designated as such and shown in **bold face print**. Text presented for information only is shown in *italic* print. When used in this report, the term "weight" means "mass."

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and, therefore, some may contain only reference to inch-pound units.

Subject Series

INTRODUCTION ..... 200 Series

NIST Handbook 130 – General ..... 210 Series
Uniform Laws ..... 220 Series
Weights and Measures Law (WML) ..... 221 Series
Weighmaster Law (WL) ..... 222 Series
Engine Fuels and Automotive Lubricants Inspection Law (EFL) ..... 223 Series

Uniform Regulations ..... 230 Series
Packaging and Labeling Regulation (PLR) ..... 231 Series
Method of Sale Regulation (MSR) ..... 232 Series
Unit Pricing Regulation (UPR) ..... 233 Series
Voluntary Registration Regulation (VRR) ..... 234 Series

Open Dating Regulation (ODR) ..... 235 Series
Uniform National Type Evaluation Regulation (UNTER) ..... 236 Series
Engine Fuels and Automotive Lubricants Regulation (EFR) ..... 237 Series

Examination Procedure for Price Verification ..... 240 Series

Interpretations and Guidelines ..... 250 Series

NIST Handbook 133 ..... 260 Series

Other Items ..... 270 Series

Table A
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231-1	D	HB 130, Packaging and Labeling Requirements, Section 6, Declaration of Quantity: Consumer Products (refer to Item 270-14 in the NCWM 2010 L&R Committee Interim Agenda)	5
232		METHOD OF SALE REGULATION	7
232-1	V	Method of Sale for Fireplace and Stove Wood, Flavoring Chips, and Packaged Natural Wood (refer to Item 232-3 in the NCWM 2010 L&R Committee Interim Agenda)	7
232-2	V	Pelletized Ice Cream (refer to Item 270-3 in the NCWM 2010 L&R Committee Interim Agenda)	10
232-3	V	Method of Sale for Hydrogen (refer to Item 270-4 in the NCWM 2010 L&R Committee Interim Agenda)	12
232-4	I	Method of Sale Regulation Section 2.13.4. "Declaration of Weight" (refer to Item 270-6 in the NCWM 2010 L&R Committee Interim Agenda)	14
232-5	I	Uniform Regulation for Method of Sale of Commodities - Packaged Printer Ink and Toner Cartridges (refer to Item 270-9 in the NCWM 2010 L&R Committee Interim Agenda)	16
232-6	V	Method of Sale, Section 2.23. Animal Bedding (refer to Item 270-12 in the NCWM 2010 L&R Committee Interim Agenda)	18
237		ENGINE FUELS AND AUTOMOTIVE LUBRICANTS REGULATION (EFT)	21
237-1	W	Uniform Engine Fuels Regulation – Section 2.2.1 Premium Diesel Lubricity (refer to Item 270-1 in the NCWM 2010 L&R Committee Interim Agenda)	21
237-2	I	Engine Fuel Quality Requirements for Hydrogen (refer to Item 270-4 in the NCWM 2010 L&R Committee Interim Agenda)	24
237-3	I	Engine Fuels and Automotive Lubricants Regulation, Section 3.15 Biodiesel and Biodiesel Blends (refer to Item 270-10 in the NCWM 2010 L&R Committee Interim Agenda)	27
260		NIST HANDBOOK 133	30
260-1	V	Guidance on Allowing for Moisture Loss and Other Revisions	30
260-2	V	Seed Count for Agricultural Seeds (refer to Item 270-5 in the NCWM 2010 L&R Committee Interim Agenda)	35
260-3	I	HB 133, Chapter 4.7. Polyethylene Sheeting - Test Procedure - Footnote Step 3 (refer to Item 270-7 in the NCWM 2010 L&R Committee Interim Agenda).	41
260-4	W	HB 133, Chapter 4.7. Polyethylene Sheeting Test Procedure – T-shirt/cut-out bags (refer to Item 270-8 in the NCWM 2010 L&R Committee Interim Agenda)	42
260-5	W	HB 133, Method of Measurement of the Volume of Bagged Mulch (refer to Item 270-11 in the NCWM 2010 L&R Committee Interim Agenda)	44
260-6	V	National Pasta Association - HB 133, Moisture Allowance for Pasta Products	45

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270-1 D Fuels and Lubricants Subcommittee (FALS) (refer to Item 270-2 in the NCWM 2010 L&R Committee Interim Agenda) 47
270-2 I Ice Glazed Seafood Forum 48

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B	Hydrogen Fuel Method of Sale	B1
C	Packaged Printer Ink and Toner Cartridges	C1
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E	Handbook 130 Engine Fuels and Automotive Lubricants Regulation, Section 3.15. Biodiesel and Biodiesel Blends	E1
F	Table of Proposed Amendments and Editorial Changes for Handbook 133, *Checking the Net Contents of Packaged Goods,* Fourth Edition	F1
G	Draft of Handbook 133, *Checking the Net Contents of Packaged Goods,* Fourth Edition with Proposed Amendments and Editorial Changes	G1
H	Agriculture Seed Count Rule	H1
I	Polyethylene Sheeting	I1
J	Amerigrow Mulch Proposal and Documentation	J1
K	National Pasta Association (NPA) Proposal to Establish a Moisture Allowance for Pasta Products)	K1

Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
232-1	34	0	46	0	Passed
232-2	34	0	47	0	Passed
232-3	31	0	42	0	Passed
232-6	32	2	37	3	Passed
260-1	28	5	44	2	Passed
260-2	30	4	39	3	Passed
260-6	21	10	25	11	Returned to Committee

Table D
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
AASCO	Association of American Seed Control Officials	IICA	International Ice Cream Association
AOSA	Association of Official Seed Analyst	L&R	Laws and Regulations
ASTA	American Seed Trade Association	NCWM	National Conference on Weights & Measures
ASTM	American Society for Testing and Materials International	NIST	National Institute of Standards & Technology
CFR	Code of Federal Regulations	MLWG	Moisture Loss Work Group
CNG	Compressed Natural Gas	NEWMA	Northeastern Weights & Measures Association
CWMA	Central Weights & Measures Assn.	NFPA	National Fire Protection Association
FALS	Fuels and Lubricants Subcommittee	NTEP	National Type Evaluation Program
FDA	Food and Drug Administration	S&T	Specifications & Tolerances Committee
FD&C Act	Food Drug and Cosmetic Act	SI	International System of Units
FPLA	Fair Packaging and Labeling Act	SWMA	Southern Weights & Measures Association
FSIS	Food Safety and Inspection Service	UPLR	Uniform Packaging and Labeling Regulation
FSS	Fuel Specifications Subcommittee	USDA	U.S. Department of Agriculture
FTC	Federal Trade Commission	USNWG	U.S. National Work Group
HB 44	NIST Handbook 44, *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*	WG	Work Group
HB 130	NIST Handbook 130, *Uniform Laws and Regulations in the areas of Legal Metrology and Engine Fuel Quality*	WMD	NIST Weights & Measures Division
HB 133	NIST Handbook 133, *Checking the Net Content of Packaged Goods*	WWMA	Western Weights & Measures Association
IDFA	International Dairy Food Association		

Details of all Items
(In order by Reference Key Number)

231 PACKAGING AND LABELING REGULATION (PLR)

231-1 D HB 130, Packaging and Labeling Requirements, Section 6, Declaration of Quantity: Consumer Products (refer to Item 270-14 in the NCWM 2010 L&R Committee Interim Agenda)

Source: Northeastern Weights and Measures Association (NEWMA)

Purpose: To allow manufacturers to develop multi-lingual labels. This item would permit manufacturers to use approved symbols on consumer packages.

Item Under Consideration: Amend HB 130 Packaging and Labeling Regulations, Section 6: Declaration of Quantity: Consumer Packages, addition to 6.4.1. Combination Declaration:

Numerical Count

Numerical count can be expressed as either:

(a) alpha-numeric characters (Figure A); or

(b) alpha-numeric characters in conjunction with an approved symbol of the commodity from Section 6.7.1 (Figure B).

3 Razors
(Figure A.)


(Figure B)

HB 130 Packaging and Labeling Regulations, Section 6: Declaration of Quantity: Consumer Packages amend Section 6.7.1., Symbols and Abbreviations (Figure C).


Disposable Razor
(figure C)

Background/Discussion: A representative of Procter and Gamble (P&G) submitted a proposal at the 2009 NEWMA Interim Meeting held in Springfield, Massachusetts. This proposal is to amend the language in HB 130 Packaging and Labeling Regulation, Section 6 that will facilitate value comparisons for a diverse set of consumers. It is proposed to amend the net content declaration of content for consumer products labeled only with a count to allow for the use of approved symbols. According to P&G, this will limit the language of net content information, especially products with multi-language declarations, making the statement more noticeable to the eye. In addition, labels that are intended towards consumers whose first language is not English will benefit from knowing the content visually versus by text. P&G states that by ensuring the net content information is more noticeable; consumers will be more likely to make value comparisons.

P&G cites 21CFR 201.15 (c)(2); this requirement formally applies to over the counter drug products, but absent guidance for other categories of products subject to the Food Drug and Cosmetic Act (FD&C Act) and Food Packaging and Labeling Act (FPLA). This provides the best guidance principles for manufacturers to develop

compliant multilingual labels. P&G states that net content translation and package size considerations can make a compliant statement difficult to understand.

Language extracted from 21 CFR 201.15:

> (c)(1) All words, statements, and other information required by or under authority of the act to appear on the label or labeling shall appear thereon in the English language: *Provided, however*, that in the case of articles distributed solely in the Commonwealth of Puerto Rico or in a Territory where the predominant language is one other than English, the predominant language may be substituted for English.
>
> (2) If the label contains any representation in a foreign language, all words, statements, and other information required by or under authority of the act to appear on the label shall appear thereon in the foreign language.
>
> (3) If the labeling contains any representation in a foreign language, all words, statements, and other information required by or under authority of the act to appear on the label or labeling shall appear on the labeling in the foreign language.

At the 2009 NEWMA Interim Meeting held October 12 - 15, 2009, Springfield, Massachusetts, the L&R Committee recommended this proposal be a Developing item.

At the 2010 NCWM Interim Meeting held in Nashville, Tennessee, Mr. Chris Guay, P&G, provided an explanation that in Europe products sold by count are using pictograms in the net content declaration and the package could be considered multi-language. This system would allow for industry to develop one package that can be used in several different countries without having to develop packaging for one specific language. An official urged that this be a Developing item to see if pictograms could be acceptable.

The Committee would like to see this item go through all the regions (NEWMA, CWMA, WWMA, and SWMA) for review and comment. The Committee requested from Mr. Guay an approved set of international pictograms and further information on the labeling requirements (FPLA). The NIST Technical Advisor will also research the pictograms for any conflicts with other Federal Laws and Regulations. The NIST Technical Advisor met with the Federal Trade Commission (FTC) on February 26, 2010, to seek their assistance in reviewing this proposal. The L&R Committee agreed that this should be a Developing item.

At the 2010 NEWMA Annual Meeting held in Groton, Connecticut, in May 2010, there were no comments heard on this item. The Committee agreed that this item should remain as a Developing item until further information is made available. The NIST Technical Advisor has not heard back from FTC regarding this issue

At the 2010 CWMA Annual Meeting held in Springfield, Illinois, in May 2010, an industry representative mentioned that there are several issues with this proposal: the Federal Drug Administration (FDA) will need to update labeling regulations, changing demographics, and international marketing of products requiring information in several languages. Regulations need to be put in place to either prohibit this practice or to establish guidelines and regulations. An inspector commented that the use of pictographs is currently in the marketplace, and it is considered a violation in their jurisdiction.

At the NCWM Annual Meeting held in St. Paul, Minnesota, on July 12 - 15, 2010, no comments were received on this item.

232 METHOD OF SALE REGULATION

232-1 V Method of Sale for Fireplace and Stove Wood, Flavoring Chips, and Packaged Natural Wood (refer to Item 232-3 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was adopted.)

Source: Southern Weights and Measures Association (SWMA) (2008 Carryover Item)

Purpose: The purpose of this proposal is to clarify the requirement for the display of metric units. The current regulation lacks a clearly stated requirement for the appropriate unit use of metric measure by volume for fireplace and stove wood, flavoring chips, and packaged natural wood. When a quantity statement for cubic meter is carried out to three decimal points, it is likely not useful in making value comparisons.

In Method of Sale Regulation, HB 130, Section 2.4.3.(d) states that flavoring chips shall be sold by volume, but it falls short of saying which volume units are required. Packers refer to Section 2.4.3. Quantity, where the guidance seems to imply that chips must be sold by the cubic meter. This creates a conflict between the Method of Sale of Commodities Regulation and the Uniform Packaging and Labeling Regulation (UPLR) Declaration of Quantity for Consumer Packages Rule of 1000. Using cubic centimeters would also create a conflict.

Item Under Consideration: Amend Section 2.4.3. as follows:

2.4.3. Quantity. – Fireplace and stove wood shall be advertised, offered for sale, and sold only by measure, using the term "cord" and fractional parts of a cord or the cubic meter, except that:

(a) **Packaged natural wood.** – Natural wood offered for sale in packaged form in quantities less than 0.45 m^3 ($^1/_8$ cord or 16 ft^3) shall display the quantity in terms of:

(1) ~~**cubic meters**~~ **liters**, to include ~~**decimal**~~ fractions of ~~**cubic meters**~~ **liters**; or

(2) for quantities less than one cubic foot, in terms of cubic inches; or

(3) for quantities of one cubic **foot or greater, in terms of cubic feet,** to include fractions of **a** cubic ~~feet~~ **foot**.

(b) **Artificial compressed or processed logs.** – A single fireplace log shall be sold by weight, and packages of such individual logs shall be sold by weight plus count.

(c) **Stove wood pellets or chips.** – Pellets or chips not greater than 15 cm (6 in) in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.

(Amended 1976 and 1991)

(d) **Flavoring chips.** – ~~**Flavoring chips shall be sold by volume.**~~ **Flavoring chips offered for sale in packaged form in quantities less than 0.45 m^3 ($^1/_8$ cord or 16 ft^3) shall display the quantity in terms of:**

(1) ~~**cubic meters**~~ **liters**, to include ~~**decimal**~~ fractions of ~~**cubic meters**~~ **liters**; or

(2) for quantities less than one cubic foot, in terms of cubic inches; or

(3) for quantities of one cubic **foot or greater, in terms of cubic feet,** to include fractions of **a** cubic ~~feet~~ **foot**.

(Added 1998) **(Amended 2010)**

Note: In determining the appropriate Method of Sale, a clear distinction must be made as to whether the wood is being sold primarily as fuel (some wood is sold as fuel, but flavoring is a byproduct) or strictly as a wood flavoring.
(Added 2010)

Background/Discussion: A state cited a company for a violation of the jurisdictions net quantity contents labeling for flavoring chips. The citation also led this to initiate a review of all of its packaging and labeling to ensure compliance with HB 130 regulations. The company requested assistance from Weights and Measures Division (WMD) on the appropriate unit of metric measure for their flavoring chip packaging. Upon review, it became apparent that the regulation was ambiguous about the appropriate metric volume unit to be used. When a quantity statement for cubic meter is carried out to three decimal points, it is likely not useful in making value comparisons.

In HB 130, Method of Sale Regulation, Section 2.4.3.(d) states that flavoring chips shall be sold by volume, but it falls short of saying which volume units are required. Most packers also refer to Section 2.4.3. Quantity, which contains the Commodities Regulation and UPLR - Declaration of Quantity for Consumer Packages Rule of 1000. Using cubic centimeters also causes a conflict. Most states, if not all, give precedent to UPLR over the Method of Sale because most jurisdictions adopt the UPLR and not the Method of Sale of Commodities Regulation.

Proposal initially submitted in 2008.

2.4.3. Quantity. – Fireplace and stove wood – Shall be advertised, offered for sale, and sold only by measure, using the term "cord" and fractional parts of a cord or the cubic meter, except that:

(a) **Packaged natural wood.** – Natural wood offered for sale in packaged form in quantities less than 0.45 m^3 ($^1/_8$ cord or 16 ft^3) shall display the quantity in terms of ~~**cubic meters**~~ **liters**, to include ~~**decimal**~~ fractions of ~~**cubic meters**~~ **liters**; or cubic feet **or cubic inches up to one cubic foot**, to include fractions of **a** cubic ~~**feet**~~ **foot**.
(Amended 20XX)

(b) **Artificial compressed or processed logs.** – A single fireplace log shall be sold by weight, and packages of such individual logs shall be sold by weight plus count.

(c) **Stove wood pellets or chips.** – Pellets or chips not greater than 15 cm (6 in) in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.
(Amended 1976 and 1991)

(d) **Flavoring chips.** – ~~**Flavoring chips shall be sold by volume.**~~ Flavoring chips offered for sale in **packaged form in quantities less than 0.45 m^3 ($^1/_8$ cord or 16 ft^3) shall display the quantity in terms of liters, to include fractions of liters, cubic feet, or cubic inches up to one cubic foot, to include fractions of a cubic foot.**
(Added 1998) (Amended 20XX)

Note: In determining the appropriate Method of Sale, a clear distinction must be made as to whether the wood is being sold primarily as fuel (some wood is sold as fuel, but flavoring is a byproduct) or strictly as a wood flavoring.
(Added 20XX)

This item was presented at the NCWM 2008 Annual Meeting and at all of the 2008 Regional Meetings.

At the 2009 Interim Meeting, it was requested to add the words "up to one cubic foot" after the words cubic inches. The Committee agreed to modify the proposal and move it forward for a vote at the 2009 Annual Meeting.

At the 2009 Central Weights and Measures Association (CWMA) Annual Meeting in St. Louis, Missouri, on May 3 - 6, 2009, a NIST Technical Advisor recommended that the proposal be changed in Section 2.4.3.(a) to read as … fractions of **liters** ~~**cubic meters.**~~ A state regulator stated that the proposal conflicts with HB 44 "Units of

Measures" and believes that liters should only be used for fluid measurements. After review of HB 44, Appendix C. (pgs. C-2 and C-8), the CWMA L&R Committee did not feel that there is a conflict. The CWMA L&R Committee supports this item for the following reasons: "A precedent has been established for use of liters in dry measure (e.g., mulch), traditional industry practices utilize liters as their method of sale, it provides a better value comparison, and it would remove the current conflict with violation of the Rule of 1000 when cubic meters are used."

At the 2009 NEWMA Annual Meeting in South Portland, Maine, May 11 - 14, 2009, the NEWMA L&R Committee supported this item along with the recommended changes from the NIST Technical Advisor. A NIST Technical Advisor recommended that the proposal be changed in Section 2.4.3.(a) to read as: fractions of **liters** ~~**cubic meters.**~~ A state official stated that the changes to this section are being made to correct a technical error with the use of metric measure and that customary units will not change. An industry representative questioned whether liters would be the correct metric measure and suggested decimeters. It was noted that decimeters and liters are equivalent.

At the 2009 NCWM Annual Meeting in San Antonio, Texas, there was discussion that this proposal needs additional review by the NCWM L&R Committee for editorial changes. The original proposal did not adequately correct the issue and for that reason it was not adopted at the 2009 NCWM Annual Meeting and was returned to the NCWM L&R Committee for further consideration. It was recommended that the term "fraction of liters and cubic feet" be given consideration.

At the 2009 CWMA Interim Meeting in Rock Island, Illinois, the participants supported the proposal in the recommendation shown above. The CWMA recommended to the NCWM Committee that the proposal under consideration go forward as a Voting item.

At the 2009 Western Weights and Measures Association (WWMA) Annual Meeting in Los Cruces, New Mexico, the WWMA L&R Committee heard specific recommendations for changes to the current proposal during its open hearings.

The WWMA L&R Committee supports the need for clarification and this could be accomplished by changing the following wording to replace the current recommendation with:

2.4.3. Quantity. – Fireplace and stove wood shall be advertised, offered for sale, and sold only by measure, using the term "cord" and fractional parts of a cord or the cubic meter, except that:

(a) **Packaged natural wood.** – Natural wood offered for sale in packaged form in quantities less than 0.45 m^3 ($^1/_8$ cord or 16 ft^3) shall display the quantity in terms of:

(1) ~~**cubic meters**~~ **liters**, to include ~~**decimal**~~ fractions of ~~**cubic meters**~~ **liters**; or

(2) for quantities less than one cubic foot, in terms of cubic inches; or

(3) for quantities of one cubic **foot or greater, in terms of cubic feet,** to include fractions of **a** cubic ~~feet~~ **foot**.

(b) **Artificial compressed or processed logs.** – A single fireplace log shall be sold by weight, and packages of such individual logs shall be sold by weight plus count.

(c) **Stove wood pellets or chips.** – Pellets or chips not greater than 15 cm (6 in) in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.

(Amended 1976 and 1991)

(d) **Flavoring chips.** – ~~**Flavoring chips shall be sold by volume.**~~ **Flavoring chips offered for sale in packaged form in quantities less than 0.45 m3 ($^1/_8$ cord or 16 ft3) shall display the quantity in terms of:**

(1) ~~**cubic meters**~~ **liters**, to include ~~**decimal**~~ fractions of ~~**cubic meters**~~ **liters**; or

(2) **for quantities less than one cubic foot, in terms of cubic inches;** or

(3) **for quantities of one** cubic **foot or greater, in terms of cubic feet,** to include fractions of **a** cubic ~~feet~~ **foot**.

(Added 1998) **(Amended 201X)**

At the 2009 SWMA Annual Meeting in Clearwater, Florida, the SWMA L&R Committee received a comment from an industry representative that there are two legal units of measurement, but only one unit of measurement is being proposed in this item. An industry representative expressed that additional work needs to be done on this item. The SWMA recommends to the NCWM L&R Committee that this item go forward as a Voting item.

At the 2009 NEWMA Interim Meeting held in Springfield, Massachusetts, they received positive comments on this proposal. NEWMA also reviewed the WWMA 2009 changes and supports this item with the Western recommendations.

At the 2010 the NCWM Interim Meeting held in Nashville, Tennessee, the Committee agreed to move forward the WWMA recommendation. There were no comments heard on this item during the open hearings. The Committee agreed to move the item under consideration forward as a Voting item.

At the 2010 NEWMA and the CWMA Annual Meetings no comments were received on this item and both Committees recommended that this item move forward as a Voting item.

At the 2010 NCWM Annual Meeting held in St. Paul, Minnesota, a comment was received from a California county director that the item for consideration clears up confusion with the metric statement and he supports it, as it appears.

232-2 V Pelletized Ice Cream (refer to Item 270-3 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was adopted.)

Source: NIST Weights and Measures Division, International Dairy Foods Association (IDFA), FDA

Purpose: Pelletized ice cream is manufactured using very low temperatures and a liquid nitrogen process in order to form the unique beads. FDA declared that pelletized ice cream is a semi-solid food, in accordance with 21 CFR 101.105(a), the appropriate net quantity of content declaration for this type of product is net weight. An FDA Official attending the 2009 NCWM Annual Meeting stated that manufacturers have until April 2010 to modify their labels with a net weight declaration. The purpose of this proposal is to amend the current method of sale requirements, which require ice cream to be sold by volume to reflect that the FDA now requires pelletized ice cream to be sold by weight.

Item Under Consideration: Insert the following language into HB 130, Method of Sale Regulation:

1.7.2. Pelletized Ice Cream - A semi-solid food product manufactured at very low temperatures using a nitrogen process and consisting of small beads of varying sizes. Bits of inclusions (cookies, candy, etc.) that also vary in size and weight may be mixed with the pellets.

1.7.2.1. Method of Retail Sale - Packaged pelletized ice cream shall be kept, offered, or exposed for sale on the basis of net weight.

(Note: This method of sale shall be enforceable after April 17, 2010)

Background/Discussion: At the 2008 NCWM Annual Meeting open hearings, Ms. Cary Frye, Vice President, Regulatory and Scientific Affairs from the International Ice Cream Association (IICA), gave a briefing on behalf of industry on pelletized ice cream. This product briefing covered the standard of identity, test method procedures, and

several other key points. Ms. Frye informed the Conference that additional assistance would be required from the FDA (refer to the Table B, Appendix D in the 93rd NCWM Conference Report).

The WMD submitted to the NCWM L&R Committee detailed minutes pertaining to the June 27, 2008, meeting held at NIST, concerning issues with the pelletized ice cream product. The minutes (see Table B, Appendix E refer to Item 237-2 in the report of the 94th Interim Meeting in 2009) provide great detail of the current issue, background information, representatives and manufacturers, method of sale, and test method procedure.

This item has been presented at the 2008 WWMA and the SWMA Annual Meetings and at NEWMA and the CWMA Interim Meetings. NEWMA discussed this issue, including the FDA's role and their impact on the NCWM process. One member stated that the FDA may be slow to reach a decision because of an impending change in leadership. Another member expressed the difficulty (practical experience) of testing this product. All regions are in agreement that this item should remain Developmental until further information is received from the FDA.

At the 2009 NCWM Interim Meeting, it was reported by a NIST Technical Advisor that the FDA was actively working on this item.

At the 2009 NCWM Annual Meeting in San Antonio, Texas, the NIST Technical Advisor presented a letter dated April 17, 2009, (see the NCWM 2010 Interim L&R Appendix D) from the FDA regarding their decision on the method of sale for pelletized ice cream. The FDA declared that pelletized ice cream is a semi-solid food, in accordance with 21 CFR 101.105(a), and the appropriate net quantity of content declaration for this type of product is net weight. A FDA Official attending the NCWM Annual Meeting stated that manufacturers have until April 2010 to modify their labels with a net weight declaration. Manufacturers that are unable to meet this deadline will need to contact the FDA. The FDA will look at each extension request on a case-by-case basis. The FDA replied to the IDFA/IICA in a letter dated October 22, 2009, denying their request to change the label compliance date to January 2, 2012 (refer to L&R Appendix E in the NCWM 2010 Interim Agenda). The FDA will continue to review any request for an extension on a case-by-case basis.

At the CWMA 2009 Interim, the WWMA 2009 Annual, the SWMA 2009 Annual, and NEWMA 2009 Interim Meetings, there were no comments heard, and all regions recommended to the Committee that the proposed item move forward as a Voting item.

At the 2010 NCWM Interim Meeting open hearings, Ms. Frye informed attendees that she is requesting clarification from the FDA regarding the classification for pelletized "ice" products and frozen desserts to also be exempted.

The Committee recommends the item be moved forward as a Voting item at the Annual Meeting to be held in St. Paul, Minnesota, in July 2010. Any additional information submitted by the FDA on Ms. Frye's issue will be taken into consideration at the meeting.

At the NEWMA Annual Meeting held in Groton, Connecticut, in May 2010, there was concern expressed from a State Director that changing the sales and testing procedure of ice cream could conflict with existing state regulations.

At the CWMA Annual Meeting held in Springfield, Illinois, in May 2010, the Committee recommends this as a Voting item, to provide a method of sale for pelletized ice cream only.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, Minnesota, Ms. Frye informed the Conference that on May 14, 2010, a written request was submitted to the FDA, to include similar pelletized products (ice, water ice, sherbet, or other frozen dessert). Ms. Frye informed the Conference that manufacturers are currently revising their labels to be compliant with the new regulation. One manufacturer, Kemps, has received a one year extension from the FDA on getting their labels in compliance (refer to Appendix A). The NIST Technical Advisor advised the Conference that a copy of the waiver letter extending the compliance date would be distributed to the NCWM members and State Directors.

232-3 V Method of Sale for Hydrogen (refer to Item 270-4 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Purpose: Adopt a method of sale for hydrogen in HB 130 to address gaseous hydrogen refueling applications. There is a corresponding proposal in Section 360 Other Items of the January 2010 NCWM Interim S&T Agenda to add a tentative Hydrogen Gas Measuring Devices Code to HB 44 to address requirements for hydrogen gas refueling equipment.

Item Under Consideration: The U.S. National Work Group (USNWG) Fuel Specifications Subcommittee (FSS) presented the following recommendation for consideration for inclusion in HB 130 Uniform Regulations for Method of Sale of Commodities. (Item has been renumber to fit the requirements of HB 130.)

2.32. Retail Sales – Hydrogen Fuel (H).

2.32.1. Definitions Hydrogen Fuel (H). – A fuel composed of the chemical hydrogen intended for consumption in an internal combustion engine or fuel cell.

2.32.2. Method of Retail Sale and Dispenser Labeling. – All hydrogen fuel kept, offered, or exposed for sale and sold at retail shall be in mass units in terms of the kilogram.

The symbol for hydrogen vehicle fuel shall be the capital letter "H" (the word Hydrogen may also be used).

2.32.3. Retail Dispenser Labeling.

(a) A computing dispenser must display the unit price in whole cents on the basis of price per kilogram.

(b) The service pressure(s) of the dispenser must be conspicuously shown on the user interface in bar or the SI Unit of Pascal (Pa) (e.g., MPa).

(c) The product identity must be shown in a conspicuous location on the dispenser.

(d) National Fire Protection Association (NFPA) labeling requirements also apply.

(e) Hydrogen shall be labeled in accordance with 16 CFR 309 – FTC Labeling Alternative Fuels.

2.32.4. Street Sign Prices and Advertisements.

(a) The unit price must be in terms of price per kilogram in whole cents (e.g., $3.49 per kg, not $3.499 per kg).

(b) The sign or advertisement must include the service pressure~~(s)~~ (expressed in megapascals) at which the dispenser(s) delivers hydrogen fuel (e.g., H35 or $H70_{MPa}$).

(Added 2010)

Background/Discussion: Twenty-four states have hydrogen refueling dispensers in operation. Hydrogen stations using permanent and mobile refueling systems for automobiles, fleet vehicles (buses), forklifts, and airport totes are increasing and may go unnoticed. Many stakeholders who are not familiar with the weights and measures standards process will need to participate at this stage rather than after this is a commercial application. This effort by the USNWG for the Development of Commercial Hydrogen Measurement Standards is to ensure there are appropriate

standards and test procedures in place in time for dispenser manufacturers, service agencies, and officials to educate the general public, not if, but for when retail hydrogen applications become commercially available.

Existing codes do not fully address hydrogen refueling applications because of hydrogen's properties and other technical differences in the setup and operations of dispensing systems. The development of legal metrology standards for newly emerging hydrogen technology is a necessary component of the hydrogen infrastructure. The weights and measures community must have time to consider requirements for hydrogen-refueling systems before this application is available for public access at corner service stations.

The USNWG is bringing the proposal before the weights and measures community to share this information about upcoming standards for an emerging technology. The simultaneous development of the code and corresponding test procedures will allow for input from the weights and measures and hydrogen communities, appropriate trials of the standards, and to address all areas of concerns early in the standards development process.

This item was reviewed at the WWMA and the SWMA 2008 Annual Meetings and at the NEWMA 2008 Interim Meeting. NEWMA members generally discussed the hydrogen issue and its usage in the marketplace. It is anticipated that hydrogen at first will be relegated to fleet vehicles (such as compressed natural gas [CNG]), and that retail sales will be slow in coming to the marketplace. NEWMA recommends that this item remain a Developing item.

At the 2009 Interim and Annual Meetings, the NIST Technical Advisor briefed the Committee on work that the USNWG FSS has done to date (refer to the report of the 94th Annual NCWM Conference, Appendix J for Hydrogen USNWG FSS background information). In April 2009 at the U.S. National Hydrogen Work Group (WG) meeting held in Sacramento, California, the WG further clarified the definition for street sign prices to specify that the megapascal is the appropriate SI unit for expressing the numerical value of the dispenser's service pressure on street signs.

There were no comments received on this proposal at the CWMA 2009 Interim Meeting.

At the WWMA 2009 Annual Meeting held in Los Cruces, New Mexico, industry representatives acknowledged that some details of the specifications for fuel standards are in development. The WWMA Committee believes it is best to be proactive on this item so that Hydrogen stations can be ready to make retail sales.

At the SWMA 2009 Annual Meeting held in Clearwater, Florida, the SWMA L&R Committee received a recommendation from a state that as the test methods are developed they get published. The state also requested that documentation be produced on the affects of hydrogen if they exceed certain property values listed in the table "Hydrogen Fuel Quality Specification," and why this is important in the testing of hydrogen.

At the NEWMA 2009 Interim Meeting held in Springfield, Massachusetts, the Committee reviewed this proposal and recommended it be a Developing item.

During the open hearings at the 2010 Interim Meeting held in Nashville, Tennessee, a California state official spoke in support of this item to move forward as a Voting item so that there is a method of sale for the commercialization of hydrogen. The Committee agreed that the method of sale go forward as a Voting item. The Committee indicated that the test methods were not developed enough to move the fuel quality specification portion forward. The Hydrogen Fuel Quality Specification section will remain as Informational (refer to Item 237-2 in the report of the 95th NCWM Annual Meeting).

At the 2010 NEWMA Annual Meeting held in Groton, Connecticut, they supported this proposal and recommended it move forward as a Voting item.

At the 2010 CWMA Annual Meeting held in Springfield, Illinois, there were no comments heard. The Committee recommends moving this forward as a Voting item, but does not specifically indicate support for this proposal.

At the 2010 Annual Meeting held in St. Paul, Minnesota, several states expressed support for adoption. The Committee also received five letters reflecting support of this item (refer to Appendix B in the report of the 95th

NCWM Annual Meeting). The NIST Technical Advisor advised the conference that there is a corresponding Item 237-2 (refer to the report of the 95th NCWM Annual Meeting) that refers to the engine fuel quality requirements for hydrogen which is an Informational item on the L&R agenda.

Additional information on this hydrogen item and the corresponding hydrogen gas measuring devices code can be found at www.nist.gov/pml/wmd/lmdg/hydrogen.cfm. For additional information on this item, contact Ms. Lisa Warfield at lisa.warfield@nist.gov or (301) 975-3308.

232-4 I Method of Sale Regulation Section 2.13.4. "Declaration of Weight" (refer to Item 270-6 in the NCWM 2010 L&R Committee Interim Agenda)

Source: Western Weights and Measures Association (WWMA)

Purpose: Update HB 130, Section 2.13.4. to provide new density values for heavier density plastics that are currently in the marketplace.

Item under Consideration: Amend HB 130, Method of Sale Regulation, Section 2.13.4. as follows:

2.13.4. Declaration of Weight. – The labeled statement of weight for polyethylene sheeting and film products under Sections 2.13.1.1. Sheeting and film, and 2.13.3.1. Bags, shall be equal to or greater than the weight calculated by using the formula below. The final value shall be calculated to four digits, and declared to three digits, dropping the final digit as calculated (for example, if the calculated value is 2.078 lb, then the declared net weight shall be 2.07 lb).

For SI dimensions:

M = T x A x D/1000, where:

M = net mass in kilograms
T = nominal thickness in centimeters
A = nominal length in centimeters times nominal width [***NOTE 6***, page 122] in centimeters
D = density in grams per cubic centimeter as determined by ASTM Standard D1505 68, Standard Method of Test for Density of Plastics by the Density Gradient Technique (or latest issue)

For the purpose of this regulation, **when D is not known,** the minimum density **(D) used to calculate the target net weight for linear low polyethylene products (LLPD) and products other than high density (HDPE)** shall be 0.92 g/cm^3 ~~**(when D is not known).**~~

For products labeled High Density (HDPE) or similar wording, the minimum density (D) used to calculate the target net weight shall be 0.95 g/cm^3.

For inch-pound dimensions:

W = T x A x 0.03613 x D, where:

W = net weight in pounds;
T = nominal thickness in inches;
A = nominal length in inches times nominal width [***NOTE 6***, page 122] in inches;
D = density in grams per cubic centimeter as determined by ASTM Standard D1505 68, Standard Method of Test for Density of Plastics by the Density Gradient Technique (or latest issue); and 0.03613 is a factor for converting g/cm^3 to lb/in^3.

~~**For the purpose of this regulation, the minimum density shall be 0.92 g/cm^3.**~~

(Added 1977) (Amended 1980, 1982, 1987, 1989, 1990, 1993, and 201X)

NOTE 6: *The nominal width for bags in this calculation is twice the labeled width.*

Background/Discussion: It was stated at the 2009 WWMA Annual Meeting in Los Cruces, New Mexico, some manufacturers and distributors of polyethylene bags are using the calculated target weight identified in HB 130 Section 2.13.4. to understate the net quantity of their labels. The polyethylene industry recognizes a density value of 0.92 g/cm³ for linear low polyethylene products (LLDP). When 0.92 g/cm³ is used to calculate the target net weight of high-density polyethylene (HDPE), the product may make the target net weight. However, when the appropriate density value of 0.95 g/cm³ is used to test HDPE, the product often fails to meet the calculated target net weight. Further testing reveals than one or more of the labeled width, thickness, or count statements are inaccurate. It appears that some manufacturers are aware that weights and measures officials are restricted to testing HDPE product using the 0.92 g/cm³ value because the actual density value is not stated on the product label. Existing procedural guidelines do not address high density polyethylene materials. When testing at manufacturing locations, weights and measures officials are able to obtain information regarding the density of the product directly from the manufacturer. However, at distributor locations density information is not available and officials must test using the 0.92 g/cm³ value designated in HB 130 and HB 133 to verify the weight of the product. When the product has no net weight statement on the package, 0.92 g/cm³ is the only factor that the inspector may use to calculate the target net weight.

The 2009 WWMA Association supports the following item and recommends that it be a Voting item:

2.13.4. Declaration of Weight. – The labeled statement …

~~**For the purpose of this regulation, the minimum density shall be 0.92 g/cm³ (when D is not known).**~~
~~**For the purpose of this regulation, the minimum density shall be 0.92 g/cm³.**~~

Amend Section 2.13.4. as follows:

For the purpose of this regulation, **when D is not known,** the minimum density **(D) used to calculate the target net weigh for linear low polyethylene produ cts (LLDP) and products other than high density (HDPE)** shall be 0.92 g/cm³ ~~(when D is not known)~~**. For products labeled "High Density," HDPE, or similar wording, the minimum density (D) used to calculate the target net weight shall be 0.95 g/cm³.**

NEWMA reviewed this item at its 2009 Interim Meeting and recommends that this proposal be a Developing item.

At the 2010 NCWM Interim Meeting held in Nashville, Tennessee, the Committee heard support for the density factor changing from 0.92 g/cm³ to 0.95 g/cm³ on this item. A California county commissioner indicated that the information provided by the WWMA was data extracted from Internet searches. Manufacturers are complaining that under current practice they cannot compete fairly.

Mr. Mike Jackelen from Berry Plastics urged the Committee to reject this proposal. Mr. Jackelen stated that 0.92g/cm³ density currently works for manufacturers and that changing it to 0.95 g/cm³ will cause undue cost and waste. Most manufacturers do not make high density (HD) bags, but are producing blends. According to Mr. Jackelen, another reason to reject the proposal is if the 0.95 g/cm³ bag is punctured, it continues to tear.

A state official commented that if you use the term HD, then you are bound by the 0.95 g/cm³. If you use the length x width x thickness to determine the net weight, then the density value needs to be added on the package labeling. A state official said that manufacturers should consider disclosing the density factor on every product as part of the labeling. It was voiced that if there are questions about an absolute 0.95 g/cm³ density, then there should be an alternative.

Another state official commented that the 0.95 g/cm³ will be factored in only when the density is not known. The Committee received letters that were reviewed on this item. The Committee recommended moving the item under consideration forward as a Voting item.

At the 2010 NEWMA Annual Meeting in Groton, Connecticut, the region was concern that there appears to be a lack of data on this item. This item was never reviewed by all regions and not presented to industry for comments.

The Committee felt this item was not an emergency and would like to review comments received from all the regions and industry.

At the 2010 CWMA Annual Meeting in Springfield, Illinois, the Committee heard no comments on this item and recommended moving it forward as a Voting item.

At the 2010 NCWM National Meeting in St. Paul, Minnesota, the Committee heard from Mr. Jackelen (refer to Appendix I within the report of the 95th NCWM Annual Meeting [2010]) who opposed this item and requested that it be withdrawn. Mr. Jackelen believes this proposal would have a detrimental effect because can liners are made of natural gas and oil, and the cost of these two items are increasing. Currently, the 0.92 g/cm³ is an established practice in industry and the marketplace and is used to set the bottom weight. Changing this density will cause confusion. Mr. Jackelen clarified that High Density (HD) does not mean it is a better density. There are other linear bags that have higher quality than HD. As far as sustainability, if 0.95 g/cm³ is the established requirement it will cause an additional 12 million pounds of trash to be generated.

An official countered that the intent of this proposal is to provide the inspectors with information. There is fraud in the marketplace on these types of items and additional information is warranted. A director recommends that a minor amendment be done to the item under consideration and insert "for products labeled HD when the D is not on the package label use 0.95 g/cm³." Also use a similar statement "if the packer or manufacturer does not disclose the density then use 0.95 g/cm³." The director pointed out that it is not the role of the conference to address quality issues, but to have a level playing field for inspectors to test a product. Another official remarked that companies need to identify their product on the container, and inspectors will use what density is disclosed.

The Committee received one letter asking for the withdrawal of this proposal and California submitted material safety data sheets from several companies (refer to Appendix H within the report of the 95th NCWM Annual Meeting [2010]). The Committee considered comments received and agreed that more work was needed so the item was changed to Informational status.

232-5 I Uniform Regulation for Method of Sale of Commodities - Packaged Printer Ink and Toner Cartridges (refer to Item 270-9 in the NCWM 2010 L&R Committee Interim Agenda)

Source: Southern Weights and Measures Association (SWMA)

Purpose: This proposal is to clarify the labeling requirements for industry, consumers and weights and measures officials.

Item Under Consideration:

2.XX. Printer Ink and Toner Cartridges.

2.XX.1 Definitions.

2.XX.1.1. Printer ink cartridges – Any cartridge or module that contains ink or a similar substance in liquid form employed in the printing of documents, papers, pictures, etc., that is used in a printing device and designed to be replaced when no longer able to supply its contents in printing.

2.XX.1.2. Toner cartridges – Any cartridge or module that contains toner, powder, or similar non-liquid substance employed in the copying or printing of documents, papers, pictures, etc. that is used in a copying device and designed to be replaced when no longer able to supply its contents in printing and/or copying.

2.XX.2. Method of Sale and Labeling.

2.XX.2.1. Method of sale, printer ink cartridges. – All printer ink cartridges kept, offered, or exposed for sale or sold shall be sold in terms of the count of such cartridges and the fluid volume of ink in each cartridge stated in terms of milliliters or fluid ounces.

2.XX.2.2. Method of Sale, toner cartridges. – All toner cartridges kept, offered, or exposed for sale or sold shall be sold in terms of the count of such cartridges and the net weight of toner substance.

(Added 201X)

Background/Discussion: Over the past several years, there has been a change in the marketplace on inkjet and toner cartridges net content statements. Currently, there is little uniformity in the marketplace on this item, and the Committee is seeing some labels with a net content or with only a page yield count (e.g., prints 1000 pages). The WMD pointed out that according to guidelines printed in HB 130 from the Weights and Measures Law, Section 19 "information required on packages," these products are required to have the net contents of the ink (and toner) labeled, but manufacturers have resisted, claiming an exemption under the FPLA. The purpose of this proposal is to specifically clarify the requirements for industry, consumers, and weights and measures officials.

At the 2009 SWMA Annual Meeting in Clearwater, Florida, a Lexmark representative commented that they do not believe that a net content statement should be required, and that a page yield is sufficient. He read the main points of a letter from Lexmark to Mr. Max Gray, Director of Florida Agriculture and Consumer Services, dated March 17, 2009. The main points within the letter were: 1) the ink associated with a cartridge is a small fraction of the total cost of the print cartridge mechanism; 2) a page yield can provide a meaningful comparison to a consumer if all manufacturers employ the same estimating assumptions and techniques; and 3) International Organization for Standardization (ISO) studied this issue for years and has rejected reliance on ink volume or quantity; instead ISO has developed a yield estimating and claiming methodology that permits cartridges to be compared using a consistent yardstick. Unlike ink volume measurements, page yield measurements provide a consumer with a reliable way to compare the amount of printing that can be expected. Lexmark also stated that ink is expressly exempt from labeling as provided by the FPLA 16 CFR 503.2(a).

An industry representative believes this issue does need to be discussed and reviewed further. However, many officials believe that consumers should know what they are getting. If it is determined that page count is the quantity statement, then the page print standard should be reviewed and have tighter standards. Mr. Gray felt that more data is needed from manufacturers on this issue.

The SWMA L&R Committee recommends the item be considered for Developing by the NCWM L&R Committee.

At the 2010 Interim Meeting held in Nashville, Tennessee, the Committee heard testimony from Mr. Matthew Barkley, Hewlett Packard, regarding how the FPLA creates an exemption for ink, which extends to toner and ink cartridges. A declaration of weight and volume are not the best way for consumers to make value comparisons. Customers benefit from page count/yield. Page yield is widely accepted and has repeatability measures. Mr. Barkely urged that this issue be withdrawn. If this issue is to proceed, it should be Informational and a review of the FPLA exemption needs to be reviewed.

Mr. Paul Jeran, Hewlett Packard, submitted a white paper (refer to Appendix C in the report of the 95th NCWM Interim Meeting) from the Information Technology Industry Council (ITI). This white paper included manufacturers from Epson, Hewlett Packard, Kodak, and Lexmark. Mr. Jeran explained that his background is with ink and toner measurement. For the same volume of ink, two different systems of the same model cartridge from two different vendors can print a different number of pages. In order to determine the page yield, they are using the ISO/IEC methodology. ISO is currently working on a photo yield standard.

A state official expressed concerns with page yield being the standard page print for quantity. There are variations in yield based on the type of cartridge, printer, font, and if graphics/photos are being printed. There is also a concern with what ink cartridge refillers are doing. The Florida official reviewed the current practice of refillers, and what the refillers are listing on cartridge labels for the amount of ink. With the quality of manufactured packages in the marketplace, value comparison to original equipment manufacturer (OEM) is critical. Ink/toner is an expensive

commodity and clarifications of the requirements are needed. A state official recommended that this item not be withdrawn, but made Informational to allow for additional research. It is firmly believed that there is a need for consistency with the declaration statement on these types of items. A consumer stated his belief that net content needs to be stated with voluntary supplemental information for page yield. Others voiced the opinion that consumers need to know page yield in order to make a value comparison. The NIST Technical Advisor stated that under the FTC regulations ink and toner cartridges were not part of the CFR (refer to Appendix C for background information in the report of the 95th NCWM Annual Meeting [2010]). NIST met with the FTC on February 26, 2010, to request clarification of the exemption. According to the Committee, there needs to be a test procedure for verification of net content developed for ink and toner cartridges.

The Committee recommends that this item be made Informational until they can receive clarification from the FTC, review ISO standards, and determine what refillers' current practices are.

At the 2010 NEWMA and the CWMA Annual Meetings the Committees received a presentation from Mr. Stephen Pociask from American Consumer Institute, regarding a lack of consumer information when purchasing computer printers and cartridges. Both Committees expressed that there are still many unanswered questions and would like to hear from manufacturers of ink and toner cartridges. NEWMA and the CWMA recommend that this be an Informational item.

At the 2010 Annual Meeting held in St. Paul, Minnesota, Mr. Pociask presented a study done by his organization (refer to Appendix C within the report of the 95th NCWM Annual Meeting [2010]). It was asked who initially requested the study and who funded it. Mr. Pociask stated that the study was done in 2007 with funding by a telemarketing research company.

A Weights and Measures Official expressed concern that the study presented was not clear; is cartridge page count based on certain fill levels or declaring the weight on the cartridge itself? Mr. Pociask responded that currently Quality Logic uses the ISO standards. He also concluded that net weight is easy to enforce. Mr. Pociask stressed that his focus is to provide consumers with useful information to use in purchasing printers, and the life cost of the printer, which includes printer ink cost.

Another official stated that the study was interesting, but would like to hear from manufacturers. There are several issues; cartridges are only for specific printers, when comparing price per page you suggest that price is static, and ink cartridge refillers need to be addressed.

Mr. Joshua Rosenberg, IT Industry Council (ITI), agreed that providing consumers with information is meaningful, however; relevant to the consumer is the number of pages that can print. The ISO standards are a good tool, but will lead to customer confusion. Mr. Rosenberg expressed that there is a lot more that needs to be discussed on this issue (refer to Appendix C within the report of the 95th NCWM Annual Meeting [2010]).

At the 2010 Annual Meeting, the Board of Directors established a Printer Ink and Toner Cartridge Work Group to review and obtain additional information from all stakeholders. Ms. Vicky L. Dempsey, Chief Inspector, Montgomery County, Ohio will Chair this group and Lisa Warfield will be the NIST Technical Advisor. If you are interested in participating in this work group, please contact Ms. Dempsey at telephone (937) 225-6309 or e-mail: DempseyV@mcohio.org.

232-6 V Method of Sale, Section 2.23. Animal Bedding (refer to Item 270-12 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was adopted.)

Source: Southern Weights and Measures Association (SWMA)

Purpose: To amend NIST HB 130, Method of Sale, Section 2.23. Animal Bedding and the Interpretations and Guidelines Section 2.3.16. to accommodate the special needs and provisions of granular, pelleted, and other non-compressible, dry laboratory animal bedding materials sold to commercial end-users in the specialized lab animal research industry on a weight or per pound basis.

Item Under Consideration: Amend HB 130, Method of Sale, to include an exemption for non-consumer packages sold to laboratory animal research industry.

Section 2.23.

2.23. Animal Bedding. – Packaged animal bedding of all kinds, except for baled straw, shall be sold by volume, that is, by the cubic meter, liter, or milliliter and by the cubic yard, cubic foot or cubic inch. If the commodity is packaged in a compressed state, the quantity declaration shall include both the quantity in the compressed state and the usable quantity that can be recovered.

Example: 250 mL expands to 500 mL (500 in^3 expands to 1000 in^3).

(Added 1990)

2.23.1. Exemption – Non Consumer Packages Sold to Laboratory Animal Research Industry. – Packaged animal bedding consisting of granular corncobs and other dry (8 % or less moisture), pelleted, and/or non-compressible bedding materials that are sold to commercial (non-retail) end users in the laboratory animal research industry (government, medical, university, preclinical, pharmaceutical, research, biotech, and research institutions) ~~shall~~ may be sold on the basis of weight. (Added 201X)

Delete the following section from HB 130, Interpretations and Guidelines:

~~**Section 2.3.16. Animal Bedding**~~
~~**(L&R, 1988, p. 159)**~~

~~**Recommended Method of Sale**~~

~~**Animal bedding of all kinds, except for baled straw, should be sold by volume, that is, by the cubic meter, cubic yard, cubic foot or cubic inch.**~~

~~**The test method in Handbook 133, Section 4.11. Peat Moss, can be used for animal bedding. The test official should "fluff up" or in some way reduce the amount of compaction of product that may occur under ordinary packaging and distribution processes prior to testing.**~~

Background/Discussion: At the 2009 SWMA Annual Meeting in Clearwater, Florida, Mr. Terry Burns-Heffner, Harlan Laboratories, gave a briefing on "Bedding Packaging for Research Applications." He recommended that HB 130 be modified primarily to better control and regulate retail materials, such as mulch, peat moss, and top soil that were being sold by weight, but could easily be "spiked" with moisture. During the revision of this guideline, animal bedding materials were also rolled into this category.

Section 2.23. Paragraph 1, Sentence 1 as follows:

2.23. Animal Bedding. – Packaged animal bedding of all kinds, except for baled straw, shall be sold by volume, that is, by the cubic meter, liter, or milliliter and by the cubic yard, cubic foot or cubic inch. If the commodity is packaged in a compressed state, the quantity declaration shall include both the quantity in the compressed state and the usable quantity that can be recovered.

Example: 250 mL expands to 500 mL (500 in^3 expands to 1000 in^3).

(Added 1990)

2.23.1. Packaged animal bedding consisting of granular corncobs and other dry (less than 8 % moisture or less), pelleted, and/or non-compressible bedding materials that are sold to commercial (non-retail) end users in the laboratory animal research industry (government agencies, medical centers and universities, pharmaceutical and pre-clinical contract research organizations and other biotech and related research institutions) can still be sold on the basis of weight.

(Added 201X)

HB 130, Interpretations and Guidelines: Remove this section.

~~**2.3.16. Animal Bedding**~~

~~**(L&R, 1988, p. 159)**~~

~~**Recommended Method of Sale**~~

~~**Animal bedding of all kinds, except for baled straw, should be sold by volume, that is, by the cubic meter, cubic yard, cubic foot or cubic inch.**~~

~~**The test method in Handbook 133, Section 4.11. Peat Moss, can be used for animal bedding. The test official should "fluff up" or in some way reduce the amount of compaction of product that may occur under ordinary packaging and distribution processes prior to testing.**~~

For dry, non-compressible bedding substrates, such as granular corn cobs and pelleted paper, wood, and corn cobs that are sold to commercial end users in the laboratory animal research industry, this generalized classification and change from selling by weight to selling by volume is inappropriate for numerous reasons:

1. Requiring the sale of dry, granular or non-compressible pelleted bedding materials on the basis of volume provides an incentive for the manufacturer to produce lighter, less dense bedding, and, therefore, that bedding has less absorptive capacity. Therefore, selling bedding by volume is not in the consumers' best interest, because it is the amount of absorbent material in a cage that is most important, not the volume.

2. Historically, consumers in this non-retail industry segment, including government and regulatory agencies, such as the National Institute of Health (NIH), the Department of Defense DOD, and pharmaceutical and university research sites have purchased bedding material on the basis of weight.

3. There are existing governing bid specifications on all lab animal bedding material that tightly controls the nature and consistency of the bedding materials sold for this specific purpose. These specifications include restrictions on maximum moisture concentration, which generally require all bedding materials to contain less than 10 % moisture. Typical moisture range for these materials is in the 6 % to 8 % range. This has become the industry standard.

4. Verification of package contents is very easy to do, if it is packaged by weight. Verification of proper package content becomes difficult when product is packaged by volume, and, once again, there is the opportunity/incentive for the manufacturer to reduce amounts of bedding material put into packages over time. This verification is even more difficult on larger, bulk packages, such as the large bulk totes ranging in weight from 500 lb to 2000 lb.

At the 2010 NCWM Interim Meeting held in Nashville, Tennessee, the Committee received written notification (refer Appendix D) from industry reflecting their support on this item. During the open hearings, there were several representatives from industry who spoke on behalf of this. This item currently represents the current method of sale practice in the marketplace and, in addition, they are requesting an 8 % or less moisture loss. The 8 % moisture allowance originates from the NIH. A California official stated that if weight is important, then both weight and volume should be declared. The Government requires animal bedding to be sold on a weight basis. The NIST Technical Advisor will provide language to capture both methods of sale for the exemption. The Committee recommends the item under consideration be moved forward as a Voting item.

At the 2010 NEWMA and the CWMA Annual Meetings, there were no comments received on this item, and both regions recommend this remain a Voting item.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, the Committee received several letters on this item (refer to Appendix D in the report of the 95th NCWM Annual Meeting [2010]). There were many letters opposing this item for the following reasons: historically this is how animal bedding is being sold in the retail and laboratory marketplace, product is not consistent in density, and measurement is not appropriate for all bedding.

A presentation was given by Mr. Jerry Reynolds, The Andersons, who opposes this item. Mr. Reynolds' presentation pointed out that one item, corn cob, should not be singled out as an exception. The current regulation recognizes that a consistent bag fill is the proper measurement and method of sale to ensure consumer protection. When utilizing this product, in cage fills they are done by volume not by weight. In 1967, The Andersons was one of the first companies to sell cob bedding, which was then sold by weight. In 2006, the regulation was changed for bedding to be sold by volume because this was considered a consistent measure. Mr. Reynolds is in agreement with the moisture standard of 8 % or less.

A presentation in favor of the proposal was done by Mr. Burns-Heffner, Harlan Laboratories. Mr. Burns-Heffner stated that corn cob bedding is not sold in retail outlets, and all bedding materials are not created equal. It varies in material and characteristics. Mr. Burns-Heffner stated bedding materials are purchased and shipped, and the selling price is determined using weight. Selling by weight is precise, controlled, and easily verifiable and is the preferred method of sale with most clients in industry. Also, similar materials, such as wood pellets, stone, and gravel are sold by weight.

Mr. Reynolds did verify with Mr. Burns-Heffner of Harlan Laboratories that they are not a manufacturer of corn cob bedding. They are a packer of this type of product.

An official asked Mr. Burns-Heffner, "What percentage of customers is requesting to buy bedding by weight?" Mr. Burns-Heffner stated government agencies, and large pharmaceutical companies request this method.

Mr. Michael Schoonover, Shepherd Specialty Papers, informed the conference that they agree with Harlan Laboratories that bedding covers a wide range of products and some bedding should not fall be sold by volume. This type of product is sold to a limited marketplace.

Mr. Gregg Sharp, Green Products Company, is in favor of this proposal, which will allow non-consumer groups to buy by either method.

Two states recommended that the current method remain as is, and with consideration given to the possibility of a supplementary declaration on this product.

The Committee agreed that the language in the stated exemption is only for non-consumer packages sold to the animal research industry. Currently, it is the practice to sell by weight to research institutes and federal agencies. Updating the method of sale will allow manufacturers to follow an official method of sale.

237 ENGINE FUELS AND AUTOMOTIVE LUBRICANTS REGULATION (EFT)

237-1 W Uniform Engine Fuels Regulation – Section 2.2.1 Premium Diesel Lubricity (refer to Item 270-1 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was withdrawn.)

Source: Southern Weights and Measures Association (SWMA) (See Item 270-5 in the Report of the 92nd Annual NCWM Meeting in 2006)

Purpose: Effective January 1, 2005, the test tolerance for regular diesel lubricity was ASTM D6079 reproducibility of 136 μm (see ASTM D975-04b). The NCWM chose to accept the ASTM reproducibility limits for all diesel

(D975) and gasoline (D4814) properties (see HB 130, Section 7.2.2. Reproducibility), but chose a different reproducibility limit for premium diesel lubricity without providing any explanation as to why the ASTM reproducibility limit was insufficient. The Chairman of the Fuels and Lubricants Subcommittee (FALS) provided an update at the 2010 Interim Meeting on the work being done at ASTM.

Item Under Consideration: Amend HB 130, Uniform Engine Fuels and Automotive Lubricants Regulation. Section 2.2.1., Premium Diesel Fuel. The following reflects the current text as it was modified in 2003.

2.2. Diesel Fuel. – shall meet the most recent version of ASTM D975, "Standard Specification for Diesel Fuel Oils."

2.2.1. Premium Diesel Fuel. – All diesel fuels identified on retail dispensers, bills of lading, invoices, shipping papers, or other documentation with terms such as premium, super, supreme, plus, or premier must conform to the following requirements:

(a) **Cetane Number.** – A minimum cetane number of 47.0 as determined by ASTM Standard Test Method D613.

(b) **Low Temperature Operability.** – A cold flow performance measurement which meets the ASTM D975 tenth percentile minimum ambient air temperature charts and maps by either ASTM Standard Test Method D2500 (Cloud Point) or ASTM Standard Test Method D4539 (Low Temperature Flow Test, LTFT). Low temperature operability is only applicable October 1 - March 31 of each year.

(c) **Thermal Stability.** – A minimum reflectance measurement of 80 % as determined by ASTM Standard Test Method D6468 (180 min, 150 °C).

(d) **Lubricity.** – A maximum wear scar diameter of 520 µm as determined by ASTM D6079. If an enforcement jurisdiction's single test of more than 560 µm is determined, a second test shall be conducted. If the average of the two tests is more than 560 µm, the sample does not conform to the requirements of this part.

(Amended 2003)

Background/ Discussion: (Refer to the NCWM 93rd Annual Meeting (2008) for background information on this item.) A member of the petroleum industry believed the test and associated tolerances for lubricity on premium diesel specified in Section 2.2.1.(d) Lubricity were inconsistent with that for regular diesel. Effective January 1, 2005, the test tolerance for regular diesel lubricity was the ASTM D6079 reproducibility of 136 µm (see ASTM D975-04b). The NCWM chose to accept the ASTM reproducibility limits for all diesel (D975) and gasoline (D4814) properties (see Section 7.2.2. Reproducibility), but chose a different reproducibility limit for premium diesel lubricity without providing any explanation as to why the ASTM reproducibility limit was insufficient. If the NCWM intended to impose a stricter lubricity requirement for premium diesel, it should have designated a tighter specification for this property, not a different test tolerance (e.g., for regular and premium gasoline, premium has a different octane specification than for regular, but the test tolerance is the same). ASTM reproducibility limits were, by definition, based on establishing a 95 % probability that product that should pass, will pass. Applying an average test, as specified in Section 2.2.1.(d), reduced that probability to 80 %.

At the 2006 WWMA Annual Meeting, the L&R Committee received only one comment regarding this item, acknowledging the ongoing review by the FALS. The WWMA noted that the NCWM L&R Committee forwarded the proposal for review by the Subcommittee and agreed this item should remain Developmental pending its recommendation.

At its 2006 CWMA Interim Meeting, the Committee indicated the NCWM Fuel and Lubricant Subcommittee would make recommendations after ASTM improved the test method's precision and after the conclusion of other tests. The CWMA L&R Committee is awaiting the recommendation from the Subcommittee.

During the 2007 NCWM Interim Meeting, the Committee carried this item over as an Information item. The Committee sent this proposal to FALS and requested its recommendation on how to proceed with the issue. The FALS suggested this item remain on the agenda as an Information item until further notice and reported that the activities of ASTM International and the Coordinating Research Council were continuing.

At the 2008 NCWM Interim Meeting in Albuquerque, New Mexico, and the 2008 NCWM Annual Meeting in Burlington, Vermont, the Committee carried this item over as a Developing item. This proposal was sent to FALS for its recommendation on how to proceed with the issue. FALS suggested this item continue to remain on the agenda as a Developmental item.

At the 2008 CWMA Interim Meeting, the Committee requested that this item remain Informational pending release of the FALS recommendation, the Coordinating Research Council study, and the ASTM Lubricity Test Method Task Force reports. At the 2008 NEWMA, the WWMA, and the SWMA Annual Meetings, the Committees recommended that this item remain Informational.

In October 2008, NEWMA held their Interim Meeting, where they heard from a representative of the bio-diesel industry who briefed members on the newly adopted FTC standards regarding bio-diesel products, including the labeling of B-5, B-20, and B-100. One member expressed a concern regarding the "field testing" of bio-fuel blends and quality. This member also expressed that not enough testing occurs with regard to "octane quality" and that bio-blend testing would probably be conducted even less.

At the 2009 NCWM Interim Meeting in Daytona Beach, Florida, FALS reported to the Committee that they are awaiting development of items from ASTM.

At the 2009 CWMA Annual Meeting, the Committee recommended that this item remain Informational. The Chairman of the FALS provided an update on the work being done at ASTM. ASTM conducted a round robin to develop better precision for measuring lubricity. There is a Coordinating Research Council study to determine whether the wear scar limit is adequate to provide protection.

At the 2009 NEWMA Annual Meeting, the Committee recommended that this item remain Informational.

At the 2009 Annual Meeting held in San Antonio, Texas, the FALS Chairman gave an update that ASTM is still working on improving the precision of the test method. This should go to ballot at ASTM this semester and be final in December. The Committee recommends that this item remain informational until ASTM adopts a revision to its standard.

At the 2009 CWMA Interim Meeting held in Rock Island, Illinois, the FALS Chairman, Mr. Ron Hayes, provided CWMA an update on the ASTM ballot to revise the precision of the test method as a result of the recent round robin study. The ballot failed in June at the main committee and the new proposal is being developed for ballot.

At the 2009 WWMA Annual Meeting in Los Cruces, New Mexico, the SWMA Annual Meeting in Clearwater, Florida, and the NEWMA Interim Meeting held in Springfield, Massachusetts, there were no comments heard and these regions recommended that this proposal remain a Developing item.

At the 2010 Interim Meeting, the FALS Chairman provided an update that the ASTM ballot items failed in June 2009. They are working on improving the test method and this continues to be an on-going process.

At the 2010 NEWMA Meeting in Groton, Connecticut, the Committee heard no comments on this item. The Committee recommends that this remain an Informational item.

At the 2010 CWMA Annual Meeting in Springfield, Illinois, a state regulator recommended that this item be withdrawn. A state regulator commented that the precision of the test method still does not provide adequate protection when the precision is acknowledged for enforcement purposes for premium diesel fuel.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, it was recommended by Mr. Randy Jennings, Tennessee, that the Committee consider withdrawing this item because it has been under consideration since 2006,

and little progress has been made. The FALS Chairman supported withdrawing this item. The Committee changed the status of this item to Withdrawn during this meeting.

For additional information, please contact Mr. Hayes, FALS Chairman, (573) 751-2922 or ron.hayes@mda.mo.gov by e-mail.

237-2 I Engine Fuel Quality Requirements for Hydrogen (refer to Item 270-4 in the NCWM 2010 L&R Committee Interim Agenda)

Source: Western Weights and Measures Association (WWMA)

Purpose: Adopt engine fuel quality requirements for hydrogen in HB 130 to address gaseous hydrogen refueling applications. There is a corresponding proposal in Section 360 Other Items of the January 2010 NCWM Interim S&T Agenda to add a Draft Hydrogen Gas Measuring Devices Code to HB 44 to address requirements for hydrogen gas refueling equipment

Item Under Consideration: The U.S. National Work Group (USNWG) Fuel Specifications Subcommittee (FSS) presented the following recommendation for consideration.

FSS supports the proposed new definitions to address gaseous hydrogen refueling applications.

1. Specification for Hydrogen Fuel for Internal Combustion Engines and Fuel Cells

2. Definitions

1.XX. Fuel Cell. – an electrochemical energy conversion device ~~used to convert hydrogen and oxygen into electrical~~ in which fuel and an oxidant react to generate energy without consumption of its electrodes or electrolytes ~~to power a motor vehicle~~.

(Added 201X)

1.XX. Hydrogen Fuel. – a fuel composed of the chemical hydrogen intended for consumption in a surface vehicle with an internal combustion engine or fuel cell.

(Added 201X)

1.XX. Internal Combustion Engine. – a device used to ~~ignite hydrogen in a confined space to create mechanical~~ generate power by converting chemical energy bound in the fuel into mechanical work to power a ~~motor~~ vehicle.

(Added 201X)

Specification for Hydrogen Fuel:
The FSS identified several quality criteria where there was tentative agreement with their associated values (see properties 6, 7, 8, 9, 12, 14, and 16 which are highlighted in green) in the proposed Table 1. Hydrogen Fuel Quality Specification. When a quality property and numerical value (defining a maximum or minimum limit) is added to the specification, appropriate test methods must then be identified. As test methods are identified and adopted by the FSS, they will be added to column 6 (test methods) in Table 1. The FSS did not agree on all of the properties contained in the DMS proposal because there was either not enough research data or test methods available to support a decision (see properties 1, 2, 3, 4, 5, 10, 11, 13, and 15 which are highlighted in yellow) in Table 1 below. These and perhaps other properties will receive further consideration by the FSS and may be added to the quality standard in the future when such action is supported by research.

In April 2009, at the U.S. National Hydrogen Work Group meeting held in Sacramento, California, they further refined the definitions for hydrogen vehicle fuel based on input from SAE International. The definitions were modified to include more technically correct language and the text is in alignment with the widely recognized

"Bosch Automotive Handbook." In January 2010, a column was added to Table 1. Hydrogen Fuel Quality Specifications to reflect the responsible standards committee and the status of the test method.

Table 1. Hydrogen Fuel Quality Specification*

	Property	Value	Unit	Limit	Test Method(s)	Responsible Stds. Committee and Status of test method
1	Ammonia	0.1	ppm v/v	Maximum	to be specified	WK 10196 under ASTM D03.14
2	Carbon Dioxide	2.0	ppm v/v	Maximum	to be specified	WK 10196 and WK 4548 under ASTM D03.14
3	Carbon Monoxide	0.2	ppm v/v	Maximum	to be specified	WK 10196 under ASTM D03.14
4	Formaldehyde	0.01	ppm v/v	Maximum	to be specified	WK 10196 under ASTM D03.14
5	Formic Acid	0.2	ppm v/v	Maximum	ASTM D7550-09	WK 10196 under ASTM D03.14
6	Helium	300.0	ppm v/v	Maximum	to be specified	ASTM D03.14
7	Hydrogen Fuel Index	99.97	% (a)	Minimum	to be specified	
8	Nitrogen and Argon	100.0	ppm v/v	Maximum	to be specified	WK 4548 under ASTM D03.14
9	Oxygen	5.0	ppm v/v	Maximum	to be specified	WK 4548 under ASTM D03.14
10	Particulate Concentration	1.0	mg/kg	Maximum	to be specified	WK 9688 and WK 21611 under ASTM D03.14
11	Total Allowable Non-Hydrogen, Non-Helium, Non-Particulate constituents	100.0	ppm v/v	Maximum	to be specified	
12	Total Non-Hydrogen Gases	300.0	ppm v/v (b)	Maximum	to be specified	
13	Total Halogenated Compounds	0.05	ppm v/v	Maximum	to be specified	WK 23815 under ASTM D03.14
14	Total Hydrocarbons	2.0	ppm v/v (c)	Maximum	to be specified	WK 22378 under ASTM D03.14
15	Total Sulfur Compounds	0.004	ppm v/v	Maximum	to be specified	WK 24073 under ASTM D03.14
16	Water	5.0	ppm v/v	Maximum	to be specified	WK 10196 and WK 4548 under ASTM D03.14

Footnotes to Table 1 –

a. Hydrogen fuel index is the value obtained with the value of total gases (%) subtracted from 100 %.
b. Total Gases = Sum of all impurities listed on the table except particulates.
c. Total Hydrocarbons may exceed 2 ppm v/v only due to the presence of methane, provided that the total gases do not exceed 300 ppm v/v.

* The FTC's Fuel Rating Rule (16 CFR Part 309) see the requirements in "Labeling of Alternative Fuels" at http://www.ftc.gov/bcp/edu/pubs/business/autos/bus29.shtm requires dispensers to bear an declaration of minimum percent of hydrogen determined according to test methods described in "Standard Test Method for Analysis of Natural Gas by Gas Chromatography (ASTM D1946)

Updated 1/20/2010

Background/Discussion: Twenty-four states have hydrogen refueling dispensers in operation. Hydrogen stations using permanent and mobile refueling systems for automobiles, fleet vehicles (buses), forklifts, and airport totes are increasing and may go unnoticed. Many stakeholders who are not familiar with the weights and measures standards process will need to participate at this stage rather than after this is a commercial application. This effort by the USNWG for the Development of Commercial Hydrogen Measurement Standards is to ensure there are appropriate standards and test procedures in place in time for dispenser manufacturers, service agencies, and officials to educate the general public, not if, but when retail hydrogen applications become commercially available.

Existing codes do not fully address hydrogen refueling applications because of hydrogen's properties and other technical differences in the setup and operations of dispensing systems. The development of legal metrology standards for newly emerging hydrogen technology is a necessary component of the hydrogen infrastructure. The weights and measures community must have time to consider requirements for hydrogen-refueling systems before this application is available for public access at corner service stations.

The USNWG is bringing the proposal before the weights and measures community to share this information about upcoming standards for an emerging technology. The simultaneous development of the code and corresponding test procedures will allow for input from the weights and measures and hydrogen communities, appropriate trials of the standards, and to address all areas of concerns early in the standards development process.

This item was reviewed at the WWMA and SWMA 2008 Annual Meeting and at the NEWMA 2008 Interim Meeting. NEWMA members generally discussed the "hydrogen issue" and its usage in the marketplace. It is anticipated that hydrogen at first will be relegated to "fleet vehicles" (such as compressed natural gas [CNG]), and that retail sales will be slow in coming to the marketplace. NEWMA recommends that this item remain a Developing item.

At the 2009 Interim and Annual Meetings, the NIST Technical Advisor briefed the Committee on work that the USNWG FSS has done to date (refer to Appendix J in the report of the 94th Annual NCWM Conference [2009]).

There were no comments heard on this proposal at the CWMA 2009 Interim Meeting.

At the WWMA 2009 Annual Meeting held in Los Cruces, New Mexico, industry representatives acknowledged that some details of the specifications for fuel standards are in development. The WWMA Committee believes it is best to be proactive on this item so that Hydrogen stations can be ready to make retail sales.

At the SWMA 2009 Annual Meeting, the SWMA L&R Committee heard a recommendation from a state that as the test methods are developed they get published. They also requested that documentation be produced on the effects of hydrogen if they exceed certain property values listed in the table "Hydrogen Fuel Quality Specification," and why this is important in the testing of hydrogen.

NEWMA reviewed this proposal at their 2009 Interim Meeting and recommends leaving this as a Developing item.

At the NCWM 2010 Interim Meeting, the NIST Technical Advisor provided an updated Table 1. Hydrogen Fuel Quality Specification (refer to L&R Appendix B in this report) that amends the chart to identify which Standards Committee is actively working on the test method under development.

At the 2010 NEWMA and CWMA Annual Meeting no comments were received on this item and both Committees recommended that this item move forward as an Informational item.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, the Committee heard from Mr. Jennings, Tennessee, who informed the conference that ASTM is actively working on a hydrogen specification. Until further developed by ASTM there is nothing that can be done on this item. Mr. Jennings would also like to provide users information on what the significance is of each property.

Additional information on this hydrogen proposal and the corresponding hydrogen gas measuring devices code can be found at website: http://www.nist.gov/pml/wmd/lmdg/hydrogen.cfm. For additional information on this item, contact Ms. Lisa Warfield at lisa.warfield@nist.gov or (301) 975-3308.

237-3 I Engine Fuels and Automotive Lubricants Regulation, Section 3.15. Biodiesel and Biodiesel Blends (refer to Item 270-10 in the NCWM 2010 L&R Committee Interim Agenda)

Source: Southern Weights and Measures Association (SWMA)

Purpose: Amend Section 3.15. Biodiesel and Biodiesel Blends of the Engine Fuels and Automotive Lubricants Regulation to remove the exemption for declaration of biodiesel content on product transfer documents for biodiesel blends up to 5 %.

Item Under Consideration: Amend Section 3.15. Biodiesel and Biodiesel Blends of the Engine Fuels and Automotive Lubricants Regulation.

3.15. Biodiesel and Biodiesel Blends

3.15.1. Identification of Product. – Biodiesel shall be identified by the term "biodiesel" with the designation "B100." Biodiesel blends shall be identified by the term "Biodiesel Blend."

3.15.2. Labeling of Retail Dispensers.

3.15.2.1. Labeling of Grade Required. – Biodiesel shall be identified by the grades S15 or S500. biodiesel blends shall be identified by the grades No. 1-D, No. 2-D, or No. 4-D.

3.15.2.2. EPA Labeling Requirements Also Apply. – Retailers and wholesale purchaser-consumers of biodiesel blends shall comply with EPA pump labeling requirements for sulfur under 40 CFR § 80.570.

3.15.2.3. Automotive Fuel Rating. – Biodiesel and biodiesel blends shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.15.2.4. Biodiesel Blends. – When biodiesel blends greater than 20 % by volume are offered by sale, each side of the dispenser where fuel can be delivered shall have a label conspicuously placed that states "Consult Vehicle Manufacturer Fuel Recommendations."

The lettering of this legend shall not be less that 6 mm (¼ in) in height by 0.8 mm ($^{1}/_{32}$ in) stroke; block style letters and the color shall be in definite contrast to the background color to which it is applied.

3.15.3. Documentation ~~for Dispenser Labeling Purposes~~ Required on Transfer Documents. – ~~**The retailer shall be provided, a**~~**A**t the time of delivery of the fuel, a declaration of the volume percent biodiesel **shall be disclosed on all transfer documents.** ~~**on an invoice, bill of lading, shipping paper, or other document. This documentation is for dispenser labeling purposes only;** i~~It is the responsibility of any potential blender to determine the amount of biodiesel in the diesel fuel prior to blending.

3.15.4. Exemption.

(a) Biodiesel blends that contain less than or equal to 5 % biodiesel by volume are exempted from the requirements of Sections 3.15.1.~~,~~ **and** 3.15.2.~~**, and 3.15.3.**~~ when it is sold as "diesel fuel" as required in Section 3.3.

(b) Diesel fuel containing less than 1 % by volume biodiesel is exempted from the requirement of 3.15.3

(c) Diesel fuel containing 1 % and not more than 5 % by volume biodiesel fuel is exempt from disclosing the actual percent by volume of biodiesel as required in Section 3.15.3. However, the term "Contains Biodiesel" or other similar terms shall be used.

(Added 2005) (Amended 2008 **and 201X**)

Background/Discussion: At the 2009 SWMA Annual Meeting held in Clearwater, Florida, a discussion over blending was presented by a FALS member. Biodiesel is being blended at many terminals across the country in concentrations up to 5 %. Marketers downstream of the terminal are then attempting to blend additional biodiesel to target levels, and finding that their product is being over-blended because they were not aware that the fuel contained any biodiesel. Per Mr. Jennings, Tennessee, at least one major truck stop operator has already voiced concerns to the FALS Chairman. This amended proposal will remove the exemption declaration of biodiesel content on product transfer documents for biodiesel blends up to 5 %. Biodiesel is blended at terminals in concentrations up to 5 %. Mr. Jennings felt it was important to start this recommendation and have the FALS Chairman vet the proposal out to all members of the FALS Committee for their comments before the NCWM Interim meeting in January 2010.

3.15. Biodiesel and Biodiesel Blends

3.15.1. Identification of Product. – Biodiesel shall be identified by the term "biodiesel" with the designation "B100." Biodiesel blends shall be identified by the term "Biodiesel Blend."

3.15.2. Labeling of Retail Dispensers.

3.15.2.1. Labeling of Grade Required. – Biodiesel shall be identified by the grades S15 or S500. biodiesel blends shall be identified by the grades No. 1-D, No. 2-D, or No. 4-D.

3.15.2.2. EPA Labeling Requirements Also Apply. – Retailers and wholesale purchaser-consumers of biodiesel blends shall comply with EPA pump labeling requirements for sulfur under 40 CFR § 80.570.

3.15.2.3. Automotive Fuel Rating. – Biodiesel and biodiesel blends shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.15.2.4. Biodiesel Blends. – When biodiesel blends greater than 20 % by volume are offered by sale, each side of the dispenser where fuel can be delivered shall have a label conspicuously placed that states "Consult Vehicle Manufacturer Fuel Recommendations."

The lettering of this legend shall not be less that 6 mm (¼ in) in height by 0.8 mm ($^1/_{32}$ in) stroke; block style letters and the color shall be in definite contrast to the background color to which it is applied.

3.15.3. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, a declaration of the volume percent biodiesel on an invoice, bill of lading, shipping paper, or other document. ~~**This documentation is for dispenser labeling purposes only; it is the responsibility of any potential blender to determine the amount of biodiesel in the diesel fuel prior to blending.**~~

3.15.4. Exemption. – Biodiesel blends that contain less than or equal to 5 % biodiesel by volume are exempted from the requirements of Sections 3.15.1.~~,~~ **and** 3.15.2.~~**, and 3.15.3.**~~ when it is sold as "diesel fuel" as required in Section 3.3.

(Added 2005) (Amended 2008 **and 20XX**)

The SWMA Committee recommends moving this item forward to the NCWM L&R Committee Agenda as a Voting item.

At the 2010 NCWM Interim Meeting, Mr. Hayes, FALS Chairman, gave an update on the subcommittee's work to remove the current exemption for biodiesel disclosure in diesel fuel at 5 % and below on product transfer documents.

A draft of substitute language was circulated among FALS members prior to the interim meeting. This substitute expanded the disclosure of biodiesel content on all transfer documents (not limited to ones to the retailer) and for levels greater than 1 % biodiesel. The substitute was an attempt to find middle ground. FALS members were more agreeable to this substitute, but many still felt more work is needed.

The L&R and FALS Committee received seven letters (refer to Appendix E) that do not support this proposal as stated, but would support it with amendments. The Committee does support working on this issue and receiving feedback from industry. There is great concern with the documentation and comingling of fuels. If fuel is comingled, it would need to be sampled every time, which could be quite costly.

An official would like to see this item move forward as a Voting item. This official would like the spring Regional meetings (NEWMA and CWMA) to review and further develop the language. API stated there are many things to consider, such as preemption language, cost implications, commercial issue of declaring with each transaction. API has worked with marketers, but there continues to be a difference of opinion and no consensus. It was voiced by industry that all biodiesel needs to be documented on the paperwork. If not, it puts the wholesaler, retailer, and consumer at risk. There was a comment from a stakeholder that they do not agree with API's comment and that this has been a two year battle on who gets to do the blending. Blenders are over-blending because they are not aware of what the current blend is. To prevent this situation, it would require disclosure on the transfer document.

At the 2010 NEWMA Annual Meeting in Groton, Connecticut, a comment was heard from a stakeholder that the FTC has not changed the existing posting rule. The Committee recommends that this item remain Informational.

At the 2010 CWMA Annual Meeting in Springfield, Illinois, there were several comments stating that the exact percentage of an alternative fuel needs to be known. Without the percentage being known, mislabeling can occur, which is not good for consumer, marketers, and the environment and renewable fuels. One question that needs to be addressed is: What is the downside of providing this information? A representative of the National Biodiesel Board does not support this proposal and would like to have further discussions and seek what is best for the entire industry. They also commented that FTC declined to modify requirements for disclosure on product transfer documents for fuels containing 5 % or less biodiesel. A state official disagrees that the exact percentage is necessary since it is the blender's responsibility to test the product prior to blending. A representative of the Renewable Fuels Association would like to see the proposal expanded to include all additives and stated that the focus needs to be in broader terms instead of renewable fuels and recommends that the scope include all blending components.

It was recommended by the Committee that this item move forward as an Informational item and that FALS form a task force under their direction, to help further develop this proposal.

At the 2010 NCWM Annual Meeting held in St. Paul, Minnesota, the Committee received numerous letters (refer to Appendix E within the report of the 95th NCWM Annual Meeting [2010]) and heard from fifteen stakeholders and industry representatives, supporting Section 3.15.3 that requires disclosure. A few expressed concerns with several sections of the proposal. Currently, the FTC has the authority to protect consumers and they are looking at requiring product transfer documents. Several stakeholders indicated that they expect FTC to issue a proposed rule on biodiesel in the near future. It would be best if we stayed in line with the FTC ruling on the biodiesel issue. The very low blends seem to be the challenge.

The sections that are of concern to some stakeholders are 3.15.4 (b) and (c), since it conflicts with reporting of taxes collected on biodiesel. The exact amount of the blend needs to be documented on the transfer document. The concern is when fuel is picked up from various locations and delivered; the actual amount of biodiesel is not documented. Currently blending at the terminal is not an issue.

The Committee agreed to allow time for the FALS Committee to receive additional information and further discuss this item.

260 NIST HANDBOOK 133

260-1 V Guidance on Allowing for Moisture Loss and Other Revisions

(This item was adopted.)

Source: Moisture Loss Work Group (MLWG).

Purpose: Revise and update the 4th Edition of NIST 133 "Checking the Net Contents of Packaged Goods" (2005). Some of the changes were developed to improve the guidance on making moisture allowances.

Item Under Consideration: Current changes and recommendations to HB 133 are reflected in Appendix F, Proposed Amendments and Editorial Changes. A working draft document of HB 133 is presented in Appendix G, HB 133, "Checking the Net Contents of Packaged Goods," 4th Edition, proposed changes for 2011.

Background/Discussion: At the 2009 NCWM Interim Meeting in Daytona Beach, Florida, the NIST Technical Advisor gave a presentation to the MLWG titled, "NIST HB 133 Checking the Net Contents of Packaged Goods – An Explanation of Its Statistical Requirements and Approaches to Allowing for Moisture Loss from Packaged Goods."

The MLWG reviewed draft changes it developed to revise and update HB 133. Some of the proposed changes and recommendations were developed to improve the guidance on making moisture allowances. It was requested that comments or concerns regarding the draft changes be submitted to the NIST Technical Advisor. It was recommended that the states distribute this document to interested parties within their state for comment. The MLWG met Sunday, July 12, 2009, at the Annual Meeting in San Antonio, Texas, to consider any comments received prior to the meeting.

The U.S. Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS) issued a final ruling on 9 CFR parts, 317, 381, and 442 (refer to the NCWM Publication 15, 2009 NCWM Interim Meeting Agenda, Table B, Appendix B) "Determining Net Weight Compliance for Meat and Poultry Products," that states the procedures set forth for determining "net weight compliance." This ruling requires the use of the 4th Edition of HB 133 for all inspections of packages of meat and poultry products subject to federal law and USDA regulations effective October 9, 2008. Therefore, the incorporated provisions of NIST HB 133 do not serve merely as compliance guidance, but are a part of the meat and poultry products inspection regulations.

To be consistent with this final rule, state and local officials must determine net weight compliance for meat and poultry products, including single-ingredient, raw poultry, in a manner that includes the free-flowing liquids as part of the product and not part of the tare weight.

The MLWG updated HB 133 Section 2.3., Basic Test Procedure, to be consistent with 9 CFR parts, 317, 381, and 442. That means removing any reference to the "wet tare" method for determining net weight of USDA restricted products, since the FSIS considers free-flowing liquid to be part of the product.

At the CWMA 2009 Annual Meeting held May 3 - 6, 2009, in St. Louis, Missouri, the Committee recommended support of this item after reviewing the current proposed revisions (refer to CWMA's 2009 Annual Report) to HB 133. Comments documented during open hearings included the following recommendations from an industry representative:

1. Chapter 1-3 – add "compliance" to the reasons listed since manufacturers "overpack" to meet current regulations;

2. Chapter 1-2 – "moisture" should be inserted in front of allowance (last paragraph of page L&R - C5); there is a need to recognize that other products may be subject to moisture loss for which allowances have not been established; and

3. Chapter 2-3 and Chapter 2-5 – the dates referenced can be removed since they are already in the past. The representative cautioned that this proposal does not "finish" the issue with moisture loss.

The CWMA position is there are two questions which remain unanswered: 1) What guidance can be provided for manufacturers with products other than those listed for moisture loss?, and 2) What methodology is necessary for manufacturers to demonstrate the data needed for a moisture allowance?

A state regulator objected to this proposal as a Voting item and stated that members cannot vote on this item since the information will not be available until the July meeting. The official recommended that the proposal be moved to Informational. The regulator acknowledged that HB 133 is a NIST publication, but stated that due process must be provided since the NCWM does vote to adopt the changes in this handbook. At the CWMA voting session, the membership voted not to accept the recommendation of the Committee and recommended the item be made Informational.

At the 2009 NEWMA Annual Meeting, held May 11 - 14, 2009, in South Portland, Maine, the Committee recommended support of this item. The group discussed the meaning of "editorial" and agreed that due to the volume of changes being recommended, the correct process is to review all comments received, and then have a vote on them by the NCWM. A state official suggested that the document be distributed over the NIST Commodities Server List. A recommended change to HB 133 Chapter 2, Section 2.6., specifically references the use of glaze with frozen seafood products. It was suggested that wording include other glazed products, such as frozen chicken (i.e., glazed chicken wings).

At the 2009 NCWM Annual Meeting in San Antonio, Texas, the MLWG met on July 12, 2009. A NIST Technical Advisor informed the Committee and the MLWG that the draft HB 133 was sent out mid-May 2009 to the Weights and Measures Directors, NCWM HB 44 and Commodities list servers, e-mailed to stakeholders, MLWG attendees, and trade associations. Additional comments and recommendations received were distributed to the Committee.

HB 133 was reviewed in its entirety by the MLWG (refer to the NCWM L&R Committee Report for the 94th Annual Meeting, Appendix F.). Several state officials voiced concern that they had not had ample time to thoroughly review and evaluate the changes. A draft document of HB 133 is located in the NCWM L&R Committee Report for the 94th Annual Meeting, Appendix G.

NIST will incorporate changes from the July 12, 2009, MLWG meeting. NIST will disseminate this information to all stakeholders using their contact point information system and list servers (Weights and Measures (W&M) Directors and the NCWM HB 44 and Commodities list server).

At the 2009 CWMA Interim and the SWMA Annual Meetings, both regions recommended moving the proposed revisions forward as a Voting item at the 2010 NCWM Annual Meeting.

At the 2009 WWMA Annual Meeting held in Los Cruces, New Mexico, the WWMA L&R Committee heard concerns at the open hearings regarding moisture allowance being applied before the package's errors are determined. The WWMA L&R Committee discussed that there are jurisdictions that use the before and after application process. Software applications currently in use also apply this method. A California official informed the Committee that California policy is to take moisture allowance after the package errors are determined. It was requested that the MLWG remain active to clarify and work on the moisture loss issues. Additional resources need to be found to help support the MLWG. The WWMA Committee recommends moving this item forward as a Voting item with the following noted changes (refer to the WWMA 2009 Conference Addendum, Appendix A for a detailed description of line items):

- The majority of the WWMA L&R Committee recommended moving forward line Item 7 from the WWMA agenda Appendix A (not accepting line item 8).

    - Section 1.2.(5)a.: The amount of ~~lost~~ moisture **loss** depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors.

Revise the first paragraph, last sentence: For loss or gain of moisture, ~~apply~~ the moisture allowances **may be applied before or after the package errors are determined.**

- Line Item 25, Section 2.3.8.b. "What are the moisture allowances for flour and dry pet food?" The Committee recommends changing the title on Table 2-3 to read as "**Moisture Allowances for Product in Distribution."** This could help the Inspector from potentially applying an incorrect test procedure at a production facility.

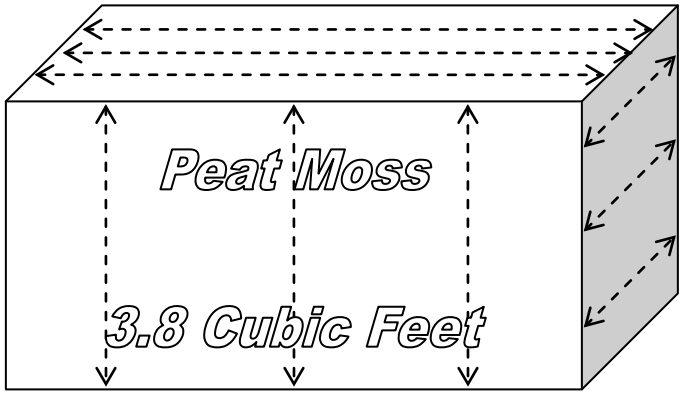
- Line item 29, Section 2.3.8.d. "What moisture allowance is used with wet tare when testing packages bearing a USDA seal of inspection?" should read as: When there is free-flowing liquid **and liquid** ~~or absorbent~~ **absorbed by** packing materials in contact with the products, all free liquid **and the absorbed liquid** is part of the wet tare.

- Remove line Item 30, Section 2.3.8.e. "How is moisture loss handled for products not listed in HB 133?" in its entirety and retain as a Developmental item with future work to be done by the MLWG.

- Line Item 61, Section 3.10.a. "How are packages of peat and peat moss labeled by compressed volume testing?" modify the second sentence to add the underlined words and graphic:

  - **For each dimension (length, width, and height) take three equidistant measurements, take the average of each respective dimension and multiply to determine the cubic measure as follows:**

Average height X average width X average length = cubic measurement



At the NEWMA 2009 Interim Meeting, officials reviewed the changes, located in Appendix A, of language deemed "editorial changes." While NEWMA supports the majority of "editorial changes," they have concerns that some of the changes go beyond "editorial" and requests that the language proposed for inclusion on Section 2.3.8. Question (e) on page 25 by [Kraft: Paul Hoffman (7/09)] be removed from the editorial changes. NEWMA felt the language proposed for that section is repetitive and that it already exists in other Federal Law.

A state official also requested language previously included in the 3rd edition of HB 133, but was omitted from the 4th edition, be included in the newest revision. That language addresses the issue of gray area as it pertains to moisture content and moisture loss. NEWMA also recommends a mocked up copy of HB 133 with highlights of changes be posted on the NIST website.

At the NCWM 2010 Interim Meeting held in Nashville, Tennessee, the MLWG met on Sunday, January 24, 2010, to review the line item changes located in Appendix A, Table of Proposed Amendments and Editorial Changes for HB 133, *Checking the Net Contents of Packaged Goods* (refer to the NCWM 2010 Interim L&R Agenda). Participants in the meeting provided and discussed their input into each line item to the L&R Committee.

During the open hearings, a state official recommended that this item under consideration be moved forward as a Voting item. Comments were heard on the following line items (refer to Appendix A from the NCWM 2010 Interim L&R Agenda) during the open hearings:

- Line item 3, Section 1.1.a.(3) – Amend sentence 7. **If the weights and measures jurisdiction conducting the inspection does not have access to other retail locations, wholesalers or point of pack location(s) then the weights and measures authorities having jurisdiction in those locations should be contacted and asked to conduct an inspection at those locations to determine the cause of the findings.**

  - Mr. Guay, P&G, recommends that the word "should be replaced with ". **locations ~~should~~ it is recommended that they be contacted and asked to conduct".**

- Line item: Section 1.2.(5).a – For loss or gain of moisture**, ~~apply~~** the moisture allowances **may be applied before or after the package errors are determined**.

  - Two state officials recommend that there are currently two methods of computation. They both encourage that one method be selected and they prefer for moisture loss only be applied after.

- Line item 25: Section 2.3.8(b).

  - A California state official recommends for USDA inspection for wet tare only that the language read "packed and labeled" at a USDA facility.

- Line item 31-33: Section 2.3.8.e "How is moisture loss handled for products not listed in HB133"

  - L&R Chairman stated that these items will be removed for consideration and returned to the Moisture Loss Work Group (MLWG) for further development and clarification.

- Line item 65: 3.12. – Ice Cream Novelties

  - Ms. Cary Frye, VP Reg. and Scientific Affairs from the International Dairy Ice Cream Association supports the change to the pelletized ice cream. She is working with the FDA to get clarification for ice pelletized products (non-dairy) (refer to 232-2 of this report)

- Line item 10a: 3.11.b. – Specifications for Test Measures for Mulch and Soils.
  - Mr. Bob LaGasse, Mulch and Soil Council, spoke regarding the editorial change that left out the 12 x 12 x 24 measure.

The NIST Technical Advisor informed attendees that additional changes will occur on item 2.6. "Drained Weight for Glazed or Frozen Foods." Seafood testing training was held in January 2010 in Topeka, Kansas, and has provided recommended changes to the L&R Committee for inclusion into HB133. Ms. Judy Cardin provided the Committee with a "Glazed Seafood Worksheet" and a "Glazed Seafood Package Report" to be added to Appendix E of HB 133. The NIST Technical Advisor will incorporate these changes into Appendices F and G in the 2010 Interim L& R Report.

The Committee recommended that the item under consideration be moved forward as a Voting item.

At the 2010 NEWMA Annual Meeting in Groton, Connecticut, a comment was made on line item 8 (Appendix F), Section 1.2(5)a. that adjustments should not be made to the test data, but adjustments should be made to test results determining the criteria. Proposed revision to line item 8: 1.2.(5)a. last line to read:

You may apply an allowance after determining the **package** errors by **~~an amount equal to the moisture~~ adding the** allowance **~~to adjust the average error adding the allowance~~** to the SEL and MAV and then reevaluating sample compliance.

There was concern that the test procedures do not take into account non-conforming size samples (e.g. 80 lbs block of frozen seafood). The Committee recommends that the seafood test procedure be reviewed to accommodate different sampling sizes. NEWMA supports this item as a Voting item with the above stated revisions.

At the 2010 CWMA Annual Meeting in Springfield, Illinois there were no comments heard on this item. It was recommended by the Committee that this item move forward as a Voting item.

At the 2010 NCWM Annual Meeting held in St. Paul, Minnesota the Committee's recommendation is to adopt as revised below. Line item numbers are how they appear in Pub. 16. Appendix F.

- Line Item 8. - First paragraph – move the parenthesis to enclose the title of the Section.
  To apply a moisture allowance before determining package errors, adjust the Nominal Gross Weight (see Section 2.3. "Basic Test Procedure"~~)~~ – Determine Nominal Gross Weight and Package Errors for Tare Sample**)** so the package errors are increased by an amount equal to the moisture allowance.

- Line Item 8. – second paragraph third sentence:
  You may apply ~~an~~ a moisture allowance after determining the **package** errors by ~~an amount equal to the moisture~~ **adding the allowance** ~~to adjust the average error adding the allowance~~ to the SEL and **then, comparing the average error to the SEL to determine compliance. The moisture allowance must also be added to the** MAV **before evaluating sample errors to identify unreasonable minus errors.** ~~and then reevaluating sample compliance.~~

- Line Item 22. - replace current language with:
  When no predetermined allowance is found in HB133, the potential for moisture loss must be considered.

  Inspectors should follow their jurisdiction's guidance for making their determination on an acceptable moisture allowance.

- Line Item 24 – replace with: **Table 2-3. Moisture Allowances**

- Line Item 25 replace first paragraph
  Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

- Line Item 41 amend to read as follows:
  For **ice** glazed seafood**, meat, poultry or similar products** ~~and fish~~**,** determine the net weight after removing the glaze using the following procedure. Use this method for any ~~frozen~~ **ice** glazed food product.

- Line Item 43 amend Step 1 to read as:
  Add in the following language: Take out Step 1 and replace with the following language.

  Use an official inspection report to record the inspection information. Attach additional worksheets, test notes, and other information as needed. This handbook provides an ice glazed seafood worksheet and package report form in Appendix E. Modify the worksheet, package report and the box numbers to meet your agency's needs. Other formats that contain more or less information may be acceptable.

- Line item 44: Petroleum ~~15~~ **15.6** °C (60 °F)

- Line item 54: Replace figure 3-1 and replace with a pictograph of a frozen novelty or similar item on a stick.

- Line item 57: Put back into HB133 the figure of the stacking pattern of logs and bundle firewood that was in an older version of HB 133.

- Line items 67, 68, 69, and 70 add the word "**Ice**" as the first word in the title of the Seafood worksheets and reports.

- Editorial Item:
  Place the conversion charts located in HB44, Appendix C into an Appendix in HB133.

It was recommended that the MLWG continue to work on how moisture loss is handled for products not listed in HB 133 (refer to Appendix H. line item 28 in this report.) The NIST Technical Advisor stated that the work group will continue to work on any outstanding items concerning moisture loss. A question was asked on what the HB 133 edition number would be, since many Federal agencies have adopted the fourth edition. An official stated that federal agencies need to adjust their own rules if they consider adopting a new edition.

260-2 V Seed Count for Agricultural Seeds (refer to Item 270-5 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was adopted.)

Source: Central Weights and Measures Association (CWMA)

Purpose: To adopt a test procedure for inspection of bulk agricultural seed (specifically corn seed, soybean seed, field bean seed, and wheat seed) labeled by "count," taking account of this prevalent method of sale and the value to the seed industry and farmers arising from an accurate, practical, efficient, and uniform method.

There is a current standard adopted by the Association of Official Seed Analyst (AOSA) which is broadly accepted by industry. Several states adopt both the AOSA standard and the HB133 regulation, which causes confusion due to conflicting Maximum Allowable Variations (MAV). The MAVs in HB 133 are not considered appropriate for seed counts in which counts can be as high as a 200 000.

Item under Consideration: Amend HB 133 by adding a new Section 4.11. Rules for Testing Seeds and amending Tables 1-1. and 2-10. to provide for a uniform, practical, and accurate method for conducting inspections of specified agricultural seed varieties when labeled and/or sold by "count." There is consensus among the seed industry, state seed control officials, and academics in support of the AOSA standard for seed counting. This standard should be adopted as part of HB133 to ensure that seed is sold with an accurate count.

American Seed Trade Association (ASTA) requests (see Appendix G, ASTA Seed Count Rule for Agriculture Seeds) that HB 133, Section 4.2. Packages Labeled by Count be amended by adding the language from AOSA "Rules for Testing Seeds," Section 12: Mechanical Seed Count (see below with incorporated changes) as Section 4.11. of HB 133, to be titled "Procedure for Checking the Content of Certain Agricultural Seed Packages Labeled by Count" (see Appendix H, AOSA, Section 12: Mechanical Seed Count).

HB 133 Section 4.2. Amended to read:

4.2. Packages Labeled by Count

How are packages labeled by count tested?

If the labeled count is more than 50 items **with the exception of corn, soybeans, field beans, and wheat seeds, see** Section C 4.4. "Packages Labeled by Count of More than 50 Items." **If the labeled count is**

more than 50 items for corn, soybeans, field beans, and wheat seeds, see Section 4.11 "Procedure for Checking the Contents of Specific Agricultural Seed Packages Labeled by Count."

Amend title of Table 2-10. (HB133, Appendix B) to read:

Table 2-10. Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood and Packages Labeled by Count with Fewer than 50 Items**, and Specific Agricultural Seeds Labeled by Count**.

Amend Table 2-10. to include an additional row as shown below:

Specific Agricultural Seeds Labeled By Count	**The MAVs are:** **For corn seed: 2 % of the labeled count** **For soybean seed: 4 % of the labeled count** **For field bean seed: 5 % of the labeled count** **For wheat seed: 3 % of the labeled count**

Amend HB 133, Appendix A, Table 1-1. to adjust for the new name of Table 2-10. ("Table 2-10. Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood, and Packages Labeled by Count with Fewer than 50 Items**, and Specific Agricultural Seeds Labeled by Count").**

AOSA Section 12.6. Rules for Testing Seeds - modified for consideration as a new Section 4.11 to HB 133.

12.6. Tolerances Maximum Allowable Variations ~~for results from different laboratories.~~
Multiply the labeled seed count ~~**or first seed count test result**~~ by 4 % for soybean samples, 2 % for corn (round, flat or plateless) samples, 5 % for field bean samples and 3 %for wheat samples. Express the ~~**tolerance**~~ **maximum allowable variation** (the number of seeds) to the nearest whole number. Consider the results of two tests in ~~**tolerance**~~ **accord with the maximum allowable variation** if the difference, expressed as the number of seeds, is equal to or less than the ~~**tolerance**~~ **maximum allowable variation**.

Example:
Kind of seed: Corn
Label claim ~~**(1st test):**~~ 2275 seeds/lb.

Lab Test ~~**(2nd test)**~~: Purity working weight = 500.3 g
Seed count of pure seed = 2479 seeds

$$\text{Number of seeds per pound} = \frac{453.6 \text{ g/lb} \times 2479 \text{ seeds}}{500.3 \text{ g}} = 2247.6 \text{ seeds/lb}$$

Rounded to the nearest whole number = 2248 seeds/lb

Calculate ~~tolerance~~ **maximum allowable variation** value for corn:
multiply label claim by 2 %
2275 seeds/lb × 0.02 = 45.5 seeds/lb;
rounded to the nearest whole number = 46 seeds/lb

Determine the difference between label claim and lab test:
2275 seeds/lb – 2248 seeds/lb = 27 seeds/lb

The difference between the lab test ~~(2nd test)~~ and the label claim ~~(1st test)~~ is less than the ~~tolerance~~ **maximum allowable variation** (27 < 46); therefore, the two results are in ~~tolerance~~ **accord with the maximum allowable variation.**

Background/Discussion: The CWMA held their 2009 Interim Meeting on September 13 - 16, 2009, in Rock Island, Illinois. A representative from ASTA explained a proposal regarding seed count for four types of seeds: corn, soybeans, field beans, and wheat. An item to amend the requirement for testing seeds by count was considered approximately ten years ago, but there was a lack of industry consensus at that time. In the interim, state, federal, university seed regulators, and seed laboratories developed a test method after significant scientific testing to provide acceptable MAVs.

There are modern agricultural methods of farming. Farmers are now requesting the number of seeds on packages in order to accommodate their precision planting methods. Since seed is a natural biological product, it can vary in size and weight. There is currently a standard adopted by the Association of Official Seed Analysts (AOSA) that is broadly accepted. Several states adopt both the AOSA standard and HB 133 regulations which is causing confusion because of the conflicting MAV allowances. The HB 133 regulation is not seed specific; therefore, it does not contemplate items being sold in quantities as high as 200 000 per bag. A letter of support was received from the Association of American Seed Control Officials.

At the NCWM 2010 Interim Meeting, the Committee received numerous letters (refer to Appendix H in the report of the 95th NCWM Interim Meeting [2010]) in support of this item. During the open hearing Ms. Maile Hermida, Hogan & Hartson, spoke on behalf of the seed trade association in support of this proposal to modify count. Farmers need information to know how to plant their fields, and there are devices capable available and calibrated. This practice is already used by states that adopt the AOSA method as part of their current seed control law. ASTA and AOSA are in agreement and support this item. Iowa also supports this proposal. Mr. Michael Stahr, President, AOSA, supports this item, stating this is the current standard already in use in some states.

The L&R Committee recommends this item under consideration move forward as a Voting item.

At the 2010 NEWMA Meeting held in Groton, Connecticut, a representative of the seed industry provided an explanation on the background of this item. The Committee recommends this move forward as a Voting item as written.

At the 2010 CWMA Meeting held in Springfield, Illinois, it was noted that the entire Section 12 of the Association of Official Seed Analysts Rules for Testing seeds needs to be made as part of the item. The current item for consideration only has Section 12.6 specified. The Committee also noted that Section 12.6, as printed in the 2010 NCWM Pub. 15 should have been underlined and bolded in full to reflect that it would be an addition to HB 133. In accord with the CWMA's intent, they recommend the entire section be amended to include:

SECTION 12: MECHANICAL SEED COUNT

The following method shall be employed when using a mechanical seed counter to determine the number of seeds contained in a sample of soybean (*Glycine max*), corn (*Zea mays*), wheat (*Triticum aestivum*) and field bean (*Phaseolus vulgaris*).

12.1. Samples.

Samples for testing shall be of at least 500 grams for soybean, corn and field beans and 100 rams for wheat and received in moisture proof containers. Samples shall be retained in moisture proof containers until the weight of the sample prepared for purity analysis is recorded.

12.2 Seed counter calibration.

The seed counter shall be calibrated daily prior to use.

(a) Prepare a calibration sample by counting 10 sets of 100 seeds. Visually examine each set to insure that it contains whole seeds. Combine the 10 sets of seeds to make a 1,000 seed calibration sample. The seeds of the calibration sample should be approximately the same size and shape as the seeds in a sample being tested. If the seeds in a sample being tested are noticeably different in size or shape from those in the calibration sample, prepare another

calibration sample with seeds of the appropriate size and shape. Periodically re-examine the calibration samples to insure that no seeds have been lost or added.

(b) Carefully pour the 1,000 seed calibration sample into the seed counter. Start the counter and run it until all the seeds have been counted. The seeds should not touch as they run through the counter. Record the number of seeds as displayed on the counter read out. The seed count should not vary more than ±2 seeds from 1,000. If the count is not within this tolerance, clean the mirrors, adjust the feed rate and/or reading sensitivity. Rerun the calibration sample until it is within the ±2 seed tolerance. If the seed counter continues to fail the calibration procedure and the calibration sample has been checked to ensure that it contains 1,000 seeds, do not use the counter until it has been repaired.

12.3 Sample preparation.

Immediately after opening the moisture proof container, mix and divide the submitted sample, in accordance with section 2.2 of the Association of Official Seed Analysts' (AOSA's) Rules for Testing Seeds, to obtain a sample for purity analysis and record the weight of this sample in grams to the appropriate number of decimal places (refer to section 2.3 a) of the AOSA's Rules for Testing Seeds. Conduct the purity analysis to obtain pure seed for the seed count test.

12.4 Conducting the test.

After the seed counter has been calibrated, test the pure seed portion from the purity test and record the number of seeds in the sample.

12.5 Calculation of results.

Calculate the number of seeds per pound to the nearest whole number using the following formula:

Number of seeds per pound = 453.6 g/lb × no. of seeds counted in 12.4 divided by the weight (g) of sample analyzed for purity

12.6. ~~Tolerances~~ Maximum Allowable Variations

Multiply the labeled seed count by 4 % for soybean samples, 2 % for corn (round, flat or plateless) samples, 5 % for field bean samples and 3 % for wheat samples. Express the maximum allowable variation (the number of seeds) to the nearest whole number. Consider the results of two tests in accord with the maximum allowable variation if the difference, expressed as the number of seeds, is equal to or less than the maximum allowable variation.

Example:
Kind of seed: Corn
Label claim: 2275 seeds/lb.

Lab Test: Purity working weight = 500.3 g
Seed count of pure seed = 2479 seeds

Number of seeds per pound = 453.6 g/lb × 2479 seeds = 2247.6 seeds/lb divided by 500.3 g
Rounded to the nearest whole number = 2248 seeds/lb

Calculate maximum allowable variation value for corn:
multiply label claim by 2 %
2275 seeds/lb × 0.02 = 45.5 seeds/lb;
rounded to the nearest whole number = 46 seeds/lb

Determine the difference between label claim and lab test:
2275 seeds/lb – 2248 seeds/lb = 27 seeds/lb

The difference between the lab test and the label claim is less than the maximum allowable variation (27 < 46); therefore, the two results are in accord with the maximum allowable variation.

(Note: Subsection 12.6 of the AOSA Rule was modified to conform to the NCWM form and style.)

At the 2010 NCWM Annual Meeting held in St. Paul, Minnesota, there was concern expressed from the floor that the item did not appear in full on the agenda. It was clarified that the information regarding the AOSA standard for mechanical seed count is reflected in the letter from ASTA (refer to Appendix H in the report of the 95th NCWM Annual Meeting.) An AOSA representative discussed the studies that were done to ensure a high level of repeatability. There were numerous states and industry representatives that expressed support for this item.

The item below has been reviewed and modified by the NIST Technical Advisor to conform to the HB 133 structure. Additional modification to the structure may occur upon further review by the NIST Publications Coordinator.

4.11. Procedure for Checking the Contents of Specific Agriculture Seed Packages Labeled by Count

a. How is the number of seeds determined in a sample of soybean, corn, wheat, and field bean, when using a mechanical seed counter?

The following method shall be employed when using a mechanical seed counter to determine the number of seeds contained in a sample of soybean (*Glycine max*), corn (*Zea mays*), wheat (*Triticum aestivum*) and field bean (*Phaseolus vulgaris*).

Test Equipment

- **Mechanical seed counter.**
- **Moisture proof container.**

4.11.1. Test Procedure

1. **Testing samples shall be received and retained in moisture proof containers until the weight of the sample prepared for purity analysis is recorded. The sample shall be of at least 500 grams for soybean, corn, field beans, and 100 grams for wheat.**

2. **The seed counter shall be calibrated daily prior to use.**

   - **Prepare a calibration sample by counting 10 sets of 100 seeds. Visually examine each set to insure that it contains whole seeds. Combine the 10 sets of seeds to make a 1000 seed calibration sample. The seeds of the calibration sample should be approximately the same size and shape as the seeds in a sample being tested.**

   Note: If the seeds in a sample being tested are noticeably different in size or shape from those in the calibration sample, prepare another calibration sample with seeds of the appropriate size and shape. Periodically re-examine the calibration samples to insure that no seeds have been lost or added.

   - **Carefully pour the 1000 seed calibration sample into the seed counter. Start the counter and run it until all the seeds have been counted.**

   Note: The seeds should not touch as they run through the counter. Record the number of seeds as displayed on the counter read out.

- **The seed count should not vary more than ± 2 seeds from 1000. If the count is not within this tolerance, clean the mirrors, adjust the feed rate and/or reading sensitivity. Rerun the calibration sample until it is within the ± 2 seed tolerance.**

3. **Note: If the seed counter fails the calibration procedure and sample has been checked to ensure that it contains 1000 seeds, do not use the counter until it has been repaired.**

Immediately after opening the container, mix and divide the sample to obtain a sample for purity analysis. (refer to AOSA rules for testing seeds section 2.2)

4. **Record the weight of this sample in grams to the appropriate number of decimal places.**

5. **Conduct the purity analysis to obtain pure seed for the seed count test.**

6. **After the seed counter has been calibrated, test the pure seed portion from the purity test and record the number of seeds in the sample.**

7. **Calculation of results.**

   - **Calculate the number of seeds per pound to the nearest whole number using the following formula:**

   Number of seeds per pound = 453.6 g/lb × no. of seeds counted divided by the weight (g) of sample analyzed for purity

8. **Determine the Maximum Allowable Variation**

   - **Multiply the labeled seed count by 4 % for soybean, 2 % for corn, 5 % for field bean, and 3 % for wheat.**

   Note: Express the maximum allowable variation (the number of seeds) to the nearest whole number. Consider the results of two tests in accord with the maximum allowable variation if the difference, expressed as the number of seeds, is equal to or less than the maximum allowable variation.

   Example:
   Kind of seed: Corn
   Label claim: 2275 seeds/lb.

   Lab Test: Purity working weight = 500.3 g
   Seed count of pure seed = 2479 seeds

   Number of seeds per pound = 453.6 g/lb × 2479 seeds divided by 500.3 g = 2247.6 seeds/lb
   Rounded to the nearest whole number = 2248 seeds/lb

   Calculate maximum allowable variation value for corn:
   multiply label claim by 2 %
   2275 seeds/lb × 0.02 = 45.5 seeds/lb;
   rounded to the nearest whole number = 46 seeds/lb

   Determine the difference between label claim and lab test:
   2275 seeds/lb − 2248 seeds/lb = 27 seeds/lb

The difference between the lab test and the label claim is less than the maximum allowable variation (27 < 46); therefore, the two results are in accord with the maximum allowable variation.

260-3 I HB 133, Chapter 4.7. Polyethylene Sheeting - Test Procedure - Footnote Step 3 (refer to Item 270-7 in the NCWM 2010 L&R Committee Interim Agenda).

Source: Western Weights and Measures Association (WWMA)

Purpose: Update HB 133, Chapter 4.7 Polyethylene Sheeting – Test Procedure to provide new density values for heavier density plastics that are currently in the marketplace.

Polyethylene bags labeled as "High Density," or HDPE, have been found to package products whose labeled net weights meet calculated target net weights when employing a density factor of 0.92 g/cm³. When a density factor of 0.95 g/cm³ is used, as appropriate, in the calculation for high density polyethylene materials, these products commonly fail to meet the calculated target net weight. Further testing of these packages of polyethylene bags reveals that one or more of the labeled width, thickness, or count statements are inaccurate. HDPE product distributors that place a net weight statement on their packages based upon the Linear Low Density Polyethylene (LLDP) density value (0.92 g/cm³) have an approximately 3 % advantage over the distributor that uses the correct, high density, factor.

Item Under Consideration: Amend the asterisked footnote below Step 3 as follows:

*****Determined by ASTM Standard D 1505-98 **(or latest issue)** "Standard Method of Test for Density of Plastics by the Density Gradient Technique." For the purpose of this handbook, **when the actual density is not known,** the minimum density **used to calculate the target net weight** shall be 0.92 g/cm³ ~~**when the actual density is not known**~~**. For products labeled "High Density, HDPE, or similar wording, the minimum density (d) used to calculate the target net weight shall be 0.95 g/cm³.**

Background/Discussion: A proposal was presented at the WWMA 2009 Annual Meeting in Los Cruces, New Mexico, that manufacturers and distributors of polyethylene bags labeled as "High Density," or HDPE, have been found to package products whose labeled net weights meet calculated target net weights when employing a density factor of 0.92 g/cm³. When a density factor of 0.95 g/cm³ is used, as appropriate, in the calculation for high density polyethylene materials, these products commonly fail to meet the calculated target net weight. Further testing of these packages of polyethylene bags reveals that one or more of the labeled width, thickness, or count statements are inaccurate.

For example, a box of HDPE has stated dimensions of 24 in x 40 in x .4 mil, and a count of 250. Using the only density factor found in HB 133, 0.92 g/cm³, the calculated target net weight, and that shown on the label, would be 6.38 lbs. If using the actual density factor for the HDPE bags of 0.95 g/cm³, the target net weight would be 6.59 lb. This means that HDPE product distributors that place a net weight statement on their packages based upon the Linear Low Density Polyethylene (LLDP) density value (0.92 g/cm³ have an approximately 3 % advantage over the distributor that uses the correct, high density, factor.

When the original testing procedure was developed, HDPE bags had not yet entered the marketplace. Currently, this product is quite prevalent in the United States. Amending the test procedure will aid weights and measures inspectors in enforcing labeling requirements that allow true value comparisons and close a loophole within HB 133.

The 2009 WWMA Association supports this item and recommends that it be a Voting item.

NEWMA reviewed this item at their 2009 Interim Meeting and proposes this item be a Developing item.

At the NCWM 2010 Interim Meeting, the Committee heard comments for this item and Item 232-1 (L&R 2010 NCWM Interim Agenda) together at the open hearings. The Committee heard support for the suggestion that the density factor should change from 0.92 g /cm³ to 0.95 g/cm³. A California official stated that the information

provided by the Western was data extracted from Internet searches. Currently, manufacturers are complaining that under current practice, they cannot compete fairly.

Mr. Jackelen, Berry Plastics, urged the Committee to reject this proposal. Mr. Jackelen stated that 0.92 g/cm³ currently works for manufacturers and that changing it to 0.95 g/cm³ will cause undue cost and waste. Most manufacturers do not make high density (HD) bags, but are producing blends. Mr. Jackelen also stated an additional reason to reject the proposal is 0.95 g/cm³ bags, if punctured will continue to tear.

A Weights and Measures Official stated that if you use the term HD, then you are bound by the 0.95 g/cm³ density. If you use the length x width x thickness x density to determine the net weight, then the density needs to be added to the package labeling. Another official stated that manufacturers should consider disclosing the density factor on every product as part of the labeling. It was voiced that if there are questions about an absolute 0.95 g/cm³ density then there should be an alternate suggestion. Another official stated that 0.95 g/cm³ will be factored in when the density is not known. The Committee received letters that were reviewed on this item (refer to Appendix I within the report of the 95th NCWM Annual Conference.) The Committee recommends moving the item under consideration forward as a Voting item.

At the 2010 NEWMA Annual Meeting in Groton, Connecticut, there was concern that there appears to be a lack of data on this item. It was not reviewed by all regions and not presented to industry to get comments. The Committee felt that this item was not an emergency and would like to review comments received by all the regions and industry.

At the 2010 CWMA Annual Meeting in Springfield, Illinois, there were no comments heard on this item and the Committee recommends that this item remain a Voting item.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, an official stated that his comments were the same as he expressed in Item 232-4 of this report. The official stated that with the amendments recommended by an other official expressed in Item 232-4, he would support this proposal. There is agreement that the role of the Conference is not to determine quality issues, but rather to set testing standards for inspectors. Moving this item to Informational status will allow time to receive additional information and data from manufacturers of polyethylene.

The Committee believes that additional work needs to be done on this item including reviewing the labeling requirement of polyethylene. This may include requiring a mandatory statement and review of ASTM standards. The status of this item was changed to Informational during the 2010 Annual Meeting.

260-4 W HB 133, Chapter 4.7. Polyethylene Sheeting Test Procedure – T-shirt/cut-out bags (refer to Item 270-8 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was withdrawn.)

Source: Western Weights and Measures Association (WWMA)

Purpose: To offer guidelines on how to determine the net weights of the high density polyethylene "t-shirt" bags.

Item Under Consideration: Amend Chapter 4.7. Polyethylene Sheeting – Test Procedure as follows:

When testing "t-shirt" or other bags with cut-outs for handles use the following guideline to determine the target net weight amount of product cut-out of the original bag and removed from the container prior to packaging:

Calculate the target net weight in pounds of the bags as if there were no cut-out area:

$$\mathbf{T \times A \times D \times 0.03613 \times Ct. \times 2 = Z}$$

Calculate target net weight in pounds of the cut out area of bags (A) by multiplying TNW x the Handle Cutout % as found in Table 4.7.(a).

To determine the target net weight (X) of the package of t-shirt bags, subtract TNW-A.

TNW = Calculated Target Net Weight
A = Calculated Target Net Weight of cut-out area
X = Target net weight of "T-shirt" bags

Example: A package of t-shirt bags is labeled 12 in x 7 in x 22 in, 0.3 mil, 2000 count,

0.0003 x [(12+7) x 22 x 2] x 0.95 x 0.03613 x 2000 = 17.216,

17.216 lbs x 0.107 (from Table 4.7(a) = 1.84 lbs,

17.216 lbs – 1.84 lbs = 15.37 lbs, the target net weight for the t-shirt bag container.

Table 4.7.(a)

LENGTH (in)	TOTAL WIDTH FACE WIDTH + GUSSET WIDTH (in)	HANDLE CUT-OUT Percent (%)
14.0 to 16.5	12.0 to 16.5	16.27 %
16.6 to 18.5	12.0 to 16.5	15.60 %
17.0 to 18.5	16.6 to 19.75	13.10 %
18.6 to 19.5	16.6 to 19.75	12.40 %
19.6 to 20.5	16.6 to 19.75	12.65 %
20.6 to 22.0	16.6 to 19.75	10.70 %
22.1 to 23.5	16.6 to 19.0	9.63 %
22.0 to 24.0	19.76 to 22.0	10.40 %
24.1 to 25.5	19.76 to 22.0	8.35 %
28.0 to 32.0	22.0 to 24.0	7.10 %
32.1 to 36.0	22.0 to 24.0	6.04 %
28.0 to 32.0	24.1 to 26.0	6.20 %
32.1 to 36.0	24.1 to 25.0	5.14 %

Background/Discussion: At the 2009 WWMA Annual Meeting held in Los Cruces, New Mexico, this proposal was submitted. Over the past several years, there has been a rapid expansion of the production and distribution of high density polyethylene "t-shirt" (grocery) bags. The current directions for calculating the target net weight of packages containing these bags offer no guidelines on how to determine net weight. Calculating the net weight of the cut-out area has been a challenge. It has been difficult to ensure that the weight statements on the packages are accurate. Spectrum Plastics Inc. located in Los Angeles County, California, developed, with the assistance of an engineering firm, a table (above) to provide guidelines to calculate the amount of cut-out area.

The 2009 WWMA L&R Committee did not feel that sufficient background data was submitted from various sources. There are a large number of distributers of domestic and imported products with these types of bags. The HDPE shopping bags are a significant portion of the market. However, once additional data is received and validated, a proposed method of testing of the target net weights could save field testing time. They recommend this proposal be Developing.

NEWMA reviewed this proposal at its 2009 Interim Meeting and recommends it be a Developing item.

At the NCWM 2010 Interim Meeting, a comment was heard from a state official that they recommend this item remain a Developing item and that a template test procedure similar to the procedure for checking the area measurement of chamois be incorporated. The Committee reviewed this item and felt that there was not enough

information and data to support this proposal. The Committee would also like to see comments and recommendations from industry. The Committee is Withdrawing the proposed item under consideration and recommends that it be returned to the WWMA for further development and clarification.

At the 2010 NEWMA Annual Meeting in Groton, Connecticut, there was concern that there appears to be a lack of data on this item. It was not reviewed by all regions and not presented to industry to get comments. The Committee felt that this item was not an emergency and would like to review comments received through all regions and industry.

At the 2010 CWMA Annual Meeting in Springfield, Illinois, there were no comments heard on this item and the Committee recommends that this item be Withdrawn.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, an official stated his comments on this proposal were the same as stated in Item 232-4. This official spoke that it is recommended to make an amendment be done to the item and insert "for products labeled HD when the D is not on the package label use 0.95 g/cm³, they would fully support this proposal. It is not the role of the Conference to address quality issues, but to have a level playing field for inspectors to test a product. Moving this item to Informational status will allow time to receive additional information and data from manufacturers of polyethylene.

The Committee received one letter asking for the Withdrawal of this proposal and California submitted material safety data sheets from several companies (refer to Appendix H within the report of the 95th NCWM Annual Meeting [2010]).

260-5 W HB 133, Method of Measurement of the Volume of Bagged Mulch (refer to Item 270-11 in the NCWM 2010 L&R Committee Interim Agenda)

(This item was withdrawn.)

Source: Southern Weights and Measures Association (SWMA)

Purpose: Update HB 133 for the volume measurement of bag mulch, and update moisture allowance, decomposition and specification changes for testing bag mulch.

Item Under Consideration: Amend HB 133

- Chapter 2, Section 2.3. Basic Test Procedure, "Moisture Allowances":

  The purchase date of the bagged mulch product needs to be known, so that an adjustment to the bagged mulch may be made to reflect decomposition since the purchase date.

- Chapter 3, 3.11. Mulch and Soils Labeled by Volume - Add a bulleted item:

  The decomposition of wood mulch occurs over a period of time. The purchase date of the product needs to be known, so that an adjustment to the product may be made to reflect decomposition since the purchase date.

- Chapter 3, 3.11. Revise Table 3-4 "Specifications for Test Measures for Mulch and Soils" **56.6 L (2 ft^3) bag measure for bag mulch 30.48 cm (12 in) X 30.48 cm (12 in) X 60.96 cm (24 in)**

Background/Discussion: Mr. Chuck Tomlinson, Amerigrow, was unable to attend the SWMA 2009 Annual Meeting in Clearwater, Florida. Mr. Gray briefed the SWMA conference on this proposal (refer to Appendix L, Amerigrow Mulch Proposal) for bag mulch. Bag mulch is a type of product that suffers from decomposition and desiccation and turns to dirt as it ages. However, no lot number, expiration date, or date of pack is being placed onto bags to determine its age.

Amerigrow recommends adding language within HB 133 stating that the purchase date of the product needs to be proven so that reasonable adjustments can be made to reflect the decomposition since the "purchase date." Amerigrow also stated that mulch bags are easy to tamper with (open and reseal) and that a chain of custody needs to be implemented, beginning with the purchase date. A chain of custody will also assist with determining the age of the mulch and the conditions in which it was stored.

Another issue with bag mulch is that it is available with different grinds that can produce different fill rates when measured in the measuring box specified in HB 133 Table 3-4. Finer mulch does not benefit from rolling the bags and fluffing the mulch. Amerigrow has provided the SWMA with new specifications for the measuring box (**56.6 L (2 ft^3) bag measure for bag mulch 30.48 cm [12 in] X 30.48 cm [12 in] X 60.96 cm [24 in]).**

The 2009 SWMA L&R Committee recommended moving this item forward as a Developing item to the NCWM L&R Committee. The Committee would like industry to be notified of this proposal and seeks additional information and comments.

At the 2010 NCWM Interim Meeting held in Nashville, Tennessee, the Committee heard testimony from Mr. Robert C. LaGasse, Executive Director of the Mulch and Soil Council. He did not support this item and encouraged the Committee to withdraw this item. Mr. LaGasse stated that there is currently no data on the decomposition of wood mulch (air flow/moisture content). He also stated it is not a common practice to require a pack date or expiration date on the packaging of wood mulch.

Mr. LaGasse did support the editorial change in HB133 "Table 3-4. Specifications for Test Measures for Mulch and Soils." A state official did not see the necessity of this proposal. The editorial changes mentioned during the open hearings are addressed under Item 260-1 as editorial changes. The Committee recommends that the item under consideration be Withdrawn.

At 2010 NEWMA and the CWMA Annual Meetings, no comments were heard on this item and both regions agreed that this item should be withdrawn.

260-6 V National Pasta Association - HB 133, Moisture Allowance for Pasta Products
(refer to Item 270-13 in the NCWM 2010 L&R Committee Interim Agenda)

(This item neither passed nor failed and was returned to Committee.)

Source: Southern Weights and Measures Association (SWMA)

Purpose: Amend HB 133 by adopting a 3 % moisture allowance for macaroni, noodle, and like products (pasta products).

Item Under Consideration: Amend HB 133, Chapters 1 and 2, Moisture allowance to be amended as follows and which will incorporate a 3 % moisture allowance for pasta products, adding the language in bold below:

- Chapter 1: Why do we allow for moisture loss or gain?
  - This handbook provides "moisture allowances" for some meat and poultry products, flour, **pasta products,** and dry pet food.
  - Test procedures for flour, **pasta products,** some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area.
- Chapter 2: Moisture Allowances:
  - What is the moisture allowance for flour, pasta products, and dry pet food? The moisture allowance for flour, pasta products, and dry pet food is 3 % of the labeled net weight.

Note: Pasta products means all macaroni, noodle, and like products packaged in Kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.

- Chapter 2: How is the average error for the moisture allowance corrected?

  - This handbook provides "moisture allowances" for some meat and poultry products, flour, **pasta products,** and dry pet food.

Background/Discussion: Studies indicate that moisture loss for pasta products is reasonably predictable over time (see Appendix M, National Pasta Association Proposal to Establish a Moisture Allowance for Pasta Products). Pasta exhibits consistent moisture loss in all environments and packaging, which can vary more than 4 % due to environmental and geographic conditions. Although it eventually reaches equilibrium with the surrounding atmosphere because it is hygroscopic, this balance does not occur until long after packaging and shipping.

At the 2010 Interim Meeting, the Committee heard support for this item from industry and stakeholders. If this item is approved, it will also amend the Moisture Allowance Table in HB133 giving pasta a 3 % moisture allowance. The Committee reviewed the submitted study (refer to Appendix A in the report of the 95th NCWM 2010 Interim Meeting.) The Committee recommends moving the item under consideration forward as a Voting item.

At the 2010 NEWMA Annual Meeting held in Groton, Connecticut, a representative of the pasta industry gave the group an explanation of the item and expressed support for this item as written. The Committee also supports this item.

At the 2010 CWMA Annual Meeting held in Springfield, Illinois, a representative from the National Pasta Association stated the data supports the 3 % moisture allowance. A Weights and Measures Official commented that testing in their state does not support the proposal. An industry representative stated that guidance is needed for an established moisture allowance and currently there are no guidelines to establish the moisture loss percentage.

At the 2010 NCWM Annual Meeting held in St. Paul, Minnesota, a representative for the National Pasta Association spoke on behalf of the proposal. This item will allow for a specific moisture loss percentage to be taken. Inspectors will now have a specific number that they can apply to the pasta product. Representatives of several pasta companies spoke in support of this item and stated that it is consistent with numerous studies that have been done. A state director opposes this item, since pasta is known to have moisture loss due to the type of product it is. He further explained that applying a blanket 3 % moisture loss does not make sense, what may be good in Florida may not be good in New Mexico. A Weights and Measures Official stated that applying the 3 % does not stop an inspector from going into a distribution or point of pack to inspect; especially if the inspectors believe the packer is under filling packages. He urged that this proposal be supported to provide a tool. Another official felt that the proposal should be voted through, it is important to recognize guidelines for consideration. A pasta association representative also agreed that this work goes back a couple of decades and that several studies were provided for consideration. Another representative explained that they pack to net weight. Pasta contains 10 % to 13 % moisture; if the moisture standard is lowered the product falls apart along with the product quality.

270 OTHER ITEMS – DEVELOPING ITEMS

INTRODUCTION

The NCWM established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing items are those items that have not received sufficient review by all parties affected by the proposals or may be insufficiently developed to warrant review by the NCWM L&R Committee. The Developing items listed are currently under review by at least one regional association, subcommittee, or work group (WG).

The Developing items are marked according to the specific NIST handbook into which they fall – HB 130 or HB 133. The Committee encourages interested parties to examine the proposals included in the appendices and to send their comments to the contact listed in each part.

The Committee asks that the regional weights and measures associations, subcommittees, and WGs continue their work to fully develop each proposal. Should an association, subcommittee, or WG decide to discontinue work on a Developing item, the Committee asks that it be notified. When the status of an item changes because the submitter withdraws the item, the item will be listed in a table below. For more details on items moved from the Developing items list to the Committee's main agenda, refer to the new reference number in the main agenda.

270-1 D Fuels and Lubricants Subcommittee (FALS) (refer to Item 270-2 in the NCWM 2010 L&R Committee Interim Agenda)

Source: The Fuels and Lubricants Subcommittee (FALS)

Purpose: Update the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in HB 130. Another task will be to update the Basic Engine and Fuels, Petroleum Products, and Lubricants Laboratory Publication.

Item Under Consideration: FALS has met since the 2007 Annual Meeting and continues its work on a number of items in addition to preparing a major revision of the Fuel Ethanol Specifications.

Background/Discussion: The Subcommittee met on January 24, 2007, at the NCWM Interim Meeting to undertake a review of a number of significant issues related to fuel standards. Their first project was to undertake a major review and update of the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in HB 130. The Subcommittee also met at the 2007 NCWM Annual Meeting and continued its work on a number of items in addition to preparing a major revision of the Fuel Ethanol Specifications.

An additional project will be to update and possibly expand the Basic Engine Fuels, Petroleum Products, and Lubricants Laboratory Publication. The Subcommittee will undertake other projects as time and resources permit.

At the 2009 NCWM Interim Meeting and Annual Meeting, the FALS Chairman informed the Committee that FALS is working toward getting changes made to the language within the document.

At the CWMA 2009 Interim, the WWMA 2009 Annual, the SWMA 2009 Annual, and the NEWMA 2009 Interim Meetings, there were no comments heard. They recommend that this proposal remain a Developing item.

At the 2010 NCWM Interim Meeting, the FALS Chairman, Mr. Hayes, informed the Committee that FALS is still working on this project. No comments were heard during the open hearings, and the Committee agrees that this item should remain a Developing item.

At the 2010 NEWMA Annual Meeting held in Groton, Connecticut, no comments were heard on this item. The Committee recommends that this item remain Developmental.

At the 2010 CWMA Annual Meeting held in Springfield, Illinois, the NIST Technical Advisor provided information that NIST has begun work on the development of a handbook for State fuel laboratories.

At the 2010 NCWM Annual Meeting in St. Paul, Minnesota, a comment from a petroleum representative stated that this item is premature and that action needs to be taken by the Environmental Protection Agency (EPA). Mr. Hayes, FALS Chairman, clarified that this item is for a laboratory guide and that FALS supports NIST efforts to develop a handbook for state fuel laboratories. The item mentioned by the petroleum representative is for a new proposal that is being submitted through the regions modifying HB 130 as a result of a potential EPA waiver for gasoline containing more than 10 volume percent ethanol.

If you would like to participate in this Subcommittee, contact Mr. Ron Hayes, Chairman Fuels and Lubricants Subcommittee, at (573) 751-2922, e-mail: ron.hayes@mda.mo.gov, or Mr. David Sefcik, NIST at (301) 975-4868, e-mail: david.sefcik@nist.gov

270-2 I Ice Glazed Seafood Forum

Discussion/Background: An ice-glazed seafood forum was held on Sunday July 11, 2010. Ms. Judy Cardin, Wisconsin, gave a briefing on the multistate investigation with ice-glazed seafood. All states that participated in the investigation found issues with ice-glazed seafood and net weight packages.

Mr. Steve Wilson, National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Services Seafood Inspection Program (NMFS SIP), informed attendees that NOAA plans to adopt HB133 MAV's within the next month. NMFS SIP will work closely with NIST to study how variability between SIP's current methodology and HB133 can be removed. NMFS offered training to states and also to assist with investigations or inspections. NMFS will also seek ways to work with the Customs and Border Protection on the feasibility in the traceability of product through the supply chain.

Ms. Lisa Weddig, National Fisheries Institute (NFI), is committed to ending intentional fraud with short weighing. NFI members want regulators to also focus on those who are blatantly cheating the system. Educating its members on good quantity control practices and test procedures is a priority.

For more information regarding this item, contact Ms. Judy Cardin at judy.cardin@wisconsin.gov.

Mr. Joe Benavides, Texas, Chairman
Mr. Raymond Johnson, New Mexico
Ms. Jonelle Brent, Illinois
Mr. John Gaccione, Westchester County, New York
Mr. Terence McBride, Tennessee

Mr. Ron Hayes, Missouri, Chairman FALS

Mr. Doug Hutchinson, Canada, Technical Advisor
Mr. Rob L. Underwood, Associate Member Representative

Ms. Lisa Warfield, NIST Technical Advisor: e-mail: lisa.warfield@nist.gov
Mr. David Sefcik, NIST Technical Advisor: e-mail: david.sefcik@nist.gov
Mr. Ken Butcher, NIST Technical Advisor: e-mail: kenneth.butcher@nist.gov

Laws and Regulations Committee

Appendix A

Pelletized Ice Cream

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International Dairy Foods Association
Milk Industry Foundation
National Cheese Institute
International Ice Cream Association

July 10, 2008

Ms. Geraldine A. June
Team Leader, Food Labeling and Standards
Office of Nutritional Products, Labeling and Dietary Supplements
FDA/Center for Food Safety & Applied Nutrition
CPK1/4D014
5100 Paint Branch Parkway
College Park, MD 20740
Sent Via E-mail to: geraldine.june@cfsan.fda.gov

RE: Request for Interpretation of FDA Food Labeling Regulations for Net Quantity of Contents and Serving Size of Pelletized Ice Cream and Frozen Desserts

Dear Ms. June:

The International Ice Cream Association (IICA) appreciated the opportunity to meet on June 27, 2008 with officials from FDA's Office of Food Labeling, along with staff from the National Institute of Standards and Technology (NIST) Weights and Measure's Division, and regional Weights & Measures officials to discuss the net contents declaration and method of measurement for pelletized ice cream.

We are writing this letter seeking FDA assistance on determining the net quantity of content statement and serving size declaration that should be used for pelletized ice cream and frozen desserts. For the reasons noted below, IICA believes the net quantity of content statement should be a volumetric declaration that excludes the external air. We also are asking for FDA guidance in identifying the serving size that should appear in the nutrition facts panel for these products.

Pelletized ice cream is a unique and novel ice cream product that entered the market in 1988 under the brand name Dippin' Dots,™ which was predominantly sold in food service venues to consumers for immediate consumption. Due to commercialization and development of processing technology, pelletized ice cream has been introduced into retail stores over the past several years by five companies. Today the product is sold in food service and retail stores both in multi-serving and individual serving packages.

Pelletized ice cream products meet the federal standard of identity (SOI) for ice cream as specified in 21 CFR §135.110. The product is made using pasteurized mix consisting of one or more of the prescribed dairy ingredients, sweeteners, stabilizers and flavorings. The ice cream

mix is stirred via pumping and spraying action as the droplets are frozen at very low temperatures using liquid nitrogen. The freezing process results in small round shaped beads or pellets of ice cream that meet the required 4.5 lbs per gallon weight requirements set forth in the SOI for ice cream. Different flavored ice cream pellets such as strawberry, banana, chocolate and vanilla may be mixed together to create novel flavors such as "banana split," or flavoring can be added to the pellets such as cookie pieces, cookie dough, brownies, and other inclusions. In addition to pelletized ice cream, this same freezing process is also used to produce similar products such as pelletized water ice and pelletized frozen desserts. IICA believes that determination of the method of sale and serving size in the nutrition fact panel should apply to all pelletized ice cream, and all pelletized frozen dessert products.

As we discussed during the June 27th meeting, ice cream and frozen desserts are sold by units of fluid measure. Therefore, the declared net quantity of contents for pelletized ice cream and frozen desserts will be expressed in fluid ounces. The ice cream industry's position is that the method of sale and net quantity of contents for pelletized ice cream and pelletized frozen desserts should be declared in fluid ounces without including any external air surrounding the pellets of ice cream or flavoring. We are seeking concurrence from FDA that it agrees with the industry position of using in the net quantity statement fluid ounces that exclude the external air.

We also are seeking FDA guidance on the serving size that should be stated in the nutrition facts panel (NFP) for pelletized ice creams and frozen desserts. During the June 27th meeting we discussed the issue and are asking FDA to identify the serving size that should be used on these products.

We would greatly appreciate your prompt reply in this matter, as it is critical to future work on determining the proper method for measuring the volume of the pelletized ice cream and frozen desserts. The IICA would like to propose a new method of measurement for this product to the 2009 National Conference of Weights and Measures. In order to meet that deadline we would need to develop and verify a test method to submit the proposal to the Southern Weights and Measures Association meeting on October 5, 2008.

If you have any questions or require additional information regarding this matter, please feel free to contact me at (202) 220-3543 or via e-mail at cfrye@idfa.org.

Sincerely,



Cary Frye
Vice President,
Regulatory Affairs

cc: K. Butcher, NIST
L. Warfield, NIST

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
College Park, MD 20740

APR 17 2009

Cary Frye
Vice President
Regulatory Affairs
International Dairy Foods Association
Milk Industry Foundation
National Cheese Institute
International Ice Cream Association
1250 H Street NW, Suite 900
Washington, DC 20005

Dear Ms. Frye:

This is in response to your July 10, 2008 letter to the Food and Drug Administration (FDA) and a follow up to the June 27th meeting at the National Institute of Standards and Technology (NIST) seeking assistance on how to determine the appropriate net quantity of content statement for pelletized ice cream and the appropriate measurement, i.e. volume excluding the external air versus net weight. You also asked FDA for clarification on the appropriate serving size for these products.

You stated in your letter that the International Ice Cream Association believes the net quantity of content statement for pelletized ice cream and frozen desserts should be a volumetric declaration that excludes the external air. You stated that, as we discussed at the June 27th meeting at NIST, ice cream and frozen desserts are sold by units of fluid measure and, therefore, the declared net quantity of contents for pelletized ice cream and frozen desserts should be expressed in fluid ounces. Further, you stated that the ice cream industry's position is that the method of sale and the net quantity of contents for pelletized ice cream be declared in fluid ounces without any external air surrounding the pellets of ice cream or flavoring.

By way of background, the FDA enforces the Federal Food, Drug, and Cosmetic Act (FFDCA) and certain provisions of the Fair Packaging and Labeling Act (FPLA). The FFDCA requires that all labeling and packaging of food products, including the net quantity of contents statement, be truthful, informative, and not deceptive. The FPLA is concerned with the labeling of packaged consumer goods for retail sale to enable consumers to obtain accurate information about the quantity of contents and to facilitate value comparisons. Compliance with these laws and the regulations promulgated under the authority of these laws is secured through periodic inspections of facilities and products, analyses of samples, educational activities, investigations of consumer trade complaints, and legal proceedings.

Page 2 - Cary Frye

Provisions of 21 CFR 101.105(a) specify that the declaration of quantity of contents shall be in terms of weight if the product is solid, semisolid, or viscous, or a mixture of solid and liquid. Thus, it would appear that traditional ice cream products, being semisolid foods, would be declared by weight. However, provisions of §101.105(a) also provide that if there is a firmly established general consumer usage and trade custom of declaring the contents of a liquid by weight, or a solid, semisolid, or viscous product by fluid measure, it may be used. Because there appears to be a firmly established general consumer usage and trade custom of expressing quantity of contents declarations on traditional ice cream products in terms of volume, the agency has not required industry to revise their declarations to be expressed in terms of weight.

Pelletized ice cream is a unique and totally new ice cream product that is emerging in the marketplace. Because it is a semisolid food, in accordance with 21 CFR 101.105(a), the appropriate net quantity of content declaration for these products would be net weight. In addition, there is not a firmly established general consumer usage and trade custom of expressing the quantity of contents declaration in terms of volume on pelletized ice cream.

As you know, pelletized ice cream is manufactured at very low temperatures using a nitrogen process and consists of thousands of small beads of ice cream of varying sizes. Moreover, because there is variation in the diameter of the pieces, settling in the package, and the absence of a test procedure, FDA believes that a net quantity of content declaration using a volume measurement would be difficult for manufacturers to determine and confirm and for regulatory officials to test. In addition, density variations occur when inclusions are added to packages of pelletized ice cream. Because these inclusions such as cookie bits, themselves, vary in size and weight, using gravimetric testing to verify the declared volume of a sample may not be practical.

FDA believes that a net weight approach would eliminate the need to develop a new test procedure that could be time consuming and require expensive test equipment. It appears that because of the uniqueness of these products, a net weight declaration would be an easier measurement to test than a volume declaration. Furthermore, it is FDA's understanding that these products have been sold by net weight from at least one manufacturer in the United States for more than a year and there is no record of any consumer complaints regarding the method of sale. Therefore, FDA believes that the net quantity of content statement on pelletized ice cream should be declared in terms of net weight. We would expect manufacturers of pelletized ice cream to revise their labels to reflect a net weight declaration during the next printing cycle and encourage all marketers of pelletized cream to modify their labels with a net weight declaration within one year from the issue date of this letter.

Page 3 - Cary Frye

With regards to your request for guidance in identifying the serving size that should appear in the nutrition facts panel for pelletized ice cream, we point out that FDA regulations in 21 CFR 101.12 establish reference amounts customarily consumed and how to use these reference amounts to declare serving sizes. In 21 CFR 101.12(b), Table 2, the reference amount for ice cream, ice milk, frozen yogurt, sherbet, bulk and novelty frozen desserts (e.g., bars, sandwiches, cones) is a half cup with the equivalent metric quantity in parentheses. While we acknowledge that pelletized ice cream is a unique and totally new ice cream product, we believe that the half cup serving size is appropriate for this product. Therefore, the serving size for pelletized ice cream is a half cup with the equivalent weight in grams.

If you have additional questions, do not hesitate to contact us.

Sincerely yours,

Geraldine A. June
Supervisor
Product Evaluation and Labeling Team
Office of Nutrition, Labeling,
and Dietary Supplements
Center for Food Safety
and Applied Nutrition

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
College Park, MD 20740

OCT 2 2 2009

Cary Frye
Vice President
Regulatory Affairs
International Dairy Foods Association
Milk Industry Foundation
National Cheese Institute
International Ice Cream Association
1250 H Street NW, Suite 900
Washington, DC 20005

Dear Ms. Frye:

This is in response to your May 29, 2009, letter to the Food and Drug Administration (FDA) in which you thanked FDA for explaining the agency's position regarding the appropriate measurement and declaration of the net quantity of contents for pelletized ice cream. You requested that pelletized ice cream and frozen dessert manufacturers have until the next uniform compliance date of January 2, 2012 to revise their labels to a net weight declaration.

You stated in your letter that it has long been the practice of the ice cream and frozen dessert industry to declare the net quantity of contents of its products in terms of volume, not weight. You also stated that as affected member companies begin to comply with the new policy requiring declarations in terms of net weight, they will need to conduct new testing to ensure accurate declarations, and they will need to print and run labels. You further stated that many of these members have substantial existing stocks of labels, and given the seasonal nature of the affected products, it will take significant time to use this stock.

As you know, in the response letter dated April 17, 2009 to the International Ice Cream Association, FDA's decision to require a net weight declaration applied to pelletized ice cream products only and not to any other frozen dessert. Pelletized ice cream is a unique and new ice cream product that has emerged in the marketplace and our evaluation was limited to this type of product. We were not asked to evaluate other frozen dessert products, nor provided any information on any additional products that are in the marketplace. Further, we were not aware that there were similar questions regarding other frozen dessert products. It is FDA's understanding that there is a limited number of manufacturers of pelletized ice cream products and at least one manufacturer in the United States has been selling the product by net weight for more than a year. Thus, FDA believes that the one year compliance date from April 17, 2009 is an appropriate

amount of time for manufacturers to change their labels from a volume declaration to a net weight declaration on pelletized ice cream products. Therefore, FDA is denying your request for manufacturers of pelletized ice cream and frozen desserts to have until the next uniform compliance date of January 2, 2012 to revise their labels.

However, the agency recognizes that individual manufacturers may need additional time to change their labels and may request additional time. Therefore, the agency believes that it would be appropriate to consider, on a case-by-case basis, whether to exercise enforcement discretion with respect to the April 17, 2010 date. Factors that the agency intends to consider in any request from a manufacturer for the agency to exercise enforcement discretion include; the explanation of why the request is being made, the number of existing labels that the manufacturer is requesting to use, the dollar amount associated with the number of labels to be used, and the estimate of the amount of time needed to exhaust existing labels the manufacturer is requesting to use. Manufacturers may submit their requests in writing to Felicia Billingslea, HFS-820, Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Nutrition, Labeling, and Dietary Supplements, 5100 Paint Branch Parkway, College Park, Maryland 20740.

If you have additional questions, do not hesitate to contact us.

Sincerely yours,

Geraldine A. June
Supervisor
Product Evaluation and Labeling Team
Office of Nutrition, Labeling,
and Dietary Supplements
Center for Food Safety
and Applied Nutrition



International Dairy Foods Association
Milk Industry Foundation
National Cheese Institute
International Ice Cream Association

May 14, 2010

Ms. Loretta A. Carey
Consumer Safety Officer
Food Labeling and Standards Staff
Office of Nutrition, Labeling, and Dietary Supplements
CF SAN, FDA
5100 Paint Branch Parkway
College Park, MD 20740
Sent Via E-mail to: Loretta.Carey@fda.hhs.gov

RE: IICA Additional Information on Pelletized Frozen Desserts Measurement and Net Contents Declaration.

Dear Ms. Carey:

The International Ice Cream Association (IICA) is providing this information in response to your request for additional information about pelletized frozen desserts before responding to our request for confirmation of the appropriate manner of declaring net content on these products.

Pelletized frozen desserts are unique and novel products that entered the market in 1988 with the pelletized frozen ice cream sold under the brand name Dippin' Dots™, which was predominantly sold in food service venues to consumers for immediate consumption. Due to the commercialization and development of processing technology, packaged pelletized ice cream entered the retail marketplace about four years ago. While Dippin' Dots and similar pelletized ice creams meet the standard of identity for ice cream specified in 21 C.F.R 135.110, some other pelletized frozen desserts do not meet the ice cream standard. These include the three flavors of Unilever's Popsicle Shots Ice Beads and four flavors of Kemps Itti Bitz Icee Bits currently on the market. We have provided two examples to demonstrate the different types of pelletized ice cream and frozen dessert products that are currently in the market place.

Regardless of whether the pelletized products meet the ice cream standard, they are manufactured and sold in much the same manner In short, these products are beads of ice cream, water ice, sherbet or other frozen dessert that are quick frozen with liquid nitrogen. The beads are relatively small, but they can vary in shape and size.

In a June 27, 2008 meeting with officials from FDA's Office of Food Labeling, along with staff from the National Institute of Standards and Technology (NIST) Weights and Measures Division, IICA discussed the appropriate manner of net contents declarations for these pelletized products. In a follow-up letter to FDA in July 2008, IICA further explained its position that the net quantity of content statement for both pelletized ice creams and other frozen desserts should be a volumetric declaration that excludes the external air. At that time, IICA explained that such a declaration would be consistent with the volumetric declarations used on other ice cream and frozen dessert products. In response to a request to provide additional information, specifically with regard to the measurements used for other frozen novelties and the pros and cons associated with volumetric measures that include and exclude the external air, IICA provided this information in a September 8, 2008 letter.

On April 17, 2009, FDA sent a letter to IICA expressing its disagreement with the position that a volumetric declaration is appropriate. IICA and its members respected this decision and made the changes necessary to comply with the agency's position. Because FDA made clear in a subsequent October 22, 2009 letter that its decision "applied to pelletized ice cream only and not to other frozen dessert" and further noted "we were not aware that there were similar questions regarding other frozen dessert products," IICA sent its letter earlier this year seeking the agency's confirmation that indeed all pelletized frozen desserts should bear net content declarations in terms of weight, not volume.

As explained in that April 2, 2010 letter, the rationale that supported FDA's decision with regard to pelletized ice creams should apply to other pelletized frozen desserts. We see no reason for a departure. As a preliminary matter, 21 CFR 101.105(a) specifies that the quantity of contents be declared in terms of weight if the product is solid, semisolid, viscous, or a mixture of solid and liquid, unless there is a firmly established history of declaring the content of the product in terms of volume. Because pelletized ice cream is a unique and new product, FDA determined that this exception did not apply. We see no reason why a contrary rationale would be applied to pelletized frozen desserts, which are newer to the market than the pelletized ice creams. Additionally, we have provided updated information in the table below on the pros and cons of labeling pelletized frozen dessert with net weight declaration compared to the volume declaration used by conventional ice cream and frozen dessert products.

Further, as set forth in FDA's April 2009 letter, "The FPLA is concerned with the labeling of packaged consumer goods for retail sale to enable consumers to obtain accurate information about the quantity of contents and to facilitate value comparisons." Now that it has been determined that pelletized ice cream products must have net content statements in terms of weight, it would best facilitate value comparisons if all pelletized frozen desserts declared net contents in terms of weight. To determine otherwise would seem to run contrary to the dictates of the FPLA.

Because the National Conference on Weights and Measures will meet in early July and consider amendments to NIST Handbooks 130 and 133, including an amendment to reflect FDA's position with regard to net content statements for pelletized ice cream and frozen desserts, we would like the agency's timely confirmation of its position with regard to pelletized frozen desserts.

If you have any questions or require any further information, please feel free to contact me at (202) 220-3543 or via e-mail at cfrye@idfa.org.

Sincerely,



Cary Frye
Vice President,
Regulatory Affairs

cc: G. June, ONDLS, FDA
K. Butcher, NIST
L. Warfield, NIST

Comparison of Volumetric Declaration and Measurement vs. Gravimetric (weight) for Pelletized Frozen Desserts		
Option	**Pros**	**Cons**
Label by weight	• **Consistent with pelletized ice cream (FDA decision April 2009)** • **Measurement method will be easy to implement in the field** • **No concerns around product settling or melting**	• **Method inconsistent with all traditional ice cream and novelties**
Label by volume (Excluding **external air)**	• **Method consistent with all other ice cream and novelties**	• **Accurate measurement method needs to be developed** • **Water displacement methods are difficult to implement in the field** • **Inconsistency between Net Content declaration and Nutrition Facts Panel**



Strawberry, Chocolate and Vanilla Flavored Ice Cream Beads



Itti Bitz Pelletized Ice Cream



Lemon Lime Flavored Ice Beads



Icee Bits Pelletized Frozen Dessert

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
College Park, MD 20740

Martin Hahn
Hogan & Hartson LLP
Columbia Square
555 Thirteenth Street, NW
Washington, DC 20004

This is in response to your September 4, 2009 letter and subsequent e-mail dated February 2, 2010, on behalf of your client, Kemps, LLC. You are requesting an additional year exemption (through April 17, 2011) to exhaust current packaging inventory for your client's pelletized ice cream. As we understand these products are marketed under the IttiBitz brand, StoneRidge brand, Albertson's brand, and Jewel brand.

You advise that the labels for Kemps pelletized ice cream are being changed to reflect the Food and Drug Administration position that quantity of contents for pelletized ice cream should be expressed in units of net weight rather than fluid volume. As we understand, Kemps, LLC, has an overabundance of product labels because of the newness of the product lines, lower sales than projected, and the seasonal nature of the product. While we were not provided with existing and new labels for the products in question, you did provide us the following information regarding label inventory.

Brand	Flavor	label inventory as of 4/2010	Run out dates
IttiBitz	Neopolitan	551,019	12/2010
"	Mint Chip	149,152	6/2010
"	Strawberry Cheesecake	311,840	4/2011
"	Champions Chocolate	216,000	4/2011
"	Double Chocolate Stars	1,115,148	12/2010
"	Waffle Cone Twist	1,075,354	10/2010
StoneRidge	Cookies N Cream	109,274	4/2011
"	Banana Split	254,960	"
"	Neapolitan	232,981	"
"	Mint Chip	159,615	"
"	Cotton Candy	205,230	"
Albertson's	Cookies N Cream	156,412	4/2011
"	Banana Split	92,286	"
"	Neapolitan	168,412	"
"	Mint Chip	138,164	"
"	Cotton Candy	116,536	"
Jewel	Cookies N Cream	69,746	4/2011

2—Kemps

"	Banana Split	237,197	4/2011
"	Neapolitan	235,373	4/2011
"	Mint Chip	157,373	4/2011
"	Cotton Candy	167,197	4/2011

Based on the limited information you provided, FDA will agree to not take enforcement action against the products listed in the above table for reasons of incorrect declaration of the quantity of contents in terms of volume rather than net weight through the following dates:

IttiBitz brand pelletized mint chip through June 30, 2010
IttiBitz brand pelletized waffle cone twist through October 31, 2010
IttiBitz brand pelletized neopolitan through December 31, 2010
IttiBitz brand pelletized double chocolate stars through December 31, 2010.
The remaining pelletized products in the above table through April 17, 2011

However, we expect that new labels with the proper quantity of contents declaration will be used on these products after the dates specified above.

Sincerely yours,

Felicia B. Billingslea

Felicia B. Billingslea
Director
Food Labeling and Standards Staff
Office of Nutrition, Labeling
and Dietary Supplements
Center for Food Safety
and Applied Nutrition

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Appendix B

Hydrogen Fuel Method of Sale

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U.S. National Work Group for the Development of Commercial Hydrogen Measurement Standards

Fuel Specifications Subcommittee (FSS)
A Proposed Method of Sale and Quality Specification for Hydrogen Vehicle Fuel

Summary of Current Information

The Chairman of the FSS is: Mr. Robert W. Boyd, Linde North American, Inc.

a. Initially, the proposed method of sale and quality specification for hydrogen vehicle fuel was presented at the Western (WWMA) and Southern (SWMA) Weights and Measures Association Annual Meetings in the fall of 2008. The proposal was adopted with a recommendation that it be submitted as an Informational item on the National Conference of Weights and Measures (NCWM) Laws and Regulations (L&R) agenda at the 2009 Interim Meeting, which was held January 11 - 14, 2009, in Daytona Beach, Florida. This item was also presented at the two remaining regions, the Central (CWMA) and Northeastern (NEWMA), Annual Conferences in the spring of 2009. The proposal was again presented at the 2009 NCWM Annual Conference, held July 12 - 16, 2009 in San Antonio, Texas.

b. The recommendations of the FSS, based on the subcommittee's April 2009 review of the proposed method of sale for hydrogen engine fuel are:

   i. The FSS agreed to use the current proposal as a foundation for the fuel quality standard for hydrogen. The FSS will continue to consider further refinement of the definitions for hydrogen vehicle fuel based on input from SAE International should they be deemed necessary to finalize the standard.

   ii. The FSS noted that Federal Trade Commission's (FTC) Fuel Rating Rule (16 CFR Part 309), see the requirements in "Labeling of Alternative Fuels" (http://www.ftc.gov/bcp/edu/pubs/business/autos/bus29.shtm), requires dispensers to bear a declaration of minimum hydrogen content determined according to the test methods described in "Standard Test Method for Analysis of Natural Gas by Gas Chromatography (ASTM D1946-90)."

   iii. The FSS further modified the proposed HB 130 language to recognize the language in 16 CFR Part 309.15 Posting of non-liquid alternative vehicle fuel rating.

Section I. Prologue

The discussion paper that follows is "The Starting Point: A Discussion Paper Describing a Proposed Method of Sale and Quality Specification for Hydrogen Vehicle Fuel" originally published in June 2008. The corresponding proposals are for the method of sale and fuel quality.

This paper describes proposals for a uniform method of sale and fuel quality specifications on hydrogen vehicle fuels that are under development by the USNWG Fuel Specifications Subcommittee (FSS). The

purpose of this document is to organize, focus, and record the work of the FSS. Participation in the work of the subcommittee is open to anyone intending to make a positive contribution to the process

The States have always had a leadership role in establishing and enforcing the laws and regulations for legal metrology and fuel quality in the United States. The goal of this effort is to develop proposals for inclusion in NIST Handbook 130, "Uniform Laws and Regulations in the areas of Legal Metrology and Engine Fuel Quality,"[1] which is a source for model laws that the States use in developing their legal requirements. Some states adopt the regulations in that handbook by reference or citation in law. This approach has provided national uniformity in regulation of a number of significant issues, including packaging and labeling, net quantity of contents, and fuel quality.

The FSS includes hydrogen producers, dispenser and component manufacturers, weights and measures, air resource, fuel quality officials, and other interested parties. This document is presented to invite comments from automotive and fuel cell manufacturers, marketers, weights and measures, and other state officials and other experts who certainly will have questions, concerns, and suggestions as these proposals are developed in the NCWM – L&R Committee.

The members of the FSS recognize that when small groups develop standards for emerging technologies it is impossible to be knowledgeable about all aspects of a subject which is, by its nature, changing even as a meeting takes place or a report of its progress is being composed. With this in mind, please review this document and contribute your knowledge, understanding, and ideas to this effort.

Section II. Method of Sale and Fuel Quality Standard

Participants at the first FSS meeting in March 2008, considered a proposal for a Method of Sale for Hydrogen Fuel that was prepared by NIST. Recent FSS work to update the proposed Method of Sale requirements are presented below. Also discussed was the need for a quality standard. The basis for that discussion was the proposed Hydrogen Fuel Standard developed by the California Department of Food and Agriculture; Division of Measurement Standards (CDFA/DMS) contained in a March 3, 2008, regulatory notice.[2] The FSS recognizes and commends the State of California for sharing its knowledge and experience in providing a starting point for a national standard for hydrogen fuel. This document should be interpreted as neither an endorsement, nor criticism, of the CDFA/DMS proposal by either the FSS or NIST unless otherwise stated. For the most recent FSS updates on the fuel quality proposal, refer to Section III.

Uniform Method of Sale for Hydrogen Vehicle Fuel

Defining a legal requirement for a uniform method of sale for commodities is the most practical and efficient way that weights and measures uses to ensure that consumers can make value comparisons between competing sellers of the same commodity. The purpose is to ensure that purchasing decisions enable consumers to obtain the greatest value for their money. A uniform method of sale also ensures that sellers advertise and deliver a commodity using a single unit of measurement so comparisons can be quick and simple. Typically commodities (e.g., gasoline, diesel fuel, food, milk, wine, sand and gravel, and others) are sold by weight, measure (volume or dimensions, including area), or count.

[1] See the 2009 Edition of NIST HB 130 at http://www.nist.gov/owm

[2] Available at http://www.cdfa.ca.gov/dms/hydrogenfuel/hydrogenfuel.html

Establishing a method of sale for any product is a critical first step in the development of a fair and competitive marketplace for any commodity, especially one that is just emerging and for which there is not a traditional method of sale for the commodity on which to build. History has shown that when products are introduced into the marketplace without a legally defined standard, confusion and unfair competitive practices can quickly evolve and potentially harm the consumer's perception of the product and business reputation of the seller.

The need for a method of sale was stated in the 2005 "Hydrogen Delivery Technology Roadmap,"[3] which called on retailers and appropriate government agencies to establish a legal unit of measurement for hydrogen (see endnote[i] for further discussion).

The FSS recommends that all retail sales of hydrogen vehicle fuel be by mass using the kilogram as the unit of measurement.

The industry's pre-market practice has been to dispense hydrogen using the kilogram as the unit of measurement. The use of mass was strongly favored by the FSS participants who agreed that it should be the basis for retail commercial transactions. By requiring use of the kilogram as the unit of measurement for all retail dispensers, consumers can make value comparisons between competing retailers. Dispensing hydrogen by mass using the kilogram is specified in Section 2.4.2. Indications of OIML R 139 "Compressed Gaseous Fuel Measuring Systems for Vehicles" (Edition 2007) and is the method of sale used in other countries so the U.S. method of sale will be consistent with that used in the global marketplace. As this fuel becomes fully commercialized, consumers considering the lease or purchase of a hydrogen vehicle will need to learn the fueling process for their hydrogen vehicle and be educated that their fuel purchases will be made on the basis of mass using the kilogram. The FSS considered, but does not support, a gasoline gallon equivalent (GGE) units for use in retail commercial sales (see endnote [ii]).

This proposal presents the kilogram as the unit of measurement to be used in commercial sales. (See Figure 1 [pg 7] for an example of how the unit measurement may appear on the dispenser, and see Figure 2 [pg 7] on how the street signs will display the unit price). The unit can be shown using the term "kilogram" or by use of its accepted abbreviation "kg," which is its prescribed symbol in NIST Special Publication 330 – "The International System of Units (SI)."[4]

Nothing in the proposal should be interpreted as prohibiting the use of a hydrogen GGE for information purposes to facilitate general comparisons with other fuels in advertisements and other literature. Consumers who are considering the lease or purchase of a hydrogen vehicle should be informed that they will be purchasing fuel by the kilogram and that they can make reliable value comparisons using that method of sale.

The FSS recommends that in retail sales "HXX" be used to represent Hydrogen vehicle fuel and the capital "H" precede the "XX," which represents the service pressure of the hydrogen fuel offered for sale (expressed in the International System of Units (SI) unit megapascal [MPa]).

Product Identity

The FSS agreed to support the use of the capital letter "H" as the symbol for hydrogen instead of H_2 to simplify product identification of hydrogen vehicle fuel sold at the retail level.

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[3] Available at http://www1.eere.energy.gov/vehiclesandfuels on the Internet

[4] See NIST Special Publication 330 – 2008 "The International System of Units (SI)." Ambler Thompson, Editor.

Service Pressures shall be shown in the SI Unit Pascal (MPa)

Knowing the service pressure of the dispenser is a critical factor for consumers as the storage tanks on their vehicle is designed to be filled at one of those pressures. In addition to needing this information for safety and vehicle filling purposes, participants at the March 2008 FSS meeting indicated that retailers may charge different prices depending on the delivery pressure at which the fuel is dispensed. Currently, some dispensers are marked with service pressures in units of bar[5] (e.g., 350 bar and 700 bar) or megapascals (MPa), which are the pressures available to service hydrogen vehicles. A few dispenser manufacturers use megapascal (MPa) in trade publications and in declaring dispenser delivery pressures. The FSS agreed that the service pressure at which the product is dispensed must be posted on the user's interface of all dispensers.

While the bar is accepted for use with SI, the metric system, the primary SI unit for pressure is the pascal (international symbol – Pa). Typical values encountered for dispenser of service pressures in pascals, bar and pounds are 35 MPa (350 bar) (approximately equivalent to 5 000 psi) and 70 MPa (700 bar) (approximately equivalent to 10 000 psi). The FSS agreed that in using the SI unit for pressure, the pascal would standardize industry practice and enable it to easily present this information in a consistent manner. It will also simplify the manner used to declare service pressures on dispensers, street signs, and in advertisements.

Unit Pricing in Whole Cents

The FSS also agreed that the conditions for sale, when unit pricing is based on features, such as operation pressure, should be stated with the unit price in whole cents per kilogram on street signage to inform drivers of hydrogen vehicles of the service pressures available at the retailer's fueling facility. The proposal does not mandate street signs, but will require that when street signs are available they must display the unit price and service pressure of the dispensers. The requirement is only applicable when retailers voluntarily post or present the price of fuel in advertisements and on street signs.

The FSS agreed the traditional practice of using decimal fractions of a cent in unit pricing in advertisements, the unit price, or in the calculation of total price should not be extended to sales of hydrogen fuel. Under the proposed method of sale, that practice is prohibited (e.g., $3.499 per kg would not be permitted but $3.49 per kg would be permitted).

[5] A bar is an atmospheric pressure defined as 100 kilopascals. See NIST Special Publication 330 – 2008 "The International System of Units (SI)." Ambler Thompson, Editor.

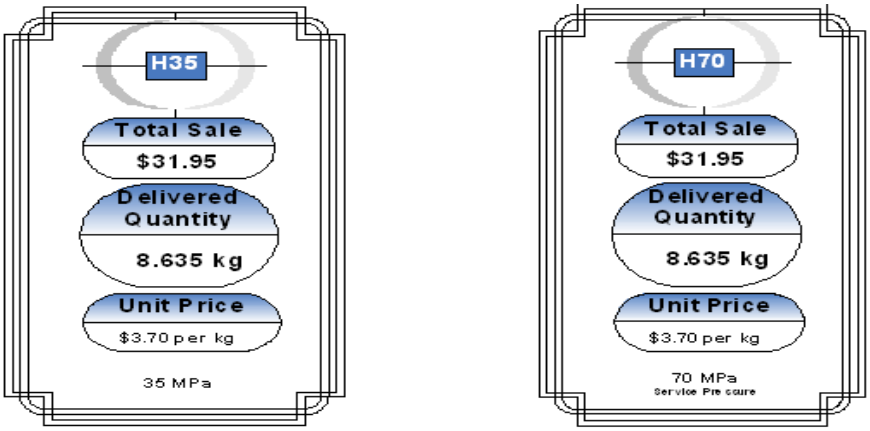


Figure 1 . Examples o f t he p roduct i dentity, measurement u nit, u nit p rice, an d s ervice p ressure o n t he user's interface of a hydrogen Fuel Dispenser

A Competitive Marketplace

Figure 2 d epicts h ow a f ueling st ation in t he m arketplace m ight d isplay r equired information. T he purpose of the graphic is to illustrate that a uniform method of sale in a single unit of measurement and other r equirements f or po sting of s ervice de livery i nformation w ill f acilitate value c omparison i n a competitive marketplace and provide users with critical information. The graphics of the signage shows how posting the unit of measurement and service pressure provides drivers with information to permit them to make product and service pressure value comparisons between retailers.

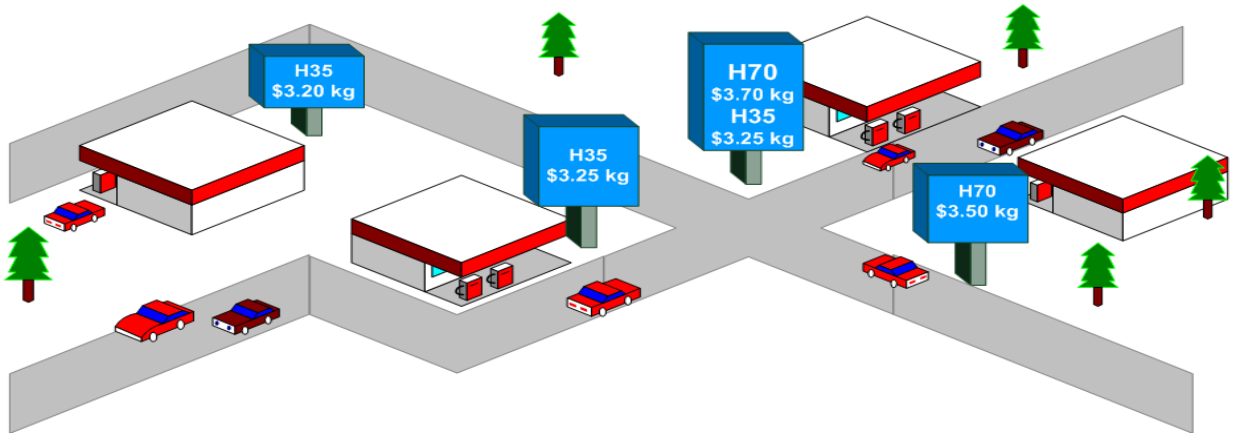


Figure 2. The use of the uniform unit o f measurement and posting o f product identity, and service pressure to enable value comparison.

One alternative to the posting of service pressures (perhaps even unit prices) may be found in the growing prevalence of v ehicle n avigation sy stems an d sat ellite i nformation se rvices. I f d rivers o f h ydrogen vehicles have access to real-time price and service pressure information through those systems, and use them t o m ake t heir pu rchasing de cisions, the c urrent a pproach of us ing s treet s ign pr icing m ay not continue in this marketplace.

The FSS supports the following method of sale for petroleum:

Recommendation: The FSS supports the proposal to be included in NIST Handbook 130: Section IV: Uniform Regulation for Method of Sale of Commodities. The FSS presented the following recommendation for consideration by the 2009 NCWM L&R Committee. This modified version includes a change to paragraph 2.XX.4.2 to include the units of megapascals.

Section 2. Non-food Products [*Note 1,* page 103]

2.XX. Retail Sales. – Hydrogen Fuel (H).

2.XX.1. Definitions – Hydrogen Fuel (H).

2.XX.1.1. Hydrogen Fuel. – A fuel composed of the chemical hydrogen intended for consumption in an internal combustion engine or fuel cell.

The symbol for hydrogen vehicle fuel shall be the capital letter "H" (the word Hydrogen may also be used.)

2.XX.2. Method of Retail Sale and Dispenser Labeling. – All hydrogen fuel kept, offered, or exposed for sale and sold at retail shall be in terms of the kilogram.

2.XX.3. Retail Dispenser Labeling.

2.XX.3.1. A computing dispenser must display the unit price in whole cents on the basis of price per kilogram.

2.XX.3.2. The service pressure(s) of the dispenser must be conspicuously shown on the user interface in bar or the SI Unit of Pascal (Pa) (e.g., MPa).

2.XX.3.3. The product identity must be shown in a conspicuous location on the dispenser.

2.XX.3.4. National Fire Protection Association (NFPA) labeling requirements also apply.

2.XX.3.5. Hydrogen shall be labeled in accordance with 16 CFR 309 – FTC Labeling Alternative Fuels.

2.XX.4. Street Sign Prices and Advertisements.

2.XX.4.1. The unit price must be in terms of price per kilogram in whole cents (e.g., "$3.49 per kg" not $3.499 per kg).

2.XX.4.2. The sign or advertisement must include the service pressure~~(s)~~ (expressed in megapascals) at which the dispenser(s) delivers hydrogen fuel (e.g., H35 or H70).

Section III. Hydrogen Vehicle Fuel Quality Specification

The FSS will continue to develop a model regulation to specify the quality requirements for hydrogen vehicle fuel for addition to the Uniform Fuels and Lubricants Regulation (UFLR) in NIST Handbook 130. The UFLR cites ASTM International and SAE International standards for gasoline, diesel, and other fuels. At least 11 states use that model regulation as a basis for their rules on fuel quality. As with other fuels, the regulations in Handbook 130 will reference standards from appropriate standards organization and utilize the test methods authorized and referenced by those standards. The proposed regulation will likely include standards developed by ASTM International, SAE International, and the International Organization for Standardization (ISO), or other American National Standards Institute (ANSI) accredited organization.

The State of California is at the forefront in establishing a fuel quality standard for Hydrogen to meet a legislative mandate.[6] At its first meeting in March 2008, the FSS participants reviewed the March 3, 2008 draft developed by the CDFA/DMS so that it could be used as a starting point in the development process for a national standard. This approach takes advantage of California's expertise, and the fact that it has been published for comment as part of that state's rulemaking process, meaning that it has received public review. The CDFA/DMS proposal provides an interim standard for hydrogen fuel.

Once ANSI has adopted fuel standard, the CDFA/DMS is required by law to adopt that standard by reference. Since test procedures have not yet been finalized to measure the properties specified in the CDFA/DMS interim standard, that agency will adopt sampling and test procedures in regulation as they are developed. The agency will begin enforcement of its regulations and require compliance once sample and test procedures have been adopted by an accredited organization and its regulation are finalized. Several FSS participants reminded the group that the higher the quality of the fuel the higher its cost may be, so the approach taken in the United States must be practical and cost effective if the commercialization of hydrogen vehicle fuel is to be successful.

Proposed Specification for Hydrogen Fuel

The FSS identified several quality criteria where there was tentative agreement with their associated values and the ability to test to those values with current technology available today (see properties 6, 7, 8, 9, 12, 14, and 16 which are highlighted in green) in the proposed Table 1. Hydrogen Fuel Quality Specification.

The FSS did not agree on all of the properties contained in the DMS proposal because there was either not enough research data or test methods available to support a decision (see properties 1, 2, 3, 4, 5, 10, 11, 13, and 15 which are highlighted in yellow) in Table 1 below. These and perhaps other properties will receive further consideration by the FSS and may be added to the quality standard in the future when such action is supported by research.

FSS supports the proposed new definitions to be included in NIST Handbook 130 Section IV. Uniform Regulations Part G. Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulations Section 2. Standard Fuel Specifications to address gaseous hydrogen refueling applications.

[6] See http://www.cdfa.ca.gov/dms/hydrogenfuel/hydrogenfuel.html for more information on the California Division of Measurement Standards Hydrogen Fuel Program. (Viewed 4/11/08)

1. Specification for Hydrogen Fuel for Internal Combustion Engines and Fuel Cells

2. Definitions

1.XX. Fuel Cell. – an electrochemical energy conversion device in which fuel and an oxidant react to generate energy without consumption of its electrodes or electrolyte.

1.XX. Hydrogen Fuel. – a fuel composed of the chemical hydrogen intended for consumption in a surface vehicle with an internal combustion engine or fuel cell.

1.XX. Internal Combustion Engine. – a device used to generate power by converting chemical energy bound in the fuel into mechanical work to power a vehicle.

Cite the appropriate reference for the hydrogen fuel quality standard below that was developed by the California Division of Measurement Standards in NIST Handbook 130 Section IV. Uniform Regulations Part G. Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulations Section 2. Standard Fuel Specifications as follows:

Table 1. Hydrogen Fuel Quality Specification*

	Property	Value	Unit	Limit	Test Method(s)	Responsible Stds. Committee and Status of test method
1	Ammonia	0.1	ppm v/v	Maximum	to be specified	WK 10196 under ASTM D03.14
2	Carbon Dioxide	2.0	ppm v/v	Maximum	to be specified	Wk 10196 and WK 4548 under ASTM D03.14
3	Carbon Monoxide	0.2	ppm v/v	Maximum	to be specified	WK 10196 under ASTM D03.14
4	Formaldehyde	0.01	ppm v/v	Maximum	to be specified	WK 10196 under ASTM D03.14
5	Formic Acid	0.2	ppm v/v	Maximum	ASTM D7550-09	WK 10196 under ASTM D03.14
6	Helium	300.0	ppm v/v	Maximum	to be specified	ASTM D03.14
7	Hydrogen Fuel Index	99.97	% [a]	Minimum	to be specified	
8	Nitrogen and Argon	100.0	ppm v/v	Maximum	to be specified	WK 4548 under ASTM D03.14
9	Oxygen	5.0	ppm v/v	Maximum	to be specified	WK 4548 under ASTM D03.14
10	Particulate Concentration	1.0	mg/kg	Maximum	to be specified	WK 9688 and WK 21611 under ASTM D03.14
11	Total Allowable Non-Hydrogen, Non-Helium, Non-particulate constituents	100.0	ppm v/v	Maximum	to be specified	
12	Total Non-Hydrogen Gases	300.0	ppm v/v [c]	Maximum	to be specified	
13	Total Halogenated Compounds	0.05	ppm v/v	Maximum	to be specified	WK 23815 under ASTM D03.14
14	Total Hydrocarbons	2.0	ppm v/v [d]	Maximum	to be specified	WK 22378 under ASTM D03.14
15	Total Sulfur Compounds	0.004	ppm v/v	Maximum	to be specified	WK 24073 under ASTM D03.14
16	Water	5.0	ppm v/v	Maximum	to be specified	WK 10196 and WK 4548 under ASTM D03.14

Footnotes to Table 1:

a. Hydrogen fuel index is the value obtained with the value of total gases (%) subtracted from 100 %.

b. Total Gases = Sum of all impurities listed on the table except particulates.

c. Total Hydrocarbons may exceed 2 ppm v/v only due to the presence of methane, provided that the total gases do not exceed 300 ppm v/v.

* The FTC's Fuel Rating Rule (16 CFR Part 309) see the requirements in "Labeling of Alternative Fuels" at http://www.ftc.gov/bcp/edu/pubs/business/autos/bus29.shtm requires dispensers to bear an declaration of minimum percent of hydrogen determined according to test methods described in "Standard Test Method for Analysis of Natural Gas by Gas Chromatography (ASTM D1946)

Updated 1/20/2010

The FSS will monitor national and international standard activities, research, and other programs to avoid duplication of effort and to ensure that its work provides a fuel specification for hydrogen vehicle fuel that serves the needs of the this emerging marketplace. Quality standards are currently under

development in SAE International (e.g., SAE J2719 "Hydrogen Specification Guideline for Fuel Cell Vehicles") and in ASTM International (e.g., see www.astm.org for a list of the work underway in its Committee D03.14 on Hydrogen and Fuel Cells and that organizations other committees).

Quality standards are under consideration around the world, including the European Union, Japan, and other countries. Also of interest are the efforts of Working Group 12 of ISO's Technical Committee 197 on Hydrogen, which is very active in this area.[7] ISO's website indicates that its fuel quality standard will be finalized within a few years.

When a quality property and numerical value (defining a maximum or minimum limit) is added to the specification, appropriate test methods must then be identified. As test methods are identified and adopted by the FSS, they will be added to Column 6 in Table 1.

Future work of the FSS may include the development of recommendations for field sampling equipment and handling procedures, along with suggestions about what type of test equipment is appropriate for establishing a hydrogen vehicle fuel quality laboratory.

For Further Information or to Comment Contact:

Please send comments and suggestions concerning the proposals presented in this document to Ms. Lisa Warfield or Mr. Ken Butcher, Technical Advisors to the USNWG Fuel Specifications Subcommittee, at lisa.warfield@nist.gov or (301) 975-3308 or kbutcher@nist.gov or at (301) 975-4859. Faxes may be sent to (301) 975-8091.

Fuel Specifications Subcommittee
U.S. National Work Group for the
Development of Commercial Hydrogen Measurement Standards
NIST Weights and Measures Division
Laws and Metric Group
100 Bureau Drive, MS 2600
Gaithersburg, Maryland 20899

[7] http://www.iso.org/iso/standards_development/technical_committees/list_of_iso_technical_committees/iso_technical_committee.htm?commid=54560. (Viewed 9/2/09)

[i] **Additional Information on the Importance of a Method of Sale** – Establishing a uniform method of sale ensures marketplace integrity and increases consumer confidence while ensuring fair trade practice in a competitive marketplace. In past experience, the lack of a legal standard of sale has resulted in sellers establishing different methods of sale for the same product. This resulted in investments in weighing and measuring equipment and spending on packaging and marketing programs, only to find that the units of measurement used were not appropriate for the commodity. Once a new standard was established, existing measuring equipment, labeling, and sales literature had to be retrofitted or discarded. Establishing a method of sale early in the process informs the designers of weighing and measuring devices about how they are to design the device and the user interface. It also enables marketers to create sales and promotional programs for the product using a consistent unit of measurement throughout the system. Past experience with conflicting methods of sale has taught weights and measures and sellers many valuable lessons over the years. One of the most important lessons is that consumers are intelligent and willing to learn new methods of sale and readily accept products and services, if the information they receive from different sellers is informative, uniform, and accurate. Establishing a uniform method of sale will also inform automobile and fuel cell manufacturers about how they will need to educate consumers in sales literature and owners' manuals about the fuel and how it will be measured for dispensing into the vehicles and other refueling applications. Decisions are needed so that as marketing and promotional ideas are being considered and developed, the uniqueness of the fuel and dispensers can be addressed using a single unit of measurement.

[ii] **Additional Information on the Gasoline Gallon Equivalent** – A question at the FSS March 2008 meeting was whether the marketing of hydrogen vehicles against those that use fuels sold on the basis of a gallon would benefit from the establishment of a gasoline gallon equivalent (GGE). GGEs are based on energy content of fuels. GGE for hydrogen is mentioned in the media and government literature as 1 kg = 119,823 kilojoules (kJ) (113,571 BTU (lower heating value). GGE is used to compare the fuel in terms of price per gallon and to introduce hydrogen as a commercial vehicle fuel. This approach facilitates those comparisons as long as it is also understood that the energy content in a gallon of fuel varies widely with the fuel. When the GGE for Compressed Natural Gas (CNG) was developed as a legally defined value in the 1990s, one reason for its adoption was to allow consumers to compare the cost of competing fuels on street signs and on dispensers in a unit of measurement that was comparable among fuels such as gasoline. Thus, consumers could determine the potential savings when choosing a vehicle capable of using one type of fuel over another. In 1994, the GGE was set at 2.567 kg for CNG by NCWM using the lower heating value of gasoline, which was then given at 120,401.7 kJ (114,118.8 BTU). It should be noted that the adoption of the GGE for CNG was somewhat contentious. A proposal to add a diesel gallon equivalent (DGE) for CNG is expected to be on the NCWM's agenda in 2009.

It is difficult to make accurate comparisons between fuels because energy content varies by fuel, by region, and season for gasoline. Currently, the *Transportation Energy Data Book* lists the net energy of a gallon of gasoline at 121,753.4 kJ (115,400 BTU) and diesel as 135,785.7 kJ (128,700 BTU). Variations in energy content increase when gasoline is blended with Ethanol (E10 or E20) and E85 (15 % gasoline + 85 % ethanol) which contains only 89,679.76 kJ (85,000 BTUs) according to the National Ethanol Vehicle Coalition. Hydrogen fuel, which is expected to come into the marketplace as a commercial fuel within the next ten years, will be competing for customers who have far more fuel choices than are currently available. If a GGE is considered for hydrogen, the question that should be asked is "Would a GGE based on today's net energy content for hydrogen be a valid tool 10 years from now to compare it against gasoline, CNG, E85, diesel, and other fuels and the new electric cars expected from automobile manufacturers?"

Because of constant changes in energy policies and environmental concerns, new fuels and blends will continue to emerge in the marketplace. This constant state of change impacts the validity of GGEs. One question that must be raised if a GGE for hydrogen is proposed is, will these artificial comparison tools be periodically reviewed to ensure they provide the equitable means of ensuring reasonable and reliable comparisons between fuels.

E-mail received from B.P. Global Fuels Technology, James Simnick

From: Randy Jennings [Randy.Jennings@tn.gov]
Sent: Tuesday, July 06, 2010 10:54 AM
To: Williams, Juana; Warfield, Lisa; Butcher, Kenneth S.; Joe Benavides
Subject: Hydrogen Specification

Please distribute to appropriate individuals.

>>> "Simnick, James J" <James.Simnick@bp.com> 7/6/2010 9:30 AM >>>
Randy
BP appreciates the opportunity to comment on this NCWM proposal for hydrogen quality. I have reviewed the proposed hydrogen fuel quality specification by the NIST National Council of Weights and Measures. http://ncwm.net/sites/default/files/meetings/annual/2010/10_Pub_16_LR.pdf
In my opinion, this proposal is both premature and the data insufficient for developing such a specification. I have cc'd several members of the DOE Freedom Car hydrogen program Delivery Technical team, of which I'm a member, for their possible input.

My reasons are as follows.
1. The proposal cites the need for hydrogen fuel quality specification for both fuel cells vehicles and internal combustion engines. Yet only one set of quality limits is proposed. The limits are totally unsupported for a ICE hydrogen engine, and in fact, also for a fuel cell vehicle (FCV).
2. For fuel cell vehicles, only prototype test vehicles refueling at controlled sites are using hydrogen today. There is no need at this time to promulgate such a specification until we have the supporting data to do so and there is a also a need to protect consumer FCV's. Neither of those items are in play today or in the near future.
3. The original limits for the SAE hydrogen fuel quality guideline (SAE J2719) were proposed as the lowest limits of detection for the analytical tests believed to detect the particular contaminant at that time. That is no way to set a specification limit. Limits should be based on publically available data on fuel cell vehicle durability and performance with various levels of hydrogen contaminants. Such data does not now exist, but will be in the future.
4. To develop a specification without fully vetted and approved consensus analytical test methods for key contaminants is a futile effort. Without agreed upon test methodology, no one can enforce nor defend themselves based on such a specification. ASTM D03.14 subcommittee is making great progress on these sampling techniques and test methods but they are not yet all approved and published.
5. The State of California developed such a specification when mandated by their state law. However this development was met with many problems for the reasons 1-4 as cited above. Relief was necessary from the specification by allowing hydrogen refueling sites in California petition for a waiver for test vehicle use of hydrogen for refueling.

In summary, BP believes that it is premature to develop such a specification for hydrogen until such time the data to support such a specification is available, necessary analytical test methods are published, and there is a need to protect consumer vehicles using hydrogen as fuel.

Jim Simnick
Technical Advisor - BP Global Fuels Technology
Ph: 630-420-5936/Fax: 630-420-4832/
email: http:simnicjj@bp.com

E-mail received from U.S. Fuel Cell Council, Robert Wichert

From: RobertWichert [mailto:wichert@fuelcells.com]
Sent: Friday, July 02, 2010 9:40 AM
To: Joe Benavides
Cc: Williams, Juana; William.Collins@UTCPower.com; Ruth Cox; brose@usfcc.com; william.chernicoff@dot.gov
Subject: Method of Sale for Hydrogen

Dear Mr. Benavides:

As the Technical Director of the US Fuel Cell Council I wish to express my support for the Method of Sale for Hydrogen that will be before your committee shortly. The US Fuel Cell Council is the industry association for fuel cells and our members include the most active and successful fuel cell and hydrogen companies from all over the world. I know that our industry needs a trial code for hydrogen gas measuring devices and a corresponding method of sale in order to progress towards the large-scale deployment of hydrogen fueling stations necessary to meet our goals of increasing transportation efficiency and lowering greenhouse gas emissions. I hope that you will help us to achieve those goals by moving the Method of Sale for Hydrogen forward.

Thank you for your consideration and support.

Sincerely,

Robert Wichert, P.Eng. LEED AP
Technical Director, US Fuel Cell Council

+1 916 966 9060
FAX +1 916 966 9068

E-mail received from UTC Power, William Collins

From: Collins, William P UTPWR [mailto:William.Collins@UTCPower.com]
Sent: Friday, July 09, 2010 3:44 PM
To: Williams, Juana
Subject: NIST 44 & 130

Juana,

My comments and suggestions:

232-3 V "Method of Sale for Hydrogen".

These proposed changes are actually proposed additions to NIST Handbook 130 "Uniform Regulations for Method of Sale of Commodities". The additions include labeling and units of measure. The additions, "as proposed" are adequate. However, clarification of several points might be to the industry's advantage. Specifically:

2.XX.2 "The symbol for Hydrogen vehicle fuel shall be a capital letter "H"."

It is suggested that it would be better if DOC NIST, DOT NHTSA and SAE (Industry) were on the same page for labeling. SAE J2578-2009, Section 4.7, suggests labeling as "CHG" in white letters against a blue diamond background for compressed hydrogen gas. The document also suggests using "LH2" in white letters against a blue diamond background for liquid hydrogen. DOT NHTSA often adopts the SAE suggestions.

2.XX.3.4. National Fire Protection Association (NFPA) labeling requirements also apply.

It is suggested that only labeling per NFPA 704, "Standard System for the Identification of the Hazards of Materials for Emergency Response", be referenced.

Table 1. Hydrogen Fuel Quality Specification* (version 19JAN2010)

It is suggested that either SAE J2719 be referenced instead of this table or that the test methods being developed by ASTM to support J2719 be incorporated into the table.

360-1 V "Code for Hydrogen Gas-Measuring Devices".

These proposed changes are actually proposed additions to NIST Handbook 44 "Hydrogen Gas-Measuring Devices Code". The additions include labeling, accuracy and precision. The additions, "as proposed" are adequate. However, clarification of several points might be to the industry's advantage. Specifically:

S.1.3.3. Maximum Value of Quantity-Value Divisions. - The maximum value of the quantity-value division shall be not greater than 0.5 % of the minimum measured quantity.

It is unclear as to what this means.

S.1.4. Value of Smallest Unit. The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

(a) 0.001 kg on devices with a maximum rated flow rate of 30 kg/min or less

(b) 0.01 kg on devices with a maximum rated flow of more that 30 kg/min

It is assumed that this means that for devices flowing less than or equal to 30 kg/min, the total amount dispensed shall be measured to +/- 0.001 kg. It is also assumed that this means that for devices flowing more than 30 kg/min, the total amount dispensed shall be measured to +/- 0.01 kg. Is this correct?

S.8. Minimum Measured Quantity. – The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

a) Measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg.

b) Measuring systems having a maximum flow rate greater than 4 kg/min but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg.

It is assumed that this means that for devices flowing less than or equal to 4 kg/min, the total amount dispensed shall be measured to +/- 0.5 kg. It is also assumed that this means that for devices flowing more than 4 kg/min, the total amount dispensed shall be measured to +/- 1.0 kg. Is this correct? These values sound low. It is our understanding that cars will typically have enough fuel on board for an effective range of 300 to 400 miles. This would require from 5 to 10 kg of fuel. Based on these values, we would expect a requirement of +/- 1% of a full tank or ~0.075 kg.

William Collins
UTC Power
(860) 727-2559
william.collins@utcpower.com

Correspondence received from Van Putten-Blue Energy Observatories



Mr. Brett Saum, Chair Committee on Specifications and Tolerances (S&T)
(BSaum@co.slo.ca.us<mailto:BSaum@co.slo.ca.us>).

Mr. Joe Benavides, Chair Committee on Laws and Regulations (L&R)
(joe.benavides@texasagriculture.gov<mailto:joe.benavides@texasagriculture.gov>).

Re: USNWG hydrogen codes July 10 2010

Dear Mr. Saum and Mr. Benavides:

I am writing you to express my support for the tentative hydrogen codes for inclusion in Handbook 44 outlining legal metrology requirements for hydrogen equipment used in vehicle refueling applications and Handbook 130 establishing a Method for Sale of hydrogen.

The v6.0 the USNWG's Hydrogen Gas-Measuring Devices-Tentative Code has been created under the excellent direction of Juana Williams with input from the regional weights and measures associations and comments from USNWG members.

Hydrogen is remarkably promising as a mobile energy carrier in view of its high energy content per unit weight, low-cost of storage in tanks and relative ease of making hydrogen out of possibly renewable energy sources.

Creating a consumer-oriented hydrogen economy forms one of the great challenges for the present century. The beauty of working on our future sustainable energy infrastructure is a potential pay-off in employment, reduction of energy costs and reliance on fossil fuels. It requires billing at custody transfer in the hydrogen pathway that, starting from a generating plant, may include hydrogen dispensing at high pressure to a tank wagon (i), a refueling station (ii), an automobile (iii) and, ultimately, in the low-pressure supply line to a combustion engine or fuel cell (iv).

The present tentative hydrogen code for (iii) is a first step for metering, certification and installation for refueling 350 or 700 bar hydrogen tanks in automobiles. If adopted by the NCWM, it will stimulate innovation on metering and field tests, generating valuable experimental data for feedback.

It has been drafted with an open mind towards further developments. For example, (iv) suggests on-board metering by existing low-pressure mass-flow metering technology with a proven record for safety and accuracy. In particular, we recently developed a new type of thermal mass-flow meter (US Pat. 7,246,519) which received approval for use in commerce by CTEP/CDFA (#5554-08). For hydrogen, it features a measurement uncertainty of 0.56% for pressures up to 16 bar. Regulatory approval at transfer point (iv) will be welcomed by the automobile industry, as I may infer from discussions at the recent NHA meeting at Long Beach earlier this year. Data generated in the field under the proposed trial code will be instrumental in developing legal metrology for the complete hydrogen pathway, complementing the present proposal for (iii).

I therefore endorse the proposed Handbook 44 trial code and Handbook 130 Method of Sale codes without reservation for gaseous hydrogen.

Sincerely yours,

Maurice HPM van Putten, Ph.D.
CEO

Van Putten-Blue Energy Observatories Inc. 266 Pearl Street A Cambridge MA 02139 www.vpgeo.com

Correspondence received from from California Fuel Cell Partnership

California
FUEL CELL PARTNERSHIP
DRIVING FOR THE FUTURE

California Fuel Cell Partnership
3300 Industrial Blvd.
Suite 1000
West Sacramento, CA 95691
(916) 371-2870

www.fuelcellpartnership.org
info@cafcp.org

Chrysler
Daimler
GM
Honda
Hyundai
Nissan
Toyota
Volkswagen

Automotive Fuel Cell Cooperation
UTC Power

Chevron
Shell Hydrogen

Cal/EPA Air Resources Board
California Energy Commission
National Automotive Center
South Coast AQMD
U.S. Department of Energy
U.S. Department of Transportation
U.S. Environmental Protection Agency

AC Transit
Air Products
CA Dept of Food and Agriculture
ITS-UC Davis
Linde North America, Inc.
NFCRC-UC Irvine
NREL
Powertech Labs
Praxair
Proton Energy Systems, Inc.
Santa Clara VTA
SunLine Transit Agency

June 25, 2010

Brett Saum
Joe Benavides
National Conference on Weights and Measures
1135 M Street, Suite 110,
Lincoln, Nebraska 68508

RE: Support for agenda items 360-1 and 232-3: Tentative Code for Hydrogen Gas-Measuring Devices and Method of Sale for Hydrogen

Dear Mr. Saum and Mr. Benavides,

The California Fuel Cell Partnership is a private-public partnership of auto manufacturers, energy companies, fuel cell companies, government, academia, and transit agencies. We actively collaborate to support fuel cell vehicle commercialization and help achieve California's goals for clean air, reduced greenhouse gases, and reduced petroleum use.

We recognize that one of the barriers inhibiting commercialization is the current inability to sell hydrogen as a retail transportation fuel. With this in mind, we would like to support the language proposed by the U.S. National Work Group for the development of commercial hydrogen measurement standards presented in agenda items 360-1 and 232-3 at the NCWM. We believe that the adoption of this language will create the appropriate starting point for developing commercial hydrogen fueling stations nationally.

The Tentative Code for Hydrogen Gas-Measuring Devices and Method of Sale for Hydrogen were developed with the best available information provided by industry experts, mostly members of the California Fuel Cell Partnership, and will provide a foundation for the commercial rollout of hydrogen vehicles. By adopting this language the United States can make significant progress toward expanding infrastructure and enabling hydrogen as a transportation fuel.

Sincerely,

Catherine Dunwoody
Executive Director

The California Fuel Cell Partnership is a collaboration in which several companies and government entities are independent participants. It is not a joint venture, legal partnership or unincorporated association.

Correspondence received from Daimler AG

DAIMLER

Dr. Christian Mohrdieck
Neue Straße 95
73230 Kirchheim/Teck-Nabern
Germany
☎ +49 7021 89 4626
✉ christian.mohrdieck@daimler.com

Brett Saum and Joe Benavides
National Conference on Weights and Measures
1135 M Street, Suite 110,
Lincoln, Nebraska 68508

July 8th, 2010

RE: Supporting agenda items 360-1 and 232-3 at the National Conference on Weights and Measures

Dear Mr. Saum and Mr. Benavides,

Daimler is a leader in the development and deployment of fuel cell vehicles, having investigated this technology since the public presentation of our first fuel cell vehicle in 1994. Over this period of time, we have conducted extensive on-road trials of fuel cell powered cars, vans and buses, with over 4.5 million kilometers driven. Daimler continues to be firmly committed to fuel cell technology, as demonstrated by the launch of the first series-produced fuel cell vehicle, the Mercedes-Benz B-Class F-CELL, in Europe and California later this year.

Codes and Standards development plays a crucial role in the commercialization of fuel cell vehicles. Specifically, one barrier to overcome is the current inability to sell hydrogen as a retail transportation fuel. We recognize that the efforts of the U.S. National Work Group to develop commercial hydrogen measurement standards are an essential step forward. Hence, Daimler would like to support the items 360-1 and 232-3 presented on the agenda at the National Conference on Weights and Measures. The adoption of the language for the *Tentative Code for Hydrogen Gas-Measuring Devices* and the *Method of Sale and Engine Fuel Quality Requirements for Hydrogen* will greatly facilitate the build-up of a much needed retail hydrogen infrastructure.

A retail hydrogen station network is essential to ensure the commercial success of Daimler's future fuel cell vehicles. However, such a network will only become viable with the requisite Codes and Standards in place.

Thank you for your continued efforts to make this a reality.

Sincerely
Daimler AG

i.V. Mohrdieck.

Dr. Christian Mohrdieck
Director
Fuel Cell & Battery Drive Development

i.V. Arwed Niestroj.

Arwed Niestroj
Senior Manager
Fuel Cell & Battery Drive Development

Daimler AG, Stuttgart, Germany
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Appendix C

Packaged Printer Ink and Toner Cartridges

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LEXMARK

Lexmark International, Inc.
740 West New Circle Road
Lexington, Kentucky 40550
USA

March 17, 2009

Mr. Max Gray
Department of Agriculture and Consumer Services
Bureau of Weights & Measures
3125 Connner Blvd. Lab 2
Tallahassee, FL 32399-1650

Dear Mr. Gray:

Thank you for providing the inquiry from cartridge refiller Dr. Ink, Inc., as well as the link to Tom Coleman's newsletter article dated March 2005. As we discussed briefly, Lexmark does not believe that the packaging for inkjet print cartridges is required to display the volume of ink contained within those devices. Lexmark also believes that despite some superficial appeal, such labeling is more apt to be misleading than illuminating to consumers.

Background

An inkjet print cartridge is not remotely similar to a bottle of milk or a tube of toothpaste; rather, it is one of the most technologically advanced micro-machines in commerce today. In fact, most of the sophisticated technology that comprised a printer in prior technologies is now contained within the print cartridge itself. Not surprisingly, then, the cost of the ink associated with a cartridge is a very small fraction of the total cost of the print cartridge mechanism and much of the price the customer pays for the cartridge is attributable to the micro-machinery, not the ink. Moreover, the capabilities of various cartridge models vary drastically in terms of print speed, print quality, drop size and resolution, and yield so a comparison of those machines based upon the quantity of ink they contain is an apples to oranges comparison. And as explained below, such a comparison could well mislead consumers into buying cartridges that will cost them more, not less, per print. Treating these sophisticated machines as though they were mere containers for ink is inappropriate.

Ink Exemption

Ink is expressly exempt from labeling as provided by the U.S. Fair Packaging and Labeling Act. See 16 C.F.R. 50.3.2(a), attached hereto. The exemption for ink has been consistently observed and applied for decades by the State of Florida, as well as every other state in the union. This is clearly demonstrated by the fact that during this period literally billions of ink pens, markers and highlighters have been sold without any labeling whatsoever as to the quantity of ink these devices contain. It cannot plausibly be denied that during the nearly 40 years the exemption has been in effect, enforcement officials of the Bureau have personally purchased a multitude of such

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products and cannot possibly have failed to notice that none of them disclosed the quantity of ink.[1]

Yet it does not appear that the Florida or any other state is currently considering requiring labeling of pens, markers and highlighters even though there is no principled way to treat them more leniently than print cartridges. Were the Bureau to abruptly change its longstanding policy regarding the ink, it would constitute a watershed change in Florida law that would encompass the entirety of two large industries that for decades have reasonably believed they were exempt. Any such unannounced deviation from established policy would create significant due process issues for the writing implement and printer companies affected.

Labeling Would Cause Confusion

As mentioned during our brief conversation, contrary to the objective of permitting meaningful comparisons of products, labeling ink volume of printing devices is more likely to cause confusion and in many cases, could cause consumers to make perfectly incorrect decisions. The ratio of the amount of ink contained in a cartridge versus the amount of printed pages a cartridge can produce is markedly different among various cartridge models. For example, a cartridge model that ejects relatively large drops of ink will consume far more ink to produce a given print than one with very fine drops and, ironically, the quality of the fine drop print will be better. Thus a consumer who chooses large-drop technology cartridge because it contains more ink than an equally priced fine-drop technology cartridge, will actually end up be paying more for each print, and obtain poorer print quality to boot.

In contrast, page yield estimates can provide a meaningful comparison of value to a consumer, at least if all manufacturers employ the same estimating assumptions and techniques. In this regard, the International Standards Organization (ISO), an independent, worldwide standard-setting body which is also interested in promoting accurate comparisons by consumers, has rejected reliance on ink volume or quantity. Instead, ISO, after studying for years the specific issue of inkjet cartridge performance and the consumer's need for meaningful comparative information, has developed a yield estimating and claiming methodology that permits cartridges to be compared using a consistent yardstick. Unlike ink volume measurements, these page yield measurements provide consumers a reliable way to compare the relative amount of printing that can be expected from competitive models of printers and their associated cartridges.

Coleman's Newsletter Article

Last, I would like to address Mr. Coleman's March 2005 newsletter article. To be honest, I am not entirely certain what this document is intended to be, but a non-regulatory agency employee's opinion set forth in a newsletter cannot possibly have the effect of countermanding the official Federal Trade Commission regulations that establish the exemption for ink. That regulation has the full force and effect of law and is recognized by all other states. Mr. Coleman's newsletter article simply is not an authoritative document that could formulate the basis for the sweeping regulatory change that Dr. Ink seeks.

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[1] Inkjet print cartridges have similarly been sold for in every state at least 25 years.

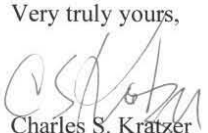
Moreover, Mr. Coleman's article does not address the ink exemption discussed above. Nor does it consider or discuss the lengthy and uniform custom and practice by the Federal government and every state government relating to ink products. It does not address the matter of whether billions of pens, markers and highlighters must, as a direct consequence of his position, must also be labeled. In this regard, there is not a single reason Mr. Coleman cites in support of his opinion that does not apply with equal force to the billions of pen, marker and highlighter packages that also do not display liquid volumes.

Although during our brief conversation you mentioned that the high cost of inkjet cartridges distinguishes them from pens, there is absolutely no provision in any packaging laws or regulations that exempts inexpensive items or provides a higher level of regulation for more highly priced items. If anything, pens, markers and highlighters are dramatically closer to being mere bottles of ink (like milk cartons) than the sophisticated micro-machines that comprise inkjet cartridges. There simply is no conscionable way for the Bureau to require the marking of high-tech ink delivery devices while permitting low-tech ink delivery devices such as pens and markers (which are purchased by more consumers and far more often) continue to be unmarked.

Conclusion

Lexmark very much hopes that based on the foregoing, the Bureau will deny Dr. Ink's request. However, if the Bureau is inclined to change its policy of nearly four decades upon which at least two huge industries have relied in good faith, Lexmark hereby requests that it do so only after giving Lexmark and all other members of the both affected industries notice and a formal opportunity to be heard regarding the complex set of regulatory and compliance issues presented by the change desired by Dr. Ink.

Very truly yours,



Charles S. Kratzer
Associate General Counsel

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TOC: Code of Federal Regulations > TITLE 16-- COMMERCIAL PRACTICES > CHAPTER I-- FEDERAL TRADE COMMISSION > SUBCHAPTER E-- RULES, REGULATIONS, STATEMENT OF GENERAL POLICY OR INTERPRETATION AND EXEMPTIONS UNDER THE FAIR PACKAGING AND LABELING ACT > PART 503-- STATEMENTS OF GENERAL POLICY OR INTERPRETATION > § 503.2 Status of specific items under the Fair Packaging and Labeling Act.
Citation: 16 cfr 503.2

16 CFR 503.2

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*** THIS SECTION IS CURRENT THROUGH THE FEBRUARY 26, 2009 ISSUE OF ***
*** THE FEDERAL REGISTER ***

TITLE 16 -- COMMERCIAL PRACTICES
CHAPTER I -- FEDERAL TRADE COMMISSION
SUBCHAPTER E -- RULES, REGULATIONS, STATEMENT OF GENERAL POLICY OR INTERPRETATION AND EXEMPTIONS UNDER THE FAIR PACKAGING AND LABELING ACT
PART 503 -- STATEMENTS OF GENERAL POLICY OR INTERPRETATION

Go to the CFR Archive Directory

16 CFR 503.2

§ 503.2 Status of specific items under the Fair Packaging and Labeling Act.

Recent questions submitted to the Commission concerning whether certain articles, products or commodities are included under the definition of the term "consumer commodity", as contained in section 10(a) of the Fair Packaging and Labeling Act, have been considered in the light of the Commission's interpretation of that term as set forth in § 503.5 of this part as follows:

(a) The Commission is of the opinion that the following commodities or classes of commodities are not "consumer commodities" within the meaning of the Act.

Antifreeze.

Artificial flowers and parts.

Automotive accessories.

Automotive chemical products.

Automotive replacement parts.

Bicycle tires and tubes.

Books.

Brushes (bristle, nylon, etc.).

Brooms and mops.

Cameras.

Chinaware.

Christmas light sets.

Cigarette lighters.

Clothespins (wooden, plastic).

Compacts and mirrors.

Diaries and calendars.

Flower seeds.

Footwear.

Garden tools.

Gift ties and tapes.

Glasses and glassware.

Gloves (work type).

Greeting cards.

Hand tools.

Handicraft and sewing thread.

Hardware.

Household cooking utensils.

Inks.

Jewelry.

Luggage.

Magnetic recording tape.

Metal pails.

Motor oil (automobile).

Mouse and rat traps.

Musical instruments.

Paintings and wall plaques.

Photo albums.

Pictures.

Plastic table cloths, plastic placement and plastic shelf paper.

Rubber gloves (household).

Safety flares.

Safety pins.

School supplies.

Sewing accessories.

Silverware, stainless steelware and pewterware.

Small arms ammunition.

Smoking pipes.

Souvenirs.

Sporting goods.

Toys.

Typewriter ribbons.

Woodenware.

(b) The Commission is of the opinion that the following commodities or classes of commodities are "consumer commodities" within the meaning of the Act:

Adhesives and sealants.

Aluminum foil cooking utensils.

(Position Provided by NIST WMD February 2005)

Due to the discussion of inkjet cartridges, over the NIST W&M list server, WMD has investigated this situation. WMD concludes that inkjet cartridges need a net quantity statement in liquid measure to comply with Handbook 130 requirements. Our analysis is below and further discussion is welcomed.

Inkjet and Printer Cartridge Considerations

The model weights and measures law contains several relevant sections that apply to ink cartridges.

Weights and Measures Law, Section 19. "Information Required on Packages:"
Except as otherwise provided in this Act or by regulations promulgated pursuant thereto, any package, whether a random package or a standard package, kept for the purpose of sale, or offered or exposed for sale, shall bear on the outside of the package a definite, plain, and conspicuous declaration of:

- the identity of the commodity in the package;
- the quantity of contents in terms of weight, measure, or count;
- the name and place of business of the manufacturer, packer, or distributor, in the case of any package kept, offered, or exposed for sale, or sold in any other place other than on the premises where packed.

Weights and Measures Law, Section 17. "Method of Sale:"
The method of sale shall provide accurate and adequate quantity information that permits the buyer to make price and quantity comparisons, except as provided by established trade custom and practice. While trade custom and practice is a consideration in some instances… the burden to provide "accurate quantity information" by means of a designated "method of sale" is the responsibility of the manufacturer.

Count alone does not fulfill this requirement.

A declaration of quantity in terms of count shall be combined with appropriate declarations of the weight, measure, and size of the individual units unless a declaration of count is fully informative.

Packaging and Labeling Regulation, Section 6.4. – "Terms:" If there exists a firmly established general consumer usage and trade custom with respect to the terms used in expressing a declaration of quantity of a particular commodity, such declaration of quantity may be expressed in its traditional terms, provided such traditional declaration gives accurate and adequate information as to the quantity of the commodity. Any net content statement that does not permit price and quantity comparisons is forbidden.

Weights and Measures Law, Section 15. – "Misrepresentation of Quantity:" No person shall represent the quantity in any manner calculated or tending to mislead or in any way deceive another person. If "accurate quantity information" is not provided, consumers are certainly being mislead or deceived and cannot possibly make price and quantity comparisons.

The Federal Trade Commission (FTC) has informed us that the following commodities (partial list only - similar products) are excluded from FTC jurisdiction.

Ink
Fountain Pens
Kindred Products (ball point pens, lead pencils, lead refills, etc.)
School Supplies
Stationery and Writing Supplies
Typewriter Ribbon
Printer Cartridges*

*While printer cartridges are not listed specifically in Handbook 130, FTC has indicated to NIST that commodities of this nature do not fall under their jurisdiction.

Metric "Only" Labeling:
Since the labeling of printer ink cartridges fall under state labeling regulations, dual unit labeling is not required. Hence, these packages may be labeled in only metric units.

Packaging and Labeling Regulation, Section 11.33. "Inch-Pound Units, Exceptions – Consumer Commodities:"
The requirements for statements of quantity in inch-pound units shall not apply to packages that bear appropriate International System of Units (SI). This exception does not apply to foods, drugs, or cosmetics or to packages subject to regulation by the FTC, meat and poultry products subject to the Federal Meat or Poultry Products Inspection Acts, and tobacco or tobacco products.

NIST Handbook 133, "Checking the Net Content of Packaged Goods," Fourth Edition, January 2005 – Product Testing:
NIST Handbook 133 has been prepared as a procedural guide for compliance testing of net content statements on packaged goods. The gravimetric test method (outlined in Chapter 2) uses weight measurement to determine the net quantity of contents of packaged goods. The handbook provides general test methods to determine the net quantity of contents of packages labeled in terms of weight and special test methods for packages labeled in terms of fluid measure or count. Gravimetric testing is the preferred method of test for products, such as inkjet and other types of printer cartridges. Therefore, the test method to verify the net contents of ink in printer cartridges exists. However, NIST recognizes the difficulties associated with determining the net content of these cartridges, such as, density determination, product cost, tare verification (cartridge), the cleaning of tare and standards, and finally, inspection lot size. Unless the products are checked at the plant or warehouse, it may be difficult to find a sufficient "retail" lot, adequate in size to obtain an appropriate sample.

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January 21, 2010

Attn: Mr. Don Onwiler, Executive Director
National Committee on Weights and Measures
1135- "M" Street, Ste. 110
Lincoln, NE 68508

Sent by E-mail: info@ncwm.net

Re: Citizen comment on
270-9 HB 130- Uniform Regulation for Method of Sale of Commodities—Packaged Ink and Toner Cartridges

Dear Mr. Onwiler:

On 01-19-10 I spoke with Ms. Lisa Warfield this morning and she directed me to certain print sources pertaining to the upcoming NCWM meetings, including the subject of Packaged Printer Ink and Toner Cartridges. Furthermore, she recommended I might speak with Mr. Ed Williams in Sacramento regarding these anecdotal experiences and observations.

I then spoke with Mr. Williams and he felt I should direct the following commentary to you for possible inclusion as citizen input in your upcoming committee meeting report.

I don't do this much and I have a propensity for HOT AIR…hope this isn't too bad.

_____

After having done my homework by reading Publication #15, Item 270-9, I shall first respond to certain comments made in Lexmark's Fox in the Henhouse letter to Mr. Max Gray, dated, March 17, 2009 supporting the current ISO-developed standard for Toner-Ink measurement methodology; then offer a personal experience to illustrate the current standard's shortcomings; then a few observations and unsolicited recommendations; and lastly, a closing comment on the need for furthering a new design paradigm and how your NCWM Conference can do something about it!

Item 1 -- It is irrelevant that the Ink/Toner component is a small part of the overall cost of a new or replacement cartridge—what matters is that the ink/Toner requires a costly and complex cartridge container for delivery. THEY ACT AS A UNIT! Lexmark's implication that the relatively low cost of the Ink/Toner alone renders proper regulatory scrutiny unnecessary <u>is totally spurious.</u>

In fact, the opposite is true—the Ink/Toner and Cartridge combination is an EXTREMELY EXPENSIVE Ink/Toner Delivery System because Content and Container <u>act as a unit</u> which, furthermore, is uniquely designed (with certain patent protection) to fit the corresponding printer model(s). Whether an OEM or lower-priced Name Brand cartridge, <u>the Unit is surprisingly expensive!</u>

Items 2, 3 --Re standards for Page Yield and current ISO solutions—"yield estimating and claiming methodology that permits cartridges to be compared using a <u>consistent yardstick</u>":

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My layman's opinion is that the "consistent yardstick" approach alone is inadequate. It prevents quantification of the contents—the essential ingredient inside the cartridge. Why not require the OEM Ink/Toner Cartridge/Printer industry to comply with freshly conceived DESIGN CRITERIA with at least one goal being to provide the consumer with a simple, yet accurate "back-up indicator" of a cartridge's actual toner content?

Personal observations:
The purpose of the foregoing recommendation would be to empower the consumer with a GUARANTEE for DELIVERY of the ENTIRETY of the purchased Ink/Toner.

This approach is meant only to supplement, not replace, the simpler, more convenient ISO-approved Page Count approach. The secondary consumer benefit would be to eliminate the "wiggle room"-based dealer responses to Ink/Toner shortage customer complaints as not many consumers are inclined to pry toner cartridges apart or properly argue issues of equity in the event of suspected shortages.

Whether by software revisions or hardware re-design, mandated new performance-based criteria can provide the consumer with a long-overdue checks-and-balances Tool to level the manufacturers' playing fields.

Solutions can take many forms—whether alpha-numerics via existing LCD windows or by color bar chart display graphics or even by adoption of primitive "clear plastic" toner cartridges. At the very least, the consumer would then have some kind of needed VERIFICATION TOOL.

Naturally, Lexmark's letter to Mr. Gray fails to address any constructive new solutions as none were previously required by any regulatory agency. To illustrate the need for the foregoing, consider my particular frustration which occurred because of the absence of a Verification Tool:

My personal experience (Haven't we all had them?):
The following sequence occurred in my design office. We purchase Brother or Staples TN-350 Toner Cartridges for my Brother MFC 7420 desktop laser printer (purchased several years ago), which has generally been lightly used (average 3-15 copies daily) since purchase:

EVENTS IN MY OFFICE:

- Periodically, the printer shuts down and will not print any longer…until a replacement Toner Cartridge is purchased and inserted into the printer!
  NOTE:
  - No easily noticeable, if any, Print Counter capability on the cartridge or the printer. The Toner Cartridge is a proverbial "Black Box".
  - Printer shutdown appears to occur SIGNIFICANTLY BEFORE the estimated 2500 pages of usage.
  - No warning whatsoever of the pending total shutdown , i.e. printing quality drop-off or fade-out.
  - All printed copies 100% perfect prior to shutdown.

- Printer LCD Display Message then appears, saying something like "Out of Toner" or "Replace Toner Cartridge"

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- Printer cannot be cajoled into operating again without a new replacement cartridge, i.e. pushing the rocker switch to OFF, waiting 30 seconds, then back to ON; rocking toner cartridge; sliding the corona wire; etc.

EVENTS FOLLOWING AT THE STORE:

- I take "suspect" cartridge to office supply dealer (where I purchased the printer, cartridges and all office supplies). A question and complaint is planned prior to purchasing a new replacement cartridge.
- The Store Manager recites the manufacturer's mantra about the difficulty of estimating toner consumption, varying printed text/page densities, etc.
- I then suggest we investigate the circumstances together—we remove End Cap from cartridge and….guess what….a SIGNIFICANT amount of toner spills out!
- The Store Manager then claims "Equipment Malfunction" may be responsible–did I purchase a Warranty? Ultimately, he reluctantly offered me a new replacement cartridge at half-price—but it was like pulling teeth from a donkey!.

EPILOGUE:
Was I satisfied? Yes and No

- Yes, because of the Manager's offer--I didn't feel like a total idiot.
- No, because of the repair disruption and the waste of my time.
- No, because of my uncertainty of a future repeat experience.
- No, because of the lack of final problem resolution—was the printer the real culprit or was it a batch of poorly designed Ink/Toner cartridges? Without the benefit of a built-in Diagnostic or Verification Tool(s)--either answer might be wrong. Will I, in the future, prematurely purchase again one or both of this manufacturer's products?

To avoid that risk of becoming a true idiot (the second time burn), will I switch manufacturers to avoid that possibility?

- Probably yes. What a shame, because otherwise, the printer offers excellent value!

Final Thoughts/Conclusions:
The cartridge Page Yield Estimate, purportedly reflecting quantity of content, provides inadequate consumer protection without at least one additional design feature (in mechanism or software) to deliver to, and assure, consumer of **full usage** of the cartridge's Ink/Toner contents.

Should not better Consumers Protection apply to the design of COMPLEX or PERMANENTLY SEALED CONTAINERS (i.e. Ink/Toner Cartridges)? These devices, during design, should trigger **design compliance with additional new standards and regulations,** generated by the appropriate agency, to assure the customer of:

1. Quantity of container's Contents
2. Delivery of Entirety of Contents, as is practical.
3. Provide consumer with a Print Count or Ink/Toner quantity verification tool, (on Cartridge or Printer Display Screen) as offered in larger printers.

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WHICH COMPARISON IS MORE APT?
Consider the comparison of a sophisticated, complex, injection-molded Ink/Toner Cartridge vs. an old-fashioned Burlap Bag for Grain or Paper Bag for Cement, where measurement can be easily confirmed because of the container's scale, flexibility and negligible weight --after all, it's just a BAG!

Now consider the same Toner Cartridge vs. a craftily-designed rigid Magician's Box with a false bottom (designed by the Magician or Manufacturer), which by accident or design, conceals a portion (i.e.30%) of the grain--which remains unused and ultimately is then unknowingly discarded by the Consumer. Is that right?

Throughout history, did not the science of measurements ultimately evolve in most every society so as to identify and prevent the proliferation of deceptive and/or irregular measurement practices (whether for government tax gain or for the public's protection)?

So Why Not Now?

EXAMPLE OFTHE NEW PARADIGM--REFILL THE REFILL:
The job of providing "replacement toner" could be done just as well with a Refill-the-Refill design. An affordable, small, lightweight, saltshaker-sized, two-ounce $3.00 Ink/Toner refill snap-on module or squeeze-dispenser bottle enabling a customer to conveniently refill an empty toner cartridge (purchased in $18.00 six-packs instead of buying one $50.00 traditional cartridge on six separate trip occasions). When do we "outlaw" UNAFFORDABLE, LARGE, HEAVY, PACKAGED, PALLETED and TRANSPORTED cartridges produced and sold in the usual way?

A side-by-side Energy Audit of the two approaches would indicate at least NINE BILLION DOLLARS OF WASTE and FAR MORE IN UNNECESSARY ENERGY COSTS in the ten billion dollars per year Ink/Toner Cartridge !ndustry. Did I read ten billion somewhere?

In closing, the Ink/Toner cartridge is only one of countless ethically-challenged manufactured products cluttering and consuming our environment. My experience, though very minor in the big scheme of things, again illustrates the range of social and environmental losses resulting from the current license manufacturers often have to legally harvest unearned profits and waste substantial energy in the process of producing these small-scale consumer products. The public suffers.

Respectfully,

Gary J. Neville

cc: Lisa Warfield,
Ed Williams

Information Technology Industry Council
Leading Policy for the Innovation Economy

Printer Toner and Ink Cartridges:

Best Practices for Conveying Yield Performance to the consumer

This paper has been prepared by the Information Technology Industry Council (ITI). ITI is the premier voice, advocate, and thought leader for the information and communications technology (ICT) industry. ITI is widely recognized as the tech industry's most effective advocacy organization in Washington D.C., and in various foreign capitals around the world. ITI's members include the leaders of printer manufacturing technologies including Epson, Hewlett Packard, Kodak, and Lexmark, among others.

Executive Summary:

The ultimate goal of any product measure is to provide information to a customer that facilitates an informed purchase decision. At first glance, comparing the volume or weight of ink or toner would seem to be a good proxy for the page yield. For a host of reasons this is often not the case. Toner and ink cartridges are complex mechanisms designed to deliver a consistent customer experience and because of this, ink or toner can be used in different amounts when printing and for purposes other than printing. All of this is highly dependent on the design of the larger printing system of which the cartridge is a critical but not independent part.

The printing industry realized the difficulty of presenting cartridge performance information to the customer and because of this voluntarily chose to develop several standards for measuring yield performance. These standards are developed specifically for these devices and use standard test patterns and methods to provide accurate and repeatable measurement. Moreover, the standards include protocols for clear and consistent communications to users regarding cartridge yields. The industry wholly believes that these test procedures provide a more reliable means of measurement and a more accurate method for consumers to determine value than comparing the volume or weight of ink or toner.

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Printer Toner and Ink Cartridges:

Best Practices for Conveying Yield Performance to the consumer

Objectives of weights and measures regulations include facilitating value comparisons and providing a standard of fairness in the marketplace. When it comes to selecting printer hardware and replacement supplies, these objectives dictate that weights and measures criteria that could lead the consumer to making economically incorrect decisions regarding value should not be implemented.

Some customers are interested in making comparisons on the relative value between printing supplies, both at the initial printer purchase and afterwards when purchasing additional supplies. In addition to cost, product reliability, brand reputation and print quality another important measure considered by some customers during the supply purchase is page yield. At first glance, comparing the volume or weight of ink or toner would seem to be a good proxy for the page yield. Unfortunately this is often not the case. This paper will outline the drawbacks of using weight or volume as a proxy for page yield and highlight the reasons why all major printer manufacturers use a set of ISO/IEC standards to measure and communicate printer yield.

Depending on the printing technology, the use of ink or toner can be impacted by several factors.

The amount of toner applied in printing pages compared to the amount of toner supplied in the cartridge is dependent on many factors and that a simple measure of the weight of the toner will not give a clear indication of ultimately how many pages can be printed. In electro-photographic (laser) printers, different toner formulations will use different amounts of toner when printing the same page. This is due to charge, particle size and formulation variation between toners. These attributes are engineered and varied by each cartridge vendor to provide what they feel to be the best experience to their customers. Some customers prefer thin sharp lines and fine detail, others prefer thick bold lines. Depending on the choices that a given manufacturer makes in toner formulation (base polymer, particle size, charge distribution and charge control agents), the amount of toner used to print the same page may vary. Additionally, the amount of toner cleaned and deposited in the waste hopper depends on several variables including the job size, coverage environment and printer design. Finally, the bulk densities of toners are not the same; for a given volume of toner, there can be significant differences in weights. All of these factors result in the reality that two different toner supplies of the same weight will not necessarily deliver the same number of pages.

Similar to laser printers, inkjet printer cartridge vendors manipulate several variables in their ink formulation to meet the needs they identify as important for their customers. Some of the variables that manufacturers consider and apply include: different ink formulations; dye vs. pigment inks, actual loads of pigment or dye in the ink formulation, and drop size. Different combinations of these ink content characteristics will result in substantially different ink consumption rates while printing the

same page. In addition, all inkjet systems perform routine servicing, and those servicing routines may be driven by a number of factors such as the ink formulation, usage and content. In addition, changes to non-ink materials by the inkjet cartridge manufactures or during remanufacture can affect the amount of ink that can be used in printing pages. Finally, for the same volume of ink, two different systems or the same model cartridge from two different vendors can print a different number of pages.

Ultimately what matters to many customers is answering the question, "How much can I print with a cartridge in a given printer?" Page yield reported using the ISO/IEC methodology better addresses this question than weight or volume. ISO/IEC JTC1 SC28 identified this as a consumer need in 2000 and started working on a family of standards that address this customer need. Standards now published measure yield for monochrome laser printers (ISO/IEC 19752), color laser and color inkjet printers (ISO/IEC 19798 & ISO/IEC 24711) using a common test suite (ISO/IEC 24712). Currently under development are standards to measure photo yield consisting of a methodology for inkjet printers (ISO/IEC 29102) and a photo test suite for any printing technology (ISO/IEC 29103). These standards are based on common design philosophies and change their methods slightly, depending on the technology being measured. The following attributes are endemic to each standard:

1. Use of a well defined consumer type document for printing – Coverage can vary depending on how it is measured and depending on what choices are made in defining coverage; the same "coverage" page can perform differently. For the ISO/IEC standards, the test pages were defined so that a consumer can more easily relate them to their work stream. These pages are freely available so customers can view and understand what the standard is based on. These test pages can be found at www.iso.org/jtc1/sc28.

2. Testing of multiple printers and cartridges to account for printer and supply variation – There is manufacturing variation not only with how much ink or toner is put in a supply, but how effectively a printing system uses that ink or toner. This usage is also impacted by the specific printer used during test; some printers of the same model will use more or less ink or toner. For this reason, the ISO/IEC standards require a minimum of three cartridges to be used on a minimum of three printers (minimum of 9 cartridges tested). The yield information from these 9 cartridges is reported using a lower 90% confidence bound (LCB) on the mean. This gives a reliable estimate of lowest predicted average yield with 95% statistical confidence. The LCB not only takes into account the average performance of the cartridges tested, but also the breadth of variation in the cartridges and printers tested. The goal is to try and characterize the end user experience taking into account some of the normal variations in printers and supplies.

3. A well controlled printing environment – The environment that a printing system operates in can have an impact on the number of pages printed for a given amount of ink or toner. For laser systems both temperature and humidity can impact the amount of toner used. For this reason both the temperature and humidity are controlled for toner yield testing. For inkjet,

temperature is the main environmental driver for ink usage, so only temperature is controlled during testing.

4. A well defined end of life criteria – For the purposes of the ISO standards, end of life is defined in one of two ways. First, when the printer stops printing and reports that the supply should be changed. The other method requires a visual assessment of elements on the test targets. This visual assessment is defined as a visually significant fade in the target elements greater than 3mm as compared to the 100th print for that cartridge. These two methods are meant to represent the two common criteria that users would choose to determine if a supply has to be changed.

When the publication of the first yield standard occurred in the summer of 2004 it was accepted by industry and consumer's groups as the best method for conveying one attribute of cartridge performance that was of interest to customers. Building on this acceptance, ISO/IEC JTC1 SC28 created additional standards for yield; these have been met with similar market acceptance as the original.

Because well established methods for the measure of cartridge yield exist and weight and volume are not as useful or meaningful in making value comparisons, this group recommends that cartridge performance information be conveyed to customers using the developed ISO/IEC yield standards.

Footnotes to press releases and reception of ISO yield standards:

http://www.pcmag.com/article2/0,2817,2183959,00.asp

http://www.hp.com/hpinfo/newsroom/press/2004/040617b.html

http://www.incits.org/press/2007/pr200701.pdf



Information Technology Industry Council
Leading Policy for the Innovation Economy

August 10, 2010

Mr. Don Onwiler, Executive Director
National Committee on Weights and Measures
1135- "M" Street, Ste. 110
Lincoln, NE 68508

Via Email

Subject: NCWM Proposal for Uniform Regulation for Method of Sale of Commodities- Packaged Printer Ink and Copier Toner

Mr. Onwiler,

On behalf of the Information Technology Industry Council (ITI) and its members[1], I welcome the opportunity to offer these comments on the issue above for consideration at the 2010 National Conference on Weights and Measures (NCWM) Annual Meeting.

ITI agrees with the main objective of this proposal which is to provide consumers with a meaningful measurement of value. In this case, the most relevant measurement criterion for consumers is the number of pages that they can obtain from a given printer cartridge. The ISO/IEC standards for yield provide a common, well accepted basis for consumers to understand and compare different cartridge options.

However, ITI's members believe that volume and weight are a poor proxy for value. This measurement does not directly relate to the number of pages that a consumer can print from a cartridge and its use may lead consumers to draw incorrect conclusions regarding their choice of supplies.

[1] ITI is the premier voice, advocate, and thought leader for the information and communications technology (ICT) industry. ITI's members include the leaders of printer manufacturing technologies including Epson, Hewlett Packard, Kodak, and Lexmark, among others.

We continue to support the use of ISO/IEC yield measurement standards, which provide a clear, managed basis to measure and declare the yield of a specific cartridge. These standards rely on a test suite of pages relevant to consumer output that are freely available to consumers to review.

For color inkjet and laser printers, the industry supports yield declarations based on the normative testing described in ISO/IEC 24711 and ISO/IEC 19798. For monochrome laser printers, the industry supports yield declarations based on the normative testing described in ISO/IEC 19752. These three ISO/IEC measurement methods are widely accepted and are in practice by the industry. ITI would not encourage the use of any other value measurement as part of a mandatory or supplemental labeling requirement.

Thank you for your consideration of these comments. We recognize that this is a complex issue and look forward to continuing to work with the NCWM and with the working group being created under the L&R Committee. Please let me know if you have any questions or require further information.

Sincerely,



Josh Rosenberg
Director, Global Policy

cc:

John Gaccione
Chairman
Laws and Regulations Committee
National Committee on Weights and Measures

Lisa Warfield
NIST Technical Advisor
Laws and Regulations Committee
National Committee on Weights and Measures

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Consumers and Overpriced Print Ink Cartridges

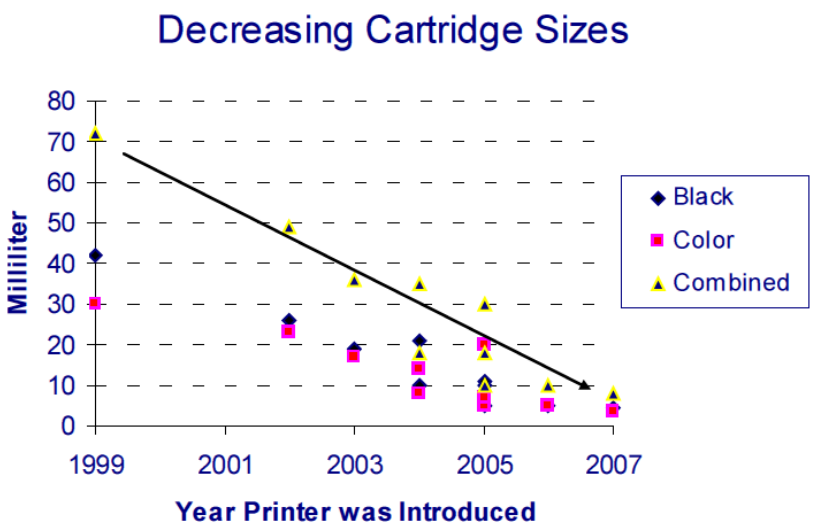
Steve Pociask
President
The American Consumer Institute
Center for Citizen Research

July 12, 2010

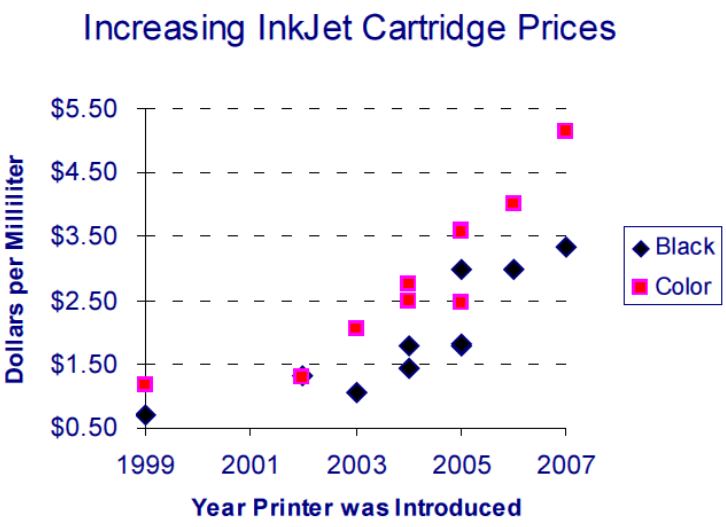
ACI
The American Consumer Institute
Center for Citizen Research

www.TheAmericanConsumer.Org

Consumers Buy Smaller Size Inkjet Cartridges …



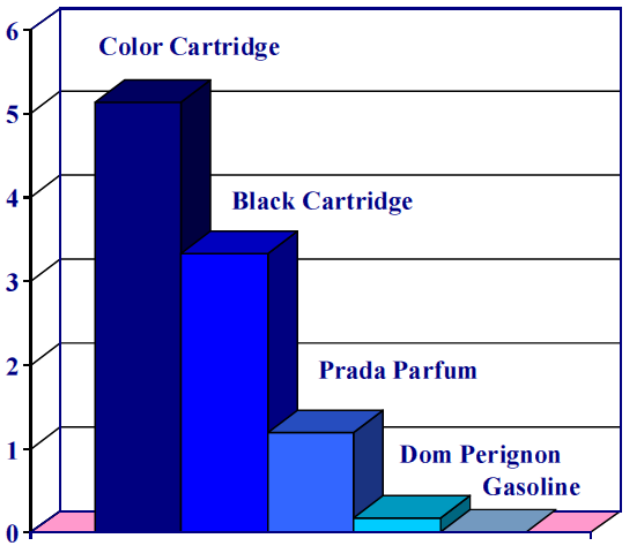
… And Consumers Pay More For These Cartridges



The American Consumer Institute 3

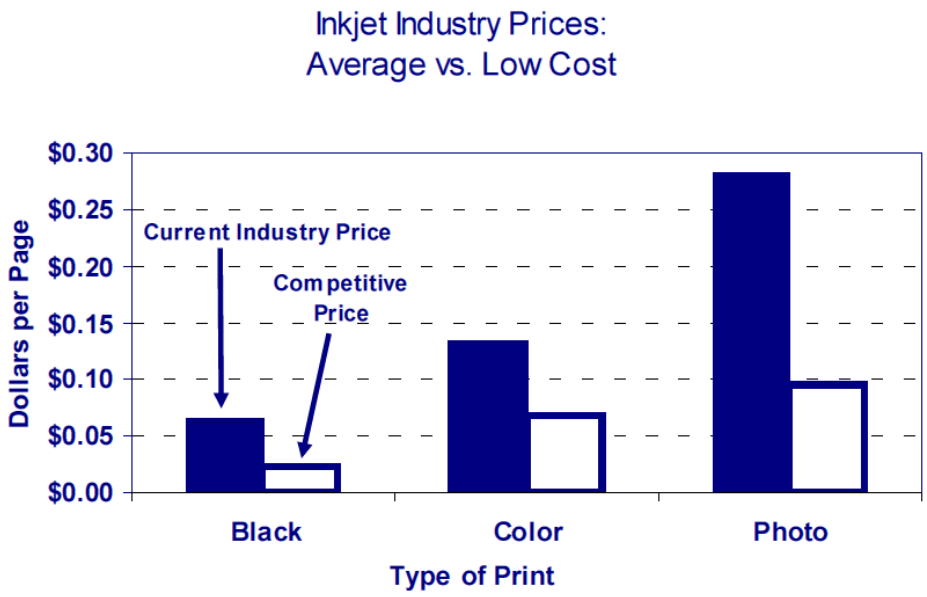
Ink Is A Luxury Good

Dollars Per Milliliter



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Industry Ink Prices Are Not Competitive



ISO Standards Already Exist to Measure Black Text and Color Printing Yield

- ISO/IEC 24711:2007
  - Methodology for the determination of ink cartridge yield for inkjet printers and multi-function devices that contain printer components
- ISO/IEC 19752:2007
  - Black text test pages for measurement of office equipment consumable yield
- ISO/IEC 24712:2007
  - Color test pages for measurement of office equipment consumable yield
- Covers
  - electro-photographic printers, inkjet printers, multi-function, all-in-one, electro-photographic machines with digital printing capabilities
  - Home and office equipment
  - Liquid or solid ink

Example – Cartridge Prices

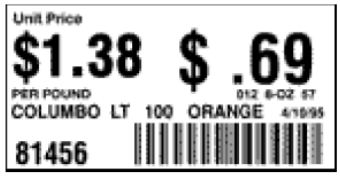
Prices	CMY	C	M	Y	K1	K2	LC	LM
Brother MFC-5460		$12.99	$12.99	$ 12.99	$ 19.99			
Canon MP160	$24.99				$ 19.99			
Canon MP510		$14.25	$14.25	$ 14.25	$ 16.25			
Canon MP600		$14.25	$14.25	$ 14.25	$ 16.25	$ 14.25		
Canon MP 810		$14.25	$14.25	$ 14.25	$ 16.25	$ 14.25		
Epson CX6000		$12.34	$12.34	$ 12.34	$ 16.99			
Epson RX580		$14.24	$14.24	$ 14.24	$ 16.14		$14.24	$14.24
HP C3180	$19.99				$ 14.99			
HP C4180	$19.99				$ 19.99			
HP C5180		$ 9.99	$ 9.99	$ 9.99	$ 17.99		$ 9.99	$ 9.99
Lexmark 8350	$21.99				$ 19.99			
Lexmark x3470	$19.99							
Kodak 5300	$14.99				$ 9.99			

Example – Cartridge Yields for Color Printing

Output - Color	CMY	C	M	Y	K1	K2	LC	LM
Brother MFC-5460		809	623	824	533			
Canon MP160	324				332			
Canon MP510		874	713	666	490			
Canon MP600		900	686	702	532	6348		
Canon MP 810		873	672	712	514	5782		
Epson CX6000		435	288	451	251			
Epson RX580		976	489	459	308		427	607
HP C3180	210				203			
HP C4180	206				399			
HP C5180		375	373	496	682		7508	5506
Lexmark 8350	264				291			
Lexmark x3470	116							
Kodak 5300	378				342			

Retail Store Shelf Labels Show Unit Costs

- Store Shelf Labels Permit Consumers to Compare Like Products on a Per Unit Cost Basis



Retailers are already positioned to do this …

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Printer Costs Per Page

Printer	Mono	Color	Photo	Average
HP C4180	$ 0.13	$ 0.17	$ 0.39	$ 0.17
Canon MP160	$ 0.07	$ 0.18	$ 0.50	$ 0.16
HP C5180	$ 0.08	$ 0.17	$ 0.34	$ 0.14
Canon MP600	$ 0.09	$ 0.17	$ 0.26	$ 0.14
Canon MP510	$ 0.08	$ 0.15	$ 0.33	$ 0.13
Brother MFC-5460	$ 0.06	$ 0.15	$ 0.34	$ 0.12
Epson RX580	$ 0.07	$ 0.14	$ 0.24	$ 0.11
Canon MP 810	$ 0.06	$ 0.10	$ 0.29	$ 0.10
Epson CX6000	$ 0.04	$ 0.09	$ 0.24	$ 0.08
Lexmark 8350	$ 0.04	$ 0.09	$ 0.15	$ 0.07
HP C3180	$ 0.04	$ 0.09	$ 0.16	$ 0.07
Lexmark x3470	$ 0.04	$ 0.09	$ 0.16	$ 0.07
Kodak 5300	$ 0.02	$ 0.07	$ 0.10	$ 0.05

This illustration assumes a 50-40-10% mix of mono, color and 4x6 in. photo printing, respectively.
Sources: TeleNomic Research, QualityLogic yields and Staples prices.

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Life Costs: What Consumers Pay To Use A Printer Costing Under $150

Printer	Printer Price	Ink Cost	Lifetime Cost
HP OJ5780	$134.99	$695.25	$830.24
HP C4280	$99.99	$728.55	$828.54
HP C5280	$129.99	$689.85	$819.84
Epson CX8400	$99.99	$713.70	$813.69
Epson CX6000	$99.99	$665.10	$765.09
Lexmark X5470	$99.99	$650.25	$750.24
Epson RX595	$129.99	$610.65	$740.64
Canon MP160	$89.99	$502.20	$592.19
Cannon MP470	$99.99	$490.50	$590.49
Brother MFC-440CN	$129.99	$421.65	$551.64
Cannon MP520	$149.99	$311.40	$461.39
Kodak ESP-5	$149.99	$216.00	$365.99
Kodak ESP-3	$129.99	$213.30	$343.29

* - Includes $50 manufacture discount; uses QL 2008 yield report, manufacture prices. Assumes 4,500 pages (say 6 years at 750 pages per year) for monotone (black), color and photo printing; with a 50-40-10% mix of monotone, color and 4x6 in. photo printing.

Printer Costs per 1,000 pages

	Black	Color	Photo	All Types
HP C4180	$ 127.57	$ 166.27	$ 386.72	$ 167.67
Canon MP160	$ 73.53	$ 183.95	$ 500.87	$ 156.75
HP C5180	$ 79.39	$ 169.03	$ 337.08	$ 138.03
Canon MP600	$ 86.91	$ 172.33	$ 259.61	$ 135.50
Canon MP510	$ 80.17	$ 151.99	$ 328.72	$ 131.36
Brother MFC-5460	$ 56.59	$ 147.14	$ 340.64	$ 118.20
Epson RX580	$ 65.89	$ 137.34	$ 238.37	$ 109.34
Canon MP 810	$ 59.27	$ 103.09	$ 288.91	$ 98.30
Epson CX6000	$ 40.33	$ 90.18	$ 240.78	$ 78.65
Lexmark 8350	$ 39.14	$ 91.62	$ 152.27	$ 69.70
HP C3180	$ 37.22	$ 90.85	$ 155.23	$ 68.69
Lexmark x3470	$ 36.96	$ 89.69	$ 159.91	$ 68.59
Kodak 5300	$ 22.63	$ 68.87	$ 95.77	$ 46.90

Ink cost per 1,000 pages with a mono, color and photo mix of 50-40-10%, respectively.
Sources: TeleNomic Research, QualityLogic yields and Staples prices.

Operating Costs …
Retail Shelf Cards Should Look Like This …



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Now Is the Cheaper Printer Really Cheaper For the Consumer?



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Summary

- Findings
  - Ink prices are too high; showing costs per page can help
  - Consumers need better information
  - Industry needs a better industry metric
    - ML and yield do not work very well
    - Need to incorporate printing costs
- Solutions
  - Shelf labels and fact cards information for both printers and cartridges
    - Printers should show standardized cost (cost per 1,000 pages)
    - Cartridges should show the printer's average cost per page
  - Package labeling is another option
- Policy Solutions
  - State legislation
  - Federal legislation
  - FTC

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Appendix D

Animal Bedding

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American Wood Fibers D18
The Andersons, Cob Products Division D26
The Andersons, Cob Products Division Presentation D29
Newco Distributors Inc. – Specialty Division D36
Absorption Corporation D37

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Green Products Company
16902 290th Street
PO Box 756
Conrad, IA 50621 USA

Gregg Sharp
800 247-7807 ext. 1230
641-366-2001
FAX 641-366-2366
gregg@greenproducts.com

January 23, 2010

Lisa Warfield
Weights & Measures, Coordinator
NIST, Weights & Measures Division
100 Bureau Drive
Gaithersburg, MD 20899-2600

Dear Ms. Warfield:

Re: Proposed Amendment for Handbook 130, Method of Sale, Section 2.23 – Animal Bedding

Green Products Company is a processor of corncobs that are used as a bedding material for the laboratory animal research industry. We fully support adopting the amendment which would allow us to continue selling on the basis of weight.

All of the end-users identified in the amendment clearly fall under the definition of "Non-consumer" as defined in HB 130, Packaging & Labeling Regulations, Section 2.3 on page 60 and so there is no grey area regarding to whom the amendment is applicable. Additionally, all laboratory animal research entities are subject to stringent standards and monitoring by industry accrediting agencies and that further delineates the market.

The industry's practice of buying corncob bedding on the basis of weight stretches over several decades. Those who buy and specify lab animal bedding products are well educated and sophisticated. Of the few processors and marketers of corncob bedding, only one processor packages by volume and that is a relatively recent change from their past practice.

The absorptive capacity is the most important physical characteristic used to evaluate lab beddings. Bulk density is a measure of weight for a given volume and usually expressed in terms of pounds per cubic foot. Corncob bedding with a heavier bulk density will always absorb more than lighter density bedding. As a processor of corncobs, we purchase all of our raw materials on the basis of weight. When selling by volume, there is great economic incentive for the processor to process lighter density raw materials because it takes less weight to fill the given volume, yet it is the heavier density raw materials that have greater absorptive capacity, and that is what the end-user wants.

Checking the net contents of packaged goods is relatively easy for small units whether packaged by weight or volume. However, the industry trend is to utilize 1,000 lb. bulk bags. It would be possible to weigh a bulk bag, but it is difficult to imagine a practical method for checking the net contents of a bulk bag containing 35 – 40 cubic feet of corncob bedding.

Because of that, the bulk bag portion of the industry will simply be unregulated because there is no way for a curious end-user to check the contents.

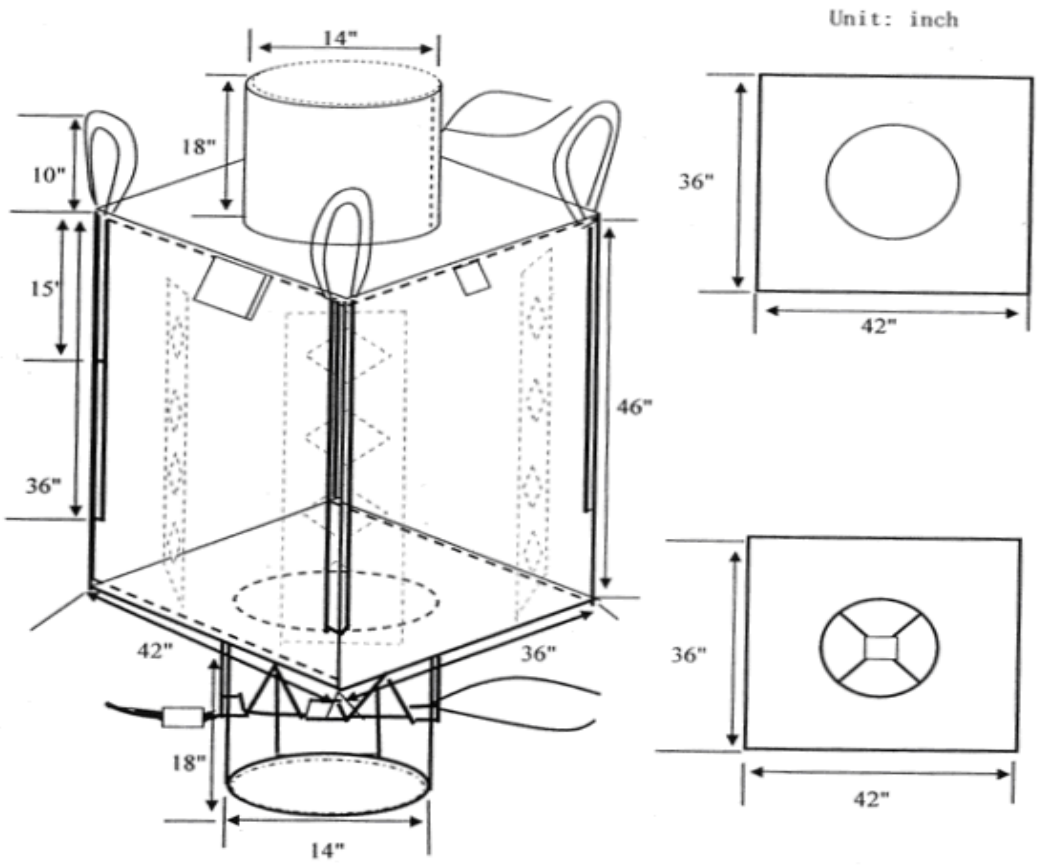
When listening to those who would like to influence the committee's decision, you should consider whether the individual or entity is a processor/manufacturer, a distributor, or end-user of the bedding. A processor will benefit from volumetric method of sale by packaging lighter density material which is less absorbent and that is to the detriment of the end-user. Although Green Products Company is a processor, we support Harlan Laboratories. Harlan is successful in the lab industry, not because they are loyal to their supplier, but because they are fully committed to serving the needs and best interests of their customers. It is the end-user who benefits from weight as the method of sale.

Sincerely,

Gregg Sharp
Sales Manager
Green Products Company

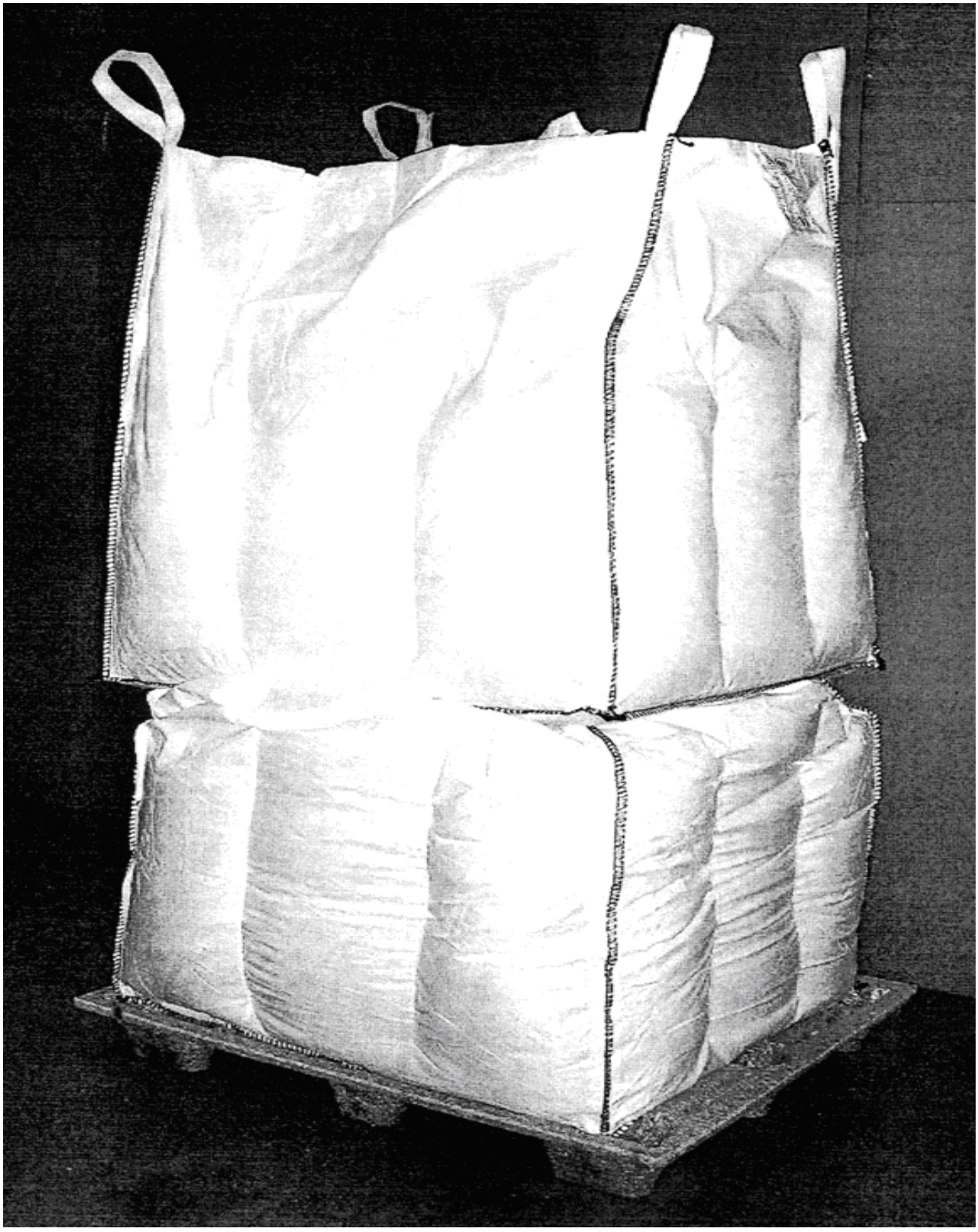
PS Line drawings of bulk bags and photos are included with this.

Model: IGP-46 (36"x42"x46") 4-Panel Baffle Design



Description

Size	36" x 42" x 46"	**Printing**	No
SWL, SF	2000 lbs 5:1	**Document Pouch**	1 - 12x12 Ziplock
PP Fabric	6.0 oz. Coated, White	**PE Liner**	No
Top	14"D x 18"L, ½" Tie Spout	**Sift-Proof**	No
Bottom	14"D x 18"L, ½" Tie Spout; Star Closure, Rope Tube		
Lifting Loop	Vertically Sewn Lifting Loops Height: 10", Sewing down: 15" & 36"		



harlan™ Helping you do research better

Harlan Laboratories

Bedding Packaging for Research Applications

All Animal Bedding Materials Are Not Created Equally

TERRY BURNS-HEFFNER
Teklad National Sales Manager
May 4, 2009



harlan™ Helping you do research better

Bedding Materials for the Biomedical Research Community

All products sold directly to commercial end-users, on an international basis.

Harlan Laboratories

The Market

The International Biomedical Research Community

Customers such as:

- Government Institutions (NIH, NCI, FDA, USDA, DOD)
- Pharmaceutical Firms (Merck, Pfizer, Schering, Wyeth)
- Contract Toxicology Labs (Covance, Battelle, Wil Research)
- Medical Schools (Johns Hopkins, Harvard, Wash U.)
- Biotech Firms (Amgen, MedImmune, Genentech)
- Large Commercial Breeders (Harlan, Charles River, Jackson)

harlan Harlan Laboratories 3

THE MARKET: Part 2

THE CUSTOMERS IN THIS SEGMENT ARE:

> **LARGE USERS** Most often buying full pallets
Some by in Bulk, Some buy full trucks
Mechanized Materials Handling
Some use robotics technology

> **VERY DEMANDING** Rigid Specs for Product Quality

> **HIGHLY REGULATED** NIH, USDA, AAALAC, GLP's

harlan Harlan Laboratories 4

Harlan, as a part of this Industry

1. is a Manufacturer of both Diets and some Beddings (***not*** cobs)
2. sells manufactured items (diets & some beddings) and re-sells other manufacturer's bedding items direct to commercial end users
3. is also one of the largest Commercial End Users
4. sells, re-sells and purchases on an International basis
5. products are ***not*** sold in retail stores

Therefore, we come to you with both a manufacturer as well as a customer/end user perspective .

harlan Harlan Laboratories 5

"All Bedding Materials are not created equally"

Wide Variety of Materials & Characteristics

- ***Wood Chips*** ***(cubes of wood from saw cuts)***
- ***Corncobs*** ***(granular, 1/4" or 1/8" particles)***
- ***Paper*** ***(Loose Pulp)***
- ***Paper "chips"*** ***(diced, rigid squares of alpha cellulose)***
- ***Paper Pellets***
- ***Cob Pellets***
- ***Wood Pellets***
- ***Wood Shavings*** ***(not commonly used in research – variables)***

(NOTE: The vast majority of these items are still packaged & sold by weight)

harlan Harlan Laboratories 6

CHARACTERISTICS:

- VERY DRY: (typically 6 to 10% moisture or less)
  - Maximize Absorbency
  - Minimize Mold/Contaminants
  - NIH Specifications
  - Regulated & Controlled Indoor Storage Requirements

    (USDA, NIH Guidebook, AAALAC, FDA GLP's)

  MOISTURE: Is a bad thing, and not tolerated. *Low* Moisture is critical for proper product performance, and to meet client specifications & expectations

  (This is not mulch, peat moss or top soil)

  * Some materials are compressible, but most are not

harlan Harlan Laboratories 7

The Issue

In meetings with NIST leaders, it was discovered that the spirit and intent of the current statute was to control packaging of materials such as mulch, peat moss & top soil. These materials, when packed by weight, can vary widely in terms of weight. Significant moisture loss can occur during shipment & storage. Such products can also be "spiked" with moisture to increase weight.

Animal Bedding is not plant bedding or soil, and as demonstrated earlier, in this particular market segment, moisture is an undesirable characteristic that is very tightly controlled and regulated. Most beddings used by clients in this segment are also not compressible, due mainly to the need for "flowability" in high-throughput facilities.

Further, for most bedding materials, raw materials & other input costs are purchased and calculated in terms of weight, freight is calculated in terms of weight, and so selling price is determined using weight. For value comparison purposes, clients either request or require pricing on bids & contracts in terms of weight.

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NIH SPECIFICATIONS

(NIH Spec: NIH-13-119)

3.2 Processing: …. When delivered, the bedding shall contain at least 8% but not more than 10% moisture…

3.3 Form: Specifications on particle distribution and dust content or fines. (US Standard Sieve Tests/specs are also given here)

5.1 Packaging: Bedding shall be packaged in 40 Lb. (+/- 1 lb.) bags

The NIH Bid specifications also require that all bedding items be bid by weight, in terms of pounds, to allow for proper value comparison

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Accuracy in Filling Bags

(NON-Compressible Materials)

By Weight

- Precise
- Alarmed/controlled
- Easily Verifiable (both by manufacturer and client)
- Complies with NIH Bid Specifications
- Preferred by most clients in large bids/Industry Standard

By Volume

- Estimated by flow rates for filling bulk totes (or weight?)
- Less precise than weight, involves estimations
- Not as readily verifiable (especially larger packages)
- Does not comply with NIH bid requirements and strays from Industry Standards

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FACTORS IN DETERMINING HOW MUCH BEDDING MATERIAL TO PUT INTO A CAGE (*"Enough")*

First thing that must be done, per application, is determine the proper amount of material, by weight, to put into a cage. Absorbency is calculated in terms of a % of weight (Example: "Absorbs 130% of its weight in liquids")

Determined by:

> Type of Caging: IVC, Static, Enclosed Isolator, Other

> Species & Population of Cage

> Temp., Humidity & Air Changes: At cage level & at room level

> Desired Interval Between Cage Changes

> Weight, or "Amount of Absorbent Material", is the final determining factor, *not Volume (Rice Krispies vs. Grape Nuts)*

These and other factors will often be different within a given facility

harlan Harlan Laboratories 11

BULK TOTES: A Customer's Perspective

When is this full?



How would I verify?



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Accurate Weight is Required for Shipping

Domestic Haulers

- An accurate weight per truckload or container must be calculated for every shipment, truck or rail
- Packing by weight makes calculations easy for the shipper, and is easily verified by the hauler

Overseas Containers

- Same hold true for overseas containers, and clients prefer packaging by weight, which allows for more rapid/accurate verification
- Carriers must have the weight on Bill of Lading to comply with maximum weight laws

harlan Harlan Laboratories 13

Similar Materials Sold by Weight

Wood Pellets for Wood Stoves are sold by the pound (40 & 50 pound bags) and/or by the Ton

Stone & Gravel sold by weight, either by the bag or by the ton

harlan Harlan Laboratories 14

Summary:

- Most bedding materials used in this industry are not compressible, and have therefore historically been packaged & sold by weight
- Moisture loss during storage, and risk of moisture "spiking" are not issues due to the low starting moisture
- Low moisture is vital to proper product performance, and is also tightly controlled & regulated by both the NIH, the USDA, and through bid specifications of many other larger end users
- Research Standards require strict and controlled indoor storage conditions to maintain the integrity of bedding products prior to use
- Packing by weight is more precise and much more easily verifiable, both by the manufacturer, and by the customer
- Packing by weight is specified by most government bids, and is preferred by most Purchasing Agents for ease & accuracy of value comparison

harlan Harlan Laboratories 15

Summary (continued)

- In terms of shipping, weight, not volume is required for calculating accurate weights for billing of freight (which is traditionally billed "per ton"), and in meeting legal truck and highway federal weight requirements. Weight is also required on all Bills of Lading
- For a Manufacturer: Verification by volume is less precise and more difficult when it comes to larger packages (such as bulk totes)
- For an End User: Verification by volume is not as easy for smaller packages, and nearly impossible (and labor-intensive) on larger packages that hold from 500 to 1000 lbs. of material
- There are non-consumer provisions for many other commodities regulated by the NIST and Weights & Measures Divisions. Non-compressible bedding materials for the biomedical research community (which is clearly non-retail) should be covered by one of these non-consumer provisions.

harlan Harlan Laboratories 16

.

Thank You!

harlan Harlan Laboratories 17

SHEPHERD | SPECIALTY PAPERS

Date: January 22, 2010

To: Don Onwiler,
Executive Director
National Institute of Standards and Technology

First let me introduce myself, I am Michael Schoonover, Vice President of Shepherd Specialty Papers. I am a Civil Engineer by degree, and have 30 years experience working in the paper business.

Shepherd Specialty Papers (SSP) is a distributor and manufacture of primarily paper products used mostly in the animal research industry. We also purchase, sell and distribute a full line of animal bedding products including Cobs. SSP is a leader in a number of these products and has been in this business since 1980. For more information on SSP visit www.ssponline.com .

We not only agree with the proposed changes to section 2.23 in HB130, but feel they are a requirement if this stature applies to the animal research industry.

Our primary product is a Paper Pulp Chip, a small square of pure pulp fibers, which the research industry uses as contact bedding. We manufacture this same product for sale into other markets including the construction and food industries, and in all cases we sell by weight. This is the measurement that most directly relates to the effective use of the product, the amount of fiber included. In the research industry, this dictates moisture absorption and consistency. There is really no consistent or fair way to package or sell this product by volume.

SSP also purchases and sells a full line of alternative animal bedding materials, the majority of which are sold to us and we in turn sell by weight. This has been the accepted standard in this industry and is the basis of most government, industry, and public bids that are issued. For each different product, specific guidelines are included to address moisture, packaging, particle sizing and distribution and other things that standardize the weight among suppliers and laboratories. It is these specifications that determine or clarify whether weight, volume or piece is the selling method. A key aspect of this sales arrangement is verification and repeatability. For our Paper Pulp Chip this is clearly weight, for other products weight is a key component in this industry as it normally correlates to the product's absorption capability.

We have reviewed the Harlan presentation materials presented in May 2009 and agree with and can confirm all arguments presented for this change. SSP believes that our Paper Pulp Dice product has even stronger arguments, which we can present if the committee desires.

In summary, section 2.3 applied to bedding used in the animal research industry needs to be updated to include the option of selling by weight as proposed in the amendment before this committee.

Thank you for your time and consideration,

Michael Schoonover
Vice President Operations

P.O. Box 346 • 10211 M-89 • Richland, MI 49083
(269) 629 8001 • (800) 253 3286 • Fax: (269) 629 8004 • www.ssponline.com

Northeastern Products Corp.
P.O. Box 98 • 115 Sweet Road
Warrensburg, NY 12885

T 518.623.3161 · 800.873.8233
F 518.623.3803
E info@nep-co.com W www.nep-co.com

NEPCO®
Celebrating Over 50 Years of Excellence
Established 1955

June 29, 2010

New York Dept. of Agriculture and Markets
Attn: Ross Andersen
10B Airline Drive
Albany, NY 12235
ross.andersen@agmkt.state.ny.us

Dear Mr. Andersen:

Re: Proposed Revision to Handbook 130, Method of Sale, Section 2.23 – Animal Bedding

NEPCO is and has been a manufacturer of Laboratory Animal Bedding for over 40 years supplying wood chip beddings to the industry. We have been advised that the NIST L&R committee has been considering a revision as referenced above and wish to express our concerns as we are not in agreement with the proposed changes. As a granular, non-compressable material, our wood chip beddings would be affected and for the following reasons we feel that the proposal is not in the best interest of the end users.

1. There is a significant difference in the density of different species of wood and therefore a variance in the density of the wood chip beddings. Two of the most commonly used and preferred species are Hard Maple and Aspen with respective densities of 44.2 and 27.0 lb/cu ft. A bag that is filled volumetrically to identical levels of wood chips from these species will have a proportional weight difference but since the product is used volumetrically each bag will fill the same number of animal cages.

2. The absorptive capacity of the wood varies according to its porosity of and does not necessarily correlate to wood density. In fact, White Pine with a density of 26.3 lb/cu ft has the capacity to absorb more liquid than Hard Maple at its density of 44.2 lb/cu ft. The softer fibers of pine more readily absorb the liquid and the larger interstitial spaces provide more volume in which the liquid can be retained.

3. The verification of package size for volumetrically filled bags is regularly observed in the practice of filling cages since most bedding dispensers are volumetric in design. The end user will note under-filled packages if the number of fillings from a bag decreases. Similarly, when palletized and received by the end user, volumetrically filled bags will result in uniform pallet heights. For packages of varying densities filled by weight, the pallet height can vary dramatically, necessitating check weighing by the end user to assure compliance with the weight standard.

In summary, we feel that the method of sale currently used for wood chip, corn cob and like beddings is best and that a change to a weight standard will make it less certain for an end user to determine whether they are receiving fair value for their purchase. The L&R Committee 2010 Interim Report makes reference to "industry support" for the change; for the record, NEPCO is clearly not in consensus with this recommendation.

Sincerely,

Gary Schiavi
President

Jason Raynor
Lab Supply
General Manager
Phone: 1-800-262-5258 Fax: 817-492-9300
Lab Supply

Jason Raynor
Lab Supply
General Manager
Phone: 1-800-262-5258 Fax: 817-492-9300
Lab Supply

From: Norm_Peiffer@AndersonsInc.Com [mailto:Norm_Feiffer©AndersonsInc.Com] Sent: Wednesday, June 30, 2010 7:56 AM
To: undisclosed-recipients:
Cc: Ted_Weaver@AndersonsInc.com; Jerry_Reynolds©AndersonsInc.COM; Dale Theis©Andersonsinc.Com; Andrea_Gay@andersonsinc.com; Colleen_Kander©andersonsinc.com; Barb_Sample@AndersonsInc.com
Subject: Letter template for Weight & Measures HB 130

Here is a letter we drafted for your consideration to use when writing to your state W & M representative. Fell free to use as is (after adding your letterhead) or parts and pieces.

We'll get you the outcome as soon as we have it.

Thanks again

Ted Weaver (almost retired)
Andrea Gay
Colleen Kander Jerry Reynolds Norman Peiffer

Dear Mr. Benavides,

Re: Proposed Revision to Handbook 130, Method of Sale, Section 2.23 — Animal Bedding

As a member of the laboratory animal provisions and supplies industry, we do not support the proposed change that would allow selling of bedding used for laboratory animals to be sold by weight. Below are the specific reasons this proposed change is inappropriate for the laboratory bedding consumer or any end user. These reasons are counter to what is reported on Page L&R 18.

1. There is no incentive for manufactures to produce a lighter product. The product varies seasonally and cannot be consistently produced to the same density per cubic foot while maintaining the quality of product. Furthermore, the product absorbency is not decreased by making it lighter, it is INCREASED. This was verified in an independent study by C.C. Burns & G.J. Mason, Department of Zoology, University of Oxford, UK, Animal Sciences Department & University of Guelph, Ontario, Canada. Accepted May 12, 2004 the study entitled: "Absorbencies for six different rodent beddings: commercially advertised absorbencies are potentially misleading". The study conclusion is: "By volume, corncob was the most absorbent bedding...". Corncob had the highest absorbency per cm^3..."and "In contrast, reported absorbency values calculated per unit mass would give the misleading impression... Attached is a copy of the study for your reference.

2. Historically, NIH has purchased primarily wood bedding for their labs, a product that has always been sold by volume. All customers including pharmaceutical, university research sites and large commercial breeders including Harlan who have purchased wood bedding have bought it by volume. Currently, The Andersons is the largest supplier of corncob to the laboratory animal market, and has been supplying customers since 2006 in government, pharmaceutical, university research sites and contract labs with corncob sold by volume.

3. Moisture range is only part of the equation that determines the density of processed corncobs. All manufactures comply with the restrictions. Corncob genetic variation of the hybrid seed, seasonal changes in humidity, hammer mill processing, drying and final screening all contribute to the varying cubic density and thus mass of the finished product.

4. Verification of package contents is easy with volume. The packages are sized to hold the stated volume of the package. The pallets stack heights when filled by volume are all the same heights. A 1.25 cubic foot bag fill can be checked by poured into it into a 1.25 cubic foot box that can be purchased on-line. A simple box with inside dimensions of 12" x 12" x 15" filled to capacity will verify the fill. In the case of bulk sack the dimensions are printed on a tag providing the bag dimensions. Dividing the multiple of all the dimensions by 1728 will yield the volume in cubic feet. Scales vary in accuracy must be calibrated to ensure consistency.

Conclusions:
The sale of dry, granular or non-compressible pelleted bedding is best sold by volume. The cages used to hold the animals are filled by volume in the lab, not by weight. In labs where automatic bedding dispensers are used, they are calibrated to dispense by volume, not weight. The seasonal variance in bulk density inherent in these natural products varies the bag fill and thus cage fill of the bags when the bedding is sold by weight. The bag fill and thus the number of cages fill per bag do not vary when the product is sold by volume.

The industry does not support this change as noted in the final paragraph of page 18 of L & R letter. The Andersons, the largest corncob manufacturer and supplier, nor any of the other largest manufacturers of laboratory bedding industry members commented upon the proposed resolution.

Thanks,

Jason

From: Gaccione, John [jpg4@westchestergov.com]
Sent: Wednesday, June 30, 2010 3:28 PM
To: Warfield, Lisa
Subject: FW: Proposed Revision to Handbook 130, Method of Sale, Section 2.23 - Animal Bedding

More for you.

John P. Gaccione
Acting Director of Consumer Protection
Director of Weights and Measures
Westchester County Consumer Protection
(914)995-2164

From: Bill Clarke [mailto:Bill@animalspecialties.biz]
Sent: Wednesday, June 30, 2010 1:52 PM
To: Gaccione, John
Subject: Proposed Revision to Handbook 130, Method of Sale, Section 2.23 - Animal Bedding

Dear Committee Members,

As a member of the feed industry in Pennsylvania specializing in laboratory animal diets and beddings, we do not support the proposed change that would allow the selling of bedding used for laboratory animals to be sold by weight. Below are the specific reasons this proposed change is inappropriate for the laboratory bedding consumer or any end user. These reasons are counter to what is reported on Page L&R 18.

1. There is no incentive for manufactures to produce a lighter product. The product varies seasonally and cannot be consistently produced to the same density per cubic foot while maintaining the quality of product. Furthermore, the product absorbency is not decreased by making it lighter, it is INCREASED. This was verified in an independent study by C.C. Burns & G.J. Mason, Department of Zoology, University of Oxford, UK, Animal Sciences Department & University of Guelph, Ontario, Canada. Accepted May 12, 2004 the study entitled: "Absorbencies for six different rodent beddings: commercially advertised absorbencies are potentially misleading". The study conclusion is: "By volume, corncob was the most absorbent bedding…". Corncob had the highest absorbency per cm^3…"and "In contrast, reported absorbency values calculated per unit mass would give the misleading impression…"

2. Historically, NIH has purchased primarily wood bedding for their labs, a product that has always been sold by volume. All customers including pharmaceutical, university research sites and large commercial breeders including Harlan, who have purchased wood bedding have bought it by volume. Currently, The Andersons is the largest supplier of corncob to the

laboratory animal market, and has been supplying customers since 2006 in government, pharmaceutical, university research sites and contract labs with corncob sold by volume.

3. Moisture range is only part of the equation that determines the density of processed corncobs. All manufactures comply with the restrictions. Corncob genetic variation of the hybrid seed, seasonal changes in humidity, hammer mill processing, drying and final screening all contribute to the varying cubic density and thus mass of the finished product.

4. Verification of package contents is easy with volume. The packages are sized to hold the stated volume of the package. The pallets stack heights when filled by volume are all the same heights. A 1.25 cubic foot bag fill can be checked by poured into it into a 1.25 cubic foot box that can be purchased on-line. A simple box with inside dimensions of 12" x 12" x 15" filled to capacity will verify the fill. In the case of bulk sack the dimensions are printed on a tag providing the bag dimensions. Dividing the multiple of all the dimensions by 1728 will yield the volume in cubic feet. Scales vary in accuracy must be calibrated to ensure consistency.

Conclusions:
The sale of dry, granular or non-compressible pelleted bedding is best sold by volume. The cages used to hold the animals in the lab are filled by volume, not by weight. In labs where automatic bedding dispensers are used, they are calibrated to dispense by volume, not weight. The seasonal variance in bulk density inherent in these natural products varies the bag fill and thus cage fill of the bags when the bedding is sold by weight. The bag fill and thus the number of cages fill per bag do not vary when the product is sold by volume.

The industry does not support this change as noted in the final paragraph of page 18 of L & R letter. The Andersons, the largest corncob manufacturer and supplier, nor any of the other largest manufacturers of laboratory bedding have commented upon the proposed resolution.

Thank you for your consideration,

William Clarke
Animal Specialties and Provisions, LLC
www.animalspecialties.biz
215-804-0144 Ext. 13

From: Bill Clarke [Bill@animalspecialties.biz]
Sent: Monday, August 09, 2010 2:22 PM
To: Warfield, Lisa
Subject: Lab Animal Bedding

Dear Ms. Warfield,
I had sent a previous letter against the provision or change regarding lab animal bedding being sold by weight instead of volume. We have sold corn cob bedding, wood beddings and paper bedding materials with some items packaged by volume AND some packaged by weight. I misunderstood the change was to cause all bedding to be sold by weight instead of volume. I could support the change (Handbook #130, Section 2.23 Paragraph 1) as worded specifically for ALPHA-dri or similar products (chipped paper products) manufactured by Shepherd Specialty Papers.

Thank you,

William Clarke
W. Edwards Deming Animal Specialties and Provisions, LLC
www.animalspecialties.biz
215-804-0144 Ext 13

"It is not necessary to change. Survival is not mandatory."
W. Edward Deming

Roe Bio-Medical Products
125 Wilbur Pl. Bohemia, NY 11716
www.roebiomed.com
(631) 236-9155 Fax (631) 289-4126

June 29, 2010

Michael Sikula
New York Bureau of Weights & Measures
Bldg 7A, State Campus
Albany, NY 12235

Re: NIST HB 130, Method of Sale, Section 2.23. Animal Bedding

Dear Sir,

I am a manufacturer of animal bedding material handling equipment, www.roebiomedical.com, including systems to handle and dispense all types of laboratory animal bedding. Included in our product line are both volumetric laboratory animal bedding dispensing systems and weight and volumetric bagging systems. I personally have 40+ years in the industry.

The method of sale for animal bedding should remain volumetric for NIST HB 130, Method of Sale, Section 2.23 Animal Bedding.

With few, if any, exceptions, all end users have employed and continue to employ volumetric methods for dispensing these bedding materials into cages, as the end users find there are considerable variables, confusion and difficulties in dispensing the animal bedding products by weight.

End users find that cost of volume supplied to volumes used are directly equitable number of cages, hence the cost per cages they process.

Volumetric sale of the animal bedding products eliminates environmentally influenced variables, such as moisture absorption or off gassing during storage or shipment, or post autoclaved (steam sterilized) moisture retention in these products. These environmental influences may significantly alter the animal bedding materials mass, making difficult to predict effective amounts of bedding product needed per cage.

Further, the harsh conditions in the cage wash processing areas where the bedding products are metered into the cages are NOT conducive to weighing methods without considerable cost to the end user. Ambient temperatures and relative humidity have great swings throughout the day in these cage processing facilities, making accurate instrumentation to dispense these products cost prohibitive.

In summary, NIST HB 130, Method of Sale, Section 2.23 Animal Bedding, should remain volumetric.

Thank you,

Philippe Roe
President
Roe Biomedical Products, LLC

AMERICAN WOOD FIBERS

Four Generations of Experience

July 9, 2010

TO: NCWM Laws and Regulations Committee:
FROM: Rich Whiting, VP Sales and Marketing, American Wood Fibers, Inc.

Dear Committee Members,
The purpose of this letter is twofold. First we wish to express our support for the proposed amendment to Handbook 130 being voted on at this conference allowing loose packages of animal bedding to be sold by weight.

The second is to enter into the record of this conference a concern which also has to do with package labeling of animal bedding. This is an issue which our company has raised several times in meetings of the NCWM, its regional affiliates, and various state agencies over the last several years. As the largest national supplier of wood fiber animal bedding to the continental U.S., American Wood Fibers takes the responsibility of package labeling adherence to current NCWM regulations very seriously. There is, however, widespread noncompliance in the market for large bales of compressed bedding sold predominantly to farm and home retailers, as evidenced by the 14 examples shown in the attached document. Essentially, we, and others who are in compliance, are confronting an unlevel playing field on which to compete.

The pertinent sections of Handbook130 are:

- Section 2.2, Method of Sale for animal bedding - "…If the commodity is sold in a compressed state, the quantity declaration shall include both the quantity in the compressed state, and the usable quantity that can be recovered."
- Section 6.14 Packaging and Labeling - Qualification of Declaration Prohibited: In no case shall any declaration of quantity be qualified by the addition of the words "when packed", "minimum", or "not less than" or any words of similar import (e.g. "approximately"), nor shall any unit of weight, measure or count be qualified by any term (such as "jumbo", "giant", "full" or the like) that tends to exaggerate the amount of the commodity.
- Packaging and Labeling 10.11 Statements of Cubic Measure in Compressed Form: When the content declaration on a commodity sold in compressed form is stated in terms of cubic measure, an additional statement may indicate the amount of material from which the final product was compressed. The amount in such statement shall not exceed the actual amount of material that can be recovered.
- Packaging and Labeling sections 8.1.1 and 8.2.2 regarding the font size and placement of the primary quantity declaration.

We are asking your support for greater attention to enforcement of compliance in the field. I have made contact with numerous state Weights and Measures officials to give specific examples of violations, and would be happy to supply further documentation by state, manufacturer or retailer upon request.

We appreciate your attention to this matter and look forward to remaining an active Industry participant in future NCWM conferences.

Rich Whiting
AMERICAN WOOD FIBERS
P-800-624-9663
rwhiting@awf.com

Corporate Office and Consumer Products
9841 Broken Land Parkway
Suite 302
Columbia, MD 21046
800-624-9663 / 410-290-8700
Fax 410-290-6660

Industrial and Wood Flour Products
100 Alderson St.
P.O. Box 468
Schofield, WI 54476-0468
800-642-5448 / 715-355-1900
Fax 715-355-5721

ISO 9002:1994
Certificate no. 09719

Visit us at: www.awf.com

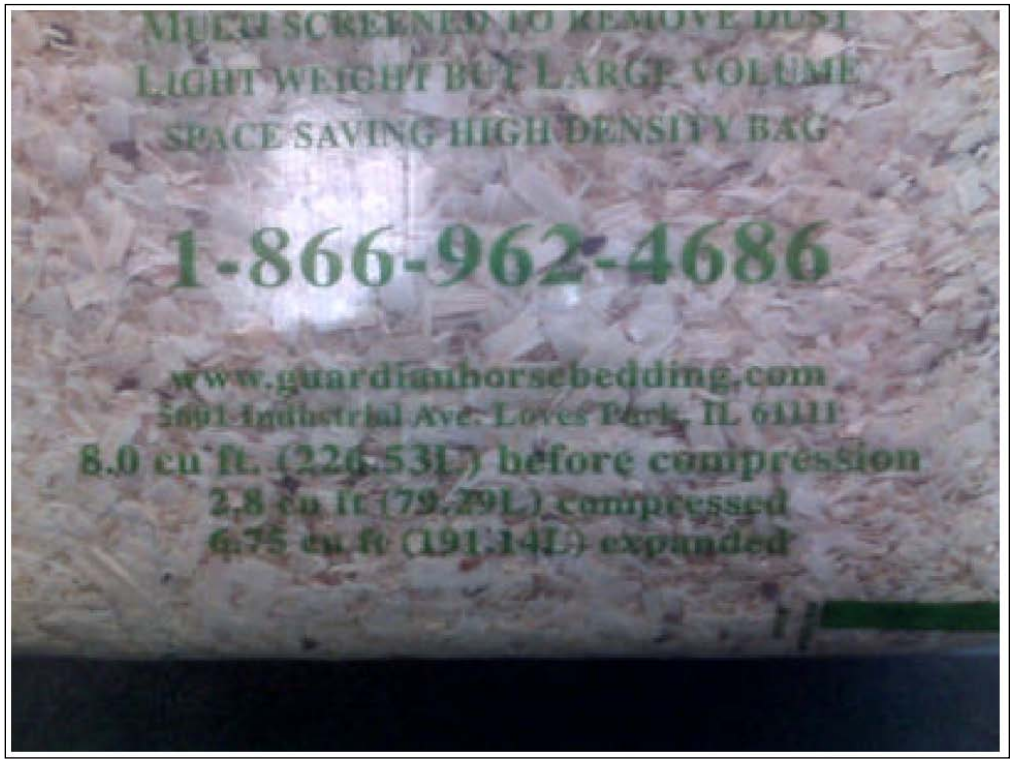
TN Retailer – No expanded volume statement



WI Retailer – Qualification of declaration statement



MI, VA, TN, TX, KY, IL, NE and others – Pre-compression statement exceeds expanded volu
statement



OH, PA, NY – Qualification of declaration statement



PA, NY, New England – No expanded volume statement



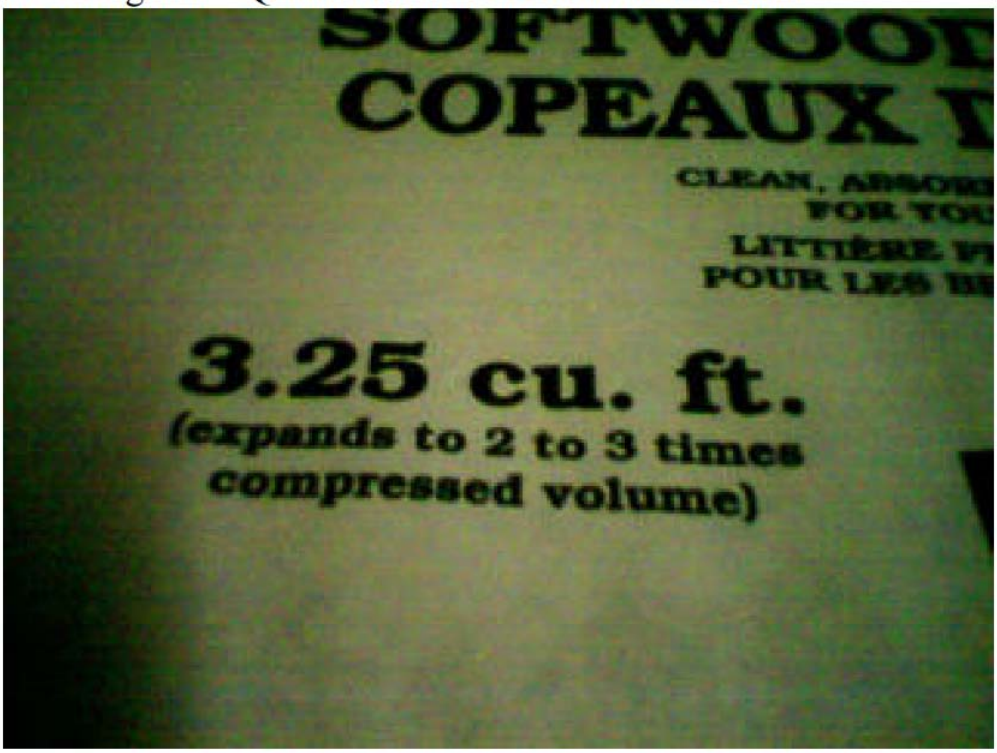
OH – no expanded volume statement



VA, MD – no expanded volume statement



New England – Qualification of declaration statement



TN – No volume statement, quantity declaration not proper height or placeme



IN – volume statement on bottom of bag – states only "7.0 cu. ft. expanded"



NC, VA, MD , PA – no expanded volume statement



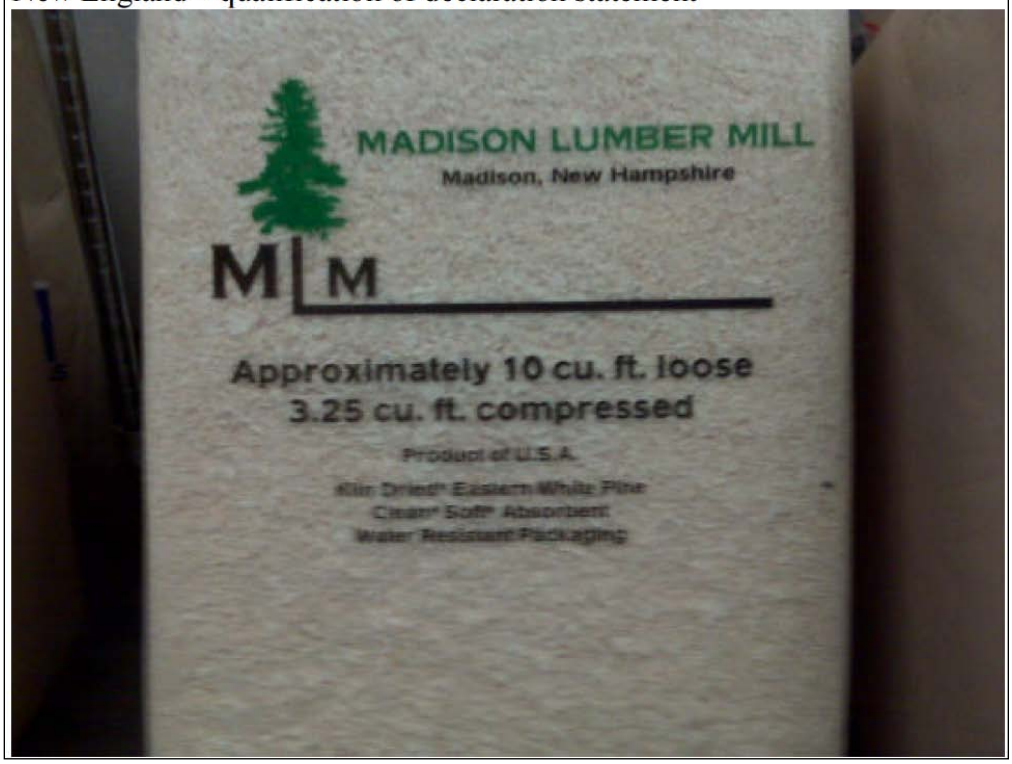
NJ, PA, NY – font size too small



PA – no expanded volume statement



New England – qualification of declaration statement



480 W. Dussel Drive, Maumee, OH 43537

Thursday, July 08, 2010

To: Laws and Regulations Committee
Re: Proposed Amendment to NIST HB 130, Method of Sale Section 2.23 Animal Bedding

Dear Committee Members,

I would like to categorically address the major claims made within the four numbered paragraphs of Page L & R 18. These four paragraphs appear to form the basis for the amendment request.

1. Selling by weight vs. volume:
Why did we start selling by volume? It was a California W & M "stop sale" citation to one of the companies referenced as an "industry supporters" (ref: last paragraph on Page L & R 18), for selling animal bedding by weight vs. volume to pet stores. We were directly informed by this company that we should change to volume to comply with the law. Today that same company wants the HB130 exception implemented. We complied seeing no difference between commercial end users and non commercial end users. Both user types use the bedding products to fill their animal cages in the same way --- volumetrically.

I do not know when the current regulation was first established, but the NIST had it right to regulate the sale by volume as opposed to weight. Volume packaging means the bag will always contain the same volume of product bag after bag after bag. Biomass products have a wide range of densities or weight per cubic foot and it is this density range which causes the bag fill content to vary. The higher the density the less the bag fill – the lower the density the fuller the bag.
Volume is the significant and consistent method of sale. Consumers use the product by volume whether in a pets cage or in a research laboratory cage.

Consumers, a.k.a., end users can always budget or know their bedding cost per cage fill is always the same bag after bag regardless of its weight since the bag always contains the same volume. Cost per fill becomes very important when research is paid on a per diem basis. The R & D expenses of the private pharmaceutical industry and the government based facilities become more closely monitored, correct budgeting has become more important.

2. Historically…..research sites have purchased bedding material on the basis of weight.
Weight was established in the late 1960's as the method of sale for corn cob bedding to the pet and lab research community because we knew no better. The Andersons were one of the first, if not first, to sell corn cob bedding into the research community and we sold by weight which became the benchmark. Many of our customers complained about the differing volume amounts in a bag, but 40 lb is 40 lbs whether it is a bag of feathers or a baggie of iron. And we continued to sell by weight and as new competitors entered the corn cob bedding market they followed suit.
It was not the purchasing departments who established the standard it was the early vendors.

3. Moisture as an industry standard
We could not agree more with the moisture level standard. Our published specifications are less than 10% but are typically within the 6 to 8% range.

4. Verification of package contents
Verification of volume only requires a simple box with an inside dimension of 12 x 12 x 15 to determine if the package fill is correct for our 1.25 cubic foot. Or in the case of a large bulk bag, the bag dimensions are on an attached printed tag which has been affixed by the bag manufacturer. Again using these dimensions to calculate the bag volume is a matter of simple math.
The Andersons provided many educational materials during the transition period from weight to volume including calculators which compare the number of bag fills at differing densities of a bag sold by weight. The calculator also generates a cost per fill by volume and shows that regardless of the density, the bag's volumetric content always yields the same number of fills regardless of the bag weight.
Unless a customer has access to a certified scale capable of handling the weight of a bulk bag (or for that matter weighing any size bag) there is no way to verify the weight as shown if in fact is correct. Volume is a mathematical equation and easily verified with the use of a calculator.

Bedding is used by volume not by weight. If the L& R committee would consult those "industry supporter" company web sites you will find Harlan sells some bedding products by volume and some by weight; while Shepherd Specialty Papers, sells by volume or by weight. Green Products supplies the corn cob bedding to Harlan by weight and to the pet industry the same product by volume. There is an interesting quote on the Shepherd web site; it is the comment that the Shepherd bedding dispensing system "…controls the exact amount of bedding per cage and replicating the volume across all cages in the facility. A small amount of variation in the amount of bedding used per can add up to thousands of dollars over the course of a year." **OUR POINT EXACTLY!!**

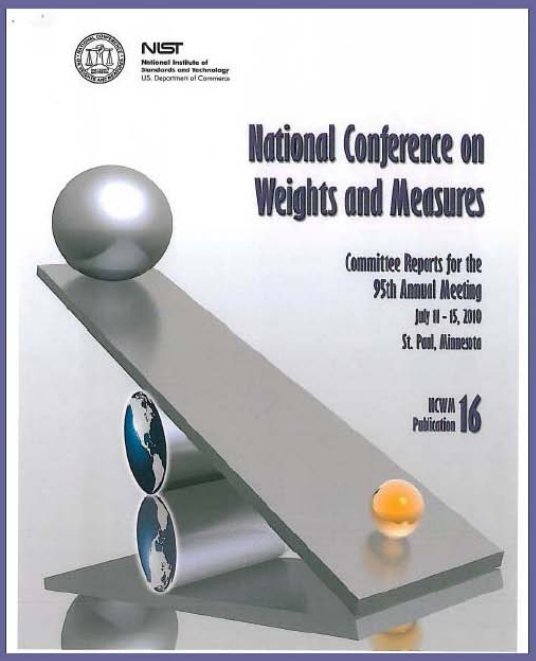
When bedding is sold by weight a higher density has a higher cost per fill, the lower the density the reverse is true. When the bedding product is sold by volume and the cages are always filled by volume, the price per fill is always the same regardless of the density!!

The end user customer receives consistent and fair value bag after bag after bag. And that's the point of W & M regulations -- protecting the end user customer regardless of the industry the user belongs to.

Selling by weight to one industry and to another by volume is inconsistent. Next will be a request by a commodity producer to sell a bag of nuts by piece count instead of total bag weight or how about selling a loaf of bread by the number of slices instead of package weight?

Sincerely yours,

Norman Peiffer
Market Development Manager
Cob Products Division



Colleen Kander
Jerry Reynolds
Cob Products Division,
Maumee, OH

The Andersons

Yearly Lab Bedding Consumed

- Over 453,000,000 cage changes per year for rodents alone.
- Yearly Retail value: $40,000,000
- Over 80% of the market is wood, cobs and paper sold by VOLUME
- Less than 20% is paper and cob sold by WEIGHT
- Bedding dispensed by VOLUME

2.23.1. Packaged animal bedding consisting of granular corncobs and other dry (less than 8 % moisture or less), pelleted and/or non-compressible bedding materials that are sold to commercial (non-retail) end users in the laboratory animal research industry (government agencies, medical centers and universities, pharmaceutical and pre-clinical contract research organizations and other biotech and related research institutions) can still be sold on the basis of weight.
(Added 201X)

We do not agree with the singling out of one product, corn cob, and do not agree with the "exception" as being in the best interest of the end user.

The current regulation recognizes that a consistent bag fill is the proper measure and method of sale to ensure consumer protection.

1. Sales by volume vs weight
   - It's the law!
   - It's a consistent bag fill
   - Cages are filled by volume not by weight
   - Provides consistent number of cage fills and cost per fill

BioMass Products Can Have a Wide Density per Cubic Foot

Loose Density (Per Cubic Foot)

Saw dust & Wood Shavings*	10 to 25 lbs (species dependent)
Corn Cob	1/4" Bedding 20 to 27 lbs 1/8" Bedding 26 to 33 lbs

Density when Compressed (per Cubic Foot)

Pellets

Sawdust	32 to 45
Corn Cob	36 to 45

*www.powderandbulk.com

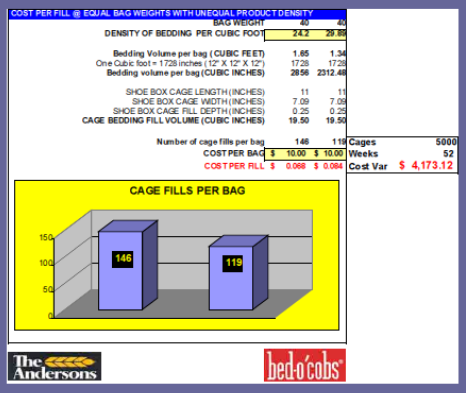
IMPACT OF WEIGHT vs VOLUME



2. Historically …purchased bedding by weight

- The Andersons were one of the first to sell cob bedding to the industry in 1967. Weight was the only measure we knew.
- We were made aware of the volume regulation in 2006 and changed to comply.
- Research labs, both public and private, understand the "consistent measure" and order volumetric bags.
- The "cost per fill" concept is a predictable

Cost per Fill Worksheet

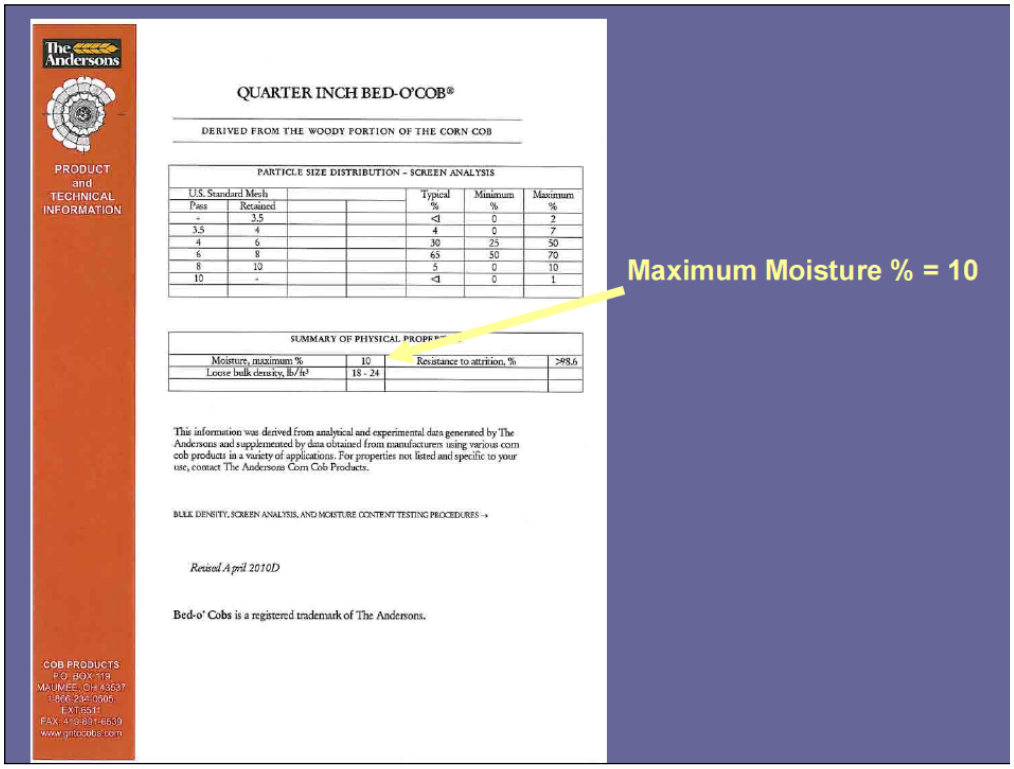


Cost per Fill Comparison

- Same bag Weight
- Same bag cost
- Higher cost per fill on higher density

3. Moisture as an industry standard

– We could not agree more with the moisture level standard. Our published specifications are less than 10% and are typically within the 6 to 8% range.

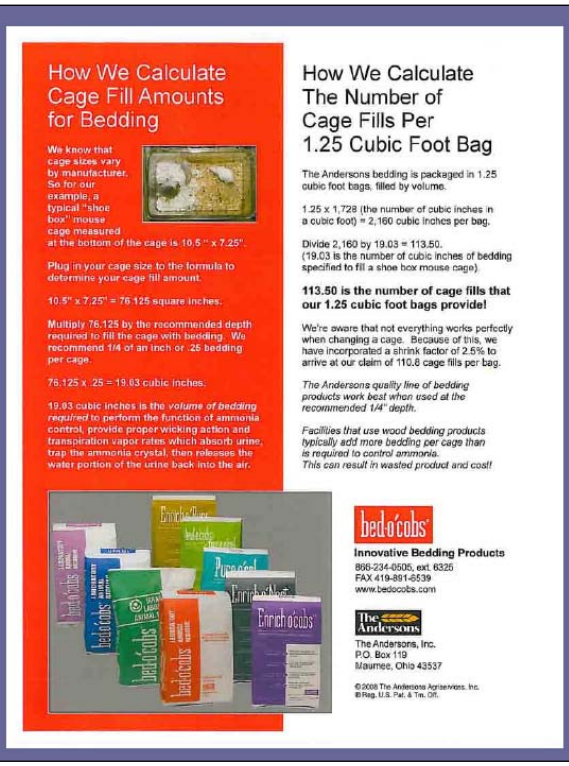


4. Verification of package contents

- -12”x12”x15” = 1.25 cf
  - a cardboard box of these dimensions will verify the content volume
- -Bulk Bags state their dimensions on a sewn in tag.
  - Mathematical calculation will again verify volume contents regardless of the weight

•Is a scale always handy to verify the claimed 1000 lbs of weight?

•A tape measure and a calculator can verify volume



How We Calculate Cage Fill Amounts for Bedding

We know that cage sizes vary by manufacturer. So for our example, a typical "shoe box" mouse cage measured at the bottom of the cage is 10.5 " x 7.25".

Plug in your cage size to the formula to determine your cage fill amount.

10.5" x 7.25" = 76.125 square inches.

Multiply 76.125 by the recommended depth required to fill the cage with bedding. We recommend 1/4 of an inch or .25 bedding per cage.

76.125 x .25 = 19.03 cubic inches.

19.03 cubic inches is the *volume of bedding required* to perform the function of ammonia control, provide proper wicking action and transpiration vapor rates which absorb urine, trap the ammonia crystal, then releases the water portion of the urine back into the air.

How We Calculate The Number of Cage Fills Per 1.25 Cubic Foot Bag

The Andersons bedding is packaged in 1.25 cubic foot bags, filled by volume.

1.25 x 1,728 (the number of cubic inches in a cubic foot) = 2,160 cubic inches per bag.

Divide 2,160 by 19.03 = 113.50.
(19.03 is the number of cubic inches of bedding specified to fill a shoe box mouse cage).

113.50 is the number of cage fills that our 1.25 cubic foot bags provide!

We're aware that not everything works perfectly when changing a cage. Because of this, we have incorporated a shrink factor of 2.5% to arrive at our claim of 110.6 cage fills per bag.

The Andersons quality line of bedding products work best when used at the recommended 1/4" depth.

Facilities that use wood bedding products typically add more bedding per cage than is required to control ammonia. This can result in wasted product and cost!

bed-o'cobs®
Innovative Bedding Products
866-234-0505, ext. 6326
FAX 419-861-6539
www.bedocobs.com

The Andersons
The Andersons, Inc.
P.O. Box 119
Maumee, Ohio 43537

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® Reg. U.S. Pat. & Tm. Off.

We provide the formula to verify the volume (and the cage fills) for any size bag.


THANK YOU!!
Questions????
The Andersons

NEWCO
DISTRIBUTORS, INC

P. O. Box 1449 • 10700 7th Street • Rancho Cucamonga, CA 91729-1449
PH: (909) 291-2240 • FAX: (909) 291-2241

June 30, 2010

Dear Mr. Jeff Humpreys,

Re: Proposed Revision to Handbook 130, Method of Sale, Section 2.23 – Animal Bedding

As a member of the laboratory animal provisions and supplies industry, we do not support the proposed change that would allow selling of bedding used for laboratory animals to be sold by weight. Below are the specific reasons this proposed change is inappropriate for the laboratory bedding consumer or any end user. These reasons are counter to what is reported on Page L & R 18.

1. There is no incentive for manufactures to produce a lighter product.
The product varies seasonally and cannot be consistently produced to the same density per cubic foot while maintaining the quality of product. Furthermore, the product absorbency is not decreased by making it lighter, it is INCREASED. This was verified in an independent study by C.C. Burns & G.J. Mason, Department of Zoology, University of Oxford, UK, Animal Sciences Department & University of Guelph, Ontario, Canada. Accepted May 12, 2004 the study entitled: "Absorbencies for six different rodent beddings: commercially advertised absorbencies are potentially misleading". The study conclusion is: "By volume, corncob was the most absorbent bedding…". Corncob had the highest absorbency per cm^3…"and "In contrast, reported absorbency values calculated per unit mass would give the misleading impression…" Attached is a copy of the study for your reference.

2. Historically, NIH has purchased primarily wood bedding for their labs, a product that has always been sold by volume.
All customers including pharmaceutical, university research sites and large commercial breeders including Harlan who have purchased wood bedding have bought it by volume. Currently, The Andersons is the largest supplier of corncob to the laboratory animal market, and has been supplying customers since 2006 in government, pharmaceutical, university research sites and contract labs with corncob sold by volume.

3. Moisture range is only part of the equation that determines the density of processed corncobs.
All manufactures comply with the restrictions. Corncob genetic variation of the hybrid seed, seasonal changes in humidity, hammer mill processing, drying and final screening all contribute to the varying cubic density and thus mass of the finished product.

4. Verification of package contents is easy with volume.
The packages are sized to hold the stated volume of the package. The pallets stack heights when filled by volume are all the same heights. A 1.25 cubic foot bag fill can be checked by poured into it into a 1.25 cubic foot box that can be purchased on-line. A simple box with inside dimensions of 12" x 12" x 15" filled to capacity will verify the fill. In the case of bulk sack the dimensions are printed on a tag providing the bag dimensions. Dividing the multiple of all the dimensions by 1728 will yield the volume in cubic feet. Scales vary in accuracy must be calibrated to ensure consistency.

Conclusions:
The sale of dry, granular or non-compressible pelleted bedding is best sold by volume. The cages used to hold the animals are filled by volume in the lab, not by weight. In labs where automatic bedding dispensers are used, they are calibrated to dispense by volume, not weight. The seasonal variance in bulk density inherent in these natural products varies the bag fill and thus cage fill of the bags when the bedding is sold by weight. The bag fill and thus the number of cages fill per bag do not vary when the product is sold by volume.

The industry does not support this change as noted in the final paragraph of page 18 of L & R letter. The Andersons, the largest corncob manufacturer and supplier, nor any of the other largest manufacturers of laboratory bedding industry members commented upon the proposed resolution.

Thank you for your time and consideration

Sincerely,

Sarah Watkins
Sales and Marketing Manager
Newco Distributors Inc-Specialty Division

Absorption Corp "Products and Technology for the Good of the Environment"

July 9, 2010

Kirk Robinson
Washington Department of Agriculture
PO Box 42560
Olympia, WA 98504-2460
Via E-mail krobinson@agr.wa.gov

Dear Mr. Robinson,

I write to you today in opposition of the Proposed Revision to Handbook 130, Section 2.23- Animal Bedding. Absorption Corp is the leading manufacturer of wood pulp (cellulose fiber) small animal bedding in the country, providing product both for the consumer pet trade and to the institutional (laboratory) market. The matter is of interest to your office by virtue of our manufacturing plant in Ferndale, WA that would be impacted by the proposed changes. We ask you to oppose the referenced changes currently before the National Conference on Weights and Measures, Laws and Regulations Committee.

Below are specific reasons that it is inappropriate for laboratory bedding to be sold by weight rather than by volume as has historically been the case in the both the laboratory and retail consumer market.

1. Cages are filled by volume, not weight.
The amount of bedding used in a shoe box cage or micro isolator varies based on the bedding being used. This takes into consideration the characteristics of the substrate. Is the bedding dense and does it provide great absorption capacity? Then less is used. Is the bedding "fluffy", supporting burrowing and nesting, then the cage is filled to a greater depth. The mandated change out interval, type of study, and type of animals in the cage dictate the volume of bedding used. If you ask animal care takers how much bedding goes in each cage they will answer, "about an inch" and not, "100 grams". The comparative factor used by institutional users is, "How many cage fills do I get per bag," and that is a function of volume.

2. The inherent density of many agricultural based substrates varies.
In our case, short fiber waste pulp from pulp mills such as Rayonier, Proctor and Gamble, and Koch and Georgia Pacific, vary in fiber length and the amount of processing to purify wood chips into cellulose fiber. We create a "recipe" to blend our fiber supplies in order to balance out the chemical and physical differences in one fiber stream from another to make a consistent product. However, that consistent product from a performance standpoint is not consistent in density. We test density on an hourly basis during our production run and adjust filling equipment in order to give laboratories the same volume in every bag, and thus the same number of cage fills each time.

Corporate Office
West Coast Production:
6960 Salashan Parkway
Ferndale, WA 98248
Phone: 360-734-7415
Fax: 360-671-1588

East Coast Production:
2200 Sunset Blvd.
Jesup, GA 31545
Phone: 912-427-4952
Fax: 912-427-7489

Customer Service:
Animal Care Products 800-242-2287
Industrial Products 800-962-6737
email: absorbs@absorption-corp.com

3. Standardized volumetric testing methodology exists.
In our case we use testing methodology designed for cellulose insulation in order to verify density and the volume fill. In the case of wood shavings, a simple 1 cubic foot box test is used to verify the "recovered volume". Wood shavings are another good example of why weight is not a good unit of measure for caging substrate. A compressed bale of shavings, 4 cubic feet in dimension, can weigh 20 pounds if filled with big curly shavings and 50 pounds if filled with sawdust. Both bales will fill the same sized horse stall or the same number of cages. The fact that curly shavings and sawdust don't do the same job of absorbing liquid or controlling ammonia order is a function of the "bedding" in the bag, and not the fact that one is 20 pounds and one is 50 pounds.

4. The same unit of measure may not be appropriate for all bedding substrates.
We sell a granular, flowable, paper substrate into the laboratory market. Since it can be made to be uniform in density, and since we consider it a "litter" rather than a "bedding", we label and sell the product by weight. Our core bedding product is the consistency of shredded egg cartons and looks like gray corn flakes. Since the density varies, we sell it by volume.

5. If the argument for weight is truly bulk super sacks of corn cob, address them separately.
The arguments brought forward by Harlan Industries and Green Products Company concerning verification of volume by the end user when corn cob is purchased in super sacks for use with automatic dispensing machines is a valid one. However periodic checking using the "1 cubic foot box" test by the end user if a discrepancy is suspected is not unreasonable. Neither is requiring a tag listing the density of the corn cob so that volume can be verified with a mathematical calculation from the weight of the super sack. Discussion by the National Conference on Weight and Measures, Laws and Regulations Committee, suggested a solution requiring both a stated volume and weight, which we could support for bulk super sacks only.

6. The proposed changes do not have wide industry support as claimed the by sponsor.
Harlan Industries is not a manufacturer of laboratory bedding substrates; it is a distributor of a wide variety of bedding produced by nearly every major producer of bedding. As such they are not in a position to speak for the ease of implementation of the proposed changes or the motivations of manufacturers who they claim to be intentionally gaming the system. Absorption Corp is only aware of the current discussions to change the requirements to sell laboratory bedding on a weight basis because of third hand information. We have not had discussions with Harlan Industries and were not contacted for comment by any regulatory body.

7. The cost of bedding to the end user will go up with this change.
When the density of our raw material is variable the only way to ensure consistent fill by weight is to invest heavily in technology that can deal with the variability. Unfortunately that will come at a cost to the end user and will result in bags of bedding that do not appear to be uniform in size or shape. We currently sell our cellulose bedding to one

Japanese customer that requires that we give them the same weight in every bag. We apply a surcharge to the bedding to pay for the extra costs involved and continually hav to explain to them why each bag is not the same size or shape, even though it weighs th same.

8. The proposed change may not be motivated by concern for the end user.
The proposed regulatory change is being championed primarily by one company and it corn cob supplier. Are they attempting to use regulatory change to gain a competitive advantage over another supplier rather than letting the market place determine the valu of the alternative features and benefits of its corn cob bedding vs. the major corn cob supplier in the market?

Thank you for reviewing this matter. If we can provide additional information or answ any questions please contact me at 1-800-242-2287 extension 3007 or via e-mail at sdooley@absorption-corp.com.

Regards,



Shawn Dooley
Vice President

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Appendix E

Handbook 130

Engine Fuels and Automotive Lubricants Regulation

Section 3.15. Biodiesel and Biodiesel Blends

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Marathon Oil

From: George, Laurie [mailto:lageorge@marathonoil.com]

Sent: Friday, January 22, 2010 11:29 AM

Ron,

After review of the attached proposal, we offer the following comments:

- We support the revised 3.15.3 language as submitted by API. Disclosure should not be required on **all** transfer documents.
- We do not support any of the proposed revisions/additions to 3.15.4.
- 16 CFR 306.6 and 306.8 of the FTC Automotive Fuel Rating regulation require refiners, producers and distributors to certify the automotive fuel rating (i.e., the "alternative liquid automotive fuel" content) to any transferee of the fuel who is not an end user. However, blends containing 5% or less biodiesel or biomass-based biodiesel are excluded from the "alternative liquid automotive fuel" definition, and there is no requirement for the transferor to disclose biodiesel content of 5% or less to the transferee, whether on product transfer documentation or otherwise. We believe that NIST 130 should be consistent with these provisions of federal law.
- The FTC Automotive Fuel Rating regulation contains a federal preemption provision at 16 CFR 306.4. If NIST 130 is amended to impose requirements for blends containing 5 % or less biodiesel or biomass-based diesel when federal law specifically excludes such requirements, we believe that any state adopting such language into its state laws runs the risk of a legal challenge in state or federal court based on the doctrine of federal preemption.
- The proposed language would require unnecessary testing of biodiesel content along the diesel fuel distribution system.

We appreciate the opportunity to provide feedback on the proposal, and encourage the Fuels and Lubricants Subcommittee to have additional dialogue on the subject and allow ample time for review prior to balloting.

I will not be in attendance next week, but feel free to reference my comments in the meeting.

Best Regards,

Laurie George
Product Quality Manager
Marathon Petroleum Company LLC

Alliance of Automobile Manufacturers

From: Ellen Shapiro [mailto:ESHAPIRO@autoalliance.org]
Sent: Friday, January 22, 2010 11:56 AM
Subject: RE: Fuels and Lubricants Subcommittee - Biodiesel Labeling

Ron,
The Alliance supports developing language to help prevent biodiesel over-blending, and I think everyone agrees this issue needs to be addressed, but we are unable at this time to accept any of the proposals or to recommend alternative language. Also, I think the email exchanges show the subcommittee lacks consensus and would benefit from further discussion. We hope you will recommend postponing any L&R vote next week or at least indicate the desire to discuss this further within the subcommittee (the Alliance will not be represented next week). Meanwhile, we will continue to review the various proposals and try to offer suggestions in the near future.

The Alliance also has concerns about Section 3.15.2.4 that we would like to add to the subcommittee agenda. This provision requires labeling B20 and higher to advise the consumer to consult the vehicle manufacturer. As you may know, virtually all light duty vehicles currently in the market are warranted for use with biodiesel only up to B5. Some manufacturers are working to increase compatibility with higher blends, such as B20 (Ford recently announced a vehicle that will debut this year that can use B20, and a few years ago, Chrysler began selling a vehicle to captive fleets that was allowed to use mil spec B20), but the existing light duty diesel fleet (which has grown quite a bit the last couple of years) is still only compatible up to B5. It is very important, therefore, to start labeling pumps at B6 and above rather than starting at B20. Also, we are concerned that the prescribed font size is too small to be noticed by the consumer. At the risk of generating email reactions now (I suggest people wait at least until after the meeting next week, if not until the next subcommittee meeting), we propose the following changes (the label details are based on similar provisions elsewhere in the model rule):

3.15.2.4. Biodiesel Blends. – When biodiesel blends greater than ~~**20**~~ **5** % by volume are offered by sale, each side of the dispenser where fuel can be delivered shall have a label ~~**conspicuously placed**~~ that states "Consult Vehicle Manufacturer Fuel Recommendations."

This information shall be clearly and conspicuously posted on the upper 50 % of the dispenser front panel, in a type at least 12.7 mm (½ in) in height, 1.5 mm (1/16 in) stroke (width of type), ~~**The lettering of this legend shall not be less that 6 mm (¼ in) in height by 0.8 mm (1/32 in) stroke;**~~ **using** block style letters and ~~**the**~~ **a** color ~~**shall be**~~ **that is** in definite contrast to the background color to which it is applied.

Thanks for the opportunity to weigh in.

Regards,
Ellen Shapiro
Director, Automotive Fuels
Alliance of Automobile Manufacturers
1401 Eye St., NW Suite 900
Washington, DC 20005
202-326-5533
eshapiro@autoalliance.org

Michigan Department of Agriculture

-----Original Message-----
From: William Spitzley [mailto:spitzleyw@michigan.gov]
Sent: Thursday, January 21, 2010 2:53 PM
Subject: Re: Fuels and Lubricants Subcommittee - Biodiesel Labeling

The proposal does not adequately address the need to identify the Biodiesel concentration in blends containing less than 5 % Biodiesel which could result in the creation of a blend greater than 5 % not being properly identified. The section 3.15.4.3 should be eliminated from the proposal. Rob DeRubeis will be present at the meeting to represent Michigan views regarding other proposals.
Thank You

William Spitzley
Motor Fuels Quality Specialist
Michigan Dept. of Agriculture
Motor Fuels Quality
(517) 655-8202

To do business in Michigan, visit the Michigan Business One Stop. It's easy, fast and simple.

ConocoPhillips

From: Schuettenberg, Alex [mailto:Alex.Schuettenberg@conocophillips.com]
Sent: Thursday, January 21, 2010 5:26 PM

Subject: RE: Fuels and Lubricants Subcommittee - Biodiesel Labeling

If you're blending in biodiesel and know the percentage that you've blended in, regardless of how small a percentage you've blended, you should have to tell the buyer what percentage you've blended.

If you don't know the exact percentage you've blended but you know a range, you should have to disclose the range (e.g. "contains up to 3 % biodiesel").

Regards,
Alex Schuettenberg
ConocoPhillips

National Biodiesel Board (NBB)

From: Rebecca Richardson [mailto:rebeccar@mchsi.com]
Sent: Thursday, January 21, 2010 5:09 PM.
Subject: Comments on Biodiesel Labeling on PTD's

Ron and FALS members,
I have reviewed the proposed language Ron sent. NBB has some concerns with the new language.

For blend levels that fall within D975, (i.e. B5% and less) there should be no legal requirement for labeling the exact amount of biodiesel in any documents, labels or other notifications. Biodiesel meeting D6751 is now simply one of a myriad compounds that can make up diesel fuel. There is no requirement to mention the amount of light cycle oil in diesel fuel, or the amount of cat cracker stock, etc. The same should follow here. D975 is based on engine performance, and as long as the fuel and its components are covered in the scope of D975 and the resulting finished blend meets the parameters in Table 1 of D975, then there is no performance need to say whether its zero, 1%, or 5%--it will all meet the performance needs of engines.

NBB certainly understands that some petroleum companies purchasing their diesel fuel may want to know how much biodiesel is already in the fuel, particularly if there may be more biodiesel added downstream (i.e. if you want to make a B20 blend, you will need to know if there is already 5% biodiesel in the blend for instance). But that information should be part of commercial agreements between companies, not specified as part of any state or federal requirement. For those companies that are just buying diesel fuel and not planning to blend in any more biodiesel, the only thing that requiring the exact percent of biodiesel does is make for more paperwork and a more costly product without any corresponding benefit to the user.

The question of requiring the disclosure of the exact blend level was discussed during a past ASTM balloting process. Someone raised a concern that they believed the exact level of biodiesel should be reported. This concern was overwhelmingly put down with the rationale that ASTM D975 was a performance-based specification, and as long as the B100 met D6751 and the finished properties met D975 it was not important or germane whether it has 1% vs. 3% vs. 5%.

If this change is adopted, essentially, every time a diesel fuel is commingled or mixed, it would need to be reanalyzed for blend concentration. That would put a tremendous overall burden on the ENTIRE diesel fuel distribution system and increase costs for everyone—regardless of whether any biodiesel is being added.

Very few are currently adding biodiesel compared to those that are commingling diesel fuel, so the overall costs to the consumer will be <u>much less</u> if you do not require the exact blend of biodiesel on the product transfer document.

If the exact level was required less than B5, it would also negatively affect pipeline shipments of biodiesel blends below B5, which could increase the costs to the general consumer even more.

In summary, the National Biodiesel Board is concerned about the economic and logistical issues the proposed changes will bring to both the diesel and the biodiesel industry. Considering the issue has only very recently been brought forward, and there has been no dialogue at the national level on this issue, NBB hopes NCWM and the Fuels and Lubricants Subcommittee will encourage continued discussion on this topic and keep it informational until all interested parties have had ample opportunity to hear the proposal, consider the potential for the industries involved, and develop an informed decision before the item comes to a vote.

NBB does not believe that biodiesel blends up to and including 5% should require any special labeling or identification beyond the requirements specified in 40 CFR 80.590. With that exception and the actual

volume percentage being a labeling option in 3.15.3.2, 3.15.3.3 and 3.15.3.4, we support the language changes submitted by the American Petroleum Institute's Pat Kelly (see NBB's proposed changes to the API document) as a better alternative to the original.

I will be in attendance at the meeting in Nashville to participate in further discussion on the issue.

Respectfully submitted,
Rebecca Richardson

Proposal Continued on Next Page

National Biodiesel Board Proposal for Disclosure of Biodiesel Content in Diesel Fuel *(continued)*

3.15. Biodiesel and Biodiesel Blends.

3.15.1. Identification of Product. – Biodiesel shall be identified by the term "biodiesel" with the designation "B100." Biodiesel blends shall be identified by the term "Biodiesel Blend."

3.15.2. Labeling of Retail Dispensers.

3.15.2.1. Labeling of Grade Required. – Biodiesel shall be identified by the grades S15 or S500. Biodiesel Blends shall be identified by the grades No. 1-D, No. 2-D, or No. 4-D.

3.15.2.2. EPA Labeling Requirements Also Apply. – Retailers and wholesale purchaser-consumers of biodiesel blends shall comply with EPA pump labeling requirements for sulfur under 40 CFR § 80.570.

3.15.2.3. Automotive Fuel Rating. – Biodiesel and biodiesel blends shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.15.2.4. Biodiesel Blends. – When biodiesel blends greater than 20 % by volume are offered by sale, each side of the dispenser where fuel can be delivered shall have a label conspicuously placed that states "Consult Vehicle Manufacturer Fuel Recommendations."

The lettering of this legend shall not be less that 6 mm (¼ in) in height by 0.8 mm ($^{1}/_{32}$ in) stroke; block style letters and the color shall be in definite contrast to the background color to which it is applied.

3.15.3. Documentation ~~for Dispenser Labeling Purposes~~ to Indicate Biodiesel Content in Biodiesel Blends. – **~~The retailer shall be provided, at the time of delivery of the fuel, a declaration of the volume percent biodiesel on an invoice, bill of lading, shipping paper, or other document. This documentation is for dispenser labeling purposes only; it is the responsibility of any potential blender to determine the amount of biodiesel in the diesel fuel prior to blending.~~ Upon custody or title transfer of biodiesel blends, except when such fuel is dispensed to motor vehicles or other end users, the transferor must provide to the transferee a document indicating the percentage by volume of biodiesel in the biodiesel blend.**

3.15.3.1. EPA Documentation Requirements also Apply – Transferors of biodiesel blends must comply with EPA Product Transfer Document (PTD) requirements as specified in 40 CFR 80.590.

3.15.3.2. Biodiesel Blends Greater than 20 % – The transferor of a biodiesel blend with a biodiesel concentration greater than 20 % by volume shall classify the fuel as such. ~~The actual volume percentage or~~ Language similar to the term "Biodiesel blend greater than 20 %" shall be transmitted to transferee on a Bill of Lading, Invoice, PTD, shipping paper, or other document.

3.15.3.3. Biodiesel Blends Greater than 5 % But Not More Than 20 %. – The transferor of a biodiesel blend with a biodiesel concentration greater than 5 % by volume but not more than 20% by volume shall classify the fuel as such. ~~The actual volume percentage or~~ Language similar to the term "Biodiesel blend greater than 5 % but not more than 20 %" shall be transmitted to transferee on a Bill of Lading, Invoice, PTD, shipping paper, or other document.

3.15.3.4. Biodiesel Blends 5 % or Less – The transferor of a biodiesel blend with a biodiesel concentration 5 % by volume or less shall classify the fuel as such. ~~The actual volume percentage or~~ Language similar to the term "Contains 5 % or less biodiesel" shall be transmitted to transferee on a Bill of Lading, Invoice, PTD, shipping paper, or other document.

~~3.15.4. Exemption. Biodiesel blends that contain less than or equal to 5 % biodiesel by volume are exempted from the requirements of Sections 3.15.1., 3.15.2, and 3.15.3. when it is sold as "diesel fuel" as required in Section 3.3.~~

(Added 2005) (Amended 2008)

American Petroleum Institute (API)

From: Patrick Kelly [mailto:kellyp@api.org]
Sent: Wednesday, January 20, 2010 3:49 PM
Subject: RE: Fuels and Lubricants Subcommittee - Biodiesel Labeling

Ron and the FLS Members,

My biggest concern with the proposed language is the need to indicate an exact biodiesel concentration. This section should be consistent with FTC labeling requirements which segregate biodiesel blended fuels into 3 categories: 5% or less; greater than 5% to 20%; and greater than 20%. Fuels in distribution are commonly mixed within those ranges and the exact volume percentage is not always known after two batches are mixed.

I am also concerned about placing a requirement on ALL transfer documents. This will have a significant impact on computer systems that generate the forms. It is unnecessary and creates confusion as to what documents are considered "Transfer Documents". EPA requires a Product Transfer Document (PTD) which is a logical place to put the information. Depending on individual company practice, the BOL or invoice might make more sense and the shipper should be able to choose which document to disclose the information.

I've not seen a biodiesel blend de minimis percentage level mentioned before, and am unclear if the <1% figure has a precedent. I don't think this section is the place to establish a precedent for a minimum blend level to trigger compliance if federal agencies with biodiesel regulations do not specify the same level.

The attached draft is API's recommended changes to the existing Biodiesel and Biodiesel Blends section that incorporates these concerns, while fulfilling the L&R charge of disclosing biodiesel content that is technically correct and adequate to protect from over blending [and subsequent mislabeling]. Unfortunately, I am unable to attend the meeting next week, but I hope these concerns are taken into consideration.

Kind Regards,
Patrick Kelly
API

New York State Department of Agriculture and Markets
Bureau of Weights and Measures

From: Ross Andersen [mailto:Ross.Andersen@agmkt.state.ny.us]
Sent: Wednesday, January 20, 2010 2:41 PM
To: Hayes, Ron
Subject: RE: Fuels and Lubricants Subcommittee - Biodiesel Labeling

Ron,

I reviewed your draft but think a broader revision is in order in order to mirror EPA and ASTM changes. We now have 4 products, diesel fuel (<5% bio), 6-20% biodiesel blends, 21-99% biodiesel blends and B100 Biodiesel.

I think we should follow EPA and define both biodiesel and biomass based diesel fuels to clarify the significant differences.

Then we should separately define biodiesel blends and biomass diesel blends as any blend of the bio fuel with petroleum based diesel fuels. That sets the stage for the various labeling and disclosure requirements.

Then we need to decide if we can combine biodiesel and biomass based diesel in the same section 3.15.

I might suggest we fix 3.15.2.1. The present wording appears to indicate that blends do not have to comply with sulfur labeling requirements. Shouldn't it read "Biodiesel blends shall be identified by the grades No. 1-D, No. 2-D or No. 4-D combined with grades S15 or S500 as appropriate."?

I don't support requiring disclosure of biodiesel blends <5% by volume. My concern is that we would be adding a requirement to disclose between 1 and 5 % biodiesel to the retailer that does not exist in any of the federal rules. Why should we be requiring it when they don't. I suggest that 3.15.3. begin with the exemption for less than 5% just as suggested for 3.15.2. so that any blend over 5% is disclosed. The requirement that the blender determine the amount of bio fuel in the base fuel before blending takes care of everything from then on. I understand that biomassed based diesel may not be as easy to detect as the esters in biodiesel but won't refiners doing that disclose it for tax purposes anyway. Nothing in the reg prohibits labeling <5% if they want to do it voluntarily.

Finally I find the exemption in 3.15.4. is out of place. I think it belongs at the start of 3.15.2. as in

3.15.2. Labeling of Retail Dispensers -Except for biodiesel blends containing less than 5% by volume of biodiesel or biomass based diesel that are sold as diesel fuel as required in Section 3.3., biodiesel blends shall be labeled as provided in Sections 3.15.2.1 to 3.15.2.4."

Or change title

3.15.2. Labeling of Retail Dispensers, Biodiesel and biodiesel blends containing more than 5% biodiesel or biomass based diesel.

Regards

Ross J Andersen, Director
New York State Department of Agriculture and Markets
Bureau of Weights and Measures
10B Airline Drive
Albany, NY 12235
(518) 457-3146 or FAX (518) 457-5693

E-mails:

Manuch Nikanjam – Chevron
Chuck Ulm – State of Maryland
Ron Leone – State of Missouri

Sent: Thursday, January 21, 2010 7:19 PM
To: Hayes, Ron
Subject: RE: Fuels and Lubricants Subcommittee - Biodiesel Labeling

Ron,

I generally support the response that was sent by the API.

Regards,

Manuch

From: CHUCK ULM [mailto:CULM@comp.state.md.us]
Sent: Thursday, January 21, 2010 11:46 AM
To: Hayes, Ron
Subject: Re: Fuels and Lubricants Subcommittee - Biodiesel Labeling

Thanks Ron. This looks good to me.

Chuck

Chuck Ulm
Assistant Director
Field Enforcement Division
Comptroller of Maryland
(410) 260-7278

From: Ronald J. Leone [mailto:ron@mpca.org]
Sent: Friday, January 22, 2010 10:34 AM
To: 'Rob Underwood'; 'Ann Hines'; 'tom palace'; 'Dan Gilligan'; 'Mark Morgan'; 'Sam Bell'; 'Michael Fields'; 'Tim Keigher'; 'dawn@pmcofiowa.com'; 'John Maynes'
Subject: RE: ADDITIONAL L&R LETTERS on biodiesel content disclosure

Rob:

1. Consumers: No notice or pump labels should be required at retail for B5 or less concentrations.

2. Rack/Terminal: Papers must be provided at the rack/terminal to indicate the exact amount (not a range but the exact amount) of bio in any load of diesel to ensure no "over-blending" occurs when marketers splash-blend with additional bio away from the terminal.

For example, if the load already contains B2, and my member splash-blends to reach B5, he is now at B6 or B7 which could lead to liability issues and could be a violation of state law including pump labeling.

Ron Leone, Missouri

July 7, 2010

Mr. Joe Benavides
Chairman, Laws and Regulations Committee
National Conference on Weights and Measures
Regulatory Branch Chief, Texas Department of Agriculture
P.O. Box 12847
Austin, Texas 78711

Dear Mr. Benavides:

The Petroleum Marketers and Convenience Stores of Iowa (PMCI) is a non-profit state trade association serving the needs of independent petroleum distributors, petroleum retailers and convenience store owners throughout the state of Iowa. While some of our members may display the logo of one of the major oil companies, they are independently owned and operated from the major oil company. Since 1937, one of PMCI's major goals is the maintenance of a competitive business climate that will encourage the growth of the independent petroleum marketing industry within the state. On behalf of our membership, PMCI would like to thank the National Conference on Weights and Measures for their thorough review of all issues relevant to the petroleum marketing industry.

I am writing you today to emphasize the need to modify the language contained in Item 237-3, Engine Fuels and Automotive Lubricants Regulation, Section 3.15 Biodiesel and Biodiesel Blends (Publication 16). PMCI is very concerned that Item 237-3 in Publication 16 will foster unintended consequences for petroleum marketers and consumers if the Item is approved without modifications that require the disclosure of the exact volume percentage of biodiesel contained in any diesel mixture involving a wholesale transaction.

Currently, biodiesel producers, oil companies and terminals are not required to disclose the exact volume percentage of biodiesel contained in a diesel mixture if blended at a rate of 5% or less. In 2009, 643 million gallons of diesel fuel were sold in Iowa. 205 million of those gallons contained biodiesel with 172 million of those gallons blended at a rate of 5% or less. All biodiesel gallons blended with diesel fuel in Iowa are blended below the pipeline or terminal level. If Item 237-3 in Publication 16 is approved without modification, petroleum marketers will unknowingly purchase product labeled as diesel fuel at a terminal which contains an undisclosed amount of biodiesel, subsequently blend that product with biodiesel, and have no assurance as to the actual blend percentage of the fuel. This is of very serious concern to petroleum marketers. Without full biodiesel content disclosure on product transfer documents, petroleum marketers and retailers face the following issues: mislabeling, product/equipment compatibility, and ultimately the breach of supply contract with customers. All of these issues threaten to create mistrust between business owners and their customers.

PMCI believes that terminal documents should be required to disclose the exact volume percentage of biodiesel on the invoice, bill of lading (BOL), and shipping paper, to ensure against over-blending. Proponents of this measure have cited the cost of adding this item to terminal documents as the primary reason for their support of it. Proponents have suggested that wholesalers blending biodiesel may simply test the fuel they receive for its biodiesel content. At an average cost of $75-$100 per sample, and with a turn-around time of roughly ten days, this testing solution is simply not feasible in the wholesale fuel distribution business. The simplest

solution to this issue is requiring full disclosure of biodiesel content on product transfer documents received at a terminal. Requiring this disclosure will allow petroleum marketers the transparency necessary to continue investing in, and marketing biodiesel blends.

On behalf of PMCI, I appreciate your attention to this critical issue. Petroleum marketers must know the amount of biodiesel in the product they receive from terminals to supply their customers with the exact type of product requested. By modifying Item 237-3 to resemble the language crafted by the Southern Weights and Measures Association, the NCWM will ensure this happens in the most cost effective manner. PMCI requests that you take these comments into consideration when the NCWM Laws and Regulations Committee convene in St. Paul, Minnesota in July 2010.

Sincerely,



Dawn M. Carlson
President
Petroleum Marketers and Convenience Stores of Iowa

AOMA Arkansas Oil Marketers Association, Inc.

PO Box 229, Little Rock, AR 72203 • Phone: 501-374-6293 • Fax: 501-374-7351 • www.AOMA.org

July 10, 2010

Mr. Joe Benavides, Chairman
Laws and Regulations Committee
National Conference on Weights and Measures
Regulatory Branch Chief
Texas Department of Agriculture
PO Box 12847
Austin, TX 78711

Dear Joe:

On behalf of the members of the Arkansas Oil Marketers Association, thank you for the courtesy that has been shown to us whenever we have appeared before the L & R Committee. I have been impressed with the Committee's knowledge about our industry and their attention to detail.

The Southern Weights and Measures L & R Committee has brought forward language that would require the exact volume percentage of biodiesel be disclosed on invoices, bills of lading and shipping papers to ensure that marketers are blending biodiesel safely and legally. The Arkansas Oil Marketers Association supports the proposed change. Petroleum marketers need to be able to supply the exact biodiesel products our customers want and need. And we need this disclosure in order to do that. While this proposed change is Informational for the 2010 Annual Meeting, we support the acceptance of this proposal.

There are 10 pipeline terminals in Arkansas with connections to 4 different pipelines. And our members who are in the border areas of the state pick up product in other states also. Tennessee requires the exact amount of biodiesel be noted on the product transfer documents. Arkansas does not. The AOMA members who pick up product at Valero in Memphis have an advantage in that they know what the blend is and if they have a customer who wants a 10% biodiesel blend, they can quickly determine how much biodiesel to add. While we like the Tennessee regulation, if a marketer is operating in multiple states, it helps if there are uniform language requirements.

We ask that you take these comments into consideration when the Laws and Regulations Committee meets In St. Paul.

Sincerely,

Ann Hines

Ann Hines
Executive Vice President



PETROLEUM MARKETERS ASSOCIATION OF AMERICA
1901 N. Fort Myer Drive • Suite 500 • Arlington, VA 22209-1604 • 703-351-8000 • Fax 703-351-9160

June 15, 2010

Mr. Joe Benavides
Chairman, Laws and Regulations Committee
National Conference on Weights and Measures
Regulatory Branch Chief, Texas Department of Agriculture
P.O. Box 12847
Austin, Texas 78711

Dear Mr. Benavides:

On behalf of the Petroleum Marketers Association of America (PMAA), I would like to thank you for your efforts to address important issues relevant to the petroleum marketing industry during the National Conference on Weights and Measures (NCWM) interim and annual meetings. I am writing you today to highlight the need to modify language in **Item 237-3, Engine Fuels and Automotive Lubricants Regulation, Section 3.15 Biodiesel and Biodiesel Blends** (Publication 16). PMAA is concerned that Item 237-3 in Publication 16 may have unintended consequences on petroleum marketers and consumers if the current language in Item 237-3 is approved without modifications to require the disclosure of the exact volume percent amount of biodiesel blends if containing less than five percent.

PMAA is a national trade association in the petroleum industry representing 8,000 independent petroleum marketing companies who own 60,000 retail fuel outlets such as gas stations, convenience stores and truck stops. Additionally, these companies supply motor fuels to 40,000 independently owned retail outlets and heating oil to seven million households and businesses.

Currently, biodiesel producers, oil companies and terminals are not required to disclose the exact volume percentage amount of biodiesel blends below five percent. For instance, petroleum marketers could unknowingly purchase a two percent biodiesel blend and then immediately blend an additional 5 percent biodiesel creating B-7. This is a very serious concern to marketers because some standards governing engines, burners and retail infrastructure only permit 5% biodiesel.

PMAA believes terminal documents should disclose the exact volume percentage of biodiesel on the invoice, bill of lading (BOL), and shipping paper, (not simply say “may contain up to 5% biodiesel”) to ensure no over-blending off-site. Information must be accurate and disclosed at the terminal to ensure that customers are receiving the right mixture of product. Therefore, I urge you to modify the language for Item 237-3 in Publication 16 to resemble language crafted by the Southern Weights and Measures Association which would require that the exact volume percentage of biodiesel blend be disclosed on invoices, BOL and shipping papers to ensure that marketers are blending safely and legally. In regard to retail dispensers, we believe blends up to 5% biodiesel should be permitted without additional labeling or notices.

Petroleum marketers need to supply the exact biodiesel products requested by their customers. NCWM needs to ensure this happens in the most cost effective fashion and that is to require terminals to disclose any biodiesel content on invoices and product transfer documents.

PMAA urges you to take these comments into consideration when the L&R Committee meets in St. Paul, Minnesota in July 2010.

Sincerely,



Dan Gilligan
PMAA President

MPCA

Missouri Petroleum Marketers
& Convenience Store Association

205 East Capitol Avenue, Suite 200 • Jefferson City, Missouri 65101
Phone 573.635.7117 • Fax 573.635.3575 • www.mpca.org

July 1, 2010

Mr. Joe Benavides
Chairman, Laws & Regulations (L&R) Committee
National Conference on Weights & Measures (NCWM)
Texas Department of Agriculture, Regulatory Branch Chief
P.O. Box 12847
Austin, Texas 78711

Re: Terminal Documents Must Specify The Exact Percentage Of Renewable Fuel In Every Load Of Fuel

Dear Mr. Benavides:

Please accept this letter as a part of the official record and as a formal comment to the National Conference on Weights & Measures (NCWM), Laws & Regulations (L&R) Committee, regarding the above detailed subject matter.

The Missouri Petroleum Marketers & Convenience Store Association (MPCA) is a 400+ member statewide trade association located in Jefferson City, Missouri, which represents the majority of the convenience stores, gas stations and petroleum marketers located in and around Missouri.

As you know, many fuel marketers across the U.S. blend renewable fuel into their transport loads of fuel at locations away from the terminal and thereafter sell the blended fuel at retail. This "away from the terminal blending" increases the use of renewable fuels, supports U.S. agriculture and decreases our dependence on fossil fuels from countries that are often hostile to the U.S. and our way of life.

I am writing to you today in your capacity as Chair of the L&R Committee to urge your Committee and the NCWM to require that terminal documents, including bills of lading, shipping papers and/or invoices, must specify the exact percentage of the renewable fuel (biodiesel, ethanol, etc.) contained in each and every load of fuel.

Reasons for my urgent request include:

1. Position holders at terminals are very precise with their inventories and thus can easily calculate and keep track of the renewable fuel percentages in every load of fuel they sell. It would be a simple process and thus no great burden for the position holder and/or the terminal to provide the fuel marketer with the exact percentage of the renewable fuel contained in each and every load of fuel.

2. Over-blending of renewable fuel at locations away from the terminal will result in retail mis-fueling and thus is bad for the consumer and their vehicles - engine damage, voiding engine warranties, increased general distrust of renewable fuels, etc.

3. Over-blending of renewable fuel at locations away from the terminal will exceed the "blend wall" - allowable federal and/or state renewable fuel percentages - and thus could be bad for the environment.

4. Over-blending of renewable fuel at locations away from the terminal will hurt the fuel marketer – huge EPA and state fines and penalties, liability for engine damage due to mis-fueling, decrease in sales, push consumers to their competitors, etc.

5. Fuel marketer uncertainty regarding the exact amount of renewable fuel in a load of fuel will result in less blending at locations away from the terminal which is bad for the renewable fuel industry, bad for U.S. agriculture and increases our dependence on fossil fuels from countries that are often hostile to the U.S. and our way of life.

6. In the near future, blender pumps may become more common and E-15 and higher biodiesel concentrations may be encouraged and permitted by the EPA. Thus, it's imperative that fuel marketers know the exact percentage of renewable fuel in every terminal load to maintain and ensure proper fuel specifications and to never exceed the "blend wall".

7. The NCWM, the Central Weights & Measures Association (CWMA), and W&M regulators in general are charged with ensuring accuracy, fairness, compliance, and full and open public disclosure and debate.

The percentage of renewable fuel in every terminal load of fuel should be fully disclosed and subject to the same goals to readily ensure accuracy and compliance.

8. Please note that general statements such as "may contain up to 5% biodiesel" or "may contain up to 10% ethanol" or "may contain up to 15% ethanol" are insufficient and do not provide the fuel marketer and/or the consumer with the information they need to make fully informed and fully compliant blending and/or fueling decisions.

9. Finally, MPCA fully supports and incorporates herein the 6/14/10 letter to Joe Benavides from Dan Gilligan, President of the Petroleum Marketers Association of America (PMAA).

Unfortunately, I will not be able to personally attend and testify at the 2010 NCWM Annual Meeting in St. Paul, MN. However, for all of the above reasons and more I strongly urge the NCWM to require that terminal documents, including bills of lading, shipping papers and/or invoices, must specify the exact percentage of the renewable fuel (biodiesel, ethanol, etc.) contained in each and every load of fuel.

Sincerely,



Ronald J. Leone, Esq.
Executive Director
Missouri Petroleum Marketers & Convenience Store Association (MPCA)
205 E. Capitol Avenue, Suite 200, Jefferson City, MO 65101
C: 573.864.5189; W: 573.635.7117, ext. 16; F: 573.635.3575

CC:
NIST, Weights & Measures Division - Lisa Warfield
NCWM – Don Onwiler
PMAA – Rob Underwood
NACS – John Eichberger & Tim Columbus
NATSO – Holly Alfano
MO W&M – Ron Hayes & John Albert

66 Morris Avenue, P.O. Box 477, Springfield, NJ 07081-0477 • 973-467-1400 Fax 973-467-4066

Fuel Merchants Association of New Jersey

July 7, 2010

Mr. Joe Benavides, Chairman
NCWM Law & Regulations Committee
Regulatory Branch Chief – Texas Department of Agriculture
P.O. Box 12847
Austin, TX 78711

Dear Mr. Benavides,

The Fuel Merchants Association of New Jersey (hereafter FMA) represents ***small businessmen and women*** who distribute heating oil, gasoline and diesel fuel in the state. Our members distribute heating oil to residential, commercial and industrial customers and distribute branded and unbranded gasoline and diesel fuel to service stations they own, and to service stations they supply, as well as to state and local governments and commercial fleets. FMA's members also install and service central heating and air conditioning equipment.

On behalf of all FMA members I am writing to encourage you and the entire Laws & Regulations Committee to modify the language in item 237-3, Engine Fuels and Automotive Lubricants Regulation, Section 3.15 Biodiesel and Biodiesel Blends in Publication 16. FMA supports modified language that would require terminal documents to disclose the exact volume and percentage of biodiesel on the invoice, bill of lading (BOL) and shipping papers. The current language, "may contain up to 5% biodiesel" will cause over-blending and misrepresentation to the consumers you are trying to protect.

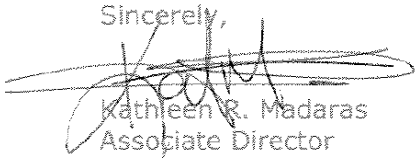
Furthermore, FMA believes the same requirement should be applicable for Bioheat® which is a mixture of 95-98% ASTM D396 heating oil and 2-5% ASTM D6751 biodiesel. A mixture not to exceed these percentages will work in all existing heating oil equipment. While we believe a higher mixture will work and our industry is actively pursuing what that mixture is, we cannot afford to have our members distribute fuel with more than 5% biodiesel at this time as it would be a non ASTM specification fuel and could void the equipment manufactures warranty on the heating system. That is why it is important for a heating oil distributor who is distributing Bioheat® to know if there is any biofuel in the fuel they are purchasing from their supplier.

If the main goal of the National Conference of Weights & Measures is to "achieve uniform and equitable weights and measures standards," the language crafted by the Southern Weights and Measures Association would achieve this goal by requiring the exact volume percentage of biodiesel blend be disclosed on invoices, BOL and shipping papers to ensure marketers are blending safely and legally.

Since petroleum marketers are required to adhere to the exact specifications of the customers' orders FMA believes biodiesel producers, refiners, terminals, and blenders should be held to the same standard.

In closing, to achieve a uniformed standard it is imperative the NCWM Laws & Regulations Committee adopt the language crafted by the Southern Weights & Measures Association.

Sincerely,



Kathleen R. Madaras
Associate Director

Appendix F

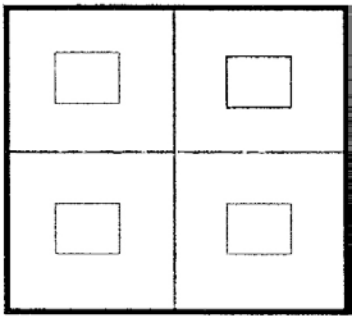
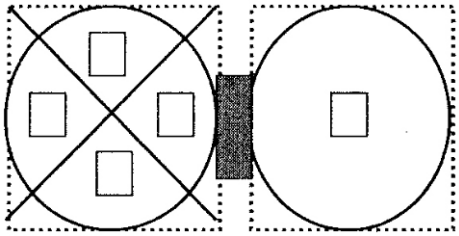
Handbook 133, 2011
Checking the Net Contents of Packaged Goods

The following table lists the amendments and editorial changes that were considered and voted on by the membership of the NCWM. As appropriate, the text on the cited pages indicates the changes to the section or paragraph as indicated in bold ~~**strikeout**~~ for deletions and bold **underscore** for insertions.

Note: The page numbers correspond to the text in L&R Appendix G.

Section No. & Page No.	Title	Action	Comments
All		Reformatted and indexed text in complete document.	Editorial
Chapter 1. General Information			
1.1. Scope			
1.1. G9	Scope	Those manufacturers whose products are sold in such packages have the right to expect that their competitors will be required to adhere to the same ~~**standards**~~ **laws and regulations.**	
1.1.a. G9	a. When and where to use checking procedures?	a. ~~**Where and when**~~ **When** and **where** to use **package** checking procedures	
1.1.a.(3) G9	(3) Retail	Amend sentence 2. It is acceptable **and** practical ~~**means**~~ for ~~**State, county and city**~~ **weights and measures** jurisdictions to monitor packaging procedures and to detect present or potential problems.	
1.2. Package Requirements			
1.2.(1) G10	(1) Inspection Lot	Replaced ~~**this collection**~~ with **the lot** for clarification.	
1.2.(3) G11	(3) Individual Package Requirements	Change the end of the last sentence. This handbook does not specify limits of overfilling **(with the exception of textiles)**, which is usually controlled by the packer **for economic, compliance and other reasons.**	
1.2.(4) G11	(4) Maximum Allowable Variation	The limit of **the** "reasonable **minus** variation" for an ~~**individual**~~ **underweight** package is called a "Maximum Allowable Variation" (MAV). An MAV is a deviation from the labeled weight, measure, or count of an individual package beyond which the deficiency is considered **an** unreasonable **minus error**.	

Section No. & Page No.	Title	Action	Comments
1.2.a. G11	a. Why **and when** do we allow for moisture loss or gain?	(Revise the first paragraph, second sentence.) The amount of ~~**lost**~~ moisture **loss** depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. (Revised the first paragraph, last sentence.) For loss or gain of moisture~~, apply~~ the moisture allowances **may be applied before or after the package errors are determined**.	
1.2.a. G11 – G12	a. Why **and when** do we allow for moisture loss or gain?	**To apply a moisture allowance before determining package errors, adjust the Nominal Gross Weight (see Section 2.3. "Basic Test Procedure") – Determine Nominal Gross Weight and Package Errors for Tare Sample, so the package errors are increased by an amount equal to the moisture allowance. This approach is used to account for moisture loss in both the average and individual package errors.** **It is also permissible to apply the moisture allowances after individual package errors and average errors are determined. For example, a sample of a product that could be subject to moisture loss might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable errors (i.e., the package error is greater than the Maximum Allowable Variation permitted for the package's labeled quantity).** ~~**to both the maximum allowable variations permitted for individual packages and the average net quantity of contents before determining the conformance of a lot**~~ **You can apply an allowance after determining the errors by adding an amount equal to the moisture allowance to adjust the average error** ~~**so the adjusted average error**~~ **and individual package errors.** ~~**provide for loss of moisture from the sample packages.**~~	Amended Added a paragraph explaining that moisture allowances can be made before or after determining package errors.
1.7. Good Measurement Practices			
1.7.(2) G15	(2) Certification Requirements for Standards and Test Equipment	This must be done according to the **calibration procedures and other instructions found on NIST's Laboratory Metrology and Calibration Procedures website at** http://www.nist.gov/pml/wmd/labmetrology/calibration.cfm ~~**in NIST Handbook 145, "Handbook for the Quality Assurance of Metrological Measurements,"**~~or **using** other recognized procedures (e.g., those adopted for use by a state weights and measures laboratory).	Editorial Many of those on the website supersede those in NIST Handbook 145 which is cited in current text. The information presented at this URL is regularly updated by the Weights and Measures Division Metrology Group. State laboratories use this as a primary source for calibration information.

Section No. & Page No.	Title	Action	Comments
Chapter 2. Basic Test Procedure – Gravimetric Testing			
2.2 Measurement Standards and Test Equipment			
2.2.f.(3) G19	f. Which performance tests should be conducted to ensure the accuracy of a scale? (3) Shift Test	**Bench Scales or Balances** use a test load equal to one-~~**half**~~ **third** of the "maximum test load: used for the "increasing-load test." For bench scales (see Diagram 1. **"Bench Scales or Balances"), ~~place~~ apply** the test load **as nearly as possible at the center of each quadrant of the load receiving element as shown in Diagram 1. "Bench Scale or Balances."** ~~**in the center of four separate quadrants, equidistant between the center and edge of the load receiving element and ….**~~ **For Equal Arm Balances use a test load equal to one-half capacity centered successively at four points positioned equidistance between the center and the front, left, back, and right edges of each pan as shown** ~~**determine the accuracy in each quadrant for**~~ **(see Diagram 2.** "**Equal-Arm Balance)**." For example, where the load-receiving element is a rectangular or circular shape, place the test load in the center of the area represented by the shaded boxes ~~**in the following diagrams**~~.	Editorial Amended this section to reflect the changes made in 2007 to the shift test procedures in NIST HB 44, Section 2.20. Scales under N.1.3.7. All Other Scales…. The change in HB 44 reduced the test-load to $^1/_3$ maximum nominal capacity and amended the requirement on placement of the test load on the load receiving element. The test pattern in Diagram 1 has been changed to reflect the new requirement.
Diagram 1. Bench Scales or Balances 		**Diagram 2. Equal-Arm Balance** 	
2.2.g. G20	Which standards apply to other test equipment?	These publications may be obtained from the Weights and Measures Division **(http://www.nist.gov/pml/wmd)** or the U.S. Government Printing Office.	Editorial
2.3. Basic Test Procedure			
2.3. G20	Basic Test Procedure	If **encased-in-ice or ice** glazed ~~**or frozen food**~~ is tested, refer to Section 2.6. "~~**Drained Weight for Glazed or Frozen Foods.**~~ **Determining the Net Weight of Encased-in-Ice and Ice Glazed Products**."	Editorial To match change in Sec. 2.6 title.
2.3.3.b. G23	Where are Maximum Allowable Variations found?	Added a missing bullet • packages bearing a USDA seal of inspection – Meat and Poultry "See Table 2-9."	Editorial

Section No. & Page No.	Title	Action	Comments
2.3.3.d. G23	How many MAVs are permitted in a sample?	d. How many ~~**MAVs**~~ **unreasonable minus errors (UMEs)** are permitted in a sample? To find out how many minus package errors are permitted to exceed the MAV, **(errors known as unreasonable minus errors or UME's),** ~~**(refer to Appendix A)**~~ see Column 4 in either Table 2-1. Sampling Plans for Category A or Table 2-2. Sampling Plans for Category B **(refer to Appendix A).** Record this number in Box 8.	
2.3.5. Tare Procedures			
2.3.5.a.(1) G24	What types of tare may be used to determine the net weight of packaged goods? –Used Dry Tare	**Note:** When testing frozen foods with **the** Used Dry Tare **approach**, the frost found inside frozen food packages is included as part of the net contents**, except in instances in which glazed or frozen foods are tested according to Section 2.6. "Determining the Net Weight of Encased-in-Ice and Ice Glazed Products**."	Editorial
2.3.5.(3) G25	What types of tare may be used to determine the net weight of packaged goods? –Wet Tare	**Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The USDA - Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference in 2008 but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).** Paragraph 2, sentence 2 – change the following: If Wet Tare is used to verify the net weight of the packages ~~**of fresh poultry, hot dogs, and franks that are subject to the USDA regulations**~~, the inspector must allow for moisture loss.	
2.3.5.d. G26	How are the tare sample and the tare weight of the package material determined?	Step 2 For sample sizes of 12 or more, subtract the individual tare weights from the **respective package** gross weights (Block a, minus Block b, on the report form) to obtain the net weight for each package and record ~~**these**~~ each value~~s~~ in Block c, "Net Wt.," on the report form.	
2.3.5.e. & 2.3.5.f. G26 – G27	How are the tare sample and the tare weight of the packing material determined?	e. Does the inspection of aerosol containers require special procedures? f. How is the tare of vacuum-packed coffee determined?	Editorial (moved to another location within Chapter)

Section No. & Page No.	Title	Action	Comments
2.3.6. Determine Nominal Gross Weight and Package Errors for Tare Sample			
2.3.6.a. G27	**a. What is nominal gross weight?**	a. ~~**What is**~~ **How do I compute** a nominal gross weight? A nominal gross weight is used to ~~**simplify the calculation**~~ calculate ~~**of**~~ package errors. To compute the nominal gross weight, add the average tare weight (recorded in Box 13) to the labeled weight (recorded in Box 1).~~ To obtain the package error, subtract a package's gross weight from the nominal gross weight.~~	
2.3.6.b. G27	~~**What is nominal gross weight?**~~ **b. How do I compute package error?**	**b. How do I compute package error?** **To obtain the package error, subtract the nominal gross weight from each package's gross weight. The package error is represented by the formula:** ***Package error = gross weight – nominal gross weight***	
2.3.6.e. G28	e. How is the total package error computed?	Add all the package errors for the packages in the sample. Be sure to subtract the minus package errors from the plus package errors and to record the total net error in Box 15**, indicating the positive or negative value of the error.**	
2.8. Moisture Allowance			
2.3.8. G30	Moisture Allowance	**Moisture loss must be considered even when no formal allowance for the specific product is found in HB 133.**	
2.3.8.b. G30	b. What are the moisture allowances for flour and dry pet food?	b. What ~~**is**~~ are the moisture allowance**s** for flour, ~~**and**~~ dry pet food**, and other products?** (See Table 2-3. Moisture Allowances) ~~**The moisture allowance for flour and dry pet food is 3 % of the labeled net weight.**~~ ~~**Note: Dry pet food means all extruded dog and cat foods and baked treat products packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at the time of pack.**~~	
2.3.8.b. G30	Table 2-3. Moisture Allowances	**Table 2-3. Moisture Allowances for Product in Distribution** Corrected a misprint in moisture allowances for packages of fresh poultry to read 3 %.	

TABLE 2-3. Moisture Allowance for Procduct in Distribution
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Table 2-3.
Moisture Allowances

If you are verifying the labeled net weight of packages of:	The Moisture Allowance is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Borax	See Section 2.4.	
Wet Tare Only		
If you are using Wet Tare in verifying the net weight of packages of one of the products listed below:	The Moisture Allowance is:	Note: Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference in 2008 but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).
Fresh poultry	3 ~~5~~%	Fresh poultry is defined as poultry at a temperature of − 3 °C (26 °F) that yields or gives when pushed with the t□umb.
Franks or hot dogs	2.5 %	
Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no moisture allowance if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dry Tare are equivalent.

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2.3.8.d. G32	d. What moisture allowance is used with wet tare when testing packages bearing the USDA seal of inspection?	d. What moisture allowance is used with wet tare**?** ~~**when testing packages bearing a USDA seal of inspection?**~~ **Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference in 2008 but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).** **See Table 2-3 Moisture Allowances - Wet Tare Only**. • ~~**Use the following guideline when testing meat and poultry from any USDA inspected plant using Wet Tare and a Category A sampling plan.**~~ • ~~**For packages of fresh poultry that bear a USDA seal of inspection, the moisture allowance is 3 5 of the labeled net weight. For net weight determinations, only, fresh poultry is defined as poultry above –3 ºC (26 ºF). This is a product that yields or gives when pushed with the thumb.**~~ • ~~**For packages of franks or hotdogs that bear a USDA seal of inspection, the moisture allowance is 2.5 % of the labeled net weight.**~~ • ~~**For packages of bacon, fresh sausage, and luncheon meats that bear a USDA seal of inspection, there is no moisture allowance if there is no free-flowing liquid or absorbent materials in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Dried Used Tare are equivalent.**~~ When there is free-flowing liquid **and liquid** ~~or absorbent~~ **absorbed by** packing materials in contact with the products, all free liquid **and the absorbed liquid** is part of the wet tare.	

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2.3.8.e.	**e. How is moisture loss handled for products not listed in NIST Handbook 133?**	**e. How is moisture loss handled for products not listed in NIST Handbook 133?** **Officials can test products for which no moisture loss guidance has been provided. If studies are a necessity they should be a collaborative effort between officials and industry. Because of the potential impact on interstate commerce, studies should be completed on a nationwide basis and not by individual jurisdictions unless circumstances justify only local consideration.** **The amount of moisture loss from a package is a function of many factors, not the least of which is the product itself (e.g., moisture content, texture and density), packaging, storage conditions (e.g., temperature, humidity, and air flow), time, handling and others. If a packaged product is subject to moisture loss, officials must allow for "reasonable" variations caused by moisture either evaporating or draining from the product. Officials cannot set arbitrary moisture allowances based solely on their experience or intuition. Moisture allowances must be based on scientific data and must be "reasonable." Reasonable does not mean that all of the weight loss caused by moisture evaporation or draining from the product must be allowed. As a result of product and moisture variability, the approach used by an official must be developed on a case-by-case basis depending on many factors to include, but not be limited to, the manufacturing process, packaging materials, distribution, environmental influence and the anticipated shelf life of the product.** **NIST Handbook 130 provides a starting point for developing a workable procedure in the Interpretation and Guideline Section 2.5.6. regarding "Resolution for Requests for Recognition of Moisture Loss in Other Packaged Products." Most studies involving nationally distributed products will require that products be tested during different seasons of the year and in different geographic locations to develop a nationally recognized moisture allowance. Some studies may require the development of laboratory tests used for inter-laboratory comparisons to establish moisture content in products at time of pack or at the time of inspection.** **Moisture loss or gain is critical consideration for any net content enforcement effort and one that, in most cases, cannot be addressed solely by a field official. If moisture loss issues are to be deliberated, it is the regulatory official's responsibility to resolve the packer's concern uti8lizing available resources and due process procedures. To full fill this obligation the official may be required to utilize specialized test equipment and specific laboratory procedures. Additionally, the collection of adequate test data may require product examination over a broad geographical area and consideration of a wide range of environmental factors.**	NOT ACCEPTED To be returned to the Moisture Loss Work Group (MLWG).

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		If a national effort is required, a coordinated effort involving industry, trade associations, weights and measures officials, and federal agencies may be required. NIST will provide technical support upon request. If studies are a necessity they should be collaborative efforts between officials and industry and can be very time consuming depending on the product. Because of the potential impact on interstate commerce, studies must be completed on a nationwide basis and not by individual jurisdictions unless circumstances justify only local consideration.	
2.3.9. Calculations			
2.3.9.a. G32	a. How is moisture allowance computed and applied to the average error?	a. How is moisture allowance computed and applied ~~**to the average error**~~?	
2.3.9.b.	**b. How is a Moisture Allowance made prior to determining package error?**	**b. How is a Moisture Allowance made prior to determining package errors?** **If the Moisture Allowance is known in advance (e.g., flour and dry pet food) it can be applied by adjusting the Nominal Gross Weight (NGW) used to determine the sample package errors. The Moisture Allowance (MA) in Box 13a is subtracted from the NGW. The NGW which is the sum of the Labeled Net Quantity of Contents (LNQC e.g., 907 g) and the Average Tare Weight from Box 13 (for this example use an ATW of 14 g (0.03 lb)) to obtain an Adjusted Nominal Gross Weight (ANGW) which is entered in Box 14.** **The calculation is:** ***Labeled Net Quantity of Contents 907 g (2 lb) + Average Tare Weight 14 g (0.03 lb) = 921 g (2.03 lb) – Moisture Allowance 27 g (0.06 lb) = Adjusted Nominal Gross Weight of 894 g (1.97 lb)*** **which is entered in Box 14.** **Package errors are determined by subtracting the Adjusted Nominal Gross Weight from the Gross Weights of the Sample Packages (GWSP).** **The calculation is:** ***Gross Weight of Samples Packages – Adjusted Nominal Gross Weight = Package Error*** **Note: When the Nominal Gross Weight is adjusted by subtracting the Moisture Allowance value(s) the Maximum Allowable Variation(s) is not changed. This is because the errors that will be found in the sample packages have been adjusted by subtracting the**	Amended

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		Moisture Allowance (e.g., 3 %) from the Nominal Gross Weight. That increases the individual package errors by the amount of the moisture allowance (e.g., 3 %). If the value(s) of the MAV(s) were also adjusted it would result in doubling the allowance. MAV is always based on the labeled net quantity.	
2.3.9.c. G33	c. How is a Moisture Allowance made after determining package error?	c. How is a Moisture Allowance made after determining package errors? **You can make adjustments when the value of the Moisture Allowance is determined following the test (e.g., after the sample fails or if a packer provides a reasonable moisture allowance based on data obtained using a scientific method) using the following approach:** **If the sample failed the Average and/or the Individual Package Requirements both of the following steps are applied.** **If the sample failed the Average Requirement but has no unreasonable package errors, only step 1 is used. If the sample passes the Average Requirement but fails because the sample included one or more Unreasonable Minus Errors (UMEs), only step 2 is used.** **Step:** **1. Use the following approach to apply a Moisture Allowance to the sample after the test is completed. The Moisture Allowance (MA) is computed (e.g., 3 % x 907 g (2 lb) = 27 g (0.06 lb) and added to the Sample Error Limit (SEL) (e.g., if the SEL is 0.023 add 0.06 to obtain an Adjusted SEL of 0.083). The Adjusted Sample Error Limit (ASEL) is then compared to the Average Error of the Sample and:** • **If the average error (disregarding sign) in Box 18 is smaller than the Adjusted Sample Error Limit, the sample passes.** **HOWEVER,** • **If the average error (disregarding sign) in Box 18 is larger than the Adjusted Sample Error Limit, the sample fails.** **2. If a Moisture Allowance is to be applied to**	

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		the Maximum Allowable Variation(s), the following method is recommended: **The Moisture Allowance (MA) is computed (e.g., 3 % x 907 g (2 lb) = 27 g (0.06 lb) and added to the value of the Maximum Allowable Variation(s) for the labeled net quantity of the package (e.g., MAV for 907 g (2 lb) is 31.7 g (0.07 lb) + 27 g (0.06 lb) = Adjusted Maximum Allowable Variation(s) (AMAV) of 58.7 g). Compare each minus package error to the AMAV. Mark package errors that exceed the AMAV and record the number of unreasonable minus errors found in the sample. If this number exceeds the number of unreasonable errors allowed, the sample fails.** ~~**How is the Maximum Allowable Variation corrected for the moisture allowance?**~~ • ~~**Adjust the MAV by adding the moisture allowance to the MAV.**~~ ~~**Example: 907 g (2 lb) package of flour: moisture allowance added to the MAV = 31.7 g (0.07 lb) (MAV for 907 g [2 lb] package) + 27 g (0.06 lb) moisture allowance = a corrected MAV of 58.7 g (0.13 lb)**~~ • ~~**Correct MAV in dimensionless units by converting the moisture allowance to dimensionless units = 0.06 lb ÷ 0.001 lb = 60. Go to Box 4 and add the moisture allowance in dimensionless units to the MAV in dimensionless units.**~~ ~~**Example: MAV = 70 (MAV for 2 lb where the unit of measure = 0.001 lb) + 60 (moisture allowance in dimensionless units) = 130. Minus package errors must exceed the MAV ± gray area before they are declared "unreasonable errors."**~~ • ~~**If the number of unreasonable errors exceeds the allowed number (recorded in Box 8), the inspection lot fails.**~~	

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		~~**How is the average error for the moisture allowance corrected?**~~ ~~**If the minus average error (Box 18) is larger (disregarding the sign) than the SEL (Box 23) and moisture loss applies, compare the difference between Box 18 and Box 23 with the moisture allowance recorded in Box 13a. (Make sure that all the values are in units of weight or in dimensionless units before making this comparison.) If Box 13a is larger than the difference between Box 18 and 23, then the lot is considered to be in the gray area.**~~ ~~**Example: Box 13a for 2 lb flour is 60 (dimensionless units); Box 18 is 2 (dimensionless units); Box 23 is 0.550 (dimensionless units). The difference between Box 18 and Box 23 is 1.450 (dimensionless units). Since Box 13a is 60 (dimensionless units), Box 13a is larger than the difference between Box 18 and Box 23, the lot is considered to be in the gray area and further investigation is necessary before ruling out moisture loss as the reason for shortweight.**~~
2.3.9.d. G35	**d. What should you do when a sample is in the moisture allowance (gray) area?**	**d. What should you do when a sample is in the moisture allowance (gray) area?** When the average error of a lot of fresh poultry, franks, or hot dogs ~~**from a USDA inspected plant**~~ is minus, but does not exceed the established "moisture allowance" or "gray area," contact the ~~**appropriate USDA official and/or**~~ **packer or** plant management personnel to determine what information is available on the lot in question. Questions to the ~~**USDA official and/or**~~ plant management representative may include: Change the note to read: **Note:** If ~~**USDA or**~~ the plant management has data on the lot, such data may help to substantiate that the "lot" **had** met **the** net content requirements at the point of manufacture.	
2.3.9.d. G35	**d. What should you do when a sample is in the moisture allowance (gray) area?**	**Reasonable deviations** from net quantity of contents caused by the loss or gain of moisture from the package are permitted when caused by ordinary and customary exposure to conditions that occur under good distribution practices.	

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2.4. Borax			
2.4.b. G37	b. How is the volume determined?	Step 3. Compare the net volume of the commodity in the package with the volume declared on the package. The volume declaration **must not ~~is not located~~ appear** on the principal display panel. **Instead, it will appear on the back or side of the package and may appear as: ~~The following example is how the declaration of volume should appear.~~**	
2.5. Determination of Drained Weight			
2.5. G38	The Determination of Drained Weight – Test Equipment	➢ **For canned tomatoes a U.S. Standard test sieve with 11.2 mm ($^{7}/_{16}$ in) openings must be used.**	
2.6. ~~Drained Weight for Glazed or Frozen Foods~~ Determining the Net Weight of Encased-in-Ice and Ice Glazed Products			
2.6. G39	Drained Weight for Glazed or Frozen Foods	**~~Drained Weight for Glazed or Frozen Foods~~ Determining the Net Weight of Encased-in-Ice and Ice Glazed Products.**	
2.6.a. G39	a. How is the drained weight of frozen shrimp and crabmeat determined?	**a.** How **~~is~~ should** the **~~drained~~ net** weight of frozen **~~shrimp (e.g., 2.27 kg (5 lb) block of shrimp) and crabmeat~~ seafood, meat, poultry or similar products encased-in-ice and frozen into blocks or solid masses be** determined? When determining the net weight of frozen **~~shrimp and crabmeat~~ seafood, meat, poultry and similar products**, use the test equipment and procedure provided below. **~~1. Immerse the product directly in water in a mesh basket or open container to thaw (e.g., it is not placed in a plastic bag). Direct immersion does not result in the product absorbing moisture because the freezing process causes the tissue to lose its ability to hold water.~~** **~~2. Maintain the water temperature between 23 °C to 29 °C (75 °F to 85 °F). This is accomplished by maintaining a constant flow of warm water into the container holding the product (e.g., place a bucket in a sink to catch the overflow, and feed warm water into the bottom of the bucket through a hose).~~** **~~3. After thawing, drain the product on a sieve for 2 minutes and then weigh it.~~**	

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2.6.a. G39	a. How ~~is~~ **should** the ~~**drained**~~ **net** weight of frozen ~~**shrimp (e.g., 2.27 kg (5 lb) block of shrimp) and crabmeat**~~ **seafood, meat, poultry and similar products encased-in-ice and frozen into blocks or solid masses (i.e., not individually glazed) be** determined? –Test Equipment	• **Balance and weights (used to verify accuracy)** • Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and −a 35 °C to +50 °C (− 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F) • Water source and hose with a**n approximate flow rate of** 4 L to 15 L (1 gal to 4 gal) per minute **for thawing blocks and other products** ~~**flow rate**~~ • Sink or other receptacle [i.e., **bucket with a capacity of approximately** 15 L (4 gal) ~~**bucket**~~S] **for thawing blocks and other products** • A wire mesh basket **used for testing large frozen blocks of shrimp** or ~~**other**~~ **a** container that is large enough to hold the contents of **one** ~~**1**~~ package (e.g., 2.27 kg [5 lb] box of shrimp) and has openings small enough to retain all pieces of the product (e.g., an expanded metal test tube basket lined with standard 16-mesh screen).	
2.6.a. G40	a. How is the drained weight of frozen shrimp and crabmeat determined? – Test Procedure	Follow Section 2.3.**1** "~~**Basic Test Procedure –**~~ Define the Inspection Lot." 1. Place the unwrapped frozen ~~**shrimp or crabmeat**~~ **seafood, meat, poultry, or similar products** in the wire mesh basket **or an open container to thaw (e.g. it is not placed in a plastic bag)** and immerse in a 15 L (4 gal) or larger container of fresh water at a temperature between 23 °C to 29 °C (75 °F to 85 °F). Submerge the basket so that the top of the basket extends above the water level. 2. Maintain a continuous flow of water into the bottom of the container to keep the temperature within the specified range. **This is accomplished by maintaining a constant flow of warm water into the container holding the product (e.g., place a bucket in a sink to catch the overflow, and feed warm water into the bottom of the bucket through a hose). Direct immersion does not result in the product absorbing moisture because the freezing process causes the tissue to lose it ability to hold water.**	
2.6.b. G40	b. How is the net weight of **ice** glazed ~~**raw**~~ seafood**, meat, poultry or similar products** ~~**and fish**~~ determined?	b. How is the net weight of **ice glazed** ~~**raw**~~ seafood, **meat, poultry and similar products** ~~**and fish**~~ determined? For **iced** glazed seafood, meat**, poultry or similar products** ~~**and fish,**~~ determine the net weight after removing the glaze using the following procedure. Use this method for any frozen glazed food product.	

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2.6.b. G40	b. How is the net weight of **ice** glazed ~~**raw**~~ seafood**, meat, poultry or similar products** ~~**and fish**~~ determined? – Test Equipment	~~**Use the equipment listed in Section 2.6.**~~ "~~**Drained Weight for Glazed or Frozen Foods**~~." • **Balance and weights (used to verify accuracy)** • **Continuous cold water source** • **Number 8 sieve and receiving pan, 20 cm (8 in)** • **for packages 453 g (1 lb) or less. A 30 cm (12 in) for packages more than 453 g (1 lb)** • **Means to determine a 17° to 20° angle** • **Stopwatch**	
2.6.b. G41	b. How is the net weight of **ice** glazed ~~**raw**~~ seafood**, meat, poultry or similar products** ~~**and fish**~~ determined? –Test Procedure	Step: 1. Fill out a **glazed seafood package** report form (**See Appendix E)** and select the random sample. A tare sample is not needed. 2. Weigh S~~**ieve and**~~ Sreceiving pan. Record this weight on a **glazed seafood package** worksheet **(See Appendix E)** as "S~~**ieve**~~S **receiving pan** weight." 3. Remove each package from low temperature storage; open it immediately and place the contents **in the sieve or other draining device (i.e. colander)** under a gentle spray of cold water**. Carefully agitate the product, handling the product with care** to avoid breaking the products. Continue the spray**ing process** until all ice glaze, that is seen or felt is removed. In general, the product should remain rigid; however, the ice glaze on certain products, usually smaller sized commodities, sometimes cannot be removed without S~~**defrosting**~~S **partial thawing of** the product. Nonetheless, remove **all S~~the~~S ice** glaze, because it **may be** S~~**is**~~ Sa substantial part of the package weight. 4. Transfer the product to the ~~**weighed**~~ sieve (if the product is not already in the sieve)S Without shifting the product, incline the sieve to an angle of 17°P Pto 20° to facilitate drainage and drain (into waste receptacle or sink) for ~~**exactly**~~ 2 minutes. 5. **At the end of the drain time immediately transfer the entire product to the tared receiving pan for weighing to determine the net weight.** Place the product and S~~**ieve**~~ **tared**	

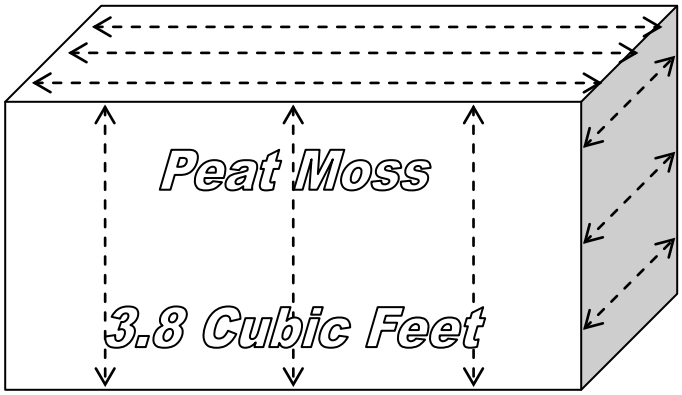
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		receiving Span on the S~~receiving pan S~~**scale** and weigh. Record this weight on a **glazed seafood package** worksheet**.** ~~**as the "Ssieve + product weight."**~~ 6. The net weight of product is equal to the weight of the **receiving** pan S~~**plus the sieve** S~~plus the product (recorded in step 5) minus the "S~~**sieve receiving** S~~**pan** weight" (recorded in step 2). Record the product net weight on the **glazed seafood package** worksheet. The package error is equal to the net weight of the product as measured minus the labeled weight. Record the Record the package error on the **glazed seafood package** worksheet and transfer it to the report form. 7. Repeat steps ~~**3**~~ **2** through 6 for each package in the sample, cleaning ~~and drying~~ the sieve and **cleaning and drying** the receiving pan between package measurements.	
Chapter 3. Test Procedures – For Packages Labeled by Volume			
3.1. Scope			
3.1.f. G44	Table 3-1. Reference Temperature for Liquids	See modified table below.	

Table 3-1.
Reference Temperatures for Liquids

If the liquid commodity is:	Then the volume is determined at the reference temperature of:	Code of Federal Regulation Reference*
Beer	~~**3.9**~~ **4** °C (39.1°F)	**27 CFR, Part 7.10**
Distilled Spirits	15.**56** °C (60 °F)	**27 CFR, Part 5.11**
Frozen food - sold and consumed in the frozen state	At the frozen temperature	**21 CFR §101.105(b)(2)(i)**
Petroleum	15.**6** °C (60 °F)	**16 CFR §500.8(b)**
Refrigerated food (e.g., milk and other dairy products labeled "KEEP REFRIGERATED")	4~~**.4**~~ °C (40 °F)	**21 CFR §101.105(b)(2)(ii)**
Other liquids and wine (e.g., includes liquids sold in a refrigerated state for immediate customer consumption such as soft-drinks, bottled water and others that do not require refrigeration)	20 °C (68 °F)	**Food: 21 CFR §101.105(b)(2)(iii)** **Non-Food: 16 CFR §500.8(b)** **Wine: 27 CFR, Part 4.10 (b)**

*The Code of Federal Regulations can be accessed online at: ***http://www.gpoaccess.gov/***

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3.2. Gravimetric Test Procedure for Liquids			
3.2. G46	Gravimetric Test Procedure for Liquids –Test Procedure	Step 3 Tilt the flask gradually so the flask walls are splashed as little as possible **as the flask** is emptied.	Editorial
3.4. Other Volumetric Test Procedures			
3.4.a. G49	a. What other methods can be used to determine the net contents of packages labeled by volume? – Test Equipment	Updated standards ➢ Class A 500 mL buret that conforms to ASTM E287~~94~~ **2(2007)**, "Standard Specification for Laboratory Glass Graduated Burets" ➢ Class A Pipets, calibrated "to deliver" that conform to ASTM E969~~-95~~-**02(2007)**, "Standard Specification for Glass Volumetric (Transfer) Pipets"	Editorial
3.4.b. G50	How is the volume of oils, syrups, and other viscous liquids that have smooth surfaces determined?	Step 2 3. Bring the temperature of both the liquid and the water to be used to measure the volume of the liquid to the reference temperature specified in Table 3-1. Reference Temperatures for Liquids. **Verify with a thermometer that product has maintained the reference termperature.**	Editorial
3.4.c. G50		**c. How is the volume of mayonnaise, salad dress, and other water immiscible products that do not have smooth and level surfaces determined?**	New
3.8. Test Viscous Materials – Such as Caulking Compounds and Pastes			
3.8.b. G61	b. What type of measurement equipment is needed to test packages of caulk, pastes, and glues?	Calibrate the density cup gravimetrically with respect to the contained volume using the procedure in ASTM E5~~4~~2-~~94~~**01(2007)**, "Standard Practice for Calibration of Laboratory Volumetric Apparatus."	Editorial
3.9. Peat Moss			
3.9.a. G62	a. How are packages of peat and peat moss labeled by compressed volume testing?	**Take three measurements (both ends and middle) of each dimension and calculate their average. Multiply the averages to obtain the compressed cubic volume.** (Modify the second sentence to add the double-underlined word and graphic:) **For each dimension (length, width, height) take three equidistant measurements, take the average of each respective dimension and multiply to determine the cubic measure as follows:** ***Average height x average width x average length = cubic measurement***	Amended

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 **Peat Moss Illustration**			
3.10. Mulch and Soils Labeled by Volume			
3.10.b. G65	b. What type of measurement equipment is needed to test packages of mulch? – Table	Modify table 3-4. – The table format was simplified and the SI units were changed to millimeters.	Editorial

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Table 3-4.
Specifications for Test Measures for Mulch and Soils

Nominal Volume of Test Measure	Interior Wall Dimensions [1]			Marked Intervals on Interior Walls [3]	Volume Equivalent of Marked Intervals
	Length	Width	Height [2]		
30.2 L (1.07 ft^3) for testing packages that contain less than 28.3 L (1 ft^3 or 25.7 dry qt)	213.4 mm (8.**4** in)	203.2 mm (8 in)	736.6 mm (29 in)	12.7 mm (½ in)	524.3 mL (32 in^3)
28.3 L (1 ft^3)	304.8 mm (12 in)	**304.8 mm (12 in)**	**304.8 mm (12 in)**		1 179.8 mL (72 in^3)
56.6 L (2 ft^3)	**304.8 mm (12 in)**	**304.8 mm (12 in)**	**685.8 mm (27 in)**		
	406.4 mm (16 in)	**228.6 mm (9 in)**	**685.8 mm (27 in)**		
84.9 L (3 ft^3)	**304.8 mm (12 in)**	**304.8 mm (12 in)**	**990.6** mm (**~~48~~ 39** in)		
	406.4 mm (16 in)	228.6 mm (9 in)	**~~1219.2~~ 990.6** mm (**~~48~~ 39** in)		

Measures are typically constructed of 12.7 mm (½ in) marine plywood. A transparent sidewall is useful for determining the level of fill, but must be reinforced if it is not thick enough to resist distortion. If the measure has a clear front, place the level gage at the back (inside) of the measure so that the markings are read over the top of the mulch.

Notes:
[1] Other interior dimensions are acceptable if the test measure approximates the configuration of the package under test and does not exceed a base configuration of the package cross-section.
[2] The height of the test measure may be reduced, but this will limit the volume of the package that can be tested.
[3] When lines are marked in boxes, they should extend to all four sides of the measure if possible to improve readability. It is recommended that a line indicating the MAV level also be marked to reduce the possibility of reading errors when the level of the mulch is at or near the MAV.

3.10.d. G66	d. How are package errors determined?	*Package Error = Package Net Volume – Labeled Volume*	Editorial

Section No. & Page No.	Title	Action	Comments
3.11. Ice Cream Novelties			
3.11. G66	Ice Cream Novelties	**Note: The following procedure can be used to test packaged products that are solid or semisolid and that will not dissolve in, mix with, absorb, or be absorbed by the fluid into which the product will be immersed. For example, ice cream labeled by volume can be tested using ice water or kerosene as the immersion fluid.** **Exception: Pelletized ice cream is beads of ice cream which are quick frozen with liquid nitrogen. The beads are relatively small, but can vary in shape and size. On April 17, 2009, the FDA issued a letter stating that this product is considered semisolid food, in accordance with 21 CFR 101.105(a). The FDA also addresses that the appropriate net quantity of content declaration for pelletized ice cream products be in terms of net weight.**	
3.12. Fresh Oysters Labeled by Volume			
3.12.a. G71	a. What requirements apply to packages of fresh oysters labeled by volume? – Test Equipment	➢ Area: 1935 cm^2 (300 in^2) or more for each 3.78 L (1 gal) of oysters (**Note: Strainers of smaller area dimensions are permitted to facilitate testing smaller containers.)**	Editorial
3.13.1. Test Procedure for Cylinders Labeled by Weight			
3.13.2.a. G76	a. How is it determined if the containers meet the package requirements using the gravimetric test procedure?	Step 4 Using NIST Technical Note 1079 "Tables of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen" (available on-line at (**http://www.nist.gov/pml/wmd/pubs/nbs.cfm),** determine the value (SCF/CF) from the content tables at the temperature and pressure of the cylinder under test.	Editorial
3.13.2. Test Procedure for Cylinders Labeled by Volume			
3.13.2.a. G76	How is it determined if the containers meet the package requirements using the volumetric test procedure?	Follow Section 2.3.**1.** "~~**Basic Test Procedure –**~~ Define the Inspection Lot."	Editorial
3.14. Firewood			
3.14. G77 – G79	Firewood	Editorial: Make 3.14. Main Title, subtitle **Firewood** categories (**3.14.2. Boxed Firewood, 3.14.3. Crosshatched Firewood, and 3.14.4. Bundles and Bags of Firewood**).	Editorial

Section No. & Page No.	Title	Action	Comments
Chapter 4. Test Procedures Packages Labeled by Count, Linear Measure, Area, Thickness, and Combinations of Quantities			
4.4. Packages Labeled by Count of More than 50 Items			
4.4. G83 – G84	Packages Labeled by Count of More than 50 Items – Audit Procedure	Step 9: Added a minus symbol to the equation between Actual Package Gross Weight and Nominal Gross Weight.	Editorial
4.6. Special Test Requirements for Packages Labeled by Linear or Square Meters (Area)			
4.6.a. G88	Are there special measurement requirements for packages labeled by dimensions?	When testing yarn and thread apply tension and use the specialized equipment specified in ASTM D1907 ~~**9**~~**07**, "Standard Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method," in conjunction with the sampling plans and package requirements described in this handbook.	Editorial
4.7. Polyethylene Sheeting			
4.7.a. G90	a. Which procedures are used to verify the declarations on polyethylene sheeting and bags? – Test Procedure	Step 3 (footnote) Updated the year (98) of approval referenced in ASTM Standard D 1505 ~~**98**~~ **03**, "Standard Method of Test for Density of Plastics by the Density Gradient Technique."	Editorial
4.8. Packages Labeled by Linear or Square (Area) Measure			
4.8. G95	– Test Procedure	Step 11 Added a minus symbol to the equation between "Package Gross Weight and Nominal Gross Weight."	Editorial
4.9. Baler Twine – Test Procedure for Length			
4.9. G97	– Test Procedure	Step 5 Added a minus symbol to the equation between "Packaged Gross Weight and Nominal Gross Weight."	Editorial
Appendix A. Table			
Table 1-1. Agencies Responsible for Package Regulations and Applicable Requirments			
	Table 1-1. Agencies Responsible for Package Regulations and Applicable Requirements	U.S. Bureau of Alcohol, Tobacco, and Firearms and state and local weights and measures ~~**http://www.atf.treas.gov**~~ **http:// www.atf.gov**	Editorial
G103	Table 2-1.	Correction to table (see next page)	Editorial

Section No. & Page No.	Title	Action	Comments

Table 2-1.
Sampling Plans for Category A

1	2	3	4	5	6
Inspection Lot Size	**Sample Size**	**Sample Correction Factor**	**Number of Minus Package Errors Allowed to Exceed the MAV[1]**	**Initial Tare Sample Size[2]**	
				Glass and Aerosol Packages	**All Other Packages**
1	1	Apply MAV			
2	2	8.984~~5~~			
3	3	2.484			
4	4	1.591			
5	5	1.24~~1~~2	0[1]	2	2
6	6	1.0~~5~~049			
7	7	0.925			
8	8	0.836			
9	9	0.769			
10	10	0.715			
11	11	0.672			
12 to 250	12	0.635			
251 to 3 200	24	0.422		3	
More than 3 200	48	0.29~~1~~0	1*		

[1] For mulch and soils packaged by volume, see Table 2-10. Exceptions to the Maximum Allowable Variations – 1 package may exceed the MAV for every 12 packages in the sample.

[2] If sample size is 11 or fewer, the initial tare sample size and the total tare sample size is 2 samples.

(Amended 2001)

Appendix B. Random Numbers Tables

G115	The Random Number Table	The random number tables in Appendix B are composed of the digits from 0 through 9, with approximately equal frequency of occurrence. This appendix consists of 8 pages. On each page digits are printed in blocks of ~~five~~ columns and blocks of ~~five~~ rows. The printing of the table in blocks is intended only to make it easier to locate specific columns and rows.	Editorial

Section No. & Page No.	Title	Action	Comments
Appendix C. Glossary			
G127	Glossary	**Sample correction factor.** ~~**Students' "t: value for a one sided test at the 3 % confidence level and n is the sample size.**~~ **The factor as computed is the ratio of the 97.5th quantile of the student's t-distribution with (n – 1) degrees of freedom and the square root of n where n is the sample size.** **sample error limit (SEL).** A statistical value computed by multiplying the sample standard deviation times the sample correction factor from Column 3 of Table 2-1. Category A – Sampling Plans for the appropriate sample size. The SEL value allows for the uncertainty between the average error of the sample and the average error of the inspection lot with an approximately 97.**5** % level of confidence.	Editorial
Appendix E. Model Inspection Report Forms			
G139		**Glazed Seafood Worksheet**	Add in report forms from Chapter 2., 2.6.
G140		**Glazed Seafood Worksheet – Example**	Add in report forms from Chapter 2., 2.6.
G141		**Glazed Seafood Package Report**	Add in report forms from Chapter 2., 2.6.
G142		**Glazed Seafood Package Report – Example**	Add in report forms from Chapter 2., 2.6.

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Appendix G

Draft of Handbook 133

Checking the Net Contents of Packaged Goods, 4th Edition

with Proposed Amendments and Editorial Changes

(Proposed changes for 2011 printing)

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Chapter 1. General Information

1.1. Scope

Routine verification of the net contents of packages is an important part of any weights and measures program to facilitate value comparison and fair competition. Consumers have the right to expect packages to bear accurate net content information. Those manufacturers whose products are sold in such packages have the right to expect that their competitors will be required to adhere to the same **laws and regulations**. ~~**standards.**~~

The procedures in this handbook are recommended for use to verify the net quantity of contents of packages kept, offered, or exposed for sale, or sold by weight, measure (including volume, and dimensions), or count at any location (e.g., at the point-of-pack, in storage warehouses, retail stores, and wholesale outlets).

a. ~~Where and when~~ When and where to use package checking procedures?

An effective program will typically include testing at each of the following levels.

(1) Point-of-pack

Testing packages at the "point-of-pack" has an immediate impact on the packaging process. Usually, a large number of packages of a single product are available for testing at one place. This allows the inspector to verify that the packer is following current good packaging practices. Inspection at the point-of-pack also provides the opportunity to educate the packer about the legal requirements that products must meet and may permit resolution of any net content issues or other problems that arise during the testing. Point-of-pack testing is not always possible because packing locations can be in other states or countries. Work with other state, county, and city jurisdictions to encourage point-of-pack inspection on products manufactured in their geographic jurisdictions. Point-of-pack inspections cannot entirely replace testing at wholesale or retail outlets, because point-of-pack inspections do not include imported products or the possible effects of product distribution and moisture loss. Point-of-pack inspections only examine the manufacturing process. Therefore, an effective testing program will also include testing at wholesale and retail outlets.

(2) Wholesale

Testing packages at a distribution warehouse is an alternative to testing at the point-of-pack with respect to being able to test large quantities of and a variety of products. Wholesale testing is a very good way to monitor products imported from other countries and to follow up on products suspected of being underfilled based on consumer complaints or findings made during other inspections, including those done at retail outlets.

(3) Retail

Testing packages at retail outlets evaluates the soundness of the manufacturing, distributing, and retailing processes of the widest variety of goods at a single location. It is an easily accessible **and**~~,~~ practical ~~**means**~~ for ~~**state, county and city**~~ **weights and measures** jurisdictions to monitor packaging procedures

and to detect present or potential problems. Generally, retail package testing is not conducive to checking large quantities of individual products of any single production lot. Therefore, follow-up inspections of a particular brand or lot code number at a number of retail and wholesale outlets, and ultimately at the point-of-pack are extremely important aspects in any package-checking scheme. After the evaluation of an inspection lot is completed, the jurisdiction should consider what, if any, further investigation or follow-up is warranted. At the point-of-sale, a large number of processes may affect the quality or quantity of the product. Therefore, there may be many reasons for any inspection lot being out of compliance. A shortage in weight or measure may result from mishandling the product in the store, or the retailer's failure to rotate stock. Shortages may also be caused through mishandling by a distributor, or failure of some part of the packaging process. Shortages may also be caused by moisture loss (desiccation) if the product is packaged in permeable media. Therefore, being able to determine the cause of an error in order to correct defects is more difficult when retail testing is used.

(Amended 2002)

b. What products can be tested?

Any commodity sold by weight, measure, or count may be tested. The product to be tested may be chosen in several ways. The decision may be based on different factors, such as (1) marketplace surveys (e.g., jurisdiction-wide surveys of all soft drinks or breads), (2) surveys based on sales volume, or (3) audit testing (see Section 1.3. "Sampling Plans") to cover as large a product variety as possible at food, farm, drug, hardware stores, or specialty outlets, discount and department stores. Follow-up of possible problems detected in audit testing or in review of past performance tends to concentrate inspection resources on particular commodity types, brand names, retail or wholesale locations, or even particular neighborhoods. The expected benefits for the public must be balanced against the cost of testing. Expensive products should be tested because of their cost per unit. However, inexpensive items should also be tested because the overall cost to individual purchasers may be considerable over an extended period. Store packaged items, which are usually perishable and not subject to other official monitoring, should be routinely tested because they are offered for sale where they are packed. Products on sale and special products produced for local consumption should not be overlooked because these items sell quickly in large amounts.

Regardless of where the test occurs, remember that it is the inspector's presence in the marketplace through routine unannounced testing that ensures equity and fair competition in the manufacturing and distribution process. Finally, always follow up on testing to ensure that the problems are corrected; otherwise, the initial testing may be ineffective.

1.2. Package Requirements

The net quantity of content statement must be "accurate," but reasonable variations are permitted. Variations in package contents may be a result of deviations in filling. The limits for acceptable variations are based on current good manufacturing practices in the weighing, measuring, and packaging process. The first requirement is that accuracy is applied to the average net contents of the packages in the lot. The second requirement is applied to negative errors in individual packages. These requirements apply simultaneously to the inspection of all lots of packages except as specified in "Exceptions to the Average and Individual Package Requirements" in this section.

(1) Inspection Lot

An "inspection lot" (called a "lot" in this handbook) is defined as a collection of identically labeled (except for quantity or identity in the case of random packages) packages available for inspection at one time. The collection of packages will pass or fail as a whole based on the results of tests on a sample drawn

from ~~this collection~~ **the lot**. This handbook describes procedures to determine if the packages in an "inspection lot" contain the declared net quantity of contents and if the individual packages' variations are within acceptable limits.

(2) Average Requirement

In general, the average net quantity of contents of packages in a lot must at least equal the net quantity of contents declared on the label. Plus or minus variations from the declared net weight, measure, or count are permitted when they are caused by unavoidable variations in weighing, measuring, or counting the contents of individual packages that occur in current good manufacturing practice. Such variations must not be permitted to the extent that the average of the quantities in the packages of a particular commodity or a lot of the commodity that is kept, offered, exposed for sale, or sold, is below the stated quantity. (See Section 3.7. "Pressed and Blown Glass Tumblers and Stemware" and Section 4.3. "Packages Labeled by Count of 50 Items or Fewer" for exceptions to this requirement.)

(3) Individual Package Requirement

The variation of individual package contents from the labeled quantity must not be "unreasonably large." In this handbook, packages that are underfilled by more than the Maximum Allowable Variation specified for the package are considered unreasonable errors. Unreasonable shortages are not generally permitted, even when overages in other packages in the same lot, shipment or delivery compensate for such shortage. This handbook does not specify limits of overfilling **(with the exception of textiles)**, which is usually controlled by the packer **for economic, compliance, and other reasons.**

(4) Maximum Allowable Variation

The limit of **the** "reasonable **minus** variation" for an ~~individual~~ **underweight** package is called a "Maximum Allowable Variation" (MAV). An MAV is a deviation from the labeled weight, measure, or count of an individual package beyond which the deficiency is considered **an** unreasonable **minus error**. Each sampling plan limits the number of negative package errors permitted to be greater than the MAV.

(5) Deviations Caused by Moisture Loss or Gain

Deviations from the net quantity of contents caused by the loss or gain of moisture from the package are permitted when they are caused by ordinary and customary exposure to conditions that normally occur in good distribution practice and that unavoidably result in change of weight or measure. According to regulations adopted by the U.S. Environmental Protection Agency, no moisture loss is recognized on pesticides. (See Code of Federal Regulations 40 CFR Part 156.10.)

a. Why and when do we allow for moisture loss or gain?

Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of ~~lost~~ moisture **loss** depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. Moisture loss may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. For loss or gain of moisture~~, apply~~ the moisture allowances **may be applied before or after the package errors are determined**.

To apply an allowance before determining package errors, adjust the Nominal Gross Weight (see Section 2.3. "Basic Test Procedure") – Determine Nominal Gross Weight and Package Errors for Tare Sample, so the package errors are increased by an amount equal to the moisture allowance. This approach is used to account for moisture loss in both the average and individual package errors.

It is also permissible to apply the moisture allowances after individual package errors and average errors are determined. For example, a sample of a product that could be subject to moisture loss might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable errors (i.e., the package error is greater than the Maximum Allowable Variation permitted for the package's labeled quantity). ~~**to both the maximum allowable variations permitted for individual packages and the average net quantity of contents before determining the conformance of a lot**~~ **You can apply an allowance after determining the errors by adding an amount equal to the moisture allowance to adjust the average error** ~~**so the adjusted average error**~~ **and individual package errors.** ~~**provide for loss of moisture from the sample packages.**~~

This handbook provides "moisture allowances" for some meat and poultry products, flour, and dry pet food. (See Chapter 2, Table 2-3. "Moisture Allowances") These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or noncompliance.

Test procedures for flour, some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area. (See Section 2.3, "Basic Test Procedure – Calculations") When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the "moisture allowance" or "gray area."

(Amended 2002)

(6) Exceptions to the Average and Individual Package Requirements

There is an exemption from the average requirement for packages labeled by count ~~**of**~~ ~~**with**~~ 50 or fewer items. The reason for this exemption is that the package count does not follow a "normal" distribution even if the package is designed to hold the maximum count indicated by the label declaration (e.g., egg cartons and packages of chewing gum). Another exception permits an "allowable difference" in the capacity of glass tumblers and stemware because mold capacity doesn't follow a normal distribution.

1.3. Sampling Plans

This handbook contains two sampling plans to use to inspect packages: "Category A" and "Category B." Use the "Category B" Sampling Plans to test meat and poultry products at point-of-pack locations that are subject to U.S. Department of Agriculture Food Safety and Inspection Service (FSIS) requirements. When testing all other packages, use the "Category A" Sampling Plan.

a. Why is sampling used to test packages?

Inspections by weights and measures officials must provide the public with the greatest benefit at the lowest possible cost. Sampling reduces the time to inspect a lot of packages, so a greater number of items

can be inspected. Net content inspection, using sampling plans for marketplace surveillance, protects consumers who cannot verify the net quantity of contents. This ensures fair trade practices and maintains a competitive marketplace. It also encourages manufacturers, distributors, and retailers to follow good manufacturing and distribution practices.

b. Why is the test acceptance criteria statistically corrected and what are the confidence levels of the sampling plans?

Testing a "sample" of packages from a lot instead of every package is efficient, but the test results have a "sampling variability" that must be corrected before determining if the lot passes or fails. The "Category A" sampling plans give acceptable lots a 97.5 % ~~**or better**~~ probability of passing. An "acceptable" lot is defined as one in which the "average" net quantity of contents of the packages equals or exceeds the labeled quantity. The "Category B" sampling plans give acceptable lots at least a 50 % probability of passing. The sampling plans used in this handbook are statistically valid. That means the test acceptance criteria are statistically adjusted, so they are both valid and legally defensible. This handbook does not discuss the statistical basis, risk factors, or provide the operating characteristic curves for the sampling plans. For information on these subjects, see explanations on "acceptance sampling" in statistical reference books.

c. Why use random samples?

A randomly selected sample is necessary to ensure statistical validity and reliable data. This is accomplished by using random numbers to determine which packages are chosen for inspection. Improper collection of sample packages can lead to bias and unreliable results.

d. May audit tests and other shortcuts be used to identify potentially violative lots?

Shortcuts may be used to speed the process of detecting possible net content violations. These audit procedures may include the following: using smaller sample sizes, spot checks using tare lists provided by manufacturers, selecting samples without collecting a random sample. These and other shortcuts allow spot checking of more products than is possible with the more structured techniques, but do not take the place of "Category A" or "Category B" testing.

e. Can audit tests and other shortcuts be used to take enforcement action?

No. Do not take enforcement action using audit test results.

If, after an audit test, there is suspicion that a lot of packages is not in compliance, use the appropriate "Category A" or "Category B" sampling plan to determine if the lot complies with the package requirements.

1.4. Other Regulatory Agencies Responsible for Package Regulations and Applicable Requirements

In the United States, several federal agencies issue regulations regarding package labeling and net contents. The U.S. Department of Agriculture regulates meat and poultry. The Food and Drug Administration (FDA) regulates food, drugs, cosmetic products, and medical devices under the Food, Drug, and Cosmetic Act (FDCA) and the Fair Packaging and Labeling Act (FPLA). The Federal Trade Commission (FTC) regulates

most non-food consumer packaged products as part of the agency's responsibility under the FPLA. The Environmental Protection Agency (EPA) regulates pesticides. The Bureau of Alcohol~~,~~ **and** Tobacco**Tax and Trade Bureau**, ~~**and Firearms**~~ (~~**ATF**~~**TTB**) in the U.S. Department of the Treasury promulgates regulations for packaged tobacco and alcoholic beverages as part of its responsibility under the Federal Alcohol Administration Act.

Packaged goods produced for distribution and sale also come under the jurisdiction of state and local weights and measures agencies that adopt their own legal requirements for packaged goods. Federal statutes set requirements that pre-empt state and local regulations that are or may be less stringent or not identical to federal regulation depending on the federal law that authorizes the federal regulation. The application of Handbook 133 procedures occurs in the context of the concurrent jurisdiction among federal, state, and local authorities. Therefore, all agencies using this handbook should keep abreast of the revisions to federal agency regulations that may contain sampling or testing information not in the regulations at the time of publication of this handbook. See Appendix A, Table 1-1. "Agencies Responsible for Package Regulations and Applicable Requirements" for information on the responsible agencies for package regulations and the requirements of this handbook must be used when testing products concurrently subject to pre-emptive federal regulations.

1.5. Assistance in Testing Operations

If the storage, display, or location of any lot of packages requires special equipment or an abnormal amount of labor for inspection, the owner or the operator of the business must supply the equipment and/or labor as required by the weights and measures official.

1.6. Health and Safety

This handbook cannot address all of the health and safety issues associated with its use. The inspector is responsible for determining the appropriate safety and health practices and procedures before starting an inspection (e.g., contact the establishment's health and safety official). Comply with all handling, health, and safety warnings on package labels and those contained in any associated material safety data sheets. The inspector must also comply with federal, state, or local health and safety laws or other appropriate requirements in effect at the time and location of the inspection. Contact your supervisor to obtain information regarding your agency's health and safety policies and to obtain appropriate safety equipment.

1.7. Good Measurement Practices

The procedures in this handbook are designed to be technically sound and represent good measurement practices. To assist in documenting tests, we have included "model" inspection report forms designed to record the information.

(1) Traceability Requirements for Measurement Standards and Test Equipment

Each test procedure presented in this handbook includes a list of the equipment needed to perform the inspection. The scales and other measurement standards used (e.g., balances, mass standards, volumetric, and linear measures) to conduct any test must be traceable to the National Institute of Standards and Technology (NIST). Standards must be used in the manner in which they were designed and calibrated for use.

(2) Certification Requirements for Standards and Test Equipment

All measurement standards and test equipment identified in this handbook or associated with the test procedures must be calibrated or standardized before initial use. This must be done according to the **calibration procedures and other instructions found on NIST's Laboratory Metrology and Calibration Procedures website at http://www.nist.gov/pml/wmd/labmetology/clibrationprocedures.cfm ~~in NIST Handbook 145, "Handbook for the Quality Assurance of Metrological Measurements,"~~**or using other recognized procedures (e.g., those adopted for use by a state weights and measures laboratory). After initial certification, the standards must be routinely recertified according to your agency's measurement assurance policies.

Chapter 2. Basic Test Procedure – Gravimetric Testing

2.1. Gravimetric Test Procedure for Checking the Net Contents of Packaged Goods

The gravimetric test method uses weight measurement to determine the net quantity of contents of packaged goods. This handbook includes general test methods to determine the net quantity of contents of packages labeled in terms of weight and special test methods for packages labeled in terms of fluid measure or count. Gravimetric testing is the preferred method of testing most products because it reduces destructive testing while maximizing inspection resources.

2.2. Meeasurement Standards and Test Equipment

a. What type of scale is required to perform the gravimetric test method?

Use a scale (for this handbook the term "scale" includes balances) that has at least 100 scale divisions. It must have a load-receiving element of sufficient size and capacity to hold the packages during weighing. It also requires a scale division no larger than $^1/_6$ of the Maximum Allowable Variation (MAV) for the package size being weighed. The MAV/6 requirement is crucial to ensure that the scale has adequate resolution to determine the net contents of the packages. Subsequent references to product test criteria agreeing within one scale division are based on scale divisions that are equal to or only slightly smaller than the MAV/6.

Example: The MAV for packages labeled 113 g (0.25 lb) is 7.2 g (0.016 lb)

(See Appendix A, Table 2-5. "Maximum Allowable Variations (MAVs) for Packages Labeled by Weight.")

MAV/6 is 1.2 g (0.002 lb). In this example, a 1 g (0.002 lb) scale division would be the largest unit of measure appropriate for weighing these packages.

b. How often should I verify the accuracy of a scale?

Verify the accuracy of a scale before each initial daily use, each use at a new location, or when there is any indication of abnormal equipment performance (e.g., erratic indications). Recheck the scale accuracy if it is found that the lot does not pass, so there can be confidence that the test equipment is not at fault.

c. Which accuracy requirements apply?

Scales used to check packages must meet the acceptance tolerances specified for their accuracy class in the current edition of NIST Handbook 44 (HB 44) "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." The tolerances for Class II and Class III digital scales are presented in HB 44, Section 2.20. "Scales."

Note: If the package checking scale is not marked with a "class" designation, use Table 2-1. "Class of Scale" to determine the applicable tolerance.

d. What considerations affect measurement accuracy?

Always use good weighing and measuring practices. For example, be sure to use weighing and measuring equipment according to the manufacturer's instructions and make sure the environment is suitable. Place scales and other measuring equipment (e.g., flasks and volumetric measures) on a rigid support and maintain them in a level condition if being level is a requirement to ensure accuracy.

e. In testing, which tolerances apply to the scale?

Do not use a scale if it has an error that exceeds the specified tolerance in any of the performance tests described in the following section.

Steps:

1. Determine the total number of divisions (i.e., the minimum increment or graduation indicated by the scale) of the scale by dividing the scale's capacity by the minimum division.

   Example: A scale with a capacity of 5000 g and a minimum division of 0.1 g has 50 000 divisions.

2. From Table 2-1. "Class of Scale", determine the class of the scale using the minimum scale division and the total number of scale divisions.

   Example: On a scale with a minimum division of 0.1 g and 50 000 total scale divisions the appropriate class of scale is "II."

Note: If a scale is used where the number of scale divisions is between 5001 and 10 000 and the division size is 0.1 g or greater and is not marked with an accuracy Class II marking, Class III scale tolerances apply.

Table 2-1. Class of Scale		
Value of Scale Division[1]	**Minimum and Total Number of Divisions**	**Class of Scale**
1 mg to 0.05 g	At least 100, but not more than 100 000	II
0.1 g or more	More than 5000, but not more than 100 000	II
0.1 g to 2 g 0.000 2 lb to 0.005 lb 0.005 oz to 0.125 oz	More than 100, but not more than 10 000	III
5 g or more 0.01 lb or more 0.25 oz or more	More than 500, but not more than 10 000	III

[1]On some scales, manufacturers designated and marked the scale with a verification division (e) for testing purposes (e = 1 g and d = 0.1 g). For scales marked Class II, the verification division is larger than the minimum displayed division. The minimum displayed division must be differentiated from the verification scale division by an auxiliary reading means such as a vernier, rider, or at least a significant digit that is differentiated by size, shape, or color. Where the verification division is less than or equal to the minimum division, use the verification division instead of the minimum division. Where scales are made for use with mass standards (e.g., an equal arm balance without graduations on the indicator), the smallest mass standard used for the measurement is the minimum division.

Steps:

3. Determine the tolerance from Table 2-2. "Acceptance Tolerances for Class of Scale Based on Test Load in Divisions" in divisions appropriate for the test load and class of scale.

   Example: Determine the number of divisions for any test load by dividing the value of the mass standard being applied by the minimum division indicated by the scale. For example, if the scale has a minimum division of 0.1 g and a 1500 g mass standard is applied, the test load is equal to 15 000 divisions (1500/0.1). On a Class II scale with a test load between 10 000 and 20 000 divisions, Table 2-2. "Acceptance Tolerances for Class of Scale Based on Test Load in Divisions" indicates the tolerance is plus or minus one division.

Table 2-2. Acceptance Tolerances for Class of Scale Based on Test Load in Divisions		
Test Load in Divisions		**Tolerance**
Class II Scale	**Class III Scale**	
0 to 5000	0 to 500	Plus or Minus 0.5 Division
5001 to 20 000	501 to 2 000	Plus or Minus 1 Division
20 001 or more	2001 to 4000	Plus or Minus 1.5 Divisions
Not Applicable	4001 or more	Plus or Minus 2.5 Divisions

f. Which performance tests should be conducted to ensure the accuracy of a scale?

Use the following procedures to verify the scale. The following procedures, based on those required in NIST Handbook 44, have been modified to reduce the amount of time required for testing scales in field situations.

(1) Increasing-Load Test

Use certified mass standards to conduct an "increasing-load test" with all test loads centered on the load-receiving element. Start the test with the device on zero and progress with increasing test loads to a "maximum test load" of at least 10 percent more than the gross weight of the packages to be tested. Use at least three different test loads of approximately equal value to test the device up to the "maximum test load." Verify the accuracy of the device at each test load. Include the package tare weight as one of the test points.

(2) Decreasing-Load Test

For all types of scales, other than one with a beam indicator or equal-arm balance, conduct a "decreasing-load test" with all test loads centered on the load-receiving element. Use the same test loads used in the "increasing-load test" of this section, and start at the "maximum test load." Remove the test loads in the reverse order of the increasing-load test until all test loads are removed. Verify the accuracy of the scale at each test load.

(3) Shift Test

Bench Scales or Balance use a test load equal to one-~~**half**~~ **third** of the "maximum test load" used for the "increasing-load test." For bench scales (see Diagram 1. "**Bench Scales or Balances")** ~~**place**~~ **apply** the test load **as nearly as possible at the center of each quadrant of the load receiving element as shown in Diagram 1. "Bench Scale or Balance."** ~~**in the center of four separate quadrants, equidistant between the center and edge of the load-receiving element and**~~

For Equal Arm Balances use a test load equal to one-half capacity centered successively at four points positioned equidistance between the center and the front, left, back, and right edges of each pan as shown ~~determine the accuracy in each quadrant for~~**(see Diagram 2.** "**Equal-Arm Balance)**." For example, where the load-receiving element is a rectangular or circular shape, place the test load in the center of the area represented by the shaded boxes in the following diagrams.

Diagram 1. Bench Scales or Balances

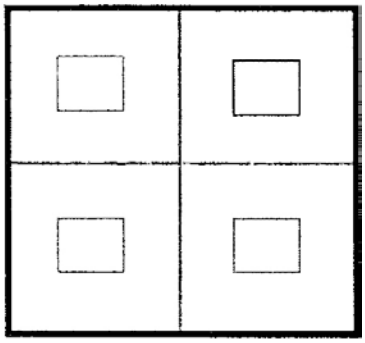
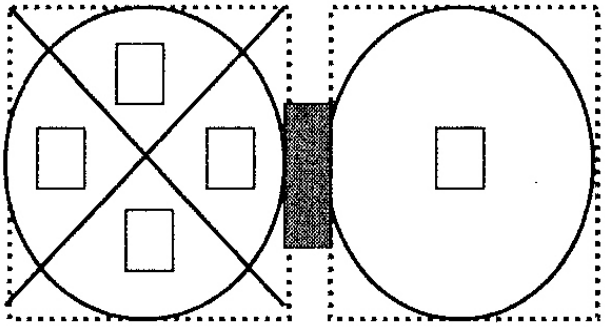


Diagram 2. Equal-Arm Balance



(4) Return to Zero

Conduct the return to zero test whenever all the test weights from the scale are removed; check to ensure that it returns to a zero indication.

g. Which standards apply to other test equipment?

Specifications, tolerances, and other technical requirements for the other measurement standards and test equipment cited in this handbook are specified in the following NIST publications. These publications may be obtained from the Weights and Measures Division (http://www.nist.gov/owm) or the U.S. Government Printing Office.

- Mass Standards – Use NIST Handbook 105-1, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Field Standard Weights (NIST Class F)" (1990)

- Volumetric Flasks and Cylinders – Use NIST Handbook 105-2, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Field Standard Measuring Flasks" (1996)

- Stopwatches – Use NIST Handbook 105-5, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Field Standard Stopwatches" (1997)

- Thermometers – Use NIST Handbook 105-6, "Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures – Specifications and Tolerances for Thermometers" (1997)

2.3. Basic Test Procedure

The following steps apply when gravimetrically testing any type of packaged product except Borax and glazed or frozen foods. If the tested products contain Borax, refer to Section 2.4, "Borax." If **encased-in-ice or ice** glazed ~~**or frozen food**~~ is tested, refer to Section 2.6. "~~**Drained Weight for Glazed or Frozen Foods.**~~ **Determining the Net weight of Encased -in-Ice and Ice Glazed Products**."

Steps:

1. Identify and define the inspection lot.
2. Select the sampling plan.
3. Select the random sample.
4. Measure the net contents of the packages in the sample.
5. Evaluate compliance with the Maximum Allowable Variation (MAV) requirement.
6. Evaluate compliance with the average requirement.

2.3.1. Define the Inspection Lot

The official defines which packages are to be tested and the size of the inspection lot. The lot may be smaller or larger than the production lot defined by the packer. Only take action on the packages contained in the lot that has been defined.

Note: Normally, there will never be access to the entire "production lot" from a manufacturer. The "inspection lot" is selected from packages that are available for inspection/test at any location in the distribution chain.

> **Example:** An inspection lot should consist of all of the cans of a single brand of peach halves, labeled with a net quantity of 453 g (1 lb). When packages are tested in retail stores, it is not necessary to sort by lot code. If lot codes are mixed during retail testing, be sure to record the lot codes for all of the packages included in the sample so that the inspector and other interested parties can follow up on the information. For special reasons, such as a large number of packages or the prior history of problems with the product or store, the inspector may choose to define a lot as only one type of packaged product (e.g., ground beef). Another reason to narrowly define the lot is if the results of an audit test indicate the possibility of a shortage in one particular lot code within a particular product.

a. What is the difference between standard and random weight packages?

Standard packages are those with identical net content declarations such as containers of soda in 2 L bottles and 2.26 kg (5 lb) packages of flour. "Random packages" are those with differing or no fixed patterns of weight, such as packages of meat, poultry, fish, or cheese.

2.3.2. Sampling Plans

a. Where are sampling plans located for "Category A" inspections?

Use Appendix A, Table 2-1. "Sampling Plans for Category A," to conduct "Category A" inspections.

b. Where are sampling plans located for "Category B" inspections?

Use Appendix A, Table 2-2. "Sampling Plans for Category B," to conduct "Category B" inspections.

2.3.3. Basic Inspection Procedure and Recordkeeping

a. How are the specific steps of the Basic Test Procedure documented?

Use an official inspection report to record the inspection information. Attach additional worksheets, test notes, and other information as needed. This handbook provides random and standard packaged products model inspection report forms in Appendix E, "Model Inspection Report Forms." Refer to Appendix E for sample instructions to the complete the forms box numbers. Modify the model reports and the box numbers to meet your agency's needs. Other formats that contain more or less information may be acceptable.

Note: Inspection reports should be legible and complete. Good recordkeeping practices typically include record retention for a specified period of time (e.g., 1 to 3 years).

Steps:

1. Record the product identity, packaging description, lot code, location of test, and other pertinent data.

2. Record the labeled net quantity of contents in Box 1. Record both metric and inch-pound declarations if they are provided on the package label.

   Example: If the labeled weight is 453 g (1 lb), record this in Box 1.

3. When the declaration of net quantity on the package includes both the International System of Units (SI) (metric) and inch-pound units, the larger of the two declarations must be verified. The rounding rules in NIST Handbook 130, "Uniform Packaging and Labeling Regulations" permit packers to round declarations up or down based on their knowledge of their package filling targets and the accuracy of packaging equipment.

   Determine the larger of the values by converting the SI declaration to inch-pound units, or vice versa, using conversion factors that are accurate to at least six places. Compare the values, and use the larger value in computing the nominal gross weight (see later steps). Indicate on the report which of the declarations is being verified when packages labeled with two units of measure are encountered.

   Example: If the net weight declared on a package is 1 lb, the metric equivalent (accurate to six significant digits) is 453.592 g. Do not round down or truncate values in the calculations until the nominal gross weight is determined and recorded. If the package is also labeled 454 g, then the metric declaration is larger than the inch-pound declaration and should be used to verify the net contents of the package. The Basic Test Procedure does not prohibit the use of units of weight instead of dimensionless units when recording package errors, nor does it prohibit the use of net content computer programs to determine product compliance. Record the unit of measure in Box 2. The unit of measure is the minimum division of the unit of measurement used to conduct the test. If a scale is used that reads to

Steps:

thousandths of a pound, the unit of measure is 0.001 lb even if the scale division is 0.002 lb or 0.005 lb.

Example: If the scale has a scale division of 0.5 g, the unit of measure is 0.1 g. If a weighed package that has an error of "−0.5 g," record the error as "−5" using "dimensionless units." If the scale indicates in increments of 0.002 lb, the unit of measure is 0.001 lb. If a weighed package has an error of "+0.016," record the error as "+16" using "dimensionless units." When using dimensionless units, multiply package errors by the unit of measure to obtain the package error in weight.

4. Enter the appropriate MAV value in Box 3 for the type of package (weight, volume, etc.), the labeled net contents, and the unit of measure.

b. Where are Maximum Allowable Variations found?

Find the MAV values for packages labeled by weight, volume, count, and measure in the tables listed below in Appendix A.

- packages labeled by weight — See Table 2-5.
- packages labeled by volume, liquid or dry — See Table 2-6.
- packages labeled by count — See Table 2-7.
- packages labeled by length, (width), or area — See Table 2-8.
- packages bearing a USDA seal of inspection – Meat and Poultry — See Table 2-9.
- textiles, polyethylene sheeting and film, mulch and soil labeled by volume, packaged firewood, and packages labeled by count with fewer than 50 items — See Table 2-10.

c. How is the value of an MAV found?

Refer to the appropriate table of MAVs and locate the declared quantity that is on the package label in the column marked "Labeled Quantity." Read across the table to find the value in the column titled "Maximum Allowable Variation." Record this number in Box 3. Determine the MAV in dimensionless units and record in Box 4 on the Standard Package Report Form (a dimensionless unit is obtained by dividing the MAV recorded in Box 3 by the unit of measure recorded in Box 2). Refer to Appendix C. "Glossary," for the definition of dimensionless units.

d. How many ~~MAVs~~ unreasonable minus errors (UMEs) are permitted in a sample?

To find out how many minus package errors are permitted to exceed the MAV**, (errors known as unreasonable minus errors or UME's),** ~~(refer to Appendix A)~~ see Column 4 in either Table 2-1. "Sampling Plans for Category A" or Table 2-2. "Sampling Plans for Category B." **(refer to Appendix A)** Record this number in Box 8.

2.3.4. Random Sample Selection

a. How are sample packages selected?

Randomly select a sample from the inspection lot. Random number tables (see Appendix B. "Random Number Tables") or a calculator that is able to generate random numbers may be used to identify the sample. If the packages for the sample are not randomly selected, the test results may not be statistically valid.

Note: If the inspector and the party that is ultimately responsible for the packing and declaration of net weight for the product agree to an alternative method of sample selection, document how the sample packages were selected as part of the inspection record.

a. How is the size of the "Lot" determined?

Count the number of packages comprising the inspection lot or estimate the size to within 5 % and record the inspection lot size in Box 5.

b. How is the sample size determined?

Refer to Appendix A. Table 2-1. "Sampling Plans for Category A" or Table 2-2. "Sampling Plans for Category B" to determine the sample size. In Column 1, find the size of the inspection lot (the number recorded in Box 5 of the report form). Read across from Column 1 to find the appropriate sample size in Column 2 and record this number in Box 6 of the report form.

2.3.5. Tare Procedures

a. What types of tare may be used to determine the net weight of package goods?

This handbook defines three types of tare for the inspection of packaged goods. The tare weight may vary considerably from package to package as compared with the variability of the package net contents, even for packages in the same production lot. Although this is not common for most packaging, the basic test procedure in this handbook considers the variation for all tare materials.

(1) Used Dry Tare

Used Dry Tare is defined as follows: Used tare material that has been air dried, or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than "normal" household recovery procedures, but not including laboratory procedures like oven drying. Labels, wire closures, staples, prizes, decorations, and such are considered tare. Used Dry Tare is available regardless of where the packages are tested. The net content procedures described in this handbook reference Used Dry Tare.

Note: When testing frozen foods with the Used Dry Tare approach, the frost found inside frozen food packages is included as part of the net contents, **except in instances in which glazed or frozen foods are**

tested according to Section 2.6. Determing the Net Weight of Encased-in-Ice and Ice Glazed Products..

(2) Unused Dry Tare

If testing packages in retail store locations where they are packaged, and sold in small quantities to the ultimate consumers, the basic test procedure may be modified by using samples of the packaging material available in the store. Unused dry tare is defined as:

All unused packaging materials (including glue, labels, ties, etc.) that contain or enclose a product. It includes prizes, gifts, coupons, or decorations that are not part of the product.

(3) Wet Tare

Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection**. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).**

If the jurisdiction uses wet tare to determine net weight, follow the procedures described below that reference Used Dry Tare, except make no effort to dry the tare material. If Wet Tare is used to verify the net weight of packages ~~**of fresh poultry, hot dogs, and franks that are subject to the USDA regulations**~~, the inspector must allow for moisture loss. Wet Tare is defined as: Used tare material where no effort is made to dry the tare material. Free-flowing liquids are considered part of the tare weight.

b. How is a tare weight determined?

Except in the instance of applying unused dry tare, select the packages for the initial tare sample from the sample packages. Mark the first two (three or five) packages in the order the random numbers were selected; these packages provide the initial tare sample. Determine the gross weight of each package and record it in Block a, "Gross Wt," under the headings "Pkg. 1," "Pkg. 2," "Pkg. 3," etc. on the report form. Except for aerosol or other pressurized packages, open the sample packages, empty, clean, and dry them as appropriate for the packaging material.

c. How is it determined on how many packages to select for the initial tare sample?

For the initial tare sample size, see Column 5 under initial tare sample size in Appendix A. Table 2-1. "Sampling Plans for Category A" or Column 3 under initial tare sample size in Appendix A, Table 2-2. "Sampling Plans for Category B." Record the initial tare sample size in Box 7 on the report form.

Note: The initial tare sample size is considered the total tare sample size when the sample size is less than 12.

d. How are the tare sample and the tare weight of the packaging material determined?

Steps:

1. Except for unused dry tare at the point-of-pack, first determine the tare weight for each package in the initial tare sample and record the value in Row b, "Tare Wt." under the appropriate package number column.

2. For sample sizes of 12 or more, subtract the individual tare weights from the **respective package** gross weights (Block a, minus Block b, on the report form) to obtain the net weight for each package and record ~~these~~ **each** value~~s~~ in Block c, "Net Wt.," on the report form.

   Determine and record the "range of package errors" (called Rc) for the initial tare sample in Box 9 on the report form. (The range is the difference between the package errors.) (Amended 2002)

3. Determine and record the "range of tare weights" (called Rt) in Box 10.

4. Compute the ratio Rc/Rt by dividing the value in Box 9 by the value in Box 10. Record the resulting value in Box 11. (Rc and Rt must both be in the same unit of measure or both in dimensionless units.)

5. Determine and record in Box 12 the total number of packages to be opened for the tare determination from either Appendix A. Table 2-3. "Category A – Total Number of Packages to be Opened for or Table 2-4. "Determination – Number Include those Packages Opened for Initial Tare Sample."

   - In the first column (titled Ratio of R_c/R_t), locate the range in which the computed R_c/R_t falls. Then, read across to the column headed with the appropriate sample size.

   - If the total number of packages to open equals the number already opened, go to step 6.

   - If the total number of packages to open is greater than the number of packages already opened, compute the number of additional packages to open for the tare determination and go to step 6. Enter the total number of tare samples in Box 12.

6. Determine the average tare weight using the tare weight values for all the packages opened and record the average tare weight in Box 13.

e. Does the inspection of aerosol containers require special procedures?

Yes, aerosol containers are handled differently for two reasons. First, regulations under the Uniform Packaging and Labeling Regulation (UPLR) in NIST HB 130 require that packages designed "to deliver" the product under pressure, "must state the net quantity of the contents that will be expelled when the instructions for use as shown on the container are followed." This means that any product retained in aerosol containers after full dispersion is included in the tare weight. Second, aerosol containers must not be opened because they are pressurized; for safety reasons they should not be punctured or opened. When

emptying aerosol containers to determine a tare weight, exhaust them in a well-ventilated area (e.g., under an exhaust hood or outdoors) at least 15 m (50 ft) from any source of open flame or spark.

To ensure that the container properly dispenses the product, read and follow any dispensing instructions on the package. If shaking during use is specified in the instructions, periodically shake (at least two or three times during expulsion of the product). If directions are not given, shake the container five times with a brisk wrist twisting motion. If the container has a ball agitator, continue the shaking procedure for one minute after the ball has shaken loose.

f. How is the tare of vacuum-packed coffee determined?

The gross weight of a can of vacuum-packed coffee will be more after the seal is broken and air enters the can. In the procedure to determine the tare weight of the packaging material, correct the gross weight determined for unopened cans as follows. Use the initial tare sample packages, weigh, and record the gross weight of the product-filled cans before and after breaking the vacuum seal. Compute the average gross weight difference (open weight minus sealed weight) and record this in Box 13a of the report form. The nominal gross weight equals the average tare weight minus the average difference in gross weights plus the labeled weight (Box 14): Box 13 − Box 13a + Box 1.

g. When and where is unused dry tare used, and how is it used to determine an average tare weight?

You may determine the average tare weight using samples of unused dry tare when testing meat, poultry, or any other products that are not subject to regulation of the Food and Drug Administration (FDA). You may use unused dry tare samples when conducting inspections at locations where the point-of-pack and sale are identical (e.g., store-packed products in a supermarket meat case). To determine unused dry tare at the point-of-sale, randomly select two (2) samples of unused dry tare, and weigh each separately. If there is no measurable variation in weight between the samples, proceed with the test using the weight of one of the samples. If the weight of the two (2) initial samples, randomly select three (3) additional tare samples and determine the average weight of all five (5) samples. Use this value as the average tare weight.

(Amended 2002)

2.3.6. Determine Nominal Gross Weight and Package Errors for Tare Sample

a. ~~What~~ is How do I compute a nominal gross weight?

A nominal gross weight is used to simplify the calculation of package errors. To compute the nominal gross weight, add the average tare weight (recorded in Box 13) to the labeled weight (recorded in Box 1). ~~To obtain the package error, subtract a package's gross weight from the nominal gross weight.~~

The nominal gross weight is represented by the formula:

Nominal gross weight = average tare + labeled weight

b. How do I compute the package error?

To obtain the package error, subtract the nominal gross weight from each package's gross weight. The package error is represented by the formula:

Package error = gross weight − nominal gross weight

c. How are individual package errors determined for the tare sample packages?

Determine the errors of the packages opened for tare by subtracting the nominal gross weight recorded in Box 14 from the individual package gross weights recorded for each package (Pkg 1, Pkg 2, etc.) in Block a, "Gross Wt." The nominal gross weight must be used, rather than the actual net weight, for each package to determine the package error. This ensures that the same average tare weight is used to determine the error for every package in the sample, not just the unopened packages.

- **Standard Packages.** – Record the package error in the appropriate plus or minus column on the report form for each package opened for tare.

- **Random Packages.** – Determine the package error for the tare sample using a nominal gross weight for each package so that all of the package errors are determined with the same tare weight value. Record the package error on the Random Package Report Form in the appropriate plus or minus column under Package Errors.

  Note: Converting the package error to dimensionless units allows the inspector to record the package errors as whole numbers disregarding decimal points and zeroes in front and unit of measure after the number.

  Example: If weighing in 0.001 lb increments, the unit of measure is also 0.001 lb. If the package error for the first package opened for tare is +0.008 lb, instead of recording 0.008 lb in the plus column, record the error as "8" in the plus column. If the second package error is +0.060 lb, record the package error as "60" in the plus column, and so on. (This section does not prohibit the use of units of weight or computer programs instead of dimensionless units.)

d. How are individual package errors determined for the other packages in the sample?

Compare the gross weight of each of the unopened sample packages with the nominal gross weight (Box 14). Record the package errors in the "Package Errors" section of the report form using either units of weight (lb or g) or dimensionless units.

e. How is the total package error computed?

Add all the package errors for the packages in the sample. Be sure to subtract the minus package errors from the plus package errors and to record the total net error in Box 15**, indicating the positive or negative value of the error.**

2.3.7. Evaluating Results

a. How is it determined if a sample passes or fails?

The following steps lead the inspector through the process to determine if a sample passes or fails. If the product is subject to moisture allowance, follow the procedures under "Moisture Allowances" in this chapter to correct the MAV.

b. How is it determined if packages exceed the Maximum Allowable Variation?

Compare each minus package error with the MAV recorded in Box 3 or Box 4 (if using dimensionless units). Circle the package errors that exceed the MAV. These are "unreasonable errors." Record the number of unreasonable minus errors found in the sample in Box 16.

c. How is it determined if the negative package errors in the sample exceed the number of MAVs allowed for the sample?

Compare the number in Box 16 with the number of unreasonable errors allowed (recorded in Box 8). If the number found exceeds the allowed number, the lot fails. Record in Box 17 whether the number of unreasonable errors found is less or more than allowed.

Note: If the total error recorded in Box 15 is a plus value and Box 17 is "No," then the number of unreasonable errors is equal to or less than the number allowed (recorded in Box 8) and the lot passes.

d. How is the average error of the sample determined and does the inspected lot pass or fail the average requirement?

Determine the average error by dividing the total error recorded in Box 15 by the sample size recorded in Box 6. Record the average error in Box 18 if using dimensionless units or in Box 19 if using units of weight. Compute the average error in terms of weight (if working in dimensionless units up to this time) by multiplying the average error in dimensionless units by the unit of measure and record the value in Box 19.

Steps:

1. If the average error is positive, the inspection lot passes the average requirement.

2. If the average error is negative, the inspection lot fails under a "Category B" test. Record in Box 20.

3. If the average error is a negative value when testing under the Sampling Plans for "Category A," compute the Sample Error Limit (SEL) as follows:

   - Compute the Sample Standard Deviation and record it in Box 21.

   - Obtain the Sample Correction Factor from Column 3 of Appendix A. Table 2-1. "Sampling Plans for Category A" test. Record this value in Box 22.

   - Compute the Sample Error Limit using the formula:

Steps:

Sample Error Limit (Box 23)
= Sample Standard Deviation (Box 21) x Sample Correction Factor (Box 22)

4. Compliance Evaluation of the Average Error:

   - If the value of the Average Error (Box 18) is smaller than the SEL (Box 23), the inspection lot passes.

   - If the value of the Average Error (disregarding the sign) (Box 18) is larger than the SEL (Box 23), the inspection lot fails. However, if the product is subject to moisture loss, the lot does not necessarily fail. Follow the procedures under "Moisture Allowances" in this chapter.

2.3.8. Moisture Allowances

Moisture loss must be considered even when no formal allowance for the specific product is found in HB133.

a. How is reasonable moisture loss allowed?

If the product tested is subject to moisture loss, provide for the moisture allowance by following the steps listed below.

Determine the value of the moisture allowance if the product is listed below.

b. What are the moisture allowances for flour, ~~and~~ dry pet food, pasta and other products? (See Table 2-3. "Moisture Allowances.")

Table 2-3. Moisture Allowances for Product in Distribution

If you are verifying the labeled net weight of packages of:	The Moisture Allowance is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta	3 %	Note: Pasta products means all macaroni, noodle, and like product packaged in Kraft paper bags, paperboard cartons,

		and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	**See Section 2.4.**	
Wet Tare Only		
If you are using Wet Tare in verifying the net weight of packages of one of the products listed below:	**The Moisture Allowance is:**	**Notice: Wet Tare must not be used in testing packages of meat and poultry subject to USDA regulations. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference but not the "wet tare" method for determining net weight compliance. (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189 52193]).**
Fresh poultry	**3 %**	**Fresh poultry is defined as poultry at a temperature of − 3 °C (26 °F) that yields or gives when pushed with the thumb.**
Franks or hot dogs	**2.5 %**	
Bacon, fresh sausage, and luncheon meats	**0 %**	**For packages of bacon, fresh sausage, and luncheon meats, there is no moisture allowance if there is no free-flowing liquid or absorbent materials in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.**

~~**The moisture allowance for flour and dry pet food is 3 % of the labeled net weight.**~~

~~**Note: Dry pet food means all extruded dog and cat foods and baked treat products packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at the time of pack.**~~

c. What moisture allowance is used with Used Dry Tare when testing packages that bear a USDA Seal of Inspection?

There is no moisture allowance when inspecting meat and poultry from a USDA inspected plant when Used Dry Tare and a "Category A" sampling plan are used.

d. What moisture allowance is used with wet tare? w~~hen testing packages bearing a USDA seal of inspection?~~

Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th Edition of NIST HB 133 by reference but not the "wet tare" method for determining net weight compliance. FSIS considers the free-flowing liquid in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

See Table 2-3. "Moisture Allowances – Wet Tare Only."

- ~~**Use the following guideline when testing meat and poultry from any USDA inspected plant using Wet Tare and a Category A sampling plan.**~~
- ~~**For packages of fresh poultry that bear a USDA seal of inspection, the moisture allowance is**~~
- ~~**3 5 of the labeled net weight. For net weight determinations, only, fresh poultry is defined as poultry above -3 °C (26 °F). This is a product that yields or gives when pushed with the thumb.**~~
- ~~**For packages of franks or hotdogs that bear a USDA seal of inspection, the moisture allowance is 2.5 % of the labeled net weight.**~~
- ~~**For packages of bacon, fresh sausage, and luncheon meats that bear a USDA seal of inspection, there is no moisture allowance if there is no free-flowing liquid or absorbent materials in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Dried Used Tare are equivalent.**~~

When there is free-flowing liquid **and liquid** ~~or absorbent~~ **absorbed by** packaging materials in contact with the product, all free liquid **and the absorbed liquid** is part of the wet tare.

2.3.9. Calculations

a. How is moisture allowance computed and applied~~ to the average error~~?

To compute moisture allowance, multiply the labeled quantity by the decimal percent value of the allowance.

Example: Labeled net quantity of flour is 907 g (2 lb)

Misture Allowance is 3 % (0.03)

Moisture Allowance = 907 g (2 lb) x 0.03 = 27 g (0.06 lb)

Record this value in Box 13a.

b. How is a Moisture Allowance made prior to determining package errors?

If the Moisture Allowance is known in advance (e.g., flour and dry pet food), it can be applied by adjusting the Nominal Gross Weight (NGW) used to determine the sample package errors. The Moisture Allowance (MA) in Box 13a is subtracted from the NGW. The NGW which is the sum of the Labeled Net Quantity of Contents (LNQC e.g., 907 g) and the Average Tare Weight from Box 13 (for this example use an ATW of 14 g (0.03 lb)) to obtain an Adjusted Nominal Gross Weight (ANGW) which is entered in Box 14.

The calculation is:

LNQC 907 g (2 lb) + ATW 14 g (0.03 lb) = 921 g (2.03 lb) - MA 27 g (0.06 lb) = ANGW of 918 g (1.97 lb)

which is entered in Box 14.

Package errors are determined by subtracting the ANGW from the Gross Weights of the Sample Packages (GWSP).

The calculation is:

GWSP – ANGW = Package Error

Note: When the NGW is adjusted by subtracting the Moisture Allowance value(s) the Maximum Allowable Variation(s) is not changed. This is because the errors that will be found in the sample packages have been adjusted by subtracting the Moisture Allowance (e.g., 3 %) from the NGW. That increases the individual package errors by the amount of the moisture allowance (e.g., 3 %). If the value(s) of the MAV(s) were also adjusted it would result in doubling the allowance. MAV is always based on the labeled net quantity.

c. How is a Moisture Allowance made after determining package errors?

You can make adjustments when the value of the Moisture Allowance is determined following the test (e.g., after the sample fails or if a packer provides a reasonable moisture allowance based on data obtained using a scientific method) using the following approach:

If the sample fails the Average and/or the Individual Package Requirements, both of the following steps are applied.

If the sample fails the Average Requirement but has no unreasonable package errors, only step 1 is used. If the sample passes the Average Requirement but fails because the sample included one or more Unreasonable Minus Errors (UMEs), only step 2 is used.

Steps:

1. **Use the following approach to apply a Moisture Allowance to the sample after the test is completed. The Moisture Allowance (MA) is computed (e.g., 3 % x 907 g (2 lb) = 27 g (0.06 lb) and added to the Sample Error Limit (e.g., if the SEL is 0.023 add 0.06 to obtain an Adjusted SEL of 0.083). The ASEL (Adjusted Sample Error Limit) is then compared to the Average Error of the Sample and:**

   - **If the average error (disregarding sign) in Box 18 is smaller than the ASEL, the sample passes.**

   HOWEVER,

   - **If the average error (disregarding sign) in Box 18 is larger than the ASEL, the sample fails.**

2. **If a Moisture Allowance is to be applied to the Maximum Allowable Variation(s), the following method is recommended:**

The Moisture Allowance (MA) is computed (e.g., 3 % x 907 g (2 lb) = 27 g (0.06 lb) and added to the value of the Maximum Allowable Variation(s) for the labeled net quantity of the package (e.g., MAV for 907 g (2 lb) is 31.7 g (0.07 lb) + 27 g (0.06 lb) = Adjusted Maximum Allowable Variation(s) (AMAV) of 58.7 g). Compare each minus package error to the AMAV. Mark package errors that exceed the AMAV and record the number of UME's found in the sample. If this number exceeds the number of unreasonable errors allowed, the sample fails.

~~**How is the Maximum Allowable Variation corrected for the moisture allowance?**~~

- ~~**Adjust the MAV by adding the moisture allowance to the MAV.**~~

  ~~**Example: 907 g (2 lb) package of flour: moisture allowance added to the MAV = 31.7 g (0.07 lb) (MAV for 907 g [2 lb] package) + 27 g (0.06 lb) moisture allowance = a corrected MAV of 58.7 g (0.13 lb)**~~

- ~~**Correct MAV in dimensionless units by converting the moisture allowance to dimensionless units = 0.06 lb ÷ 0.001 lb = 60. Go to Box 4 and add the moisture allowance in dimensionless units to the MAV in dimensionless units.**~~

  ~~**Example: MAV = 70 (MAV for 2 lb where the unit of measure = 0.001 lb) + 60 (moisture allowance in dimensionless units) = 130. Minus package errors must exceed the MAV ± gray area before they are declared "unreasonable errors."**~~

- ~~**If the number of unreasonable errors exceeds the allowed number (recorded in Box 8), the inspection lot fails.**~~

~~**How is the average error for the moisture allowance corrected?**~~

~~**If the minus average error (Box 18) is larger (disregarding the sign) than the SEL (Box 23) and moisture loss applies, compare the difference between Box 18 and Box 23 with the moisture allowance recorded in Box 13a. (Make sure that all the values are in units of weight or in**~~

~~**dimensionless units before making this comparison.) If Box 13a is larger than the difference between Box 18 and 23, then the lot is considered to be in the gray area.**~~

> ~~**Example: Box 13a for 2 lb flour is 60 (dimensionless units); Box 18 is 2 (dimensionless units); Box 23 is 0.550 (dimensionless units). The difference between Box 18 and Box 23 is 1.450 (dimensionless units). Since Box 13a is 60 (dimensionless units), Box 13a is larger than the difference between Box 18 and Box 23, the lot is considered to be in the gray area and further investigation is necessary before ruling out moisture loss as the reason for shortweight.**~~

d. What should you do when a sample is in the moisture allowance (gray) area?

When the average error of a lot of fresh poultry, franks, or hot dogs ~~**from a USDA inspected plant**~~ is minus, but does not exceed the established "moisture allowance" or "gray area," contact the ~~**appropriate USDA official and/or**~~ **packer or** plant management personnel to determine what information is available on the lot in question. Questions to the ~~**USDA official and/or**~~ plant management representative may include:

- Is a quality control program in place?
- What information is available concerning the lot in question?
- If net weight checks were completed, what were the results of those checks?
- What adjustments, if any, were made to the target weight?

Note: If ~~**USDA or**~~ the plant management has data on the lot, such data may help to substantiate that the "lot" **had** met **the** net content requirements at the point of manufacture.

This handbook provides "moisture allowances" for some meat and poultry products, flour, and dry pet food. These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or further investigation can be conducted.

Reasonable deviations from net quantity of contents caused by the loss or gain of moisture from the package are permitted when caused by ordinary and customary exposure to conditions that occur under good distribution practices. If evidence is obtained and documented to prove that the lot was shipped from the packaging plant in a short-weight condition or was distributed under inappropriate or damaging distribution practices, appropriate enforcement action should be taken.
(Amended 2002)

2.4. Borax

a. How is it determined if the net weight labeled on packages of borax is accurate?

Use the following procedures to determine if packages of borax are labeled correctly. This procedure applies to packages of powdered or granular products consisting predominantly (more than 50 %) of borax. Such commodities are labeled by weight, but borax can lose more than 23 % of its weight due to moisture loss. However, it does not lose volume upon moisture loss, and this property makes possible a

method of volume testing based on a density determination in the event that the net weight of the product does not meet the average or individual package requirements. This method may be used for audit testing to identify possible short-filling by weight at point-of-pack. Since the density of these commodities can vary at point-of-pack, further investigation is required to determine whether, such short-filling has occurred.

Test Equipment

- Metal density cup with a capacity of 550.6 mL or (1 dry pint)
- Metal density funnel with slide-gate and stand
- Scale or balance having a scale division not larger than 1 g or (0.002 lb)
- Rigid straightedge or ruler
- Pan suitable for holding overflow of density cup

Test Procedure

Follow Section 2.3. "Basic Test Procedures – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine product compliance.

Steps:

1. If the lot does not comply by weight with the sampling plan requirements (either the average or individual package requirements), select the lightest package and record the net weight of this package.
2. Determine the weight of the density cup.
3. Place the density cup in the pan and put the funnel on top of the density cup. Close the funnel slide-gate.
4. Pour sufficient commodity into the funnel so that the density cup can be filled to overflowing.
5. Quickly remove the slide-gate from the funnel, allowing the commodity to flow into the density cup.
6. Carefully, without agitating the density cup, remove the funnel and level off the commodity with the ruler or straightedge. Hold the ruler or straightedge at a right angle to the rim of the cup, and carefully draw it back across the top of the density cup to leave an even surface.
7. Weigh the filled density cup. Subtract the weight of the density cup from the gross weight of the commodity plus the density cup to obtain the net weight of commodity in the cup.

b. How is the volume determined?

Steps:

1. Multiply the net weight (in pounds) as found for the package under test by 550.6.

2. Divide the answer just obtained by the weight of the commodity in the density cup, step 7. The result is the net volume of commodity in the package in milliliters.

3. Compare the net volume of the commodity in the package with the volume declared on the package. The volume declaration **must not ~~is not located~~ appear** on the principal display panel. **Instead, it will appear on the back or side of the package and may appear as: ~~The following example is how the declaration of volume should appear.~~**

Volume ____ cm^3 per NIST Handbook 133

Note: (1 mL = 1 cm^3)

c. What action can be taken based on the results of the density test?

If the net volume of commodity in the lightest package equals or exceeds the declared volume on the package, treat the lot as being in compliance based on volume and take no further action. If the net volume of borax in the lightest package is less than the declared volume on the package, further compliance testing will be necessary. Take further steps to determine if the lot was in compliance with net weight requirements at point-of-pack or was short-filled by weight. To determine this, perform a laboratory moisture loss analysis to ascertain the weight of the original borax product when it was fully hydrated; obtain additional data at the location of the packager; and/or investigate the problem with the packager of the commodity.

2.5. The Determination of Drained Weight

Since the weight per unit volume of a drained product is of the same order of magnitude as that of the packaging liquid that is drained off, an "average nominal gross weight" cannot be used in checking packages of this type. The entire sample must be opened. The procedure is based upon a test method accepted by the U.S. Food and Drug Administration.

A tare sample is not needed because all the packages in the sample will be opened and measured.

The weight of the container plus drained-away liquid is determined. This weight is then subtracted from the gross weight to determine the package error.

Test Equipment

- Scales and weights recommended in Section 2.2. "Measurement Standards and Test Equipment" are suitable for the determination of drained weight.

- Sieves

  - For drained weight of 1.36 kg or (3 lb) or less, one 20 cm or (8 in) No. 8 mesh U.S. Standard Series sieve, receiving pan, and cover

  HOWEVER

  - For drained weight greater than 1.36 kg or (3 lb), one 30 cm or (12 in) sieve, with same specifications as above

  - **For canned tomatoes a U.S. Standard test sieve with 11.2 mm ($^{7}/_{16}$ in) openings must be used**

- Stopwatch

Test Procedure

Follow the Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" or a "Category B" sampling plan in the inspection (depending on the location of test); select a random sample; then use the following test procedure to determine lot compliance.

Steps:

1. Use Appendix E. "Standard Pack Inspection Report." Fill out Boxes 1 through 8. Select the random sample. Determine and record on a worksheet the weight of the receiving pan.

2. Determine and record on a worksheet the gross weight of each individual package comprising the sample.

3. Pour the contents of the first package into the dry sieve with the receiving pan beneath it, incline sieve to an angle between 17°to 20° from horizontal to facilitate drainage, and allow the liquid from the product to drain into receiving pan for 2 minutes. (Do not shake or shift material on the sieve.) Remove sieve and product.

4. Weigh the receiving pan, liquid, wet container, and any other tare material. (Do not include sieve and product.) Record this weight as tare and receiving pan.

5. Subtract the weight of the receiving pan, determined in step 1, from the weight obtained in step 4 to obtain the package tare weight (which includes the weight of the liquid).

6. Subtract the tare weight, found in step 5, from the corresponding package gross weight determined in step 2 to obtain the drained weight of that package. Determine the package error (drained weight – labeled drained weight).

7. Repeat steps 3 through 6 for the remaining packages in the sample, cleaning and drying the sieve and receiving pan between measurements of individual packages.

Steps:

8. Transfer the individual package errors to the Standard Pack Report form.

9. To determine lot conformance, return to Section 2.3. "Basic Test Procedures – Evaluating Results."

2.6. ~~Drained Weight for Glazed or Frozen Foods~~ **Determining the Net Weight of Encased-in-Ice and Ice Glazed Products**

a. How ~~is~~ should the ~~drained~~ net weight of frozen ~~shrimp (e.g., 2.27 kg (5 lb) block of shrimp) and crabmeat~~ seafood, meat, poultry and similar products encased-in-ice and frozen into blocks or solid masses (i.e., not individually glazed) be determined?

When determining the net weight of frozen ~~**shrimp and crabmeat**~~ **seafood, meat, poultry and similar products**, use the test equipment and procedure provided below.

~~**Steps:**~~

~~**1. Immerse the product directly in water in a mesh basket or open container to thaw (e.g., it is not placed in a plastic bag).**~~

~~**Direct immersion does not result in the product absorbing moisture because the freezing process causes the tissue to lose its ability to hold water.**~~

~~**2. Maintain the water temperature between 23 °C to 29 °C (75 °F to 85 °F).**~~

~~**This is accomplished by maintaining a constant flow of warm water into the container holding the product (e.g., place a bucket in a sink to catch the overflow, and feed warm water into the bottom of the bucket through a hose).**~~

~~**3. After thawing, drain the product on a sieve for 2 minutes and then weigh it.**~~

Test Equipment

- **Balance and weights (used to verify accuracy)**

- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a − 35 °C to +50 °C (− 30 °F to +120 °F) accurate to ± 1 °C (± 2 °F)

- Water source and hose with a**n approximate flow rate of** 4 L to 15 L (1 gal to 4 gal) per minute **for thawing blocks and other products** ~~**flow rate**~~

- Sink or other receptacle [i.e., **bucket with a capacity of approximately** 15 L (4 gal) ~~**bucket**~~] **for thawing blocks and other products**

- A wire mesh basket **(used for testing large frozen blocks of shrimp)** or other container that is large enough to hold the contents of 1 package (e.g., 2.27 kg or [5 lb] box of shrimp) and has openings small enough to retain all pieces of the product (e.g., an expanded metal test tube basket lined with standard 16-mesh screen)

- Number 8 mesh, 20 cm (8 in) or 30 cm (12 in) sieve

- Stopwatch

Test Procedure

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" or a "Category B" sampling plan in the inspection (depending on the location of test); select a random sample; then use the following test procedure to determine lot compliance.

Steps:

1. Place the unwrapped frozen ~~**shrimp or crabmeat**~~ **seafood, meat or poultry** in the wire mesh basket **or open container to thaw (e.g. it is not placed in a plastic bag)** and immerse in a 15 L (4 gal) or larger container of fresh water at a temperature between 23 °C to 29 °C (75 °F to 85 °F). Submerge the basket so that the top of the basket extends above the water level.

2. Maintain a continuous flow of water into the bottom of the container to keep the temperature within the specified range. **This is accomplished by maintaining a constant flow of warm water into the container holding the product (e.g., place a bucket in a sink to catch the overflow, and feed warm water into the bottom of the bucket through a hose). Direct immersion does not result in the product absorbing moisture because the freezing process causes the tissue to lose its ability to hold water.**

3. As soon as the product thaws, determined by loss of rigidity, transfer all material to a sieve (20 cm [8 in] for packages less than 453 g [1 lb] or 30 cm [12 in] for packages weighing more than 453 g [1 lb]) and distribute it evenly over the sieve.

4. Without shifting the product, incline the sieve 30° from the horizontal position to facilitate drainage, and drain for 2 minutes.

5. At the end of the drain time, immediately transfer the product to a tared pan for weighing to determine the net weight.

b. How is the net weight of ice glazed ~~**raw**~~ **seafood, meat, poultry or similar products** ~~**and fish**~~ **determined?**

For **ice** glazed seafood**, meat, poultry or similar products** ~~**and fish**~~, determine the net weight after removing the glaze using the following procedure. Use this method for any frozen glazed food product.

Test Equipment

~~**Use the equipment listed in Section 2.6.**~~ "~~**Drained Weight for Glazed or Frozen Foods**~~."

- **Balance and weights (used to verify accuracy)**

- **Continuous cold water source**

- **Number 8 sieve and receiving pan, 20 cm (8 in) for packages 453 g (1 lb) or less. A 30 cm (12 in) for packages more than 453 g (1 lb)**

- **Means to determine a 17° to 20° angle**

- **Stopwatch**

Test Procedures

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; and use the following test procedure to determine lot compliance.

Steps:

1. Fill out a **glazed seafood package** report form (**See Appendix E)** and select the random sample. A tare sample is not needed.

2. Weigh ~~sieve and~~ receiving pan. Record this weight on a **glazed seafood package** worksheet **(See Appendix E)** as "~~sieve~~ receiving **pan** weight."

3. Remove each package from low temperature storage; open it immediately and place the contents **in the sieve or other draining device (i.e. colander)** under a gentle spray of cold water**. Carefully agitate the product, handling the product with care** to avoid breaking the product Continue the spray**ing process** until all ice glaze, that is seen or felt is removed. In general, the product should remain rigid; however, the ice glaze on certain products, usually smaller sized commodities, sometimes cannot be removed without ~~defrosting~~ **partial thawing of** the product. Nonetheless, remove **all** ~~the~~ **ice** glaze, because it **may be** ~~is~~ a substantial part of the package weight.
   (Amended 2002)

4. Transfer the product to the ~~**weighed**~~ sieve (if the product is not already in the sieve) Without shifting the product, incline the sieve to an angle of 17° to 20° to facilitate drainage and drain (into waste receptacle or sink) for ~~**exactly**~~ 2 minutes.

5. **At the end of the drain time immediately transfer the entire product to the tared receiving pan for weighing to determine the net weight.** Place the product and ~~sieve~~ tared receiving pan on the ~~receiving pan~~ **scale** and weigh. Record this weight on a **glazed seafood package** worksheet**.** ~~**as the**~~ "~~sieve **+ product**~~ **net** ~~**weight."**~~

6. The net weight of product is equal to the weight of the **receiving** pan ~~plus the sieve~~ plus the product (recorded in step 5) minus the "~~sieve~~ receiving **pan** weight" (recorded in step 2). Record the product net weight on the **glazed seafood package** worksheet. The package error is equal to the net weight of the product as measured minus the labeled weight. Record the package error on the **glazed seafood package** worksheet and transfer it to the report form.

7. Repeat steps ~~**3**~~ **2** through 6 for each package in the sample, cleaning ~~and drying~~ the sieve and **cleaning and drying** the receiving pan between package measurements.

Evaluation of Results

Follow the procedures in Section 2.3. **"**Basic Test Procedure – Evaluating Results."

Chapter 3. Test Procedures – For Packages Labeled by Volume

3.1. Scope

a. What types of packaged goods can be tested using these procedures?

Use this procedure to determine the net contents of packaged goods labeled in fluid volume such as milk, water, beer, oil, paint, distilled spirits, soft drinks, juices, liquid cleaning supplies, or liquid chemicals. This chapter also includes procedures for testing the capacities of containers such as paper cups, bowls, glass tumblers, and stemware.

b. What types of packages are not covered by these procedures?

These procedures do not cover berry baskets and rigid-dry measures that are covered by specific code requirements in NIST Handbook 44. "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices."

c. When can the gravimetric test procedure be used to verify the net quantity of contents of packages labeled by volume?

The gravimetric procedure may be used to verify the net quantity of contents of packages labeled in volume when the density (density means the weight of a specific volume of liquid determined at a reference temperature) of the product being tested does not vary excessively from one package to another.

d. What procedure **is followed if the gravimetric test procedure cannot be used?**

Test each package as described in Section 3.3. "Volumetric Test Procedure for Liquids."

e. What considerations **besides density affect measurement accuracy?**

In addition to possible package-to-package variations in product density, the temperature of the liquid will affect the volume of product. The product will expand or contract based on a rise or fall in product temperature.

> **Example:** The volume of a liquid cleaning product might be 5 L (1.32 gal) at 20 °C (68 °F) and 5.12 L (1.35 gal) at 25 °C (77 °F), which represents a 2.2 % change in volume.
>
> **Note:** This extreme example is for illustrative purposes, a 2.2 % volume change will not occur in normal testing.

f. What reference **temperature should be used to determine the volume of a liquid?**

Use the reference temperature specified in Table 3-1. "Reference Temperatures for Liquids" to determine volume. When checking liquid products labeled by volume using the gravimetric procedure, maintain the packages used to determine product densities at reference temperatures. If testing the packages in a sample volumetrically, each package in the sample must be maintained at or corrected to the reference temperature when its volume is determined.

Note: When checking liquid products using a volumetric or gravimetric procedure, the temperature of the samples must be maintained at the reference temperature ±2 °C (±5 °F).

Table 3-1. Reference Temperatures for Liquids

	If the liquid commodity is:	Then the volume is determined at the reference temperature of:	Code of Federal Regulation Reference*
1.	Beer	~~3.9~~ **4**°C (39.1°F)	**27 CFR, part 7.10**
2.	Distilled Spirits	15**.56** °C (60°F)	**27 CFR, part 5.11**
3.	Frozen food - sold and consumed in the frozen state	At the frozen temperature	**21 CFR §101.105(b)(2)(i)**
4.	Petroleum	15 °C (60°F)	**16 CFR §500.8(b)**
5.	Refrigerated food (e.g., milk and other dairy products labeled "KEEP REFRIGERATED")	4~~.4~~ °C (40°F)	**21 CFR §101.105(b)(2)(ii)**
6.	Other liquids and wine (e.g., includes liquids sold in a refrigerated state for immediate customer consumption such as soft-drinks, bottled water and others that do not require refrigeration)	20 °C (68°F)	**Food: 21 CFR §101.105(b)(2)(iii)** **Non-Food: 16 CFR §500.8(b)** **Wine:27 CFR, part 4.10 (b)**
*The Code of Federal Regulations can be accessed online at: ***http://www.gpoaccess.gov/***			

3.2. Gravimetric Test Procedure for Liquids

Test Equipment

- A scale that meets the requirements in Chapter 2, Section 2.2. "Measurement Standards and Test Equipment."

  Note: To verify that the scale has adequate resolution for use, it is first necessary to determine the density of the liquid; next verify that the scale division is no larger than MAV/6 for the package size under test. The smallest graduation on the scale must not exceed the weight value for MAV/6.

  Example: Assume the inspector is using a scale with 1 g (0.002 lb) increments to test packages labeled 1 L (33.8 fl oz) that have an MAV of 29 mL (1 fl oz). Also,

assume the inspector finds that the weight of 1 L of the liquid is 943 g (2.078 lb). This will result in an MAV/6 value in weight of 4.715 g (0.010 lb):

29 mL/6 = 4.8 mL	(1 fl oz/6 = 0.166 6 fl oz)
943 g/1000 mL= 0.943 g/mL	(2.07 8 lb/33.6 fl oz = 0.061 8 lb/fl oz)
4.8 mL x 0.943 g/mL = 4.5264 g	(0.166 6 fl oz x 0.061 8 lb/fl oz = 0.010 lb)

In this example, the 1 g (0.002 lb) scale division is smaller than the MAV/6 value of 4.5264 g (0.010 lb) so the scale is suitable for making a density determination.

- A partial immersion thermometer (or equivalent) with a range of − 35 °C to + 50 °C (30 °F to 120 °F), at least 1 °C (1 °F) graduations, and with a tolerance of ± 1 °C (± 2 °F)

- Volumetric measures

  Example: When checking packages labeled in SI units, flask sizes of 100 mL, 200 mL, 500 mL, 1 L, 2 L, 4 L, and 5 L and a 50 mL cylindrical graduate with 1 mL divisions may be used. When checking packages labeled in inch-pound units the use of measuring flasks and graduates with capacities of gill, half-pint, pint, quart, half-gallon, gallon, and a 2 fl oz cylindrical graduate, graduated to ½ fl dr is recommended.

- Defoaming agents may be necessary for testing liquids such as beer and soft drinks that effervesce or are carbonated. Two such products are Hexanol or Octanol (Capryl Alcohol).

  Note: The mention of trade or brand names does not imply that these products are endorsed or recommended by the U.S. Department of Commerce over similar products commercially available from other manufacturers.

- Bubble level at least 15.24 cm (6 in) in length

- Stopwatch

Test Procedure

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection. Select a random sample; then use the following procedure to determine lot compliance.

Steps:

1. Bring the sample packages and their contents to the reference temperature as specified in Table 3-1. "Reference Temperatures for Liquids." To determine if the liquid is at its reference temperature, immerse the thermometer in the liquid before starting the test. Verify the temperature again immediately after the flask and liquid is weighed. If the product requires mixing for uniformity, mix it before opening in accordance with any instructions specified on the package label. Shaking liquids, such as flavored milk, often entraps air that will affect volume measurements, so use caution when testing these products. Often, less air is entrapped if the package is gently rolled to mix the contents.

Steps:

2. For milk, select a volumetric measure equal to or one size smaller than the label declaration. For all other products, select a volumetric measure that is one size smaller than the label declaration. For example, if testing a 1 L bottle of juice or a soft drink, select a 500 mL volumetric measure.

   (Amended 2004)

   Note: When determining the density of milk, if the product from the first container does not fill the volumetric measure to the nominal capacity graduation, product may be added from another container as long as product integrity is maintained (i.e., brand, identity, lot code, and temperature).

3. Prepare a clean volumetric measure to use according to the following procedures:

   - Because flasks are ordinarily calibrated on a "to deliver" basis, they must be "wet down" before using. Immediately before use, fill the volumetric flask(s) or graduate with water. The water should be at the reference temperature of the product being tested. Fill the flask(s) with water to a point slightly below the top graduation on the neck. The flask should be emptied in 30 seconds (± 5 seconds). Tilt the flask gradually so the flask walls are splashed as little as possible **as the flask** is emptied. When the main flow stops, the flask should be nearly inverted. Hold the flask in this position for 10 seconds more and touch off the drop of water that adheres to the tip. If necessary, dry the outside of the flask. The flask or graduate is then ready to fill with liquid from a package. This is called the "wet down" condition.

Note: When using a volumetric measure that is calibrated "to contain," the measure must be dry before each measurement.

   - If the liquid effervesces or foams when opened or poured (such as carbonated beverages), add two drops of a defoaming agent to the bottom of the volumetric measure before filling with the liquid. If working with a carbonated beverage, make all density determinations immediately upon placing the product into the standard. This reduces the chance of volume changes occurring from the loss of carbonization.

   - Before making additional measurements of a liquid, use water to wash or rinse and prepare the volumetric measure. Between each two measurements of liquid from the sample packages, prepare the volumetric measure as described above, dry the outside of the flask, and drain the volumetric measure as described in earlier paragraphs of this section, as appropriate.

4. If the flask capacity is equal to the labeled volume, pour the liquid into the volumetric measure tilting the package to a nearly vertical position. If the flask capacity is smaller than the package's labeled volume, fill the flask to its nominal capacity graduation. If conducting a volumetric test, drain the container into the volumetric measure for 1 minute after the stream of liquid breaks into drops.

Steps:

5. Position the volumetric measure on a level surface at eye level. For clear liquids, place a material of some dark color outside the flask immediately below the level of the meniscus. Read the volume from the lowest point of the meniscus. For opaque liquids, read volume from the center top rim of the liquid surface.

6. Use the gravimetric procedure to determine the volume if the limit specified for the difference in density is not exceeded.

   - Select a volumetric measure equal to or one size smaller than the labeled volume (depending on the product) and prepare it as described in step 4 of this section. Then determine and record its empty weight.

   - Determine acceptability of the liquid density variation, using two packages selected for tare according to Section 2.3. "Basic Test Procedure – Tare Procedures" as follows:

     - Determine the gross weight of the first package.

     - Pour the liquid from the first package into a volumetric measure exactly to the nominal capacity marked on the neck of the measure.

     - Weigh the filled volumetric measure and subtract its empty weight to obtain the weight of the liquid. Determine density by dividing the weight of the liquid by the capacity of the volumetric measure.

     - Determine the weight of the liquid from a second package using the same procedure.

     - If the difference between the densities of the two packages exceeds one division, use the volumetric procedure in Section 3.3. "Volumetric Test Procedure for Liquids."

a. How is "nominal gross weight "determined?

Determine the "nominal gross weight" as follows:

Steps:

1. Determine the Average Used Dry Tare Weight of the sample according to provisions of Section 2.3. "Basic Test Procedure – Tare Procedures."

2. Calculate the Average Product Density by adding the densities of the liquid from the two packages and dividing the sum by two.

3. Calculate the "nominal gross weight" using the following formula if the flask capacity is equal to the labeled volume:

   Nominal Gross Weight = (Average Product Density [in weight units]) +
   (Average Used Dry Tare Weight)

Steps:
Note: If the flask size is smaller than the labeled volume, the following formula is used:

Nominal Gross Weight = (Average Product Density x
[Labeled Volume/Flask Capacity]) + (Average Used Dry Tare Weight)

b. How are the errors in the sample determined?

Steps:
1. Weigh the remaining packages in the sample.

2. Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight. All sample packages are compared to the nominal gross weight.

3. To convert the average error or package error from weight to volume, use the following formula:

Package Error in Volume = Package Error in Weight/Average Product Density Per Volume Unit of Measure

Evaluation of Results

Follow the procedures in Chapter 2, Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

3.3. Volumetric Test Procedure for Liquids

a. How is the volume of liquid contained in a package determined volumetrically?

Follow steps 1 through 6 in Section 3.2. "Gravimetric Test Procedure for Liquids" for each package in the sample.

b. How are the errors in the sample determined?

Read the package errors directly from the graduations on the measure. The reference temperature must be maintained within ± 2 °C (± 5 °F) for the entire sample.

Evaluation of Results

Follow the procedures in Chapter 2, Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

3.4. Other Volumetric Test Procedures

a. What other methods can be used to determine the net contents of packages labeled by volume?

Depending on how level the surface of the commodity is, use one of two headspace test procedures. Use the first headspace test procedure to determine volume where the liquid has a smooth surface (e.g., oils, syrups, and other viscous liquids). Use the second procedure to determine volume where the commodity does not have a smooth surface (e.g., mayonnaise and salad dressing).

Test Procedure

Before conducting any of the following volumetric test procedures follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following procedure to determine lot compliance.

Test Equipment

- Micrometer depth gage (ends of rods fully rounded) 0 mm to 225 mm (0 in to 9 in) or longer
- Level (at least 15 cm (6 in) in length)
- Laboratory pipets and/or buret
  - Class A 500 mL buret that conforms to ASTM E287-2(2007), "Standard Specification for Laboratory Glass Graduated Burets"
  - Class A pipets, calibrated "to deliver" that conform to ASTM E969-02(2007), "Standard Specification for Glass Volumetric (Transfer) Pipets"
- Volumetric measures
- Water
- Rubber bulb syringe
- Plastic disks that are 3 mm ($^1/_8$ in) thick with diameters equal to the seat diameter or larger than the brim diameter of each container to be tested. The diameter tolerance for the disks is 50 μm (± 0.05 mm [± 0.002 in]). The outer edge should be smooth and beveled at a 30° angle with the horizontal to 800 μm (0.8 mm [$^1/_{32}$ in]) thick at the edge. Each disk must have a 20 mm (¾ in) diameter hole through its center and a series of 1.5 mm ($^1/_{16}$ in) diameter holes 25 mm (1 in) **apart around the periphery of the disk and 3 mm ($^1/_8$ in)** from the outer edge. **All edges must be smooth.**
- Stopwatch
- **Partial immersion thermometer ~~(or equivalent)~~ with 1 °C (2 °F) graduations and a range of − 35 °C to + 50 °C (− 30 °F to + 120 °F) accurate to ~~, at least 1 °C (1 °F) graduations, and with a tolerance of~~ ± 1 °C (± 2 °F)**

b. How is the volume of oils, syrups, and other viscous liquids that have smooth surfaces determined?

Steps:

1. Make all measurements on a level surface.

2. Bring the temperature of both the liquid and the water to be used to measure the volume of the liquid to the reference temperature specified in Table 3-1. "Reference Temperatures for Liquids." **Verify with a thermometer that product has maintained the reference temperature.**

3. Measure the headspace of the package at the point of contact with the liquid using a depth gauge with a fully rounded, rather than a pointed, rod end. If necessary, support the package to prevent the bottom of the container from distorting.

4. Empty, clean, and dry the package.

5. Refill the container with water measured from a volumetric standard to the original liquid headspace level measured in step 3 of this section until the water touches the depth gauge.

6. Determine the amount of water used in step 5 of this section to obtain the volume of the liquid and calculate the "package error" based on that volume.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

c. How is the volume of mayonnaise and salad dressing, and water immiscible products that do not have smooth and level surfaces determined?

(1) Volumetric Headspace Test Procedure

Use the volumetric headspace procedure described in this section to determine volume when the commodity does not have a smooth surface (e.g., mayonnaise, salad dressing, and other water immiscible products without a level liquid surface). The procedure guides the inspector to determine the amount of headspace above the product in the package and the volume of the container. Determine the product volume by subtracting the headspace volume from the container volume. Open every package in the sample.

Steps:

1. Make all measurements on a level surface.

2. Bring the temperature of both the commodity and the water used to measure the volume to the appropriate temperature designated in Table 3-1. "Reference Temperatures for Liquids."

3. Open the first package and place a disk larger than the package container opening over

Steps:

the opening.

4. Measurement Procedure

   - Deliver water from a flask (or flasks), graduate, or buret, through the central hole in the disk onto the top of the product until the container is filled. If it appears that the contents of the flask may overfill the container, do not empty the flask. Add water until all of the air in the container has been displaced and the water begins to rise in the center hole of the disk. Stop the filling procedure when the water fills the center disk hole and domes up slightly due to the surface tension. Do not add additional water after the level of the water dome has dropped.

   - If the water dome breaks on the surface of the disk, the container has been overfilled and the test is void; dry the container and start over.

5. To obtain the headspace capacity, record the volume of water used to fill the container and subtract 1 mL (0.03 fl oz), which is the amount of water held in the hole in the disk specified.

6. Empty, clean, and dry the package container.

7. Repeat steps 4 and 5 of this section. Refill the package container with water measured from a volumetric measure to the maximum capacity of the package, subtract 1 mL (0.03 fl oz), and record the amount of water used as the container volume; and

8. From the container volume determined in step 7 of this section, subtract the headspace capacity in step 5 of this section to obtain the measured volume of the product and calculate the "package error" for that volume where "package error" equals labeled volume minus the measured volume of the product.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance."

3.5. Goods Labeled by Capacity **– Volumetric Test Procedure**

a. What type of measurement equipment is needed to perform the headspace test procedures?

Use the test equipment in Section 3.4. "Other Volumetric Test Procedures" (except for the micrometer depth gage) to perform these test procedures.

b. How is it determined if goods labeled by capacity meet the average and individual requirements?

Before conducting any of the following volumetric test procedures, refer to Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

Steps:

1. Make all measurements on a level surface.

2. When testing goods labeled by capacity, use water at a reference temperature of 20 °C ± 2 °C (68 °F ± 5 °F).

3. Select a sample container and place a disk larger than the container opening over the opening.

4. Measurement Procedure

   - Add water to the container using flask (or flasks), graduate, or buret corresponding to labeled capacity of the container. If it appears that the contents of the flask may overfill the container, do not empty the flask. Add water until all of the air in the container has been displaced and the water begins to rise in the center hole of the disk. Stop filling the container when the water fills the center disk hole and domes up slightly due to the surface tension.

   - If the water dome breaks on the surface of the disk, the container has been overfilled and the test is void; dry the container and start over.

   - Record the amount of water used to fill the container and subtract 1 mL (0.03 fl oz) (this is the amount of water held in the hole in the disk specified) to obtain the total container volume.

5. Test the other containers in the sample according to the procedures in step 4 of this section.

6. To determine package errors, subtract the total container volume obtained in steps 4 and 5 of this section from the labeled capacity of the container.

Evaluation of Results

Follow the procedures in Section 2.3. “Basic Test Procedure – Evaluating Results” to determine lot compliance.

3.6. Pressed and Blown Glass Tumblers and Stemware

a. What requirements apply to pressed and blown glass tumblers and stemware?

This handbook provides a tolerance to the labeled capacity of glass tumblers and stemware. The average requirement does not apply to the capacity of these products. See Table 3-2. “Allowable Differences for Pressed and Blown Glass Tumblers and Stemware.”

b. How is it determined if tumblers and stemware meet the individual package requirement?

Follow **Section 2.3.** "Basic Test Procedure **–** Define the Inspection Lot" and determine which sampling plan to use in the inspection, select a random sample, and then use the following volumetric test procedure to determine container capacity and volume errors.

c. What type of measuring equipment is needed to perform the test procedures?

Use the equipment specified in Section 3.4. "Other Volumetric Test Procedures," (except for the micrometer depth gage) to perform these test procedures.

d. What are the steps of the test procedure?

Follow steps 1 through 6 in Section 3.6. "Goods Labeled by Capacity – Volumetric Test Procedure."

e. How is it determined if the samples conform to the allowable difference?

Compare the individual container error with the allowable difference that applies in Table 3-2. "Allowable Differences for Pressed and Blown Glass Tumblers and Stemware." If a package contains more than one container, all of the containers in the package must meet the allowable difference requirements in order for the package to pass.

Table 3-2. Allowable Differences for Pressed and Blown Glass Tumblers and Stemware

Unit of measure	
If the capacity in metric units is:	**Then the allowable difference is:**
200 mL or less	± 10 mL
More than 200 mL	± 5 % of the labeled capacity
If the capacity in inch-pound units is:	**Then the allowable difference is:**
5 fl oz or less	± ¼ fl oz
More than 5 fl oz	± 5 % of the labeled capacity

Evaluation of Results

Count the packages in the sample with volume errors greater than the allowable difference and compare the resulting number with the number given in Column 3.

- If the number of containers in the sample with errors exceeding the allowable difference exceeds the number allowed in Column 3, the lot fails.

HOWEVER

- If the number of packages with errors exceeding the allowable difference is less than or equal to the number in Column 3, the lot passes.

Note: The average capacity error is not calculated because the lot passes or fails based on the individual volume errors. Act on the individual units containing errors exceeding the allowable difference individually even though the lot passes the requirement.

3.7. Volumetric Test Procedure for Paint, Varnish, and Lacquers – Non-aerosol

a. How is the volume of paint, varnish, and lacquers contained in a package determined?

Use one of three different test methods depending upon the required degree of accuracy and the location of the inspection. The procedures include both retail and in-plant audits and a "possible violation" method, which is designed, for laboratory or in plant use because of cleanup and product collection requirements. The procedures are suitable to use with products labeled by volume and packaged in cylindrical containers with separate lids that can be resealed.

Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"
- Volumetric measures
- Micrometer depth gage (ends of rods fully rounded), 0 mm to 225 mm (0 in to 9 in)
- Diameter (Pi) tape measure, 5 cm to 30 cm (2 in to 12 in)
- Spanning bar, 2.5 cm by 2.5 cm by 30 cm or (1 in by 1 in by 12 in)
- Rule, 30 cm (12 in)
- Paint solvent or other solvent suitable for the product being tested
- Cloth, 30 cm (12 in) square
- Wood, 5 cm (2 in) thick, by 15 cm (6 in) wide, by 30 cm (12 in) long
- Rubber mallet
- Metal disk, 6.4 mm (¼ in) thick and slightly smaller than the diameter of package container bottom
- Rubber spatula
- Level at least 15 cm (6 in) in length
- Micrometer (optional)
- Stopwatch

b. What test procedure is used to conduct a retail audit test?

Conduct a retail audit using the following test procedure that is suitable for checking cylindrical containers up to 4 L (1 gal) in capacity. Use step 2 in the retail audit test procedure with any size container, but step 3 must be used for containers with capacities of 4 L (1 gal). The method determines

the volume of a single can in the sample selected as most likely to contain the smallest volume of product. Do not empty any containers because only their critical dimensions are being measured.

c. How accurate is the dimensional test procedure?

The configuration of the bottom of the can, paint clinging to the lid, and slight variations in the wall and label thicknesses of the paint container may produce an uncertainty estimated to be at least 0.6 % in this auditing procedure. Therefore, this method is recommended solely to eliminate from more rigorous testing those packages that appear to be full measure. Use the violation procedures when the volume determined in step 10 is less than the labeled volume or in any case where short measure is suspected.

d. What worksheets make data recording easier?

Use the following format to develop worksheets to perform audits and determine the volume when checking paint. Follow the procedure and it will indicate the column in which the various measurements made can be recorded.

Example: Audit Worksheet for Checking Paint (add additional rows as needed)

1. Can Height	Can Diameter				6. Avg Liquid Diameter	7. Avg Liquid Level	8. Avg Container Depth	9. Avg Liquid Depth	10. Volume*
	2. Top	3. Middle	4. Bottom	5. Average					
*10. Volume = 0.7854 x 6 x 6 x 9									

Note: When the following instructions require recording a measurement, refer to the numbered columns in the "Audit Worksheet for Checking Paint" shown above.

e. How is a retail audit test performed?

Steps:

1. Select a random sample. A tare sample is not needed.

2. For containers less than 4 L or (1 gal):

   - Measure the outside diameter of each container near its middle to the closest 0.02 mm (0.001 in).

   - Use a diameter tape measure to record the measurements in Column 3.

   - Place the containers on a level surface and using the micrometer depth gage, record their heights in Column 1 on the worksheet.

   - If the range of outside diameters exceeds 0.125 mm (0.005 in) or the range in heights exceeds 1.58 mm (0.062 5 in), do not use this procedure. If the ranges are within the specified limits, weigh all cans in the sample, select the container with the lightest gross weight, and remove its lid. Continue with step 4 below.

3. For 4 L (1 gal) containers:

   - Gross weigh each package in the sample.

   - Select the package with the lightest gross weight and remove its lid.

4. Use a direct reading diameter tape measure to measure the outside diameter of the selected container near its top, middle (already measured if step 2 was followed), and bottom to the closest 0.02 mm (0.001 in). Record these measurements in Columns 2, 3, and 4. Add the three diameter values and divide by three to obtain the average diameter and record this value in Column 5.

5. If a micrometer is available, measure the wall and the paper label thickness of the container; otherwise, assume the wall and label thicknesses given in Table 3-3. "Thickness of Paint Can Walls and Labels" below:

Table 3-3. Thickness of Paint Can Walls and Labels

Can Size	Wall Thickness
4 L (1 gal)	250 μm (0.25 mm) [0.010 in]
2 L (½ gal)	250 μm (0.25 mm) [0.010 in]
1 L (1 qt)	230 μm (0.23 mm) [0.009 in]
500 mL (1 pt)	230 μm (0.23 mm) [0.009 in]
250 mL	200 μm (0.20 mm) [0.008 in]
Label Thickness* for all can sizes: 100 μm (0.10 mm) [0.004 in] (*Paper only – ignore labels lithographed directly onto the container)	

Steps:

Subtract twice the thickness of the wall of the can and paper label from the average can diameter (step 4) to obtain the average liquid diameter. Record the liquid diameter in Column 6.

6. On a level surface, place the container on the circular metal disk that is slightly smaller in diameter than the lower rim of the can so the bottom of the container nests on the disk to eliminate any "sag" in the bottom of the container.

7. Place the spanning bar and depth gage across the top of the paint can and mark the location of the spanning bar on the rim of the paint container. Measure the distance to the liquid level, to the nearest 20 μm (0.02 mm) (0.001 in), at three points in a straight line. Take measurements at points approximately 1 cm ($^3/_8$ in) from the inner rim for cans 12.5 cm (5 in) in diameter or less (and at 1.5 cm [½ in] from the rim for cans exceeding 12.5 cm [5 in]) in diameter and at the center of the can. Add the three readings and divide by three to obtain the average distance to the liquid level in the container. Record the average distance to the liquid level in Column 7.

8. Measure the distance to the bottom of the container at three points in a straight line in the same manner as outlined in step 7. Add the three readings and divide by three to obtain the average height of the container and record it in Column 8.

9. Subtract the average distance to the liquid level (Column 7) from the average height of the container (Column 8) to obtain the average height of the liquid column and record it in Column 9.

10. Determine the volume of paint in the container by using the following formula:

$$\text{Volume} = 0.7854\ D^2H$$

Where D = average liquid diameter (Column 6) and
H = average liquid height (Column 9)

11. Record this value in Column 10. If the calculated volume is less than labeled volume, go to the Violation Procedure.

f. How is an in-plant audit conducted?

Use the following procedures to conduct an in-plant audit inspection. This method applies to a container that probably contains the smallest volume of product. Duplicate the level of fill with water in a can of the same dimensions as the one under test. Use this method to check any size of package if the liquid level is within the measuring range of the depth gage. If any paint is clinging to the sidewall or lid, carefully scrape the paint into the container using a rubber spatula.

Steps:

1. Follow steps 1 through 6 of the retail audit test.

2. Place the spanning bar and depth gage across the top of the paint can. Measure the liquid level at the center of the surface and record the level in Column 7.

Steps:

3. Select an empty can with the same bottom configuration as the container under test and with a diameter and height equal to that of the container under test within plus or minus the following tolerances:

    a. For 500 mL or (1 pt) cans – within 25 μm (0.025 mm) (0.001 in)
    b. For 1 L or (1 qt) cans – within 50 μm (0.05 mm) (0.002 in)
    c. For 2 L or (½ gal) cans – within 75 μm (0.075 mm) (0.003 in)
    d. For 4 L or (1 gal) cans – within 100 μm (0.1 mm) (0.004 in)

4. Set the empty can on a level work surface with a circular metal disk that is slightly smaller in diameter than the bottom can rim underneath the can to eliminate sag. Set up the spanning bar and depth gage as in step 2 above. Fill the container with water from a volumetric measure of the same volume as the labeled volume. Measure the distance to the liquid level at the center of the container and record this level in Column 7 below the reading recorded in step 2. If this distance is equal to or greater than the distance determined in step 2, assume that the package is satisfactory. If the distance is less than the distance determined in step 2, the product may be short measure. Use the "Violation Procedure" in the next section when the audit test indicates that short measure is possible.

3.7.1. Violation Procedure

a. How is it determined if the containers meet the package requirements?

Use the following method if the liquid level is within the measuring range of the micrometer. The first step is to follow the "Basic Test Procedure" in Section 2.3. Define the inspection lot to determine which "Category A" sampling plan to use; select a random sample; and then use the following procedure. The steps noted with an (*) are required if there is paint adhering to the lid and it cannot removed by scraping into the can.

Steps:

1. Do not shake or invert the containers selected as the sample. Determine the gross weight of these packages and record in Column 2 of the "Example Worksheet for Possible Violation in Checking Paint" below.

Example Worksheet for Possible Violation in Checking Paint (add additional rows as needed)								
1. Labeled Volume	2. Gross Weight	3. Lid Paint Weight (Wet − Dry)	4. Liquid Level	5. Tare	6. Water Volume	7. Net Wt. = 2 − 5	8. Weight of Labeled Volume = 7 x 1 ÷ 6	9. Package Volume = 6 + [(3 ÷ 7) x 6)]

Steps:

Record the labeled volume of the first tare sample package in Column 1 of the worksheet. Use a circular metal disk to eliminate can "sag" and remove the lid. If paint clings to the lid of the container, scrape it off with a spatula.

2.* If paint that adheres to the lid cannot be completely removed by scraping the paint into the can, determine the weight of the lid plus any adhering paint. Clean the paint lid with solvent and weigh again. Subtract the clean lid weight from the lid weight with paint to determine the weight of the paint adhering to the lid. Record this weight in Column 3.

3. Place the spanning bar and depth gage across the top of the paint can. Mark the location of the spanning bar on the rim of the paint container. Measure the distance to the liquid level at the center of the container to the nearest 20 μm (0.02 mm) (0.001 in). Record the distance in Column 4.

4. Empty and clean the sample container and lid with solvent; dry and weigh the container and lid. Record the tare weight in Column 5.

5. Set up the container in the same manner as in step 1.

6. Place the spanning bar at the same location on the rim of the paint container as marked in step 3. With the depth gage set as described in step 3, deliver water into the container in known amounts until the water reaches the same level occupied by the paint as indicated by the depth gage. Record this volume of water (in mL or fl oz) in Column 6 of the worksheet. This is the volume occupied by the paint in the container. Follow steps, 7a, 8a, and 9a if scraping does not remove the paint from the lid. In order to determine if gravimetric testing can be used to test the other packages in the sample, follow only steps 7, 8, and 9 when no paint adheres to the lid.

7. Subtract the weight of the container (Column 5) from the gross weight (Column 2) to arrive at the net weight of paint in the selected container. Record the net weight in Column 7 of the worksheet.

7a.* Subtract the weight of the container (Column 5) and the weight of product on the lid (Column 3) from the gross weight (Column 2) to arrive at the net weight of paint in the container. Record in Column 7 (excluding the weight of the paint on the lid).

8. Calculate the weight of the labeled volume of paint (for the first package opened for tare).

net weight (Column 7) x labeled volume (Column 1) ÷ volume of paint in can (Column 6)

Record this value in Column 8.

8a.* Calculate the package volume =

volume in can (Column 6) + (lid paint weight [Column 3] x
volume in can [Column 6] / net weight [Column 7]]

Record it in Column 9 of the worksheet.

Steps:

9. Calculate the package error. Use the following formula if paint does not adhere to the lid:

   Package error = (Column 6 value) - (labeled volume)

   9a.* Use the following formula if paint does adhere to the lid and will not come off by scraping.

   Package error = (Column 9 value) - (labeled volume)

10. Repeat steps 1 through 9 for the second package chosen for tare.

b. When can a gravimetric procedure be used?

A gravimetric procedure is used if the weights of the labeled volume for the first two packages do not differ from each other by more than one division on the scale (if they meet this criterion, check the rest of the sample gravimetrically and record in Column 8).

c. How is "nominal gross weight" determined?

Determine the "Nominal Gross Weight" for use with Chapter 2, Section 2.3. "Basic Test Procedure" as follows:

The nominal gross weight equals the sum of the average weight of the labeled volume (average of values recorded in Column 8) plus the average tare (average of values recorded in Column 3) for the packages selected for tare. Note that the weight of a given volume of paint often varies considerably from container to container; therefore, volumetric measurements may prove necessary for the entire sample.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedures – Evaluating Results" to determine lot conformance.

3.8. Testing Viscous Materials – Such As Caulking Compounds and Pastes

a. How are viscous materials such as caulking compounds and paste tested?

Use the following procedure for any package of viscous material labeled by volume. It is suitable for very viscous materials such as cartridge-packed caulking compounds, glues, pastes, and other similar products. It is best to conduct this procedure in a laboratory using a hood to ventilate solvent fumes. If used in the field, use in a well ventilated area. Except for the special measurement procedures to determine the weight of the labeled volume, this procedure follows the basic test procedure. For each weight of a known volume determination, pack a portion of the packaged product into a pre-weighed cup of known volume (called a "density cup" or "pycnometer") and weigh. From the weight of the known volume, determine the weight of the labeled volume. Compare the nominal gross weight with the gross weight to determine the package error.

b. What type of measurement equipment is needed to test packages of caulk, pastes, and glues?

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment."

- Pycnometer, a vessel of known volume used for weighing semifluids. The pycnometer can be bought or made. If it is made, refer to it as a "density cup." To make a 150 mL or 5 fl oz density cup, cut off the lip of a 150 mL beaker with an abrasive saw and grind the lip flat on a lap wheel. The slicker plate is available commercially. Calibrate the density cup gravimetrically with respect to the contained volume using the procedure in ASTM E542-01(2007), "Standard Practice for Calibration of Laboratory Volumetric Apparatus."

- Appropriate solvents (water, Stoddard solvent, kerosene, alcohol, etc.)

- Caulking gun (for cartridge packed products)

c. How is a pycnometer prepared for use?

Before using, weigh and calibrate the pycnometer (or the density cup and slicker plate) with respect to volume (mL or fl oz). If applicable, comply with any special instructions furnished by the manufacturer to calibrate a pycnometer that has not been calibrated. It is not necessary to reweigh or recalibrate for each test; however, mark the pieces of each unit to prevent interchange of cups and slicker plates.

d. How is it determined if the containers meet the package requirements?

First, Follow the "Basic Test Procedure" in Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then, use the following procedure to determine lot compliance.

Steps:

1. Weigh a calibrated pycnometer and slicker plate and record as "pycnometer weight" and record this weight and the volume of the pycnometer.

2. Determine the gross weight of the first package and record the weight value. Open the package and transfer the product to the pycnometer by filling it to excess. Use a caulking gun to transfer product from the caulking cartridges. If using a pycnometer, cover it with a lid and screw the cap down tightly. Excess material will be forced out through the hole in the lid, so the lid must be clean. If using a density cup, place the slicker plate over ¾ of the cup mouth, press down and slowly move the plate across the remainder of the opening. With the slicker plate in place, clean all the exterior surfaces with solvent and dry.

3. Completely remove the product from the package container; clean the package container with solvent; dry and weigh it to determine the tare weight.

4. Weigh the filled pycnometer or filled density cup with slicker plate and record this weight. Subtract the weight of the empty pycnometer from the filled weight to determine the net weight of the product contained in the pycnometer and record this weight.

Steps:

5. Clean the pycnometer and repeat steps 2, 3, and 4 for the second package in the tare sample.

   Determine acceptability of the density variation on the two packages selected for tare. If the difference between the densities of both packages exceeds one division of the scale, do not use the gravimetric procedure to determine the net quantity of contents. Instead, use the procedure in steps 8 and 9.

   Note: If the gravimetric procedure can be used, perform steps 7 and 9.

6. Calculate the weight of product corresponding to the labeled volume of product according to the following formula:

   Weight of Product in Pycnometer ÷ Pycnometer Volume = Product Density

7. Test each package individually by determining the product density in each package using the pycnometer and record the gross, tare, and net weight of each package. Subtract the weight of the labeled volume (determined for each package) from the net weight of product to arrive at each individual package error in units of weight.

8. Convert the package errors to units of volume using the following formula:

   Package Error (volume) =
   (Package Error [weight] x Pycnometer Volume) ÷ (Weight of Product in Pycnometer)

9. Record the package errors on the report form using an appropriate unit of measure.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluation Results" to determine lot conformance.

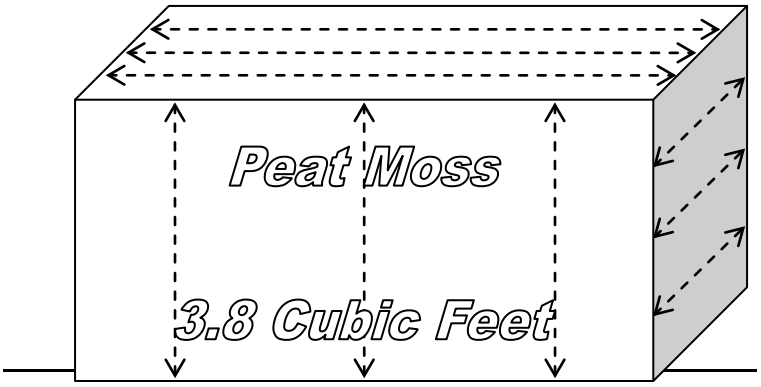
3.9. Peat Moss

a. How are packages of peat and peat moss labeled by compressed volume tested?

Measure the dimensions of the compressed material to determine if it contains the labeled quantity.

For each dimension (length, width, and height) take three equidistant measurements, take the average of each respective dimension and multiply to determine the cubic measure as follows:

Average height X average width X average length = cubic measurement



b. How are packages of peat and peat moss labeled by uncompressed volume tested?

Use the following method to test peat moss sold using an uncompressed volume as the declaration of content. The procedure is based on ASTM D2978-03, "Standard Method of Test for Volume of Processed Peat Materials."

Test Equipment

- 12.7 mm (or ½ in) sieve
- Use one of the following measures as appropriate for the package size. (Refer to Table 3-4. "Specifications for Test Measures for Mulch and Soils" for additional information on test measure construction.)
  - 28.3 L (1 ft^3) measure with inside dimensions of 30.4 cm (12 in) by 30.4 cm (12 in) by 30.4 cm (12 in). Mark the inside of the measure with horizontal lines every 1.2 cm (½ in) so that package errors can be directly determined
  - 100 L (3.5 ft^3) measure with inside dimensions of 50 cm (19.68 in) by 50 cm (19.68 in) by 40 cm (15.74 in). The inside of the measure should be marked with horizontal lines every 1.2 cm (½ in) so that package errors can be directly determined
- Straight edge, 50.8 cm (20 in) in length
- Sheet for catching overflow of material
- Level (at least 15.24 cm (6 in) in length)

c. How is it determined if the packages meet the requirements in this handbook?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then, use the following procedure to determine lot compliance.

Steps:

1. Open each package in turn, remove the contents, and pass them through the sieve directly into the measuring container (overfilling it). Use this method for particulate solids (such as soils or other garden materials) labeled in cubic dimensions or dry volume. Some materials may not pass through the sieve for peat moss; in these instances, separate the materials by hand (to compensate for packing and settling of the product after packaging) before filling the measure.

   Note: Separated material (product not passing through the sieve) must be included in the product volume.

2. Shake the measuring container with a rotary motion at one rotation per second for 5 seconds. Do not lift the measuring container when rotating it. If the package contents are greater than the measuring container capacity, level the measuring container with a straightedge using a zigzag motion across the top of the container.

3. Empty the container. Repeat the filling operations as many times as necessary, noting the partial fill of the container for the last quantity delivered using the interior horizontal markings as a guide.

4. Record the total volume.

5. To compute each package error, subtract the labeled quantity from the total volume and record it.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

3.10. Mulch and Soils Labeled by Volume

a. What products are defined as mulch and soil?

- Mulch is defined as "any product or material except peat or peat moss that is advertised, offered for sale, or sold for primary use as a horticultural, above-ground dressing, for decoration, moisture control, weed control, erosion control, temperature control, or other similar purposes."

- Soil is defined as "any product or material, except peat or peat moss that is advertised or offered for sale, or sold for primary use as a horticultural growing media, soil amendment, and/or soil replacement."

b. What type of measurement equipment is needed to test packages of mulch and soil?

- A test measure appropriate for the package size that meets the specifications for test measures in Table 3-4. "Specifications for Test Measures for Mulch and Soils"

Table 3-4. Specifications for Test Measures for Mulch and Soils

Nominal Volume of Test Measure	Interior Wall Dimensions [1]			Marked Intervals on Interior Walls [3]	Volume Equivalent of Marked Intervals
	Length	Width	Height [2]		
30.2 L (1.07 ft^3) for testing packages that contain less than 28.3 L (1 ft^3 or 25.7 dry qt)	213.4 mm (8.4 in)	203.2 mm (8 in)	736.6 mm (29 in)	12.7 mm (½ in)	524.3 mL (32 in^3)
28.3 L (1 ft^3)	304.8 mm (12 in)	**304.8 mm (12 in)**	**304.8 mm (12 in)**		1 179.8 mL (72 in^3)
56.6 L (2 ft^3)	**304.8 mm (12 in)**	**304.8 mm (12 in)**	**685.8 mm (27 in)**		
	406.4 mm (16 in)	**228.6 mm (9 in)**	**685.8 mm (27 in)**		
84.9 L (3 ft^3)	**304.8 mm (12 in)**	**304.8 mm (12 in)**	**990.6** mm (**~~48~~ 39** in)		
	406.4 mm (16 in)	228.6 mm (9 in)	**~~1219.2~~ 990.6** mm (**~~48~~ 39** in)		

Measures are typically constructed of 12.7 mm (½ in) marine plywood. A transparent sidewall is useful for determining the level of fill, but must be reinforced if it is not thick enough to resist distortion. If the measure has a clear front, place the level gage at the back (inside) of the measure so that the markings are read over the top of the mulch.

Notes:
[1] Other interior dimensions are acceptable if the test measure approximates the configuration of the package under test and does not exceed a base configuration of the package cross-section.
[2] The height of the test measure may be reduced, but this will limit the volume of the package that can be tested.
[3] When lines are marked in boxes, they should extend to all four sides of the measure if possible to improve readability. It is recommended that a line indicating the MAV level also be marked to reduce the possibility of reading errors when the level of the mulch is at or near the MAV.

- Dropcloth/polyethylene sheeting for catching overflow of material

- Level (at least 15 cm [6 in] in length)

c. How is it determined if the packages meet the package requirements?

Use the following procedure:

Steps:

1. Follow the Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection, select a random sample, then use the following procedure to determine lot conformance.

2. Open each package in turn. Empty the contents of the package into a test measure and level the contents by hand. Do not rock, shake, drop, rotate, or tamp the test measure. Read the horizontal marks to determine package net volume.

Note: Some types of mulch are susceptible to clumping and compacting. Take steps to ensure that the material is loose and free flowing when placed into the test measure. Gently roll the bag before opening to reduce the clumping and compaction of material.

3. Exercise care in leveling the surface of the mulch/soil and determine the volume reading from a position that minimizes errors caused by parallax.

d. How are package errors determined?

Determine package errors by subtracting the labeled volume from the package net volume in the measure. Record each package error.

$$\text{Package Error} = \text{Package Net Volume} - \text{Labeled Volume}$$

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

Note: In accordance with Appendix A, Table 2-10. Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood and Packages Labeled by Count with Fewer than 50 Items, apply an MAV of 5 % of the declared quantity to mulch and soil sold by volume. When testing mulch and soil with a net quantity in terms of volume, one package out of every 12 in the sample may exceed the 5 % MAV (e.g., one in a sample of 12 packages; two in a sample of 24 packages; four in a sample of 48 packages). However, the sample must meet the average requirement of the "Category A" Sampling Plan.

3.11. Ice Cream Novelties

Note: The following procedure can be used to test packaged products that are solid or semisolid and that will not dissolve in, mix with, absorb, or be absorbed by the fluid into which the product will be immersed. For example, ice cream labeled by volume can be tested using ice water or kerosene as the immersion fluid.

Exception – Pelletized ice cream are beads of ice cream which are quick frozen with liquid nitrogen. The beads are relatively small, but can vary in shape and size. On April 17, 2009, the FDA issued a

letter stating that this product is considered semisolid food, in accordance with 21 CFR 101.105(a). The FDA also addresses that the appropriate net quantity of content declaration for pelletized ice cream products be in terms of net weight.

a. How are ice cream novelties inspected to see if the labeled volume meets the package requirements?

Use the following volume displacement procedure that uses a displacement vessel specifically designed for ice cream novelties such as ice cream bars, ice cream sandwiches, or cones. The procedure determines the volume of the novelty by measuring the amount of water displaced when the novelty is submerged in the vessel. Two displacements per sample are required to subtract the volume of sticks or cups.

The procedure first determines if the densities of the novelties are the same from package to package (in the same lot) so that a gravimetric test can be used to verify the labeled volume. If a gravimetric procedure is used, compute an average weight for the declared volume from the first two packages and weigh the remainder of the sample. If the gravimetric procedure cannot be used, use the volume displacement procedure for all of the packages in the sample.

Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"
- Volumetric measures
- Displacement vessel with dimensions that is appropriate for the size of novelties being tested. Figure 3-1. Example of a Displacement Vessel shows an example of a displacement vessel. It includes an interior baffle that reduces wave action when the novelty is inserted and the downward angle of the overflow spout reduces dripping. Other designs may be used.

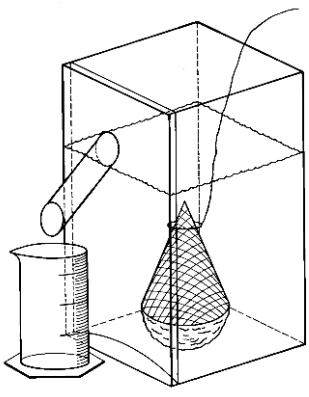


Figure 3-1. Example of a Displacement Vessel

Note: This displacement vessel can be constructed or similar devices may be obtained from any Laboratory Equipment or Science Education suppliers. The U.S. Department of Commerce does not endorse or recommend any particular device over similar commercially available products from other manufacturers.

- Thin wire, clamp, or tongs
- Freezer or ice chest and dry ice
- Single-edged razor or sharp knife (for sandwiches only)
- Ice water/kerosene maintained at 1 °C (33 °F) or below
- Indelible marker (for ice pops only)
- Level, at least 15.24 cm (6 in) in length
- A partial immersion thermometer (or equivalent) with a range of − 1 °C to + 50 °C (30 °F to 120 °F), at least 1 °C (1 °F) graduations, and with a tolerance of ± 1 °C (± 2 °F)
- A table-top, laboratory-type jack of sufficient size to hold the displacement vessel
- Stopwatch

Test Procedure

Follow the procedures in Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following steps to determine lot compliance.

Steps:

1. Maintain the samples at the reference temperature for frozen products that is specified in Table 3-1. "Reference Temperatures for Liquids" (i.e., − 18 °C [0 °F]). Place the samples in the freezer or ice chest until they are ready to be tested, and then remove packages from the freezer one at a time.

2. According to the type of novelty, prepare the sample products as follows:

   - Ice-pop. Mark on the stick(s) with the indelible marker the point to which the pop will be submerged in the ice water. (After the ice-pop contents have been submerged, remove the novelty to determine the volume of the stick.)

   - Cone. Make a small hole in the cone below the ice cream portion to allow air to escape.

   - Sandwich. Determine whether the declared volume is (a) the total volume of the novelty (that is, including the cookie portion) or (b) the volume of the ice-cream-like portion only. If the declared volume is the volume of only the ice-cream-like portion, shave off the cookie with a razor or knife, leaving some remnants of cookie to ensure that no ice cream is accidentally shaved off. Work quickly, and

Steps:

return the novelty to the freezer before the sandwich softens.

- Cup. Remove the cap from the cup. (After the cup and novelty contents have been submerged, remove the novelty from the cup to determine the volume of the cup.)

b. How is it determined if the ice cream novelty packages meet the requirements in this handbook?

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following procedure to determine lot compliance.

2. Fill the displacement vessel with ice water until it overflows the spout. Allow it to sit until dripping stops. Raise the displacement vessel as necessary and place the graduate beneath the spout.

3. Remove a package from the freezer, determine its gross weight and record it.

4. Submerge the novelty as suggested until it is below the surface level of the water.

   - Ice-pop. Use a clamp, tongs, or your fingers to hold the stick(s) and submerge the pop to the level marked in step 2 of the Test Procedures.

   - Cone. Shape the wire into a loop, and use it to push the cone, headfirst (ice cream portion first) into the ice water. Do not completely submerge the cone immediately: let water fill the cone through the hole made in step 2 of the Test Procedures before completely submerging the novelty.

   - Sandwich or cup. Skewer the novelty with the thin wire or form a loop on the end of the wire to push the sandwich or ice-cream portion or cup completely below the liquid level.

5. Record the total water volume in the graduate. For a cone or sandwich, record the water volume as the net volume and go to step 7. For ice-pops or cups, record the water volume in the graduate as the gross volume and go to step 6.

6. Refill the displacement vessel with water to overflowing and reposition the empty graduate under the spout.

   - Ice-pop. Melt the ice pop off the stick or sticks. Submerge the stick or sticks to the line marked in step 4. Record the volume of tare material (i.e., stick) by measuring the water displaced into the graduate. The net volume for the ice-pop is the gross volume recorded in step 5 minus the volume of the tare materials in this step. Record this volume as the "volume of novelty." To determine the error in the package, subtract the labeled quantity from the volume of novelty.

   - Cup. Remove the novelty from the cup. Rinse the cup, and then submerge it in

Steps:

the displacement vessel. Small pinholes in the base of the cup can be made to make submersion easier. Record the volume of water displaced into the graduate by the cup as the volume of tare material. The net volume for the novelty is the gross volume determined in step 5 minus the volume of the tare materials determined in this step. Record this as the net volume of the novelty. To determine the error in the package, subtract the labeled quantity from the volume of novelty.

7. Clean and air-dry the tare materials (sticks, wrappers, cup, lid, etc.). Weigh and record the weight of these materials for the package.

8. Subtract the tare weight from the gross weight to obtain the net weight and record this value.

9. Compute the weight of the labeled volume for the package using the following formula and then record the weight:

Product Density = (weight in item 3) ÷ (the total water volume in step 5)
Weight of labeled volume = (labeled volume) x (Product Density)

10. Repeat steps 3 through 9 for a second package.

11. If the weight of the labeled volume in steps 9 and step 10 differ from each other by more than one division on the scale, the gravimetric test procedure cannot be used to test the sample for compliance. If this is the case, steps 2 through 6 for each of the remaining packages in the sample must be used to determine their net volumes and package errors. Then go to evaluation of results.

c. How is "nominal gross weight" determined?

Steps:

1. Use Section 2.3. "Basic Test Procedure – Tare Procedure" to determine the Average Used Dry tare Weight of the sample.

2. Using the weights determined in step 11 calculate the Average Product Weight by adding the densities of the liquid from the two packages and dividing the sum by two.

3. Calculate the "nominal gross weight" using the formula:

Nominal Gross Weight = Average Product Weight + Average Used Dry Tare Weight

d. How are the errors in the sample determined?

Steps:

1. Weigh the remaining packages in the sample.

2. Subtract the nominal gross weight from the gross weight of each package to obtain package errors in terms of weight.

Steps:
Note: Compare the sample packages to the nominal gross weight.

3. Follow Section 2.3. "Basic Test Procedure."

   To convert the average error or package error from weight to volume, use the following formula:

   Package Error in Volume = (Package Error in Weight) ÷ (Product Density)

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

3.12. Fresh Oysters Labeled by Volume

a. What requirements apply to packages of fresh oysters labeled by volume?

Packaged fresh oysters removed from the shell must be labeled by volume. The maximum amount of permitted free liquid is limited to 15 % by weight. Testing the quantity of contents of fresh oysters requires the inspector to determine total volume, total weight of solids and liquid, and the weight of the free liquid.

Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment"
- Volumetric measures
- Micrometer depth gage (ends of rods fully rounded), 0 mm to 228 mm (0 in to 9 in)
- Strainer for determining the amount of drained liquid from shucked oysters. Use as a strainer a flat bottom metal pan or tray constructed to the following specifications:
  - Sides: 5.08 cm (2 in)
  - Area: 1935 cm^2 (300 in^2) or more for each 3.78 L (1 gal) of oysters (**<u>Note: Strainers of smaller area dimensions are permitted to facilitate testing smaller containers.)</u>**
  - Perforations:
    Diameter: 6.35 mm (¼ in)
    Location: 3.17 cm (1¼ in) apart in a square pattern, or perforations of equivalent area and distribution.
- Spanning bar, 2.54 cm by 2.54 cm by 30.48 cm (1 in by 1 in by 12 in)
- Rubber spatula

- Level, at least 15.24 cm (6 in) in length
- Stopwatch

b. How is it determined if the containers meet the package requirements?

Follow the Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then, use the following test procedure to determine lot compliance.

Steps:

1. Determine and record the gross weight of a sample package.
2. Set the container on a level surface and open it. Use a depth gage to determine the level of fill. Lock the depth gauge. Mark the location of the gauge on the package.
3. Weigh a dry 20.32 cm or 30.48 cm (8 in or 12 in) receiving pan and record the weight. Set strainer over the receiving pan.
4. Pour the contents from the container onto the strainer without shaking it. Tip the strainer slightly and let it drain for 2 minutes. Remove strainer with oysters. It is normal for oysters to include mucous (which is part of the product) that will not pass through the strainer, so do not force it.
5. Weigh the receiving pan and liquid and record the weight. Subtract the weight of the dry receiving pan from the weight of pan and liquid to obtain the weight of free liquid and record the value.
6. Clean, dry, and weigh the container and record the tare weight. Subtract the tare weight from the gross weight to obtain the total weight of the oysters and liquid and record this value.
7. Determine and record the percent of free liquid by weight as follows:

   Percent of free liquid by weight = [(weight of free liquid) ÷ (weight of oysters + liquid)] x 100.

8. Set up the depth gauge on the dry package container as in step 2. Pour water from the flasks and graduate as needed to re-establish the level of fill obtained in step 2. Add the volumes delivered as the actual net volume for the container and record the value.

Note: Some containers will hold the declared volume only when filled to the brim; they may have been designed for other products, rather than for oysters. If the net volume is short measure (per step 8), determine if the container will reach the declared volume only if filled to the brim. Under such circumstance, the package net volumes will all be short measure because the container cannot be filled to the brim with a solid and liquid mixture. A small headspace is required in order to get the lid into the container without losing any liquid.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure" Evaluating Results to determine lot conformance.

3.13. Determining the Net Contents of Compressed Gas in Cylinders

a. What type of compressed gases may be tested with these procedures?

These procedures are for industrial compressed gas. Compressed gas may be labeled by weight (for example, Liquefied Petroleum [LP] gas, or carbon dioxide) or by volume. Acetylene, liquid; oxygen, nitrogen, nitrous oxide, and argon are all filled by weight. Acetylene is sold by liters or by cubic feet. Helium, gaseous oxygen, nitrogen, air, and argon are filled according to pressure and temperature tables.

b. What type of test procedures must be used?

Checking the net contents of compressed gas cylinders depends on the method of labeling; those labeled by weight are generally checked by weight. Cylinders filled by using pressure and temperature charts must be tested using a pressure gauge that is connected to the cylinder. Determine the volume using the pressure and temperature of the cylinder.

c. Should any specific safety procedures be followed?

Yes, be aware of the hazards of the high pressure found in cylinders of compressed gas. An inspector should handle compressed gas only if the inspector has been trained and is knowledgeable regarding the product, cylinder, fittings, and proper procedures (see *Compressed Gas Association [CGA] pamphlet P-1, "Safe Handling of Compressed Gases in Containers*," for additional information). Additional precautions that are necessary for personal safety are described in the CGA Handbook of Compressed Gases. All personnel testing compressed gases should have this manual for reference and be familiar with its contents. It is essential that the inspector be certain of the contents before connecting to the cylinder. Discharging a gas or cryogenic liquid through a system for which the material is not intended could result in a fire and/or explosion or property damage due to the incompatibility of the system and the product. Before connecting a cylinder to anything, be certain of the following:

Steps:

1. Always wear safety glasses.

2. The cylinder is clearly marked or labeled with the correct name of the contents and that no conflicting marks or labels are present. Do not rely on the color of the cylinder to identify the contents of a cylinder. Be extremely careful with all gases because some react violently when mixed or when coming in contact with other substances. For example, oxygen reacts violently when it comes in contact with hydrocarbons.

3. The cylinder is provided with the correct Compressed Gas Association (CGA) connection(s) for the product. A proper connection will go together smoothly; so excessive force should not be used. Do not use an adapter to connect oxygen to non-oxygen cleaned equipment. When a cylinder valve is opened to measure the internal pressure, position the body away from the pressure gauge blowout plug or in front of the gauge if the gauge has a solid cast front case. If the bourdon tube should rupture, do not

Steps:

be in a position to suffer serious injuries from gas pressure or fragments of metal.

4. Thoroughly know the procedure and place emphasis on safety precautions before attempting any tests. Do not use charts referred to in the procedure until the necessary training has been completed. When moving a cylinder, always place the protective cap on the cylinder. Do not leave spaces between cylinders when moving them. This can lead to a "domino" effect if one cylinder is pushed over.

5. Open all valves slowly. A failure of the gauge or other ancillary equipment can result in injuries to nearby persons. Remember that high gas pressure can propel objects with great force. Gas ejected under pressure can also cause serious bodily injuries if someone is too close during release of pressure.

6. One of the gauges will be reserved for testing oxygen only and will be prominently labeled "For Oxygen Use Only." This gauge must be cleaned for oxygen service and maintained in that "clean" condition. The other gauge(s) may be used for testing a variety of gases if they are compatible with one another.

7. Observe special precautions with flammable gas in cylinders in addition to the several precautions necessary for the safe handling of any compressed gas in cylinders. Do not "crack" cylinder valves of flammable gas before connecting them to a regulator or test gauge. This is extremely important for hydrogen or acetylene.

d. What type of measurement equipment is needed to test cylinders of compressed gas?

Test Equipment

- Use a scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment." Use a wooden or non-sparking metal ramp to roll the cylinders on the scale to reduce shock loading.

- Two calibrated precision bourdon tube gauges or any other approved laboratory-type pressure-measuring device that can be accurately read within plus or minus 40 kPa (5 psi). A gauge having scale increments of 200 kPa (25 psi) or smaller shall be considered as satisfactory for reading within plus or minus 40 kPa (5 psi). The range of both gauges shall be a minimum of 0 kPa to 23 MPa (0 psi to 5000 psi) when testing cylinders using standard industrial cylinder valve connections. These standardized connections are listed in "CGA Standard V-1, Standard for Compressed Gas Cylinder Valve Outlet and Inlet for use with Gas Pressures up to 21 MPa (3000 psi)." For testing cylinders with cylinder valve connections rated for over 21 MPa (3000 psi), the test gauge and its inlet connection must be rated at 14 MPa (2000 psi) over the maximum pressure that the connection is rated for in CGA V-1. **Note:** There are standard high-pressure industrial connections on the market that are being used up to their maximum pressure of 52 MPa (7500 psi).

  Note: Any gauge or connectors used with oxygen cylinders must be cleaned for oxygen service, transported in a manner which will keep them clean and never used for any other gas including air or oxygen mixtures. Oxygen will react with hydrocarbons and many foreign materials that may cause a fire or explosion.

- An approved and calibrated electronic temperature measuring device or three calibrated mercury-in-glass thermometers having either a digital readout or scale division of no more than 1 °F (0.5 °C). The electronic device equipped with a surface temperature sensor is preferred over a mercury-in-glass thermometer because of its shorter response time.

- Two box-end wrenches of 29 mm ($1^{1}/_{8}$ in) for oxygen, nitrogen, carbon dioxide, argon, helium, and hydrogen and 22 mm ($^{7}/_{8}$ in) for some sizes of propane. All industrial CGA connections are limited to these two hex sizes. Avoid using an adjustable wrench because of the tendency to round the edges of the fittings, which can lead to connections not being tightened properly.

- Use a separate gauge and fitting for each gas to be tested. If adapters must be used, do not use on oxygen systems.

3.13.1. Test Procedure for Cylinders Labeled by Weight

a. How is it determined if the containers meet the package requirements using the gravimetric test procedure?

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

2. The cylinder should be marked or stenciled with a tare weight. The marked value may or may not be used by the filling plant when determining the net weight of those cylinders sold or filled by weight. If there is a tare weight marked on the net contents tag or directly on the cylinder, then an actual tare weight was determined at the time of fill. If there is no tare weight marked on a tag or on the cylinder, then the stamped or stenciled tare weight is presumed to have been used to determine the net contents.

Note: Check the accuracy of the stamped tare weights on empty cylinders whenever possible. The actual tare weight must be within (a) ½ % of the stamped tare weight for 9.07 kg (20 lb) tare weights or less or (b) ¼ % of the stamped tare weight for greater than 9.07 kg (20 lb) tare weights. (See NIST Handbook 130, "Method of Sale Regulation.")

3. Place cylinder on scale and remove protective cap. The cap is not included in the tare weight. Weigh the cylinder and determine net weight, using either the stamped or stenciled tare weight, or the tare weight marked on the tag. Compare actual net weight with labeled net weight, or use the actual net weight to look up the correct volume declaration (for Acetylene Gas), and compare that with the labeled volume.

Note: The acetone in acetylene cylinders is included in the tare weight of the cylinder. Therefore, as acetylene is withdrawn from the cylinder, some acetone will also be withdrawn, changing the tare weight.

Most producers will replace acetone in the cylinder before the cylinder is refilled, filling the cylinder with acetone to the stamped tare weight. Other producers, although not following recommended procedures, do not replace the acetone until it drops to a predetermined weight. In the latter situation, the refilling plant must note the actual tare weight of the cylinder and show it on the tag containing the net content statement or on

Steps:

the cylinder itself. Refer to tables for acetylene if necessary (if the acetylene is labeled by volume).

3.13.2 Test Procedure for Cylinders Labeled by Volume

a. How is it determined if the containers meet the package requirements using the volumetric test procedure?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

Steps:

1. Determine the temperature of the cylinders in the sample. Place the thermometer approximately halfway up a cylinder in contact with the outside surface. Take the temperature of three cylinders selected at random and use the average temperature of the three values.

2. Using the appropriate pressure gauge, measure the pressure of each cylinder in the sample.

3. Determine the cylinder nominal capacity from cylinder data tables or from the manufacturer. (These tables must be obtained in advance of testing.)

4. Using NIST Technical Note 1079 "Tables of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen" (available on-line at (http://www.nist.gov/owm), determine the value (SCF/CF) from the content tables at the temperature and pressure of the cylinder under test.

5. Multiply the cylinder nominal capacity by the value (SCF/CF) obtained from the content tables. This is the actual net quantity of gas.

6. Subtract the labeled net quantity from the actual net quantity to determine the error.

Evaluation of Results

Follow Section 2.3. "Basic Test Procedures – Evaluating Results" to determine lot conformance.

3.14. Firewood

3.14.1 Volumetric Test Procedure for Packaged Firewood with a Labeled Volume of 113 L (4 ft^3) or Less

a. How are packages of firewood tested?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample, then use the test procedure provided in Section 3.17. "Crosshatched Firewood" to determine lot compliance.

Test Equipment

- Linear Measure. Take all measurements in increments of 0.5 cm ($^3/_{16}$ in) or less and round up.
- Binding Straps. Binding straps are used to hold wood bundles together if the bundles need to be removed from the package/wrapping material.

b. How is it determined if the containers meet the package requirements?

Unless otherwise indicated, take all measurements without rearranging the wood or removing it from the package. If the layers of wood are crosshatched or not ranked in discrete sections in the package, remove the wood from the package, re-stack, and measure accordingly.

3.14.2. Boxed Firewood

a. How is the volume of firewood contained in a box determined?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot conformance.

Steps:

1. Open the box to determine the average height of wood within the box; measure the internal height of the box. Take three measurements (record as "d_1, d_2...etc.") along each end of the stack. Measure from the bottom of a straightedge placed across the top of the box to the highest point on the two outermost top pieces of wood and the center-most top piece of wood. Round measurements down to the nearest 0.5 cm ($^1/_8$ in). If pieces are obviously missing from the top layer of wood, take additional height measurements at the highest point of the uppermost pieces of wood located at the midpoints between the three measurements on each end of the stack. Calculate the average height of the stack by averaging these measurements and subtracting from the internal height of the box according to the following formula.

Average Height of Stack =
(Internal Height of Box) − (sum of measurements) ÷ (number of measurements)

Steps:

2. Determine the average width of the stack of wood in the box by taking measurements at three places along the top of the stack. Measure the inside distance from one side of the box to the other on both ends and in the middle of the box. Calculate the average width.

$$\text{Average Width} = (W_1 + W_2 + W_3) \div (3)$$

3. To determine the average length of the pieces of wood, remove the wood from the box and select the five pieces with the greatest girth. Measure the length of each of the five pieces from center-to-center. Calculate the average length of the five pieces.

$$\text{Average Length} = (L_1 + L_2 + L_3 + L_4 + L_5) \div (5)$$

4. Calculate the volume of the wood within the box. Use dimensions for height, width, and length.

Volume in liters = (height in cm x width in cm x length in cm) ÷ (1000)

Volume in cubic feet = (height in inches x width in inches x length in inches) ÷ (1728)

5. For boxes of wood that are packed with the wood ranked in two discrete sections perpendicular to each other, calculate the volume of wood in the box as follows: (1) determine the average height, width, and length as in 1, 2 and 3 above for each discrete section, compute total volume, and (2) total the calculated volumes of the two sections. Take the width measurement for Volume 2 (V_2) from the inside edge of the box adjacent to V_2 to the plane separating V_1 and V_2. Compute total volume by adding Volume 1 (V_1) and V_2 according to the following formula.

$$\text{Total Volume} = V_1 + V_2$$

6. Follow Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

3.14.3. Crosshatched Firewood

a. How must the volume of stacked or crosshatched firewood be measured?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; and use the following test procedure to determine lot compliance.

Steps:

1. Stack the firewood in a ranked and well-stowed geometrical shape that facilitates volume calculations (i.e., rectangular). The number of measurements for each dimension given below is the minimum that should be taken.

2. Determine the average measurements of the stack:

Steps:

- Height: Start at one end of the stack; measure the height of the stack on both sides at four equal intervals. Calculate and record the average height.

- Length: Start at the base of the stack; Measure the length of the stack in four equal intervals. Calculate and record the average length.

- Width: Select the five pieces with the greatest girth. Measure the length of the pieces, calculate and record the average piece length.

3. Calculate Volume:

Volume in liters = (Avg. Height [cm] x Avg. Width [cm] x Avg. Length in [cm]) ÷ 1000

Volume in cubic feet = (Avg. Height [in] x Avg. Width [in] x Avg. Length [in]) ÷ 1728

4. Follow Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

3.14.4. Bundles and Bags of Firewood

a. How is the volume of bundles and bags of firewood measured?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

Steps:

1. Average area of ends: secure a strap around each end of the bundle or bag of wood to prevent movement during testing and to provide a definite perimeter. Use two or more straps to secure the wood.

2. Set one end of the bundle or bag on tracing paper large enough to cover the end completely. Draw a line around the perimeter of the bundle or bag on the tracing paper.

3. Transfer the tracing paper to a template graduated in square centimeters or square inches. Count the number of square centimeters or square inches that are enclosed within the perimeter line. Estimate portions of square centimeters or square inches not completely within the perimeter line to the nearest one-quarter square inch.

4. Repeat this process on the opposite end of the bundle or bag.

5. Calculate the Average Area:

$$\text{Average Area} = (\text{Area 1} + \text{Area 2}) \div 2$$

6. Average length of the pieces of wood – select the five pieces with the greatest girth and measure the length of the pieces. Calculate the average length of the pieces of wood:

$$\text{Average Length} = (L_1 + L_2 + L_3 + L_4 + L_5) \div 5$$

Steps:

7. Calculate Volume:

$$\text{Volume in liters} = (\text{Average Area } [\text{cm}^2] \times \text{Average Length [cm]}) \div 1000$$

$$\text{Volume in cubic feet} = (\text{Average Area } [\text{in}^2] \times \text{Average Length [in]}) \div 1728$$

Evaluation of Results

Follow Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

Note: Specified in Appendix A, Table 2-10. "Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood, and Packages Labeled by Count with Fewer than 50 Items." – Maximum allowable variations for individual packages are not applied to packages of firewood.

Chapter 4. Test Procedures – Packages Labeled by Count, Linear Measure, Area, Thickness, and Combinations of Quantities

4.1. Scope

a. What types of packaged goods can be tested using these procedures?

Use these procedures to determine the net contents of products sold by count, area, thickness, and linear measure. If a package includes more than one declaration of quantity, each declaration must meet the package requirements.

b. Can the gravimetric test procedure be used to verify the net quantity of contents of packages labeled by count and linear measure?

Use the gravimetric procedure (below) to test products sold by measure or count if the density of the product does not vary excessively from one package to another.

c. What procedures may be used if the gravimetric test procedure cannot be used?

Open each package in the sample and measure or count the items.

4.2 Packages Labeled by Count

a. How are packages labeled by count tested?

If the labeled count is 50 items or fewer, use Section 4.3. "Packages Labeled with 50 Items or Fewer." If the labeled count is more than 50 items, see Section 4.4. "Packages Labeled by Count of More than 50 Items."

b. Can a gravimetric test procedure be used to verify the labeled count of a package?

Yes, if the scale being used is sensitive enough to determine the weight of individual items. Use the following procedures to determine if the sample packages can be tested gravimetrically.

Steps:

1. For packages labeled with a count of 84 or higher, calculate the weight equivalent for the MAV/6 for the labeled count of the package. MAV/6 must be at least equal to one-half scale division on a mechanical scale or one division on a digital scale.

2. For packages with a labeled count of 83 or fewer, when each unit weighs at least 2 scale divisions, consider the scale acceptable.

Steps:

Example: According to Appendix A, Table 2-7. Maximum Allowable Variations (MAVs) for Packages Labeled by Count, the MAV is 7 for a package labeled with a count of 250 items. The scale should be capable of measuring differences corresponding to MAV/6 or, in this example, the weight of one item.

- If the scale meets the appropriate requirement, gravimetric testing can be used to determine package count or,

- If the scale does not meet the criteria, count the content in each package in the sample.

4.3. Packages Labeled with 50 Items or Fewer

Test Procedure

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

2. Open the packages and count the number of items in each. Record the number of packages that contain fewer than the labeled count.

Evaluation of Results

1. For the sample size indicated in Column 1 of Appendix A, Table 2-11. "Accuracy Requirements for Packages Labeled by Low Count of (50 or fewer) and Packages Given Tolerance (Glass and Stemware)," refer to Column 2 to determine the number of packages that are allowed to contain fewer than the labeled count.

2. If the number of packages in the sample that contain fewer than the labeled count exceeds the number permitted in Column 2, the sample and the lot fail to meet the package requirement.

Note: For statistical reasons, the average requirement does not apply to packages labeled by count of 50 or fewer items, and the MAV does not apply to the lot. It only applies to the packages in the sample.

3. Maximum Allowable Variations: The MAVs listed in Appendix A, Table 2-7. "Maximum Allowable Variations (MAVs) for Packages Labeled by Count" define the limits of reasonable variation for an individual package even though the MAV is not directly used in the sampling plan. Individual packages that are undercount by more than the MAV are considered defective. Even if the sample passes, these should be repacked, relabeled, or otherwise handled.

   Example: If testing a lot of 160 packages of pencils labeled "50 pencils," choose a random sample of 12 packages from the lot. If the scale cannot discriminate between differences in count, open every package and count the pencils. For example, assume the 12 package counts are: 50, 52, 50, 50, 51, 53, 52, 50, 50, 50, 47, and 50.

Because only one package contains fewer than 50 pencils, the sample passes the test (refer to Appendix A. Table 2-11. "Accuracy Requirements for Packages Labeled by Low Count [50 or Fewer] and Packages Given Tolerances [Glass and Stemware]"). However, the package containing 47 pencils should not be introduced into commerce even though the lot complies with the package requirements because it is undercount by more than the MAV (1 item) permitted in Appendix A, Table 2-7. "Maximum Allowable Variations (MAVs) for Packages Labeled by Count."

4.4. Packages Labeled by Count of More than 50 Items

Test Procedures

There are two procedures to determine count without opening all packages in the sample. Both use the weight of a counted number of items in the package. If the weight of discrete items or numbers of items in a package varies, the packaged items must be counted rather than weighed.

Test Equipment

Use a scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment."

Audit Procedure

Use this procedure to audit lots of packages labeled by count of more than 50 items, but the precision of this procedure is only ± 1 %. Determine the lot compliance based on actual count or the violation procedure.

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

2. Select an initial tare sample according to Section 2.3. "Basic Test Procedure – Tare Procedures."

3. Gross weigh the first package in the tare sample and record this weight.

4. Select the number of items from the first tare package that weighs the greater:

   - 10 % of the labeled count; or
   - a quantity equal to at least 50 minimum divisions on the scale.

   Example: Using a scale with 1 g divisions, the selected count must weigh at least 50 grams. If a scale with 0.001 lb divisions is used, the selected count must weigh at least 0.05 lb. Record the count and weight.

Steps:

5. Calculate the weight of the labeled count using the following formula:

   Weight of the Labeled Count =
   (labeled count x weight of items in step 4) ÷ (Count of items in step 4)

   Record the result as "labeled count weight."

6. Gross weigh the remaining packages of the tare sample and keep contents of opened packages separated in case all of the items must be counted.

7. Determine the Average Used Dry Tare Weight of the sample according to Section 2.3. "Basic Test Procedure – Tare Procedures."

8. The weight of the labeled count plus the average tare weight represents the "nominal gross weight."

9. Subtract the nominal gross weight from the gross weight of the individual packages and record the errors.

   (Package error [weight]) =
   (actual package gross weight) − (nominal gross weight)

10. Convert the package errors in units of weight to count:

    Package error (count) = (Package error [weight] x labeled count) ÷ (labeled count weight)

    Round any fractional counts up to whole items in favor of the packager. Record the package error in units of count. Compute the average error.

    - If the average error is minus, go to the "procedure to use if the inspector suspects the lot violates the package requirements" below.

    - If the average error is zero or positive, the sample is presumed to conform to the package requirements.

Procedures to use if the inspector suspects the lot violates the package requirements

If possible, use the gravimetric procedure to determine compliance. To minimize the number of packages to be opened, combine the measurement of the weight of the number of units in the package with the determination of tare. Therefore, it will not be necessary to open more packages than the tare sample. If the audit procedure in this section has been used, the possible violation procedure below can be followed with the same sample if package contents have been kept separate and can still be counted. Use the following steps to determine if the sample passes or fails.

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance. Use a scale that meets the criteria specified in 4.2. "Packages Labeled by Count."

Steps:

2. Select an initial tare sample according to Section 2.3. "Basic Test Procedure – Tare Procedures."

3. Gross weigh the packages selected for the tare sample and record these weights. Open these packages and determine the tare and net weights of the contents, and count the exact number of items in the packages. Record this information.

4. Calculate and record the weights of the labeled counts for the first two packages using the formula:

   Weight of labeled count = (labeled count) x (contents weight ÷ contents count)

   To avoid round off errors, carry at least two extra decimal places in the calculation until the weight of the labeled count is obtained. To use the gravimetric procedure, the difference in weights of the labeled counts of the two packages must not exceed one scale division.

   - If the difference in weights exceeds this criterion, determine the actual count per package for every package in the sample recording plus and minus errors. Then, follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

   - If the difference is within the criterion, average the weights of the labeled count and go on to step 5.

5. Determine the Average Used Dry Tare Weight of the sample according to provisions in Section 2.3. "Basic Test Procedure – Tare Procedures."

6. Determine and record the nominal gross weight by adding the average weight of the labeled count of items in the package step 4 to the average tare weight step 5.

7. Weigh the remaining packages in the sample, subtract the nominal gross weight from the gross weight of the individual packages, and record the errors.

   Package Error (weight) = (Actual Package Gross Weight) − (Nominal Gross Weight)

8. Look up the MAV for the package size from Appendix A, Table 2-7. "Maximum Allowable Variations (MAVs) for Packages Labeled by Count" and convert it to weight using the formula:

   MAV (weight) =
   (MAV (count) x Avg. Wt. of Labeled Count [from step 4]) ÷ (Labeled Count)

   Convert the MAV to dimensionless units by dividing the MAV (weight) by the unit of measure and record.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluation Results" to determine lot conformance.

Convert back to count when completing the report form using the following formula:

Avg. Pkg. Error (count) = (Avg. Pkg. Error [dimensionless units]) x (Unit of Measure) x (Labeled Count) ÷ (Avg. Weight of Labeled Count)

4.5. Paper Plates and Sanitary Paper Products

a. How are the labeled dimensions of paper plates and sanitary paper products verified?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following procedure to determine lot compliance.

The following procedures are used to verify the size of paper plates and other products. The following procedure may be used to verify the size declarations of other disposable dinnerware.

Note: Do not distort the item's shape during measurement.

The count of sanitary paper products cannot be adequately determined by weighing. Variability in sheet weight and core weight requires that official tests be conducted by actual count. However, weighing can be a useful audit method. These products often declare total area as well as unit count and sheet size. If the actual sheet size measurements and the actual count comply with the average requirements, the total area declaration is assumed correct.

Equipment

- Steel tapes and rules. Determine measurements of length to the nearest division of the appropriate tape or rule.
  - Metric Units:

    For labeled dimensions 40 cm or less, linear measure: 30 cm in length, 1 mm divisions; or a 1 m rule with 0.1 mm divisions, overall length tolerance of 0.4 mm.

    For labeled dimensions greater than 40 cm, 30 m tape with 1 mm divisions.

  - Inch-pound Units:

    For labeled dimensions 25 in or less, use a 36 in rule with $^1/_{64}$ in or $^1/_{100}$ in divisions and an overall length tolerance of $^1/_{64}$ in.

    For dimensions greater than 25 in, use a 100 ft tape with $^1/_{16}$ in divisions and an overall length tolerance of 0.1 in.

- Measuring Base

  Note: A measuring base may be made of any flat, sturdy material approximately 38 cm (15 in) square. Two vertical side pieces approximately 3 cm (1 in) high and the same length as the sides of the measuring base are attached along two adjoining edges of the measuring base to form a 90° corner. Trim all white borders from two or more sheets of graph paper (10 divisions per centimeter or 20 divisions per inch). Place one sheet on the measuring base and position it so that one corner of graph paper is snug in the corner of the measuring base and vertical sides. Tape the sheet to the measuring base. Overlap other sheets on the first sheet so that the lines of top and bottom sheet coincide, expanding the graph area to a size bigger than plates to be measured; tape these sheets to the measuring base. Number each line from the top and left side of base plates: 1, 2, 3, etc.

b. How are paper products inspected?

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

2. Select an initial tare sample according to Section 2.3. "Basic Test Procedure – Tare Procedure."

3. Open each package and select one item from each.

Note: Some packages of plates contain a combination of different-sized plates. In this instance, take a plate of each declared size from the package to represent all the plates of that size in the package. For example, if three sizes are declared, select three different plates from each package.

c. How are paper products measured?

Note: Occasionally, packages of plates declared to be one size contain plates that can be seen by inspection to be of different sizes in the same package. In this instance, select the smallest plate and use the methods below to determine the package error. If the smallest plate is not short measure by more than the MAV, measure each size of plate in the package and calculate the average dimensions.

Example: If 5 plates measure 21.41 cm (8.43 in) and 15 measure 21.74 cm (8.56 in), the average dimension for this package of 20 plates is 21.66 cm (8.53 in).

Steps:

1. For paper plates: Place each item on the measuring base plate (or use the linear measure) with the eating surface down so two sides of the plate touch the sides of the measuring base. For other products, use either the measuring base or a linear measure to determine actual labeled dimensions (e.g., packages of napkins, rolls of paper towels). If testing folded products, be sure that the folds are pressed flat so that the measurement is accurate.

Steps:

2. If the measurements reveal that the dimensions of the individual items vary, select at least 10 items from each package. Measure and average these dimensions. Use the average dimensions to determine package error in step 3 below.

3. The package error equals the actual dimensions minus the labeled dimensions.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

4.6. Special Test Requirements for Packages Labeled by Linear or Square Measure (Area)

a. Are there special measurement requirements for packages labeled by dimensions?

Yes, products labeled by length (such as yarn) or area, often requires the application of tension to the ends of the product in order to straighten the product before measuring. When testing yarn and thread, apply tension and use the specialized equipment specified in ASTM D1907-07, "Standard Test Method for Linear Density of Yarn (Yarn Number) by the Skein Method," in conjunction with the sampling plans and package requirements described in this handbook.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

4.7. Polyethylene Sheeting

a. Which procedures are used to verify the declarations on polyethylene sheeting and bags?

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

Note: Most polyethylene products are sold by length, width, thickness, area, and net weight.

Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment."

- Steel tapes and rules determine measurements of length to the nearest division of the appropriate tape or rule.

  - Metric Units:

    For labeled dimensions 40 cm or less, linear measure: 30 cm in length, 1 mm divisions; or a 1 m rule with 0.1 mm divisions, overall length tolerance of 0.4 mm.

    For labeled dimensions greater than 40 cm, 30 m tape with 1 mm divisions.

  - Inch-pound Units:

    For labeled dimensions 25 in or less, use a 36 in rule with $^1/_{64}$ in or $^1/_{100}$ in divisions and an overall length tolerance of $^1/_{64}$ in.

    For dimensions greater than 25 in, use a 100 ft tape with $^1/_{16}$ in divisions and an overall length tolerance of 0.1 in.

- Deadweight dial micrometer (or equal) equipped with a flat anvil, 6.35 mm or (¼ in) diameter or larger, and a 4.75 mm ($^3/_{16}$ in) diameter flat surface on the head of the spindle. The anvil and spindle head surfaces should be ground and lapped, parallel to within 0.002 mm (0.0001 in), and should move on an axis perpendicular to their surfaces. The dial spindle should be vertical, and the dial should be at least 50.8 mm (2 in) in diameter. The dial indicator should be continuously graduated to read directly to 0.002 mm (0.0001 in) and should be capable of making more than one revolution. It must be equipped with a separate indicator to indicate the number of complete revolutions. The dial indicator mechanism should be fully jeweled. The frame should be of sufficient rigidity that a load of 1.36 kg (3 lb) applied to the dial housing, exclusive of the weight or spindle presser foot, will not cause a change in indication on the dial of more than 0.02 mm (0.001 in). The indicator reading must be repeatable to 0.001 2 mm (0.000 05 in) at zero. The mass of the probe head (total of anvil, weight 102 g or [3.6 oz], spindle, etc.) must be 113.4 g (4 oz). The micrometer should be operated in an atmosphere free from drafts and fluctuating temperature and should be stabilized at ambient room temperature before use.

- Gage blocks covering the range of thicknesses to be tested should be used to check the accuracy of the micrometer

- T-square

Test Procedure

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

2. Be sure the product is not mislabeled. Check the label declaration to confirm that all of the declared dimensions are consistent with the required standards. The declaration on sheeting, film, and bags shall be equal to or greater than the weight calculated by using the formulas below. Calculate the final value to four digits and declare to three digits dropping the final digit (e.g., if the calculated value is 2.078 lb, then the declared net

Steps:

weight is truncated to 2.07 lb).

Example Label:

Polyethylene Sheeting
1.82 m (6 ft) x 30.48 m (100 ft)
101.6 µm (4 mil)
5.03 kg (11.1 lb)

Steps:

3. Use the following formulas to compute a target net weight. The labeled weight should equal or exceed the target net weight or the package is not in compliance.

   - For metric dimensions:

     Target Mass in Kilograms = (T x A x D) ÷ 1 000

   Where: T = nominal thickness in centimeters

   A = nominal length in centimeters x nominal width (the nominal width for bags is twice the labeled width) in centimeters

   D = density in grams per cubic centimeter*

   - For inch-pound dimensions:

     Target Weight in Pounds = T x A x D x 0.036 13

   Where: T = nominal thickness in inches;

   A = nominal area; that is the nominal length in inches x nominal width (the nominal width for bags is twice the labeled width) in inches;

   D = density in grams per cubic centimeter; 0.036 13 is a factor for converting $^{g}/_{cm^3}$ to $^{lb}/_{in^3}$.

*Determined by ASTM Standard D1505-03, "Standard Method of Test for Density of Plastics by the Density Gradient Technique." For the purpose of this handbook, the minimum density shall be 0.92 g/cm^3 when the actual density is not known.

Evaluation

Steps:

1. Perform the calculations as shown in the following samples. If the product complies with the label declaration, go to step 2.

Steps:

Sample Calculations

- For metric units:

$$(0.010\ 16\ \text{cm} \times [(1.82\ \text{m} \times 100\ ^{\text{cm}}/_{\text{m}}) \times (30.48\ \text{m} \times 100\ ^{\text{cm}}/_{\text{m}})] \times 0.92\ ^{\text{g}}/_{\text{cm}^3}) \div 1000\ ^{\text{g}}/_{\text{kg}}$$
$$= \text{a target net mass of } 5.18\ \text{kg}$$

In this example, the labeled net mass of 5.03 kg does not meet the target net mass, so the product is not in compliance.

- For inch-pound units:

$$(0.004\ \text{in}) \times [(6\ \text{ft} \times 12\ ^{\text{in}}/_{\text{ft}}) \times (100\ \text{ft} \times 12\ ^{\text{in}}/_{\text{ft}})] \times 0.92\ ^{\text{g}}/_{\text{cm}^3} \times 0.03613$$
$$= \text{a target net weight of } 11.48\ \text{lb}$$

In this example, the labeled net weight of 11.1 lb does not meet the target net weight, so the product is not in compliance.

2. Select packages for tare samples. Determine and record the gross weights of the initial tare sample.

3. Extend the product in the sample packages to their full dimensions and remove by hand all creases and folds.

4. Measure the length and width of the product to the closest 3 mm ($^1/_8$ in). Make all measurements at intervals uniformly distributed along the length and width of the sample and record the results. Compute the average length and width, and record.

   - With rolls of product, measure the length of the roll at three points along the width of each roll and measure the width at a minimum of 10 points along the length of each roll.

   - For folded products, such as drop cloths or tarpaulins, make three length measurements along the width of the sample and three width measurements along the length of the sample.

5. Determine and record the average tare weight according to Section 2.3. "Basic Test Procedures – Tare Procedures."

4.7.1. Evaluation of Results – Length, Width, and Net Weight

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine the lot conformance requirements for length, width, and weight.

Steps:

1. If the sample failed to meet the package requirements for any of these declarations, no further measurements are necessary. The lot fails to conform.

Steps:
HOWEVER,

2. If the sample meets the package requirements for the declarations of length, width, and weight, proceed to step 3 to verify the thickness declaration.

3. Measure the thickness of the plastic sheet with a micrometer using the following guide. Place the micrometer on a solid level surface. If the dial does not read zero with nothing between the anvil and the spindle head, set it at zero. Raise and lower the spindle head or probe several times; it should indicate zero each time. If it does not, find and correct the cause before proceeding.

4. Take measurements at five uniformly distributed locations across the width at each end and five locations along each side of each roll in the sample. If this is not possible, take measurements at five uniformly distributed locations across the width product for each package in the sample.

5. When measuring the thickness, place the sample between the micrometer surfaces and lower the spindle head or probe near, but outside, the area where the measurement will be made. Raise the spindle head or probe a distance of 0.008 mm to 0.01 mm (0.000 3 in to 0.000 4 in) and move the sheet to the measurement position. Drop the spindle head onto the test area of the sheet.

6. Read the dial thickness two seconds or more after the drop, or when the dial hand or digital readout becomes stationary. This procedure minimizes small errors that may occur when the spindle head or probe is lowered slowly onto the test area.

7. For succeeding measurements, raise the spindle head 0.008 mm to 0.01 mm (0.000 3 in to 0.000 4 in) above the rest position on the test surface, move to the next measurement location, and drop the spindle head onto the test area. Do not raise the spindle head more than 0.01 mm (0.000 4 in) above its rest position on the test area. Take measurements at least 6 mm (¼ in) or more from the edge of the sheet.

8. Repeat step 3 above on the remaining packages in the sample and record all thickness measurements. Compute and record the average thickness for the individual package and apply the following MAV requirements.

4.7.2. Evaluation of Results – Individual Thickness

- No measured thickness of polyethylene labeled 25 µm (1 mil) or greater should be less than 80 % of the labeled thickness.

- No measured thickness of polyethylene labeled less than 25 µm (1 mil) should be less than 65 % of the labeled thickness.

Count the number of values that are smaller than specified MAVs (0.8 x labeled thickness if 25 µm [1 mil] or greater or 0.65 x labeled thickness, if less than 25 µm [1 mil]). If the number of values that fail to meet the thickness requirement exceeds the number of MAVs permitted for the sample size, the lot fails to conform to requirements. No further testing of the lot is necessary. If the number of MAVs for

thickness measurements is less than or equal to the number permitted for the sample size, go on to Evaluation of Results – Average Thickness.

4.7.3. Evaluation of Results – Average Thickness

The average thickness for any single package should be at least 96 % of the labeled thickness. This is an MAV of 4 %. Circle and count the number of package average thickness values that are smaller than 0.96 x labeled thickness. If the number of package average thicknesses circled exceeds the number of MAVs permitted for the sample size, the lot fails to conform to requirements. No further testing of the lot is necessary. If the number of MAVs for package average thickness is less than or equal to the number of MAVs permitted for the sample size, proceed to Section 2.3. "Basic Test Procedure – Evaluating Results" to determine if the lot meets the package requirements for average thickness.

4.8. Packages Labeled by Linear or Square (Area) Measure

Test Equipment

- Use a scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment." Calculate the length or area of packaged product corresponding to MAV/6. If there is no suitable weighing device, all of the packages in the sample must be opened and measured.

- Steel tapes and rules – determine measurements of length to the nearest division of the appropriate tape or rule.

  - Metric Units:

    For labeled dimensions 40 cm or less, linear measure: 30 cm in length, 1 mm divisions; or a 1 m rule with 0.1 mm divisions, overall length tolerance of 0.4 mm.

    For labeled dimensions greater than 40 cm, 30 m tape with 1 mm divisions.

  - Inch-pound Units:

    For labeled dimensions 25 in or less, use a 36 in rule with $^1/_{64}$ in or $^1/_{100}$ in divisions and an overall length tolerance of $^1/_{64}$ in.

    For dimensions greater than 25 in, use a 100 ft tape with $^1/_{16}$ in divisions and an overall length tolerance of 0.1 in.

- T-square

Test Procedure

Steps:

1. Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

2. Select an initial tare sample according to Section 2.3. "Basic Test Procedure – Tare Procedures."

Steps:

3. Gross weigh the first package in the tare sample and record this weight.

4. Determine and record the measurements (to the nearest division of the appropriate tape or rule) of the packaged goods (length, width, area; depending upon which dimensions are declared on the label) and weigh the goods from the first package opened for tare determination.

   - Calculate and record the weight of the labeled measurements using the following formula:

     Weight of the labeled measurement =
     (labeled measurement) x (contents weight) ÷ (contents measurement)

   - Look up and record the MAV in units of length or area measure (given in Appendix A, Table 2-8. "Maximum Allowable Variations for Packages Labeled by Length, (Width) or Area"

Note: See Appendix A, Table 2-10. "Exceptions to the MAVs for Textiles, and Polyethylene Sheeting and Film.

5. Determine and record the tare weight of the first package opened.

6. Determine and record the measurements (length, width, area; depending upon which dimensions are declared on the label) of the product in the second package chosen for tare determination (to the nearest division of the appropriate tape or rule). Determine and record the tare weight of this package.

7. Calculate and record the weight of the labeled measurement for the second package using the following formula:

   Weight of the labeled measurement =
   (labeled measurement) x (contents weight ÷ contents measurement)

   The weights of the labeled measurement for two packages must not differ by more than one division on the scale. If they do, open all packages in the sample, measure individually, and compare them against the labeled measure to determine the package errors. If the criterion is met, go to step 8.

8. Calculate the average weight of the labeled measurement and record.

9. Determine and record the average tare weight according to Section 2.3. "Basic Test Procedure – Tare Procedures."

10. Compute and record the nominal gross weight by adding the average weight of the labeled measurements to the average tare weight.

Steps:

11. Compute package errors according to the following formula:

Package error (weight) =
(actual package gross weight) − (nominal gross weight)

12. Convert the MAV to units of weight using the following formula:

MAV (weight) =
(avg. wt. of label measurements x MAV [length]) ÷ (labeled measurements)

Convert the MAV to dimensionless units by dividing the MAV (weight) by the unit of measure and record.

Evaluation of Results

Follow the procedure in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

Convert back to dimensions when completing the report form using following the formula:

Avg. Pkg. Error (dimension) = (Avg. Pkg. Error [dimensionless units]) x (Unit of Measure) x (Labeled unit of measure) ÷ (Avg. Weight of Labeled dimension)

4.9. Baler Twine – Test Procedure for Length

Test Equipment

- A scale that meets the requirements in Section 2.2. "Measurement Standards and Test Equipment," except a scale with 0.1 g (0.000 2 lb) increments must be used for weighing twine samples. The recommended minimum load for weighing samples is 20 divisions.

- Steel tapes and rules – Determine measurements of length to the nearest division of the appropriate tape or rule.

  - Metric Units:

    For labeled dimensions 40 cm or less, linear measure: 30 cm in length, 1 mm divisions; or a 1 m rule with 0.1 mm divisions, overall length tolerance of 0.4 mm.

    For labeled dimensions greater than 40 cm, 30 m tape with 1 mm divisions.

  - Inch-pound Units:

    For labeled dimensions 25 in or less, use a 36 in rule with $^1/_{64}$ in or $^1/_{100}$ in divisions and an overall length tolerance of $^1/_{64}$ in.

    For dimensions greater than 25 in, use a 100 ft tape with $^1/_{16}$ in divisions and an overall length tolerance of 0.1 in.

- A hand-held straight-face spring scale of at least 4.53 kg (10 lb) capacity or a cordage-testing device that applies the specified tension to the twine being measured. When measuring twine samples or total roll length, apply 4.53 kg (10 lb) of tension to the twine.

Test Procedure

Follow Section 2.3. "Basic Test Procedure – Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample; then use the following test procedure to determine lot compliance.

Steps:

1. Select packages for tare samples. Determine gross weights of the initial tare sample and record. Open the tare samples. Use the procedures for tare determination in Section 2.3. "Basic Test Procedure – Tare Procedures" to compute the average tare weight and record this value.

2. Procedure for obtaining twine samples: Randomly select four balls of twine from the packages that were opened for tare.

   From each of the four balls of twine:

   - Measure and discard the first 10.05 m (33 ft) of twine from each roll. Accurate measurement requires applying tension to the ends of the twine before measuring in order to straighten the product.

   - Take two 30.48 m (100 ft) lengths of twine from inside each roll.

   - Weigh and record the weight of each piece separately and record the values. Compare the weight values to determine the variability of the samples. If the individual weights of the eight twine samples vary by more than one division on the scale, use one of the following steps: If the lot is short, determine the actual length of the lightest-weight roll found in the lightest-weight package of the lot to confirm that the weight shortages reflect the shortages in the length of the rolls; or, determine the average weight-per-unit of measure by taking ten 30.48 m (100 ft) lengths from inside the lightest weight package. Use this value to recalculate its length and determine lot compliance.

3. Weigh all of the sample lengths together and record the total value. Determine the total length of the samples (243.8 m or 800 ft, unless more than eight sample-lengths were taken) and record the value. Compute the average weight-per-unit-of-length by dividing the total weight by the total length of the pieces.

4. Determine the MAV for a package of twine (refer to Appendix A, Table 2-8. "Maximum Allowable Variations for Packages Labeled by Length, Width, or Area").

   - Record the total declared package length.

   - Multiply the MAV from Appendix A, Table 2-8. "Maximum Allowable Variations for Packages Labeled by Length, (Width), or Area," times the total package length to obtain the MAV for length and record this value.

Steps:

- Multiply the weight per unit of length (from step 3) times the MAV for the total declared package length to obtain the MAV by weight and record this value.

- Convert the MAV to dimensionless units and record.

5. Calculate the nominal gross weight and record.

   Follow Section 2.3. "Basic Test Procedure – Determine Nominal Gross Weight and Package Errors for Sample Tare" to determine individual package errors. Determine errors using the following formula:

   Package error (weight) = (package gross weight) − (nominal gross weight)

   - To convert the Package error in weight back to length, divide the weight by the average weight-per-unit-of-length.

Evaluation of Results

Follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot compliance.

4.10 Procedure for Checking the Area Measurement of Chamois

Chamois is natural leather made from skins of sheep and lambs that have been oil-tanned. Chamois are irregularly shaped, which makes area measurement difficult. Because of these characteristics, an accurate area determination can only be made using an internationally recognized method of conditioning (rehydrating) and measurement. Chamois is produced in a wet manufacturing process, so it has high moisture content at time of measurement. Chamois is hydroscopic; therefore, its dimensions and total area change as it loses or absorbs moisture. It is also subject to wrinkling. Because of the variation of the thickness and density, and therefore the weight per unit area of chamois, an estimated gross weight procedure cannot be used to verify the labeled area declaration.

Standard Test Conditions: As with all hydroscopic products, reasonable variations in measure must be allowed if caused by ordinary and customary exposure to atmospheric conditions that normally occur in good distribution practice. Both federal and international standards specify procedures to restore the moisture content of chamois so that tests to verify dimensions and area can be conducted.

Federal Test Method Standard 311, "Leather, Methods of Sampling and Testing," (January 15, 1969) defines the standard atmospheric condition for chamois as 50 ± 4 % relative humidity and 23 ± 2 °C (73.4 ± 3.6 °F). The chamois is considered to be at equilibrium moisture when the difference in two successive weighings, made at 1 hr intervals, is no greater than 0.25 % (e.g., the maximum change in weight on a 100 g sample in two successive weighings is less than 0.25 g (250 mg).

Test Procedures

The area of chamois is verified using a two-stage test procedure. The first stage is a field audit using the template test procedure. This test is used for field audits because it is simpler to perform and does not require the chamois to be conditioned. The field audit is used to identify chamois that are potentially under measure. It is not as accurate as the gravimetric procedure because some error results from reading

the area from the template. The gravimetric procedure should be used for compliance testing because it includes conditioning (rehydrating) the chamois.

Template Test Method (for field audits)

Select a random sample of chamois and use the Template Procedure (below) to determine the area of each sample. Chamois is labeled in uniform sizes in terms of square decimeters and square feet, and are sized in increments of ¼ ft^2 (e.g., 1 ft^2, 1¼ ft^2, and 1½ ft^2). Separate the chamois into different sizes and define the inspection lot by specific sizes.

Test Equipment

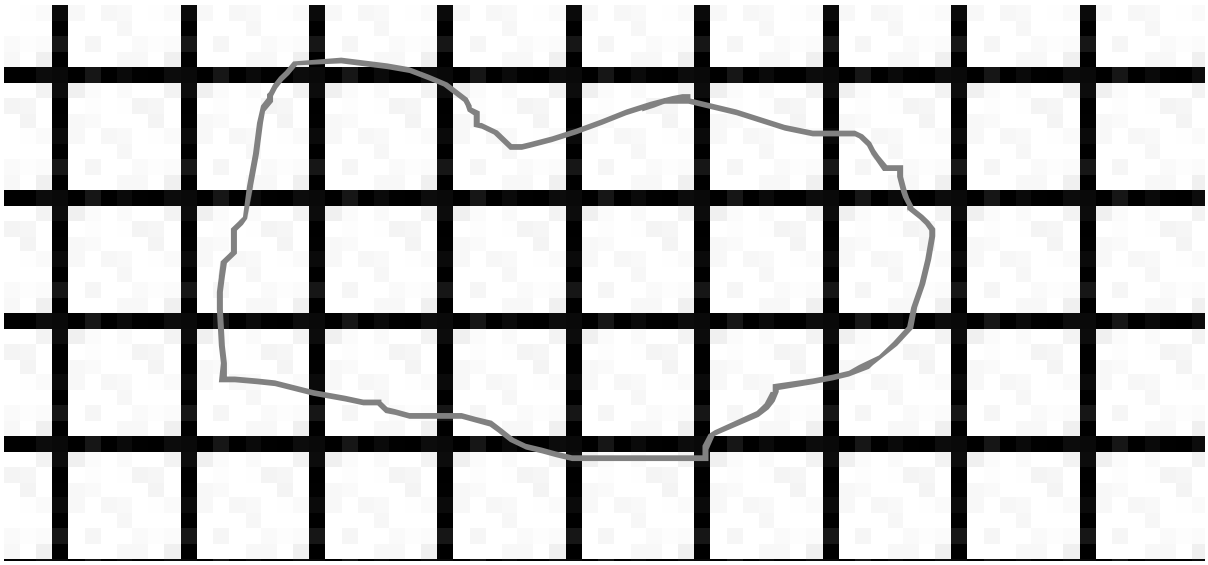
Use a transparent, flexible template that is graduated in square centimeters or square inches and that has been verified for accuracy. The template must be large enough to completely cover the chamois under test.

Template Procedures

Steps:

1. Template Procedure
   Place the template over the chamois specimen on a smooth surface. Determine the area by counting the number of squares that cover the surface of the chamois. Estimate parts of the template that do not completely cover the chamois by adding the number of partially covered blocks. (See Figure 1.) Compute the total area and go to Evaluation to determine if further action is necessary.

Figure 1.



Steps:
First Stage – Decision Criteria

If the average minus error exceeds 3 % of the labeled area, the chamois may not be labeled accurately. To confirm the finding, the sample must be taken to a laboratory for conditioning and testing using the gravimetric test procedure.

2. Gravimetric Procedure for Area Measurement

This test cannot be performed in the field because the samples must be conditioned with water before testing. This method is intended for use in checking full or cut skins, or pattern shapes. Open and condition all of the packages in the sample before determining their area on the recommended paper. Conditioning and verifying chamois can be accomplished without destroying the product. When successful tests are completed, the chamois may be repackaged for sale, so do not destroy the packaging material.

Test Equipment

- Scale with a capacity of 1 kg that is accurate to at least ± 0.01 g and a load-receiving element of adequate size to properly hold the chamois
- Atomizer or trigger-type sprayer and sealable, airtight polyethylene bags
- Medium weight drawing paper (e.g., drawing paper, medium weight (100 lb), regular surface or comparable)
- Household iron with low temperature settings 30 °C to 40 °C (86 °F to 104 °F)
- Rule or tape that is graduated in centimeters or inches
- Instrument for cutting paper (razor blade, scissors, or cutting board)

Sample Conditioning

Steps:
1. Remove each sample from its package and weigh and record each weight. Using an atomizer-type sprayer, spray water in the amount of 25 % of the weight of each skin uniformly over its area. Place wetted chamois in an airtight polyethylene bag; seal the bag, and leave it in this condition at room temperature for 24 hours.

2. Open the bag, remove the chamois, and reweigh the chamois to confirm that it retained maximum moisture. (This is done by confirming that the difference in the two consecutive weighings conducted an hour apart does not exceed 0.25 %).

3. Place the chamois flat on a continuous piece of drawing paper. To remove wrinkles and make the chamois lie flat, use a normal domestic iron that is heated to a maximum of 30 °C to 40 °C (86 °F to 104 °F). Place the iron on the bottom of the skin, and iron the skin up from the center to the top. Then, iron the skin from the center out to each side. Iron until the skin is fully extended and perfectly flat.

Measurement

Steps:

1. Immediately after ironing, carefully draw around the outline of the skin on the paper. Remove the skin; carefully cut along the outline of the skin; weigh the cutout pattern, and record to the nearest 0.1 g as Sample Weight 1 (W1).

2. Lay out the pattern and cut an accurately measured rectangle of a size not less than one-half the area of the pattern. Weigh the cutout rectangle and record the weight to the nearest 0.1 g as Sample Weight 2 (W2). Calculate the area of the rectangle cut from the patterns by multiplying length by width and record as Area (A) in centimeters or square inches.

    - For metric units – calculate the area of the original skin being checked as follows:

      $$W1/W2 \times A = \text{Skin Area in } cm^2/100 = \text{Area in } dm^2$$

    - For inch-pound units – calculate the area of the original skin being checked as follows:

      $$W1/W2 \times A = \text{Skin Area in } in^2/144 = \text{Area } ft^2$$

Evaluation of Results

Compute the average error for the sample and follow the procedures in Section 2.3. "Basic Test Procedure – Evaluating Results" to determine lot conformance.

The MAV for area declarations on chamois is 3 % of the labeled area as specified in Appendix A, Table 2-8. "Maximum Allowable Variations for Packages Labeled by Length, (Width), or Area".

Appendix A. Tables

Table 1-1. Agencies Responsible for Package Regulations and Applicable Requirements

Commodity	Responsible Agency	NIST Handbook 133 Sampling Plans	Table of Maximum Allowable Variations
Meat and Poultry	U.S. Department of Agriculture/Food Safety and Inspection Service and state and local weights and measures.	1. Use Table 2-1. Sampling Plans for Category A to test packages at other than point of pack. 2. Use Table 2-2. Sampling Plans for Category B to test packages in federally inspected meat and poultry plants.	Table 2-9. U.S. Department of Agriculture, Meat and Poultry, Groups and Lower Limits for Individual Packages
Foods, drugs, and cosmetics subject to the Food, Drug, and Cosmetic Act including those packaged at the retail store level that have been in interstate commerce (e.g., seafood) or those made with ingredients that have been in interstate commerce	U.S. Food and Drug Administration and state and local weights and measures http://www.fda.gov	Use Table 2-1. Sampling Plans for Category A to test packages at all locations.	Table 2-5. MAVs for Packages Labeled by Weight Table 2-6. MAVs for Packages Labeled by Liquid or Dry Volume Table 2-7. MAVs for Packages Labeled by Count Table 2-8. MAVs for Packages Labeled by Length (Width) or Area Table 2-10. Exceptions to the MAVs for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood, and Packages Labeled
Food products not subject to the Federal Food, Drug, and Cosmetic Act, including meat and poultry products packaged at the retail store level	State and local weights and measures http://www.nist.gov/owm		
Non-food Consumer Products	Federal Trade Commission http://www.ftc.gov		
Non-food Consumer and Non-consumer Products	State and local weights and measures		

Table 1-1. Agencies Responsible for Package Regulations and Applicable Requirements			
Commodity	**Responsible Agency**	**NIST Handbook 133 Sampling Plans**	**Table of Maximum Allowable Variations**
Alcohol and Tobacco Products	U.S. Bureau of Alcohol, Tobacco, and Firearms and state and local weights and measures ~~**http://www.atf.treas.gov**~~ **http:// www.atf.gov**		by Count with Less than 50 Items
Pesticides	U.S. Environmental Protection Agency and state and local weights and measures http://www.epa.gov		

Table 2-1. Sampling Plans for Category A

1	2	3	4	5	6
Inspection Lot Size	**Sample Size**	**Sample Correction Factor**	**Number of Minus Package Errors Allowed to Exceed the MAV ***	**Initial Tare Sample Size [2]**	
				Glass and Aerosol Packages	**All Other Packages**
1	1	Apply MAV	0[1]	2	2
2	2	8.984~~5~~			
3	3	2.484			
4	4	1.591			
5	5	1.24~~1~~**2**			
6	6	1.0~~5~~049			
7	7	0.925			
8	8	0.836			
9	9	0.769			
10	10	0.715			
11	11	0.672			
12 to 250	12	0.635			
251 to 3 200	24	0.422		3	
More than 3 200	48	0.29~~1~~0	1[1]		

[1] For mulch and soils packaged by volume, see Table 2-10. Exceptions to the Maximum Allowable Variations – 1 package may exceed the MAV for every 12 packages in the sample.

[2] If sample size is 11 or fewer, the initial tare sample size and the total tare sample size is 2 samples.
(Amended 2001)

Table 2-2. Sampling Plans for Category B
For Use in USDA-Inspected Meat and Poultry Plants Only

1	2	3	4
Inspection Lot Size	**Sample Size**	**Initial Tare Sample Size**	**Number of Packages Allowed to Exceed the MAVs in Table 2-9**
250 or Fewer	10	2	0
251 or More	30	5	

Table 2-3. Category A – Total Number of Packages to be Opened for Tare Determination Numbers Include those Packages Opened for Initial Tare Sample					
Ratio of R_c/R_t	**Total Number of Packages in Tare Sample**				
Sample Size	**12**	**24**		**48**	
Initial Tare Sample Size	**2**	**2**	**3**	**2**	**3**
If range of tare equals "zero," use Initial Tare Sample Size. If the ratio is "zero" based on a "zero" range of net weight, open all of the packages in the sample.	2	2	3	2	3
If the ratio is greater than 0 but less than or equal to 0.2	12	24	24	48	48
0.21 to 0.60	12	24	24	48	48
0.61 to 0.70	12	24	24	47	47
0.71 to 0.80	12	23	23	47	47
0.81 to 1.00	12	23	23	46	46
1.01 to 1.10	11	23	23	46	46
1.11 to 1.20	11	23	23	45	45
1.21 to 1.30	11	22	22	45	45
1.31 to 1.50	11	22	22	44	44
1.51 to 1.60	11	22	22	43	43
1.61 to 1.70	11	21	21	42	42
1.71 to 1.80	10	21	21	42	42
1.81 to 1.90	10	21	21	41	41
1.91 to 2.00	10	20	20	41	41
2.01 to 2.10	10	20	20	40	40
2.11 to 2.20	10	20	20	39	39
2.21 to 2.30	10	19	19	39	39
2.31 to 2.40	9	19	19	38	38
2.41 to 2.50	9	19	19	37	37
2.51 to 2.60	9	18	18	37	37
2.61 to 2.70	9	18	18	36	36
2.71 to 2.80	9	18	18	35	35
2.81 to 2.90	9	17	17	34	34
2.91 to 3.00	8	17	17	34	34
3.01 to 3.10	8	17	17	33	33
3.11 to 3.30	8	16	16	32	32
3.31 to 3.40	8	16	16	31	31
3.41 to 3.50	8	15	15	30	30
3.51 to 3.60	7	15	15	30	30
3.61 to 3.70	7	15	15	29	29
3.71 to 3.90	7	14	14	28	28
3.91 to 4.00	7	14	14	27	27
4.01 to 4.10	7	13	13	27	27
4.11 to 4.20	7	13	13	26	26
4.21 to 4.30	6	13	13	25	25

Table 2-3. Category A – Total Number of Packages to be Opened for Tare Determination Numbers Include those Packages Opened for Initial Tare Sample					
Ratio of R_c/R_t	**Total Number of Packages in Tare Sample**				
Sample Size	**12**	**24**		**48**	
Initial Tare Sample Size	**2**	**2**	**3**	**2**	**3**
4.31 to 4.40	6	12	12	25	25
4.41 to 4.60	6	12	12	24	24
4.61 to 4.70	6	12	12	23	23
4.71 to 4.80	6	11	11	23	23
4.81 to 4.90	6	11	11	22	22
4.91 to 5.00	5	11	11	22	22
5.01 to 5.10	5	11	11	21	21
5.01 to 5.10	5	11	11	21	21
5.11 to 5.20	5	10	10	21	21
5.21 to 5.40	5	10	10	20	20
5.41 to 5.60	5	10	10	19	19
5.61 to 5.70	5	9	9	19	19
5.71 to 5.80	5	9	9	18	18
5.81 to 5.90	4	9	9	18	18
5.91 to 6.10	4	9	9	17	17
6.11 to 6.20	4	8	8	17	17
6.21 to 6.50	4	8	8	16	16
6.51 to 6.70	4	8	8	15	15
6.71 to 6.80	4	7	7	15	15
6.81 to 7.00	4	7	7	14	14
7.01 to 7.20	3	7	7	14	14
7.21 to 7.40	3	7	7	13	13
7.41 to 7.60	3	6	6	13	13
7.61 to 8.00	3	6	6	12	12
8.01 to 8.20	3	6	6	11	11
8.21 to 8.50	3	5	5	11	11
8.51 to 8.80	3	5	5	10	10
8.81 to 9.00	2	5	5	10	10
9.01 to 9.30	2	5	5	9	9
9.31 to 9.70	2	4	4	9	9
9.71 to 10.40	2	4	4	8	8
10.41 to 10.90	2	4	4	7	7
10.91 to 11.30	2	3	3	7	7
11.31 to 12.50	2	3	3	6	6
12.51 to 13.20	2	3	3	5	5
13.21 to 13.90	2	2	3	5	5
13.91 to 16.00	2	2	3	4	4
16.01 to 19.10	2	2	3	3	3
19.11 to 19.20	2	2	3	2	3
Initial Tare Sample Size	**2**	**2**	**3**	**2**	**3**

Table 2-4. Category B – Total Number of Packages to be Opened for Tare Determination Numbers Include those Packages Opened for Initial Tare Sample		
Ratio of R_c/R_t	**Total Number of Packages in Tare Sample**	
Sample Size	**10**	**30**
Initial Tare Sample Size	**2**	**5**
If the ratio is zero, based on a "zero" range of tare, use Initial Tare Sample Size. If the ratio is "zero" based on a "zero" range of net weight, open all the packages in the sample.	2	5
If the ratio is greater than 0 but less than or equal to 0.2	10	30
0.21 to 0.40	10	29
0.41 to 0.60	10	28
0.61 to 0.80	9	26
0.81 to 1.00	8	24
1.01 to 1.20	8	23
1.21 to 1.40	7	21
1.41 to 1.60	7	19
1.61 to 1.80	6	17
1.81 to 2.00	5	15
2.01 to 2.20	5	14
2.21 to 2.40	5	13
2.41 to 2.60	4	12
2.61 to 2.80	4	11
2.81 to 3.00	4	10
3.01 to 3.20	3	9
3.21 to 3.60	3	8
3.61 to 3.80	3	7
3.81 to 4.40	2	6
If the ratio is greater than 4.40, use the Initial Tare Sample Size	2	5

Table 2-5. Maximum Allowable Variations (MAVs) for Packages Labeled by Weight

Do Not Use this Table for Meat and Poultry Products subject to USDA Regulations – Use Table 2-9.
For Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs.

Labeled Quantity	Maximum Allowable Variations
Less than 36 g, 0.08 lb, or 1.28 oz	10 % of labeled quantity
36 g or more to 54 g **0.08 lb or more to 0.12 lb** 1.28 oz or more to 1.92 oz	3.6 g **0.008 lb** 1/8 oz
More than 54 g to 81 g **More than 0.12 lb to 0.18 lb** More than 1.92 oz to 2.88 oz	5.4 g **0.012 lb** 3/16 oz
More than 81 g to 117 g **More than 0.18 lb to 0.26 lb** More than 2.88 oz to 4.16 oz	7.2 g **0.016 lb** ¼ oz
More than 117 g to 154 g **More than 0.26 lb to 0.34 lb** More than 4.16 oz to 5.44 oz	9.0 g **0.020 lb** 5/16 oz
More than 154 g to 208 g **More than 0.34 lb to 0.46 lb** More than 5.44 oz to 7.36 oz	10.8 g **0.024 lb** 3/8 oz
More than 208 g to 263 g **More than 0.46 lb to 0.58 lb** More than 7.36 oz to 9.28 oz	12.7 g **0.028 lb** 7/16 oz
More than 263 g to 317 g **More than 0.58 lb to 0.70 lb** More than 9.28 oz to 11.20 oz	14.5 g **0.032 lb** ½ oz
More than 317 g to 381 g **More than 0.70 lb to 0.84 lb** More than 11.20 oz to 13.44 oz	16.3 g **0.036 lb** 9/16 oz
More than 381 g to 426 g **More than 0.84 lb to 0.94 lb** More than 13.44 oz to 15.04 oz	18.1 g **0.040 lb** 5/8 oz
More than 426 g to 489 g **More than 0.94 lb to 1.08 lb** More than 15.04 oz to 17.28 oz	19.9 g **0.044 lb** 11/16 oz
More than 489 g to 571 g More than 1.08 lb to 1.26 lb	21.7 g 0.048 lb
More than 571 g to 635 g More than 1.26 lb to 1.40 lb	23.5 g 0.052 lb
More than 635 g to 698 g More than 1.40 lb to 1.54 lb	25.4 g 0.056 lb
More than 698 g to 771 g More than 1.54 lb to 1.70 lb	27.2 g 0.060 lb
More than 771 g to 852 g More than 1.70 lb to 1.88 lb	29.0 g 0.064 lb
More than 852 g to 970 g More than 1.88 lb to 2.14 lb	31.7 g 0.070 lb

Table 2-5. Maximum Allowable Variations (MAVs) for Packages Labeled by Weight

Do Not Use this Table for Meat and Poultry Products subject to USDA Regulations – Use Table 2-9.
For Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs.

Labeled Quantity	Maximum Allowable Variations
More than 970 g to 1.12 kg More than 2.14 lb to 2.48 lb	35.3 g 0.078 lb
More than 1.12 kg to 1.25 kg More than 2.48 lb to 2.76 lb	39.0 g 0.086 lb
More than 1.25 kg to 1.45 kg More than 2.76 lb to 3.20 lb	42.6 g 0.094 lb
More than 1.45 kg to 1.76 kg More than 3.20 lb to 3.90 lb	49 g 0.11 lb
More than 1.76 kg to 2.13 kg More than 3.90 lb to 4.70 lb	54 g 0.12 lb
More than 2.13 kg to 2.63 kg More than 4.70 lb to 5.80 lb	63 g 0.14 lb
More than 2.63 kg to 3.08 kg More than 5.80 lb to 6.80 lb	68 g 0.15 lb
More than 3.08 kg to 3.58 kg More than 6.80 lb to 7.90 lb	77 g 0.17 lb
More than 3.58 kg to 4.26 kg More than 7.90 lb to 9.40 lb	86 g 0.19 lb
More than 4.26 kg to 5.30 kg More than 9.40 lb to 11.70 lb	99 g 0.22 lb
More than 5.30 kg to 6.48 kg More than 11.70 lb to 14.30 lb	113 g 0.25 lb
More than 6.48 kg to 8.02 kg More than 14.30 lb to 17.70 lb	127 g 0.28 lb
More than 8.02 kg to 10.52 kg More than 17.70 lb to 23.20 lb	140 g 0.31 lb
More than 10.52 kg to 14.33 kg More than 23.20 lb to 31.60 lb	167 g 0.37 lb
More than 14.33 kg to 19.23 kg More than 31.60 lb to 42.40 lb	199 g 0.44 lb
More than 19.23 kg to 24.67 kg More than 42.40 lb to 54.40 lb	226 g 0.50 lb
More than 24.67 kg More than 54.40 lb	2 % of labeled quantity

(Amended 2004)

Table 2-6. Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume

Do Not Use this Table for Meat and Poultry Products Subject to USDA Regulations
For Mulch, see Table 2-10. Exceptions to the Maximum Allowable Variations
Use Table 2-9 for USDA –Regulated Products.

Labeled Quantity	Maximum Allowable Variations (MAVs)
3 mL or less **0.50 fl oz or less** 0.18 in^3 or less	0.5 mL **0.02 fl oz** 0.03 in^3
More than 3 mL to 8 mL More than 0.18 in^3 to 0.49 in^3	1.0 mL 0.06 in^3
More than 8 mL to 14 mL More than 0.49 in^3 to 0.92 in^3	1.5 mL 0.09 in^3
More than 14 mL to 22 mL **More than 0.50 fl oz to 0.75 fl oz** More than 0.92 in^3 to 1.35 in^3	1.7 mL **0.06 fl oz** 0.10 in^3
More than 22 mL to 66 mL **More than 0.75 fl oz to 2.25 fl oz** More than 1.35 in^3 to 4.06 in^3	3.8 mL **0.13 fl oz** 0.23 in^3
More than 66 mL to 125 mL **More than 2.25 fl oz to 4.25 fl oz** More than 4.06 in^3 to 7.66 in^3	5.6 mL **0.19 fl oz** 0.34 in^3
More than 125 mL to 170 mL **More than 4.25 fl oz to 5.75 fl oz** More than 7.66 in^3 to 10.37 in^3	7.3 mL **0.25 fl oz** 0.45 in^3
More than 170 mL to 221 mL **More than 5.75 fl oz to 7.50 fl oz** More than 10.37 in^3 to 13.53 in^3	9.1 mL **0.31 fl oz** 0.55 in^3
More than 221 mL to 347 mL **More than 7.50 fl oz to 11.75 fl oz** More than 13.53 in^3 to 21.20 in^3	11.2 mL **0.38 fl oz** 0.68 in^3
More than 347 mL to 502 mL **More than 11.75 fl oz to 17.00 fl oz** More than 21.20 in^3 to 30.67 in^3	14.7 mL **0.5 fl oz** 0.90 in^3
More than 502 mL to 621 mL More than 17 fl oz to 21 fl oz More than 30.67 in^3 to 37.89 in^3	18.6 mL **0.63 fl oz** 1.13 in^3
More than 621 mL to 798 mL More than 21 fl oz to 27 fl oz More than 37.89 in^3 to 48.72 in^3	22.1 mL **0.75 fl oz** 1.35 in^3
More than 798 mL to 916 mL More than 27 fl oz to 31 fl oz More than 48.72 in^3 to 55.94 in^3	26.0 mL **0.88 fl oz** 1.58 in^3
More than 916 mL to 1.15 L **More than 31 fl oz to 39 fl oz** More than 55.94 in^3 to 70.38 in^3	29 mL **1 fl oz** 1.80 in^3
More than 1.15 L to 1.62 L **More than 39 fl oz to 55 fl oz** More than 70.38 in^3 to 99.25 in^3	36 mL **1.25 fl oz** 2.25 in^3

Table 2-6. Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume

Do Not Use this Table for Meat and Poultry Products Subject to USDA Regulations
For Mulch, see Table 2-10. Exceptions to the Maximum Allowable Variations
Use Table 2-9 for USDA –Regulated Products.

Labeled Quantity	Maximum Allowable Variations (MAVs)
More than 1.62 L to 2.04 L **More than 55 fl oz to 69 fl oz** More than 99.25 in^3 to 124.5 in^3	44 mL **1.5 fl oz** 2.70 in^3
More than 2.04 L to 2.51 L **More than 69 fl oz to 85 fl oz** More than 124.5 in^3 to 153.3 in^3	51 mL **1.75 fl oz** 3.1 in^3
More than 2.51 L to 3.04 L **More than 85 fl oz to 103 fl oz** More than 153.3 in^3 to 185.8 in^3	59 mL **2 fl oz** 3.6 in^3
More than 3.04 L to 4.73 L **More than 103 fl oz to 160 fl oz** More than 185.8 in^3 to 288.7 in^3	73 mL **2.5 fl oz** 4.5 in^3
More than 4.73 L to 5.48 L **More than 160 fl oz to 185.6 fl oz** More than 288.7 in^3 to 334.9 in^3	88 mL **3 fl oz** 5.4 in^3
More than 5.48 L to 7.09 L **More than 185.6 fl oz to 240 fl oz** More than 334.9 in^3 to 443.1 in^3	103 mL **3.5 fl oz** 6.3 in^3
More than 7.09 L to 8.04 L **More than 240 fl oz to 272 fl oz** More than 443.1 in^3 to 490.8 in^3	118 mL **4 fl oz** 7.2 in^3
More than 8.04 L to 10.17 L **More than 272 fl oz to 344 fl oz** More than 490.8 in^3 to 620.8 in^3	133 mL **4.5 fl oz** 8.1 in^3
More than 10.17 L to 11.59 L **More than 344 fl oz to 392 fl oz** More than 620.8 in^3 to 707.4 in^3	147 mL **5 fl oz** 9.0 in^3
More than 11.59 L to 16.56 L **More than 392 fl oz to 560 fl oz** More than 707.4 in^3 to 1 010 in^3	177 mL **6 fl oz** 10.8 in^3
More than 16.56 L to 18.92 L **More than 560 fl oz to 640 fl oz (5 gal)** More than 1 010 in^3 into 1 155 in^3	207 mL **7 fl oz** 12.6 in^3
More than 18.92 L to 23.65 L **More than 640 fl oz to 800 fl oz** More than 1 155 in^3 to 1 443 in^3	236 mL **8 fl oz** 14.4 in^3
More than 23.65 L to 26.73 L **More than 800 fl oz to 904 fl oz** More than 1 443 in^3 to 1 631 in^3	266 mL **9 fl oz** 16.2 in^3
More than 26.73 L **More than 904 fl oz** More than 1 631 in^3	**1 % of labeled quantity**

(Amended 2004)

Table 2-7. Maximum Allowable Variations (MAVs) for Packages Labeled by Count	
Labeled Quantity	**Maximum Allowable Variations (MAVs)**
17 or less	0
18 to 50	1
51 to 83	2
84 to 116	3
117 to 150	4
151 to 200	5
201 to 240	6
241 to 290	7
291 to 345	8
346 to 400	9
401 to 465	10
466 to 540	11
541 to 625	12
626 to 725	13
726 to 815	14
816 to 900	15
901 to 990	16
991 to 1 075	17
1 076 to 1 165	18
1 166 to 1 250	19
1 251 to 1 333	20
1 334 or more	1.5 % of labeled count rounded off to the nearest whole number

Table 2-8. Maximum Allowable Variations for Packages Labeled by Length, (Width), or Area For Textiles, Polyethylene Sheeting and Film – Use Table 2-10.	
Labeled Quantity	**Maximum Allowable Variations (MAVs)**
1 m or less 1 yd or less	3 % of labeled quantity
More than 1 m to 43 m More than 1 yd to 48 yd	1.5 % of labeled quantity
More than 43 m to 87 m More than 48 yd to 96 yd	2 % of labeled quantity
More than 87 m to 140 m More than 96 yd to 154 yd	2.5 % of labeled quantity
More than 140 m to 301 m More than 154 yd to 330 yd	3 % of labeled quantity
More than 301 m to 1 005 m More than 330 yd to 1 100 yd	4 % of labeled quantity
More than 1 005 m or 1 100 yd	5 % of labeled quantity
Maximum Allowable Variations for Packages Labeled by Area	
The MAV for packages labeled by area is 3 % of labeled quantity.	
For Textiles, Polyethylene Sheeting and Film, see Table 2-10. Exceptions to the MAVs.	

(Amended 2004)

Table 2-9. U.S. Department of Agriculture, Meat and Poultry Groups and Lower Limits for Individual Packages (Maximum Allowable Variations)		
Definition of Group and Labeled Quantity		**Lower Limit for Individual Weights (MAVs)**
Homogenous Fluid When Filled (e.g., baby food or containers of lard)	**All Other Products**	
Less than 85 g or 3 oz		10 % of labeled quantity
85 g or more to 453 g 3 oz or more to 16 oz		7.1 g 0.016 lb (0.25 oz)
More than 453 g More than 16 oz	85 g or more to 198 g 3 oz to 7 oz	14.2 g 0.031 lb (0.5 oz)
	More than 198 g to 1.36 kg 7 oz to 48 oz	28.3 g 0.062 lb (1 oz)
	More than 1.36 kg to 4.53 kg More than 48 oz to 160 oz	42.5 g 0.094 lb (1.5 oz)
	More than 4.53 kg More than 160 oz	1 % of labeled quantity

Table 2-10. Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood, and Packages Labeled by Count with Fewer than 50 Items

	Maximum Allowable Variations (MAVs)
Polyethylene Sheeting and Film	**Thickness** When the labeled thickness is 25 µm (1 mil or 0.001 in) or less, any individual thickness measurement of polyethylene film may be up to 35 % below the labeled thickness. When the labeled thickness is greater than 25 µm (1 mil or 0.001 in), individual thickness measurements of polyethylene sheeting may be up to 20 % less than the labeled thickness. The average thickness of a single package of polyethylene sheeting may be up to 4 % less than the labeled thickness. **Weight** The MAV for individual packages of polyethylene sheeting and film shall be 4 % of the labeled quantity.
Textiles	The MAVs are: For packages labeled with dimensions of 60 cm (24 in) or more: Three percent of the labeled quantity for negative errors and 6 % of the labeled quantity for plus errors. For packages labeled with dimensions less than 60 cm (24 in): 6 % of the labeled quantity for negative errors and 12 % for plus errors.
Mulch And Soil Labeled By Volume	The MAVs are: For individual packages: 5 % of the labeled volume. For example: One package may exceed the MAV for every 12 packages in the sample (e.g., when the sample size is 12 or fewer, 1 package may exceed the MAV and when the sample size is 48 packages, 4 packages may exceed the MAV).
Packaged Firewood and Packages Labeled by Count with Fewer than 50 Items	MAVs are not applied to these packages.

(Amended 2004)

Table 2-11. Accuracy Requirements for Packages Labeled by Low Count (50 or Fewer) and Packages Given Tolerances (Glass and Stemware)			
	1	**2**	**3**
Inspection Lot Size	**Sample Size**	**For Packages Labeled by Low Count (50 or Fewer)**	**For Packages Given Tolerances (Glasses and Stemware)**
		Number of Packages Allowed to Contain Less than the Labeled Count	**Number of Package Errors that May Exceed the Allowable Difference**
1 - 11	1-11	1	0
12 - 250	12	1	0
251 – 3 200	24	2	1
More than 3 200	48	3	2

(Amended 2004)

Appendix B. Random Number Tables

Reproduced from Million Random Digits, used with permission of the Rand Corporation, Copyright, 1955, The Free Press (**http://www.rand.org/publications/classics/randomdigits.)**

All of the sampling plans presented in this handbook are based on the assumption that the packages constituting the sample are chosen at random from the inspection lot. Randomness in this instance means that every package in the lot has an equal chance of being selected as part of the sample. It does not matter what other packages have already been chosen, what the package net contents are, or where the package is located in the lot.

To obtain a random sample, two steps are necessary. First it is necessary to identify each package in the lot of packages with a specific number whether on the shelf, in the warehouse, or coming off the packaging line. Then it is necessary to obtain a series of random numbers. These random numbers indicate exactly which packages in the lot shall be taken for the sample.

The Random Number Table

The random number tables in Appendix B are composed of the digits from 0 through 9, with approximately equal frequency of occurrence. This appendix consists of 8 pages. On each page digits are printed in blocks of ~~five~~ columns and blocks of ~~five~~ **five** rows. The printing of the table in blocks is intended only to make it easier to locate specific columns and rows.

Random Starting Place

Starting Page. The Random Digit pages are numbered B-2 through B-8. You can use the day of the week to determine the starting page or use the first page for the first lot you test in a location, the second page for the second lot, and so on, moving to the following page for each new lot.

Starting Column and Row. You may choose a starting page in the random number table and with eyes closed, drop a pencil anywhere on the page to indicate a starting place in the table.

For example, assume that testing takes place on the 3rd day of the week. Start with Table 3 of Appendix B. Assume you dropped your pencil on the page and it has indicated a starting place at column 22, row 45. That number is 1.

If one-digit random numbers are needed, record them, going down the column to the bottom of the page and then to the top of the next column, and so on. Ignore duplicates and record zero (0) as ten (10). Following on from the last example, these numbers are 3, 2, 9, 8, etc. If two-digit random numbers are needed, rule off the pages, and further pages if necessary, in columns of two digits each. If there is a single column left on the page, ignore this column, and rule the next page in columns of two. Again, ignore duplicate numbers and record 00 as 100. For example, using the same starting place as in the last example (Table 3, column 22, row 45), the recorded two-digit numbers would be 11, 34, 26, 95, etc. When three-digit numbers are needed, rule the page in columns of three. Record 000 as 1000. Starting on Table 3, column 22, row 45, the recorded numbers would be 119, 346, 269, 959, etc.

TABLE 1 – RANDOM DIGITS

11164	36318	75061	37674	26320	75100	10431	20418	19228	91792
21215	91791	76831	58678	87054	31687	93205	43685	19732	08468
10438	44482	66558	37649	08882	90870	12462	41810	01806	02977
36792	26236	33266	66583	60881	97395	20461	36742	02852	50564
73944	04773	12032	51414	82384	38370	00249	80709	72605	67497
49563	12872	14063	93104	78483	72717	68714	18048	25005	04151
64208	48237	41701	73117	33242	42314	83049	21933	92813	04763
51486	72875	38605	29341	80749	80151	33835	52602	79147	08868
99756	26360	64516	17971	48478	09610	04638	17141	09227	10606
71325	55217	13015	72907	00431	45117	33827	92873	02953	85474
65285	97198	12138	53010	94601	15838	16805	61004	43516	17020
17264	57327	38224	29301	31381	38109	34976	65692	98566	29550
95639	99754	31199	92558	68368	04985	51092	37780	40261	14479
61555	76404	86210	11808	12841	45147	97438	60022	12645	62000
78137	98768	04689	87130	79225	08153	84967	64539	79493	74917
62490	99215	84987	28759	19177	14733	24550	28067	68894	38490
24216	63444	21283	07044	92729	37284	13211	37485	10415	36457
16975	95428	33226	55903	31605	43817	22250	03918	46999	98501
59138	39542	71168	57609	91510	77904	74244	50940	31553	62562
29478	59652	50414	31966	87912	87154	12944	49862	96566	48825
96155	95009	27429	72918	08457	78134	48407	26061	58754	05326
29621	66583	62966	12468	20245	14015	04014	35713	03980	03024
12639	75291	71020	17265	41598	64074	64629	63293	53307	48766
14544	37134	54714	02401	63228	26831	19386	15457	17999	18306
83403	88827	09834	11333	68431	31706	26652	04711	34593	22561
67642	05204	30697	44806	96989	68403	85621	45556	35434	09532
64041	99011	14610	40273	09482	62864	01573	82274	81446	32477
17048	94523	97444	59904	16936	39384	97551	09620	63932	03091
93039	89416	52795	10631	09728	68202	20963	02477	55494	39563
82244	34392	96607	17220	51984	10753	76272	50985	97593	34320
96990	55244	70693	25255	40029	23289	48819	07159	60172	81697
09119	74803	97303	88701	51380	73143	98251	78635	27556	20712
57666	41204	47589	78364	38266	94393	70713	53388	79865	92069
46492	61594	26729	58272	81754	14648	77210	12923	53712	87771
08433	19172	08320	20839	13715	10597	17234	39355	74816	03363
10011	75004	86054	41190	10061	19660	03500	68412	57812	57929
92420	65431	16530	05547	10683	88102	30176	84750	10115	69220
35542	55865	07304	47010	43233	57022	52161	82976	47981	46588
86595	26247	18552	29491	33712	32285	64844	69395	41387	87195
72115	34985	58036	99137	47482	06204	24138	24272	16196	04393
07428	58863	96023	88936	51343	70958	96768	74317	27176	29600
35379	27922	28906	55013	26937	48174	04197	36074	65315	12537
10982	22807	10920	26299	23593	64629	57801	10437	43965	15344
90127	33341	77806	12446	15444	49244	47277	11346	15884	28131
63002	12990	23510	68774	48983	20481	59815	67248	17076	78910
40779	86382	48454	65269	91239	45989	45389	54847	77919	41105
43216	12608	18167	84631	94058	82458	15139	76856	86019	47928
96167	64375	74108	93643	09204	98855	59051	56492	11933	64958
70975	62693	35684	72607	23026	37004	32989	24843	01128	74658
85812	61875	23570	75754	29090	40264	80399	47254	40135	69916

TABLE 2 – RANDOM DIGITS

40603	16152	83235	37361	98783	24838	39793	80954	76865	32713
40941	53585	69958	60916	71018	90561	84505	53980	64735	85140
73505	83472	55953	17957	11446	22618	34771	25777	27064	13526
39412	16013	11442	89320	11307	49396	39805	12249	57656	88686
57994	76748	54627	48511	78646	33287	35524	54522	08795	56273
61834	59199	15469	82285	84164	91333	90954	87186	31598	25942
91402	77227	79516	21007	58602	81418	87838	18443	76162	51146
58299	83880	20125	10794	37780	61705	18276	99041	78135	99661
40684	99948	33880	76413	63839	71371	32392	51812	48248	96419
75978	64298	08074	62055	73864	01926	78374	15741	74452	49954
34556	39861	88267	76068	62445	64361	78685	24246	27027	48239
65990	57048	25067	77571	77974	37634	81564	98608	37224	49848
16381	15069	25416	87875	90374	86203	29677	82543	37554	89179
52458	88880	78352	67913	09245	47773	51272	06976	99571	33365
33007	85607	92008	44897	24964	50559	79549	85658	96865	24186
38712	31512	08588	61490	72294	42862	87334	05866	66269	43158
58722	03678	19186	69602	34625	75958	56869	17907	81867	11535
26188	69497	51351	47799	20477	71786	52560	66827	79419	70886
12893	54048	07255	86149	99090	70958	50775	31768	52903	27645
33186	81346	85095	37282	85536	72661	32180	40229	19209	74939
79893	29448	88392	54211	61708	83452	61227	81690	42265	20310
48449	15102	44126	19438	23382	14985	37538	30120	82443	11152
94205	04259	68983	50561	06902	10269	22216	70210	60736	58772
38648	09278	81313	77400	41126	52614	93613	27263	99381	49500
04292	46028	75666	26954	34979	68381	45154	09314	81009	05114
17026	49737	85875	12139	59391	81830	30185	83095	78752	40899
48070	76848	02531	97737	10151	18169	31709	74842	85522	74092
30159	95450	83778	46115	99178	97718	98440	15076	21199	20492
12148	92231	31361	60650	54695	30035	22765	91386	70399	79270
73838	77067	24863	97576	01139	54219	02959	45696	98103	78867
73547	43759	95632	39555	74391	07579	69491	02647	17050	49869
07277	93217	79421	21769	83572	48019	17327	99638	87035	89300
65128	48334	07493	28098	52087	55519	83718	60904	48721	17522
38716	61380	60212	05099	21210	22052	01780	36813	19528	07727
31921	76458	73720	08657	74922	61335	41690	41967	50691	30508
57238	27464	61487	52329	26150	79991	64398	91273	26824	94827
24219	41090	08531	61578	08236	41140	76335	91189	66312	44000
31309	49387	02330	02476	96074	33256	48554	95401	02642	29119
20750	97024	72619	66628	66509	31206	55293	24249	02266	39010
28537	84395	26654	37851	80590	53446	34385	86893	87713	26842
97929	41220	86431	94485	28778	44997	38802	56594	61363	04206
40568	33222	40486	91122	43294	94541	40988	02929	83190	74247
41483	92935	17061	78252	40498	43164	68646	33023	64333	64083
93040	66476	24990	41099	65135	37641	97613	87282	63693	55299
76869	39300	84978	07504	36835	72748	47644	48542	25076	68626
02982	57991	50765	91930	21375	35604	29963	13738	03155	59914
94479	76500	39170	06629	10031	48724	49822	44021	44335	26474
52291	75822	95966	90947	65031	75913	52654	63377	70664	60082
03684	03600	52831	55381	97013	19993	41295	29118	18710	64851
58939	28366	86765	67465	45421	74228	01095	50987	83833	37216

TABLE 3 – RANDOM DIGITS

37100	62492	63642	47638	13925	80113	88067	42575	44078	62703
53406	13855	38519	29500	62479	01036	87964	44498	07793	21599
55172	81556	18856	59043	64315	38270	25677	01965	21310	28115
40353	84807	47767	46890	16053	32415	60259	99788	55924	22077
18899	09612	77541	57675	70153	41179	97535	82889	27214	03482
68141	25340	92551	11326	60939	79355	41544	88926	09111	86431
51559	91159	81310	63251	91799	41215	87412	35317	74271	11603
92214	33386	73459	79359	65867	39269	57527	69551	17495	91456
15089	50557	33166	87094	52425	21211	41876	42525	36625	63964
96461	00604	11120	22254	16763	19206	67790	88362	01880	37911
28177	44111	15705	73835	69399	33602	13660	84342	97667	80847
66953	44737	81127	07493	07861	12666	85077	95972	96556	80108
19712	27263	84575	49820	19837	69985	34931	67935	71903	82560
68756	64757	19987	92222	11691	42502	00952	47981	97579	93408
75022	65332	98606	29451	57349	39219	08585	31502	96936	96356
11323	70069	90269	89266	46413	61615	66447	49751	15836	97343
55208	63470	18158	25283	19335	53893	87746	72531	16826	52605
11474	08786	05594	67045	13231	51186	71500	50498	59487	48677
81422	86842	60997	79669	43804	78690	58358	87639	24427	66799
21771	75963	23151	90274	08275	50677	99384	94022	84888	80139
42278	12160	32576	14278	34231	20724	27908	02657	19023	07190
17697	60114	63247	32096	32503	04923	17570	73243	76181	99343
05686	30243	34124	02936	71749	03031	72259	26351	77511	00850
52992	46650	89910	57395	39502	49738	87854	71066	84596	33115
94518	93984	81478	67750	89354	01080	25988	84359	31088	13655
00184	72186	78906	75480	71140	15199	69002	08374	22126	23555
87462	63165	79816	61630	50140	95319	79205	79202	67414	60805
88692	58716	12273	48176	86038	78474	76730	82931	51595	20747
20094	42962	41382	16768	13261	13510	04822	96354	72001	68642
60935	81504	50520	82153	27892	18029	79663	44146	72876	67843
51392	85936	43898	50596	81121	98122	69196	54271	12059	62539
54239	41918	79526	46274	24853	67165	12011	04923	20273	89405
57892	73394	07160	90262	48731	46648	70977	58262	78359	50436
02330	74736	53274	44468	53616	35794	54838	39114	68302	26855
76115	29247	55342	51299	79908	36613	68361	18864	13419	34950
63312	81886	29085	20101	38037	34742	78364	39356	40006	49800
27632	21570	34274	56426	00330	07117	86673	46455	66866	76374
06335	62111	44014	52567	79480	45886	92585	87828	17376	35254
64142	87676	21358	88773	10604	62834	63971	03989	21421	76086
28436	25468	75235	75370	63543	76266	27745	31714	04219	00699
09522	83855	85973	15888	29554	17995	37443	11461	42909	32634
93714	15414	93712	02742	34395	21929	38928	31205	01838	60000
15681	53599	58185	73840	88758	10618	98725	23146	13521	47905
77712	23914	08907	43768	10304	61405	53986	61116	76164	54958
78453	54844	61509	01245	91199	07482	02534	08189	62978	55516
24860	68284	19367	29073	93464	06714	45268	60678	58506	23700
37284	06844	78887	57276	42695	03682	83240	09744	63025	60997
35488	52473	37634	32569	39590	27379	23520	29714	03743	08444
51595	59909	35223	44991	29830	56614	59661	83397	38421	17503
90660	35171	30021	91120	78793	16827	89320	08260	09181	53616

TABLE 4 – RANDOM DIGITS

54723	56527	53076	38235	42780	22716	36400	48028	78196	92985
84828	81248	25548	34075	43459	44628	21866	90350	82264	20478
65799	01914	81363	05173	23674	41774	25154	73003	87031	94368
87917	38549	48213	71708	92035	92527	55484	32274	87918	22455
26907	88173	71189	28377	13785	87469	35647	19695	33401	51998
68052	65422	88460	06352	42379	55499	60469	76931	83430	24560
42587	68149	88147	99700	56124	53239	38726	63652	36644	50876
97176	55416	67642	05051	89931	19482	80720	48977	70004	03664
53295	87133	38264	94708	00703	35991	76404	82249	22942	49659
23011	94108	29196	65187	69974	01970	31667	54307	40032	30031
75768	49549	24543	63285	32803	18301	80851	89301	02398	99891
86668	70341	66460	75648	78678	27770	30245	44775	56120	44235
56727	72036	50347	33521	05068	47248	67832	30960	95465	32217
27936	78010	09617	04408	18954	61862	64547	52453	83213	47833
31994	69072	37354	93025	38934	90219	91148	62757	51703	84040
02985	95303	15182	50166	11755	56256	89546	31170	87221	63267
89965	10206	95830	95406	33845	87588	70237	84360	19629	72568
45587	29611	98579	42481	05359	36578	56047	68114	58583	16313
01071	08530	74305	77509	16270	20889	99753	88035	55643	18291
90209	68521	14293	39194	68803	32052	39413	26883	83119	69623
04982	68470	27875	15480	13206	44784	83601	03172	07817	01520
19740	24637	97377	32112	74283	69384	49768	64141	02024	85380
50197	79869	86497	68709	42073	28498	82750	43571	77075	07123
46954	67536	28968	81936	95999	04319	09932	66223	45491	69503
82549	62676	31123	49899	70512	95288	15517	85352	21987	08669
61798	81600	80018	84742	06103	60786	01408	75967	29948	21454
57666	29055	46518	01487	30136	14349	56159	47408	78311	25896
29805	64994	66872	62230	41385	58066	96600	99301	85976	84194
06711	34939	19599	76247	87879	97114	74314	39599	43544	36255
13934	46885	58315	88366	06138	37923	11192	90757	10831	01580
28549	98327	99943	25377	17628	65468	07875	16728	22602	33892
40871	61803	25767	55484	90997	86941	64027	01020	39518	34693
47704	38355	71708	80117	11361	88875	22315	38048	42891	87885
62611	19698	09304	29265	07636	08508	23773	56545	08015	28891
03047	83981	11916	09267	67316	87952	27045	62536	32180	60936
26460	50501	31731	18938	11025	18515	31747	96828	58258	97107
01764	25959	69293	89875	72710	49659	66632	25314	95260	22146
11762	54806	02651	52912	32770	64507	59090	01275	47624	16124
31736	31695	11523	64213	91190	10145	34231	36405	65860	48771
97155	48706	52239	21831	49043	18650	72246	43729	63368	53822
31181	49672	17237	04024	65324	32460	01566	67342	94986	36106
32115	82683	67182	89030	41370	50266	19505	57724	93358	49445
07068	75947	71743	69285	30395	81818	36125	52055	20289	16911
26622	74184	75166	96748	34729	61289	36908	73686	84641	45130
02805	52676	22519	47848	68210	23954	63085	87729	14176	45410
32301	58701	04193	30142	99779	21697	05059	26684	63516	75925
26339	56909	39331	42101	01031	01947	02257	47236	19913	90371
95274	09508	81012	42413	11278	19354	68661	04192	36878	84366
24275	39632	09777	98800	48027	96908	08177	15364	02317	89548
36116	42128	65401	94199	51058	10759	47244	99830	64255	40516

TABLE 5 – RANDOM DIGITS

47505	02008	20300	87188	42505	40294	04404	59286	95914	07191
13350	08414	64049	94377	91059	74531	56228	12307	87871	97064
33006	92690	69248	97443	38841	05051	33756	24736	43508	53566
55216	63886	06804	11861	30968	74515	40112	40432	18682	02845
21991	26228	14801	19192	45110	39937	81966	23258	99348	61219
71025	28212	10474	27522	16356	78456	46814	28975	01014	91458
65522	15242	84554	74560	26206	49520	65702	54193	25583	54745
27975	54923	90650	06170	99006	75651	77622	20491	53329	12452
07300	09704	36099	61577	34632	55176	87366	19968	33986	46445
54357	13689	19569	03814	47873	34086	28474	05131	46619	41499
00977	04481	42044	08649	83107	02423	46919	59586	58337	32280
13920	78761	12311	92808	71581	85251	11417	85252	61312	10266
08395	37043	37880	34172	80411	05181	58091	41269	22626	64799
46166	67206	01619	43769	91727	06149	17924	42628	57647	76936
87767	77607	03742	01613	83528	66251	75822	83058	97584	45401
29880	95288	21644	46587	11576	30568	56687	83239	76388	17857
36248	36666	14894	59273	04518	11307	67655	08566	51759	41795
12386	29656	30474	25964	10006	86382	46680	93060	52337	56034
52068	73801	52188	19491	76221	45685	95189	78577	36250	36082
41727	52171	56719	06054	34898	93990	89263	79180	39917	16122
49319	74580	57470	14600	22224	49028	93024	21414	90150	15686
88786	76963	12127	25014	91593	98208	27991	12539	14357	69512
84866	95202	43983	72655	89684	79005	85932	41627	87381	38832
11849	26482	20461	99450	21636	13337	55407	01897	75422	05205
54966	17594	57393	73267	87106	26849	68667	45791	87226	74412
10959	33349	80719	96751	25752	17133	32786	34368	77600	41809
22784	07783	35903	00091	73954	48706	83423	96286	90373	23372
86037	61791	33815	63968	70437	33124	50025	44367	98637	40870
80037	65089	85919	74391	36170	82988	52311	59180	37846	98028
72751	84359	15769	13615	70866	37007	74565	92781	37770	76451
18532	03874	66220	79050	66814	76341	42452	65365	07167	90134
22936	22058	49171	11027	07066	14606	11759	19942	21909	15031
66397	76510	81150	00704	94990	68204	07242	82922	65745	51503
89730	23272	65420	35091	16227	87024	56662	59110	11158	67508
81821	75323	96068	91724	94679	88062	13729	94152	59343	07352
94377	82554	53586	11432	08788	74053	98312	61732	91248	23673
68485	49991	53165	19865	30288	00467	98105	91483	89389	61991
07330	07184	86788	64577	47692	45031	36325	47029	27914	24905
10993	14930	35072	36429	26176	66205	07758	07982	33721	81319
20801	15178	64453	83357	21589	23153	60375	63305	37995	66275
79241	35347	66851	79247	57462	23893	16542	55775	06813	63512
43593	39555	97345	58494	52892	55080	19056	96192	61508	23165
29522	62713	33701	17186	15721	95018	76571	58615	35836	66260
88836	47290	67274	78362	84457	39181	17295	39626	82373	10883
65905	66253	91482	30689	81313	01343	37188	37756	04182	19376
44798	69371	07865	91756	42318	63601	53872	93610	44142	89830
35510	99139	32031	27925	03560	33806	85092	70436	94777	57963
50125	93223	64209	49714	73379	89975	38567	44316	60262	10777
25173	90038	63871	40418	23818	63250	05118	52700	92327	55449
68459	90094	44995	93718	83654	79311	18107	12557	09179	28416

TABLE 6 – RANDOM DIGITS

96195	07059	13266	31389	87612	88004	31843	83469	22793	14312
22408	94958	19095	58035	43831	32354	83946	57964	70404	32017
53896	23508	16227	56929	74329	12264	26047	66844	47383	42202
22565	02475	00258	79018	70090	37914	27755	00872	71553	56684
49438	20772	60846	69732	07612	70474	46483	21053	95475	53448
65620	34684	00210	04863	01373	19978	61682	69315	46766	83768
20246	26941	41298	04763	19769	25865	95937	03545	93561	73871
09433	09167	35166	32731	73299	41137	37328	28301	61629	05040
95552	73456	16578	88140	80059	50296	07656	01396	83099	09718
76053	05150	69125	69442	16509	03495	26427	58780	27576	31342
34822	35843	78468	82380	52313	71070	71273	10768	86101	51474
07753	04073	58520	80022	28185	16432	86909	82347	10548	83929
04204	94434	62798	81902	29977	57258	87826	35003	46449	76636
96770	19440	29700	42093	64369	69176	29732	37389	34054	28680
65989	62843	10917	34458	81936	84775	39415	10622	36102	16753
06644	94784	66995	61812	54215	01336	75887	57685	66114	76984
88950	46077	34651	12038	87914	20785	39705	73898	12318	78334
21482	95422	02002	33671	46764	50527	46276	77570	68457	62199
55137	61039	02006	69913	11291	87215	89991	26003	55271	08153
98441	81529	59607	65225	49051	28328	85535	37003	87211	10204
57168	30458	23892	07825	53447	53511	09315	42552	43135	57892
71886	65334	38013	09379	83976	42441	14086	33197	82671	05037
40418	59504	52383	07232	14179	59693	37668	26689	93865	78925
28833	76661	47277	92935	63193	94862	60560	72484	29755	40894
37883	62124	62199	49542	55083	20575	44636	92282	52105	77664
44882	33592	66234	13821	86342	00135	87938	57995	34157	99858
19082	13873	07184	21566	95320	28968	31911	06288	77271	76171
45316	29283	89318	55806	89338	79231	91545	55477	19552	03471
22788	55433	31188	74882	44858	69655	08096	70982	61300	23792
08293	86193	05026	21255	63082	92946	28748	25423	45282	57821
29223	70541	67115	84584	10100	33854	26466	77796	70698	99393
22681	80110	31595	09246	39147	11158	43298	36220	88841	11271
74580	90354	43744	22178	38084	60027	24201	71686	59767	33274
69093	71364	08107	96952	50005	30297	97417	89575	04676	35616
40456	91234	58090	65342	95002	28447	21'700	43137	13746	85959
72927	67349	83962	58912	59734	76323	02913	46306	53956	38936
61869	33093	81129	06481	89281	83629	81960	63704	56329	10357
40048	16520	07638	10797	22270	57350	72214	36410	95526	87614
68773	97669	28656	89938	12917	25630	08068	19445	76250	24727
09774	30751	49740	11385	91468	28900	76804	52460	52320	70493
46139	36689	82587	13586	35061	76128	38568	62300	43439	53434
26566	95323	32993	89988	12152	01862	93113	33875	31730	62941
06765	57141	48617	18282	13086	76064	83334	70192	15972	80429
35384	90380	12317	89702	33091	68835	62960	38010	52710	87604
49333	78482	36199	11355	86044	88760	03724	22927	91716	92332
45595	14044	56806	99126	85584	87750	78149	22723	48245	78126
79819	15054	76174	12206	06886	06814	43285	20008	75345	19779
11971	62234	74857	46401	20817	57591	41189	49604	29604	30660
11452	89318	53084	21993	62471	74101	61217	76536	58393	63718
38746	81271	96260	98137	60275	22647	33103	50090	29395	10016

TABLE 7 – RANDOM DIGITS

93369	13044	69686	78162	29132	51544	17925	56738	32683	83153
19360	55049	94951	76341	38159	31008	41476	05278	03909	02299
47798	89890	06893	65483	97658	74884	38611	27264	26956	83504
69223	32007	03513	61149	66270	73087	16795	76845	44645	44552
34511	50721	84850	34159	38985	75384	22965	55366	81632	78872
54031	59329	58963	52220	76806	98715	67452	78741	58128	00077
66722	85515	04723	92411	03834	12109	85185	37350	93614	15351
71059	07496	38404	18126	37894	44991	45777	02070	38159	23930
45478	86066	31135	33243	01190	47277	55146	56130	70117	83203
97246	91121	89437	20393	76598	99458	76665	83793	37448	32664
22982	25936	96417	34845	28942	65569	38253	77182	12996	19505
48243	62993	47132	85248	79160	90981	71696	79609	33809	60839
93514	14915	67960	82203	22598	94802	75332	95585	69542	79924
69707	98303	93069	16216	01542	51771	16833	20922	94415	27617
87467	91794	70814	12743	17543	04057	71231	11309	32780	83270
81006	81498	59375	30502	44868	81279	23585	49678	70014	10523
15458	83481	50187	43375	56644	72076	59403	65469	74760	69509
33469	12510	23095	48016	22064	39774	07373	10555	33345	21787
67198	07176	65996	18317	83083	11921	06254	68437	59481	54778
58037	92261	85504	55690	63488	26451	43223	38009	50567	09191
84983	68312	25519	56158	22390	12823	92390	28947	36708	25393
35554	02935	72889	68772	79774	14336	50716	63003	86391	94074
04368	17632	50962	71908	13105	76285	31819	16884	11665	16594
81311	60479	69985	30952	93067	70056	55229	83226	22555	66447
03823	89887	55828	74452	21692	55847	15960	47521	27784	25728
80422	65437	38797	56261	88300	35980	56656	45662	29219	49257
61307	49468	43344	43700	14074	19739	03275	99444	62545	23720
83873	82557	10002	80093	74645	33109	15281	38759	09342	69408
38110	16855	28922	93758	22885	36706	92542	60270	99599	17983
43892	91189	87226	56935	99836	85489	89693	49475	31941	78065
93683	09664	53927	49885	94979	88848	42642	93218	80305	49428
32748	02121	11972	96914	83264	89016	45140	20362	63242	86255
49211	92963	38625	65312	52156	36400	67050	64058	45489	24165
63365	64224	69475	57512	85097	05054	88673	96593	00902	53320
63576	26373	44610	43748	90399	06770	71609	90916	69002	57180
41078	47036	65524	68466	77613	20076	71969	47706	22506	81053
70846	89558	64173	15381	67322	70097	82363	90767	17879	32697
68800	64492	20162	32707	69510	82465	26821	79917	34615	35820
44977	89525	51269	63747	30997	97213	53016	65909	05723	50168
79354	63847	24395	53679	07667	67993	24634	78867	78516	00448
14954	22299	40156	52685	19093	06090	23800	06739	76836	19050
01711	98439	09446	33937	98956	85676	89493	05132	45886	49379
62328	55328	45738	93940	15772	81975	91017	21387	57949	13992
73004	62109	81907	71077	50322	66093	79921	61412	18347	21115
34218	89445	03609	52336	19005	15179	94958	99448	11612	76981
99159	01968	45886	86875	05196	64297	59339	39878	61548	56442
92858	29949	15817	93372	34732	61584	72007	58597	43802	51066
27396	97477	65554	71601	01540	26509	19487	39684	18676	41219
37103	45309	30129	43380	66638	10841	77292	40288	25826	61431
57347	97012	48428	20606	54138	75716	23741	50462	13221	47216

Appendix C. Glossary

A

allowable difference. The amount, by which the actual quantity in the package may differ from the declared quantity. Pressed and blown tumblers and stemware labeled by count and capacity are assigned an allowable difference in capacity. This is also called a tolerance.

audit testing. Preliminary tests designed to quickly identify potential noncompliance units.

average. The sum of a number of individual measurement values divided by the number of values. For example, the sum of the individual weights of 12 packages divided by 12 would be the average weight of those packages.

average error. The sum of the individual "package errors" (defined) (considering their arithmetic sign) divided by the number of packages comprising the sample.

average requirement. A requirement that the average net quantity of contents of packages in a "lot" equals the net quantity of contents printed on the label.

average tare. The sum of the weights of individual package containers (or wrappers, etc.) divided by the number of containers or wrappers weighed.

B

berry baskets and boxes. Disposable containers in capacities of 1 dry quart or less for berries and small fruits. See Section 4.46. in NIST Handbook 44.

C

Category A (Category B). A set of sampling plans provided in this handbook to use in checking packages that must (except when exempted) meet the "average requirement" (defined).

chamois. A natural leather made from skins of sheep and lambs that have been oil-tanned.

combination quantity declarations. A package label that contains the count of items in the package as well as one or more of the following: weight, measure, or size.

compliance testing. Determining package conformance using specified legal requirements.

D

decision criteria. The rules for deciding whether or not a lot conforms to package requirements based on the results of checking the packages in the sample.

delivery. A quantity of identically labeled product received at one time by a buyer.

dimensionless units. The integers in terms of which the official records package errors. The dimensionless units must be multiplied by the "unit of measure" to obtain package errors in terms of weight, length, etc.

division, value of (d). The value of the scale division, expressed in units of mass, is the smallest subdivision of the scale for analog indication or the difference between two consecutively indicated or printed values for digital indication or printing. See NIST Handbook 44.

drained weight. The weight of solid or semisolid product representing the contents of a package obtained after a prescribed method for removal of the liquid has been employed.

dry measure. Rigid containers designed for general and repeated use in the volume measurement of particulate solids. See Section 4.45. Dry Measures in NIST Handbook 44.

dry pet food. All extruded dog and cat foods and baked treats packaged in Kraft paper bags and cardboard boxes that have a moisture content of 13 % or less at the time of packaging.

dry tare. See UNUSED DRY TARE.

E

error. See PACKAGE ERROR.

G

gravimetric test procedure. An analytical procedure that involves measurement by mass or weight.

gross weight. The weight of the package including contents, packing material, labels.

H

headspace. The container volume not occupied by product.

I

inch-pound units. Units based upon the yard, gallon, and the pound commonly used in the United States of America. Some of these units have the same name as similar units in the United Kingdom (British, English, or Imperial units), but they are not necessarily equal to them.

initial tare sample. The first packages (either two or five) selected from the sample to be opened for tare determination in the tare procedure. Depending upon the variability of these individual tare weights as compared with the variability of the net contents, this initial tare sample may be sufficient or more packages may be needed to determine the tare.

inspection lot. The collection of identically labeled (random packages, in some cases, are exempt from identity and labeled quantity when determining the inspection lot) packages available for inspection at one time. This collection will pass or fail as a whole based on the results of tests on a sample drawn from this collection.

L

label. Any written, printed, or graphic matter affixed to, applied to, attached to, blown into, formed, molded into, embossed on, or appearing upon or adjacent to a consumer commodity or a package containing any consumer commodity, for purposes of branding, identifying, or giving any information with respect to the commodity or to the contents of the package, except that an inspector's tag or other non-promotional matter

affixed to or appearing upon a consumer commodity is not a label. See Section 2.5 in the Uniform Packaging and Labeling Regulation in NIST Handbook 130.

linear measures. Rulers and tape measures.

location of test. The place where the package will be examined. This is broadly defined as one of three general locations: (1) where the commodity was packaged, (2) a warehouse or storage location, or (3) a retail outlet.

lot. See INSPECTION LOT.

lot code. A series of identifying numbers and/or letters on the outside of a package designed to provide information such as the date and location of packaging or the expiration date.

lot size. The number of packages in the "inspection lot".

M

MAV. See MAXIMUM ALLOWABLE VARIATION

maximum allowable variation (MAV). A deficiency in the weight, measure, or count of an individual package beyond which the deficiency is considered to be an "unreasonable error". The number of packages with deficiencies that are greater than the MAV is controlled by the sampling procedure.

measure containers. Containers whose capacities are used to determine quantity. They are of two basic types: (a) retail and (b) prepackaged. Retail containers are packaged at the time of retail sale, and prepackaged containers are packaged in advance of sale. An example of a prepackaged measure container is an ice cream package.

metric or SI units. Units of the International System of Units as established in 1960 by the General Conference on Weights and Measures and interpreted or modified for the United States by the Secretary of Commerce. (See NIST Special Publication 814 – Metric System of Measurement; Interpretation of the SI for the United States and Federal Government Metric Conversion Policy)

minus or plus errors. Negative or positive deviations from the labeled quantity of the actual package quantities as measured. See PACKAGE ERROR.

moisture allowance. That variation in weight of a packaged product permitted in order to account for loss of weight due to loss of moisture during good package distribution practices. For packaged goods subject to moisture loss, when the average net weight of a sample is found between the labeled weight and the boundary of the moisture allowance, the lot is said to be in a no-decision area. Further information is required to determine lot compliance or noncompliance.

mulch. Any product or material other than peat or peat moss for sale, or sold for primary use as a horticultural, above-ground dressing for decoration, moisture control, weed control, erosion control, temperature control, or other similar purposes.

N

net quantity or net contents. That quantity of packaged product remaining after all necessary deductions for tare (defined) have been made.

nominal. A designated or theoretical size that may vary from the actual.

nominal gross weight. The sum of the nominal tare weight (defined) plus the declared or labeled weight (or other labeled quantity converted to a weight basis).

P

package error. The difference between the actual net contents of an individual package as measured and the declared net contents on the package label; minus (−) for less than the label and plus (+) for more than the label.

packaged goods. Product or commodity put up in any manner in advance of sale suitable for either wholesale or retail sale.

petroleum products. Gasoline, diesel fuel, kerosene, or any product (whether or not such a product is actually derived from naturally occurring hydro-carbon mixtures known as "petroleum") commonly used in powering, lubricating, or idling engines or other devices, or labeled as fuel to power camping stoves or lights. Sewing machine lubricant, camping fuels, and synthetic motor oil are "petroleum products" for the purposes of this regulation. The following products are not "petroleum products": brake fluid, copier machine dispersant, antifreeze, cleaning solvents, and alcohol.

plus errors. See MINUS OR PLUS ERRORS

principal display panel or panels. Part(s) of a label that are designed to be displayed, presented, shown, or examined under normal and customary conditions of display and purchase. Wherever a principal display panel appears more than once on a package, all requirements pertaining to the "principal display panel" shall pertain to all such "principal display panels." See Section 2.7 in the Uniform Packaging and Labeling Regulation in NIST Handbook 130.

production lot. The total collection of packages defined by the packager, usually consisting of those packages produced within a given unit of time and coded identically.

pycnometer. A container of known volume used to contain material for weighing so that the weight of a known volume may be determined for the material. If it is constructed, it is called a density cup.

R

random pack. The term "random package" shall be construed to mean a package that is one of a lot, shipment, or delivery of packages of the same consumer commodity with varying weights which means, packages of the same consumer commodity with no fixed pattern of weight.

random sampling. The process of selecting sample packages such that all packages under consideration have the same probability of being selected. An acceptable method of random selection is to use a table of random numbers.

range. The difference between the largest and the smallest of a set of measured values.

reasonable variation. An amount by which individual package net contents are allowed to vary from the labeled net contents. This term is found in most federal and state laws and regulations governing packaged

goods. Reasonable variations from the labeled declaration are recognized for (1) unavoidable deviations in good manufacturing practice, and (2) loss or gain of moisture in good distribution practice.

rounding. The process of omitting some of the end digits of a numerical value and adjusting the last retained digit so that the resulting number is as near as possible to the original number.

S

sample. A group of packages taken from a larger collection of packages and providing information that can be used to make a decision concerning the larger collection of packages or of the package production process. A sample provides a valid basis for decision only when it is a random sample (defined).

sample correction factor. ~~Students' "t" value for a one sided test at the 3 % confidence level and n is the sample size~~. **The factor as computed is the ratio of the 97.5th quantile of the student's t-distribution with (n-1) degrees of freedom and the square root of n where n is the sample size.**

sample error limit (SEL). A statistical value computed by multiplying the sample standard deviation times the sample correction factor from Column 3 of Table 2-1. Category A – Sampling Plans for the appropriate sample size. The SEL value allows for the uncertainty between the average error of the sample and the average error of the inspection lot with an approximately 97**.5** % level of confidence.

sample size (n). The number of packages in a sample.

sampling plan. A specific plan that states the number of packages to be checked and the associated decision criteria.

scale tolerance. The official value fixing the limit of allowable error for weighing equipment as defined in NIST Handbook 44.

seat. (as in "seat diameter" or "seated capacity"). The projection or shoulder near the upper rim of a cup or container that is designed to serve as the support for a lid or cover.

seated capacity. The capacity of a cup, container, or bottle, as defined by the volume contained by them when the lid or a flat disc is inserted into the lid groove that is located inside and near the upper rim of the cup, container, or bottle.

SEL. See SAMPLE ERROR LIMIT.

shipment. A quantity of identically labeled product (except for lot code) sent at one time to a single location.

slicker plate. A flat plate, usually of glass or clear plastic composition, used to determine the "level full" condition of a capacity (volumetric) measure.

standard deviation. A measure to describe the scatter of the individual package contents around the mean contents.

standard pack. That type of package in which a commodity is put up with identical labels and only in certain specific quantity sizes. Examples of goods so packed are canned, boxed, bottled and bagged foods, and over-the-counter drugs.

supplementary quantity declarations. The required quantity declaration may be supplemented by one or more declarations of weight, measure, or count, such declaration appearing other than on a principal display panel. Such supplemental statement of quantity of contents shall not include any terms qualifying a unit of weight, measure, or count that tends to exaggerate the amount of commodity contained in the package (e.g., "giant" quart, "full" gallon, "when packed," "minimum," or words of similar import). See Section 6.12 in the Uniform Packaging and Labeling Regulation in NIST Handbook 130.

T

tare sample. The packages or packaging material used to determine the average tare weight.

tare sample size. The number of packages or packaging material units used to determine the average tare weight.

tare weight. The weight of a container, wrapper, or other material that is deducted from the gross weight to obtain the net weight.

tolerance. A value fixing the limit of allowed departure from the labeled contents; usually presented as a plus (+) and minus (-) value.

U

unit of measure. An increment of weight, length, or volume so that an inspector may record package errors in terms of small integers. (The package errors are actually the integers multiplied by the unit of measure.)

unreasonable errors. Minus package errors that exceed the MAV (defined). The number of unreasonable errors permitted in a sample is specified by the sampling plan.

unused dry tare. All unused packaging materials (including glue, labels, ties, etc.) that contain or enclose a product. It includes prizes, gifts, coupons, or decorations that are not part of the product.

used dry tare. Used tare material that has been air dried, or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than "normal" household recovery procedures, but not including laboratory procedures like oven drying. Labels, wire closures, staples, prizes, decorations, and such are considered tare. It is not the same as "wet tare." See also "wet tare."

V

volumetric measures. Standard measuring flasks, graduates, cylinders, for use in measuring volumes of liquids.

W

wet tare. Used packaging materials when no effort is made to reconstruct unused tare weight by drying out the absorbent portion (if any) of the tare.

Appendix D. Acknowledgments and References

We would like to thank the state and local weights and measures officials who evaluated the test procedures and commented on the drafts of this edition. We also thank the many packagers, industries, and trade associations for their comments and suggestions. We also received support and encouragement from the U.S. Department of Agriculture, Food Safety and Inspection Service; the Office of Food Labeling at Food and Drug Administration; and from the Federal Trade Commission. This project could not have been accomplished without the support and encouragement we received from other members of the NIST Office of Weights and Measures, especially Tina G. Butcher, Georgia Harris, Michele Krebs, and Richard Suiter. We could not have completed this handbook without the technical support, guidance, and encouragement provided by this team of dedicated professionals and friends.

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REFERENCES

C. Brickenkamp, S. Hasko, and M. G. Natrella, Third Edition of NIST Handbook 133 – Checking the Net Contents of Packaged Goods, 1988.

K. Butcher and T. Coleman, 4th Supplement to the Third Edition of NIST Handbook 133 – Checking the Net Contents of Packaged Goods, 1994.

T. Butcher, J. Williams, R. Suiter, and L. Crown, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, National Institute of Standards and Technology Handbook 44, 2004. Available at http://www.nist.gov/owm

T. Coleman, K. Dresser, and L. Crown, Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality, National Institute of Standards and Technology Handbook 130, 2004. Available at http://www.nist.gov/owm

Compressed Gas Association, Fourth Edition – Handbook of Compressed Gases, 1999. Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, Virginia 20151-2923. URL: http://www.cganet.com

P. Cunniff, ed., Official Methods of Analysis of the Association of Official Analytical Chemists International, Seventeenth Edition, Association of Official Analytical Chemists, 481 North Frederick Avenue, Suite 500, Gaithersburg, Maryland 20877, 2003. URL: http://www.aoac.org

Federal Test Method Standard 311 "Leather, Methods of Sampling and Testing." (January 15, 1969). U.S. General Services Administration.

G. L. Harris, Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 1. Specifications and Tolerances for Field Standard Weights (National Institute of Standards and Technology Class F), National Institute of Standards and Technology Handbook 105-1, 1990. Available at http://www.nist.gov/owm

G. L. Harris, Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures; 2. Specifications and Tolerances for Field Standard Measuring Flasks, National Institute of Standards and Technology Handbook 105-2, U.S. Government Printing Office, Washington, D.C., 1996. Available at http://www.nist.gov/owm

G. L. Harris, Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 5. Specifications and Tolerances for Field Standard Stopwatches, National Institute of Standards and Technology Handbook 105-5, 1997. Available at http://www.nist.gov/owm

G. L. Harris, Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 6. Specifications and Tolerances for Thermometers, National Institute of Standards and Technology Handbook 105-6, 1997. Available at http://www.nist.gov/owm

M. W. Jensen and R. W. Smith, The Examination of Weighing Equipment, National Institute of Standards and Technology Handbook 94, U.S. Government Printing Office, Washington, D.C., 1965.

G. D. Lee, Examination Procedure Outlines for Commercial Weighing and Measuring Devices, National Institute of Standards and Technology Handbook 112, 2002.

Rand Corporation. A Million Random Digits with 100,000 Normal Deviates, Glencoe, IL: The Free Press, 1955. The Rand Corporation, 1700 Main Street, P.O. Box 2138, Santa Monica, California 90407-2138. URL: http://www.rand.org

Standard Method of Test for Density of Plastics by the Density Gradient Technique, ASTM D 1505-03, 2003. URL: http://www.astm.org

Standard Method of Test for Volume of Processed Peat Materials, ASTM D 2978-71, 1998. URL: http://www.astm.org

Standard Method of Test for Yarn Number by the Skein Method, ASTM D 1907-01, 2001. URL: http://www.astm.org

Standard Practice for Calibration of Laboratory Volumetric Apparatus, ASTM E 542-01, 2001. URL: http://www.astm.org

Standard Specification for Glass Volumetric (Transfer) Pipets, ASTM E 969-02, 2002. URL: http://www.astm.org

Standard Specification for Laboratory Glass Graduated Burets, ASTM E 287-02, 2002. URL: http://www.astm.org

Standard Specification for Polyethylene Film and Sheeting, ASTM D 2103-03, 2003. URL: http://www.astm.org

Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications, ASTM D 4397-02, 2002. URL: http://www.astm.org

Standard Test Methods for Thickness of Solid Electrical Insulation, ASTM D 374-99, 1999. URL: http://www.astm.org

U.S. Department of Defense Military Standard, Sampling Procedures and Tables for Inspection by Attributes (MIL-STD-105 D), U.S. Government Printing Office, Washington, D.C., 1963.

B. Younglove and N. Olien. NBS Technical Note 1079 – Tables of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen, 1985.

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Appendix E. Model Inspection Report Forms

Report Form **Page**

Random ~~**Inspection**~~ **Package** Report G135 (E-3)

Random Package ~~**Inspection**~~ Report – Example G136 (E-2)

Standard Package ~~**Inspection**~~ Report G137 (E-4)

Standard ~~**Inspection**~~ **Package** Report – Example G138 (E-5)

Glazed Seafood Package Worksheet G139

Glazed Seafood Package Worksheet – Example G140

Glazed Seafood Package Report G141

Glazed Seafood Package Report – Example G142

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Date:	**Random Package Report**		Sampling Plan: ☐ A ☐ B	Report Number:
Location (name, address):	Product/Brand Identity: Lot Codes:		Manufacturer:	Container Description:

1. Labeled Quantity: (Enter weight for each package in Column 1 below.)	2. Unit of Measure:	3. MAV: (Look up the MAV for each package with a minus error (−), convert it to dimensionless units and enter this value in Column 4 below.)	5. Inspection Lot Size:	6. Sample Size (n):
7. Initial Tare Sample Size:	8. Number of MAVs Allowed:	9. Range of Package Errors (Rc):	10. Range of Tare Weights (Rt):	11. Rc/Rt (Box 9 ÷ Box 10 =):	12. Total No. of Tare Samples:
13. Avg. Tare Wt: ☐ Used Dry Tare ☐ Wet Tare ☐ Unused Dry Tare		13a. ☐ Tare Correction ☐ Moisture Allowance ☐ Not Applicable		14. Nominal Gross Wt: (Labeled Wt + Box 13 − Box 13a =)

	Pkg 1	**Pkg 2**	**Pkg 3**	**Pkg 4**	**Pkg 5**	**Pkg 6**	**Pkg 7**	**Pkg 8**	**Pkg 9**	**Pkg 10**
a. Gross Wt										
b. Tare Wt										
c. Net Wt										
d. Package Error										

Product Description, Lot Code, Unit Price	**Money Errors**		**Column 1 Labeled Net Weight**	**Package Errors**		**Column 4 MAV**
	–	**+**		**–**	**+**	
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
			Totals			

15. Total Error:	16. Number of unreasonable minus (−) errors: (Compare each package error with the MAV in Column 4.)	17. Is Box 16 greater than Box 8? ☐ Yes, lot fails ☐ No, go to Box 18	18. Avg. error in dimensionless units: (Box 15 ÷ Box 6 =)	19. Avg. error in labeled units (Box 18 x Box 2 =)

20. Is 18 Zero (0) or Plus (+)? ☐ Yes, lot passes, go to Box 25 ☐ No, go to Box 21	21. Compute Sample Standard Deviation	22. Sample Correction Factor	23. Compute Sample Error Limit (Box 21 x Box 22 =)

24. Disregarding the signs, is Box 18 larger than Box 23? ☐ Yes, lot fails, go to Box 25 ☐ No, lot passes, go to Box 25	25. Disposition of Inspection Lot ☐ Approved ☐ Rejected
Comments	Official's Signature: Acknowledgement of Report:

Date: *January 20, 2010*	**Random Package Report – Example**	Sampling Plan: ☒ A ☐ B	Report Number: 17

Location (name, address):	Product/Brand Identity:	Manufacturer:	Container Description:
L&O Market *MacCorkle Ave.* *Charleston, WV 251711*	*Ground Chuck* Lot Codes: *1, 19, 99*	*Meat Dept. – L&O Market*	*25 Tray w/soaker and plastic wrap*

1. Labeled Quantity: (Enter weight for each package in Column 1 below.)	2. Unit of Measure:	3. MAV: (Look up the MAV for each package with a minus error (−), convert it to dimensionless units and enter this value in Column 4 below.)	5. Inspection Lot Size:	6. Sample Size (n):
	0.001 lb		*23*	*12*

7. Initial Tare Sample Size:	8. Number of MAVs Allowed:	9. Range of Package Errors (Rc):	10. Range of Tare Weights (Rt):	11. Rc/Rt (Box 9 ÷ Box 10 =):	12. Total No. of Tare Samples:
2	*0*	*10*	*1*	*10*	*2*

13. Avg. Tare Wt: ☐ Used Dry Tare ☐ Wet Tare ☒ Unused Dry Tare	13a. ☐ Tare Correction ☐ Moisture Allowance ☒ Not Applicable	14. Nominal Gross Wt: (Labeled Wt + Box 13 − Box 13a =)
0.0205 lb		*Label Wt + 0.020 lb*

	Pkg 1	Pkg 2	Pkg 3	Pkg 4	Pkg 5	Pkg 6	Pkg 7	Pkg 8	Pkg 9	Pkg 10
a. Gross Wt	*1.852 lb*	*1.223 lb*								
b. Tare Wt	*0.020 lb*	*0.021 lb*								
c. Net Wt	*1.832 lb*	*1.202 lb*								
d. Package Error (Box a − Box 14 =)	*–18*	*–7*								

Product Description, Lot Code, Unit Price	Money Errors –	Money Errors +	Column 1 Labeled Net Weight	Package Errors –	Package Errors +	Column 4 MAV
1. *Ground Chuck – 1, 19, 99 – $1.79 per lb*			*1.85 lb*	*18*		
2.			*1.21 lb*	*7*		
3.			*1.56 lb*	*8*		
4.			*1.98 lb*	*14*		
5.	*$ 0.04*		*1.07 lb*	*23*		*44*
6.			*1.55 lb*	*16*		
7.			*1.02 lb*	*2*		
8.	*$ 0.04*		*1.44 lb*	*25*		*56*
9.			*1.33 lb*	*16*		
10.			*2.03 lb*	*20*		*70*
11.			*1.73 lb*	*14*		
12.			*1.16 lb*	*11*		
13.						
14.						
15.						
16.						
17.						
			Totals			

15. Total Error:	16. Number of unreasonable minus (−) errors: (Compare each package error with the MAV in Column 4.)	17. Is Box 16 greater than Box 8?	18. Avg. error in dimensionless units: (Box 15 ÷ Box 6 =)	19. Avg. error in labeled units (Box 18 x Box 2 =)
– 174	*0*	☐ Yes, lot fails ☒ No, go to Box 18	*– 14.5*	*– 0.014 lb*

20. Is 18 Zero (0) or Plus (+)?	21. Compute Sample Standard Deviation	22. Sample Correction Factor	23. Compute Sample Error Limit (Box 21 x Box 22 =)
☐ Yes, lot passes, go to Box 25 ☒ No, go to Box 21	*6.721*	*0.635*	*4.267*

24. Disregarding the signs, is Box 18 larger than Box 23?	25. Disposition of Inspection Lot
☒ Yes, lot fails, go to Box 25 ☐ No, lot passes, go to Box	☐ Approved ☒ Rejected

Comments	Official's Signature:
	Acknowledgement of Report:

Date:	**Standard Package Report**	Sampling Plan: ☐ A ☐ B	Report Number:

Location (name, address)	Product/Brand Identity Lot Codes	Manufacturer	Container Description

1. Labeled Quantity:	2. Unit of Measure:	3. MAV:	4. MAV (dimensionless units) (Box 3 ÷ Box 2 =)	5. Inspection Lot Size:	6. Sample Size (n):
7. Initial Tare Sample Size:	8. Number of MAVs Allowed:	9. Range of Package Errors (Rc):	10. Range of Tare Weights (Rt):	11. Rc/Rt: (Box 9 ÷ 10 =)	12. Total Number. of Tare Samples:

13. Average Tare Wt: ☐ Used Dry Tare ☐ Wet Tare ☐ Unused Dry Tare	13a. ☐ Tare Correction ☐ Moisture Allowance ☐ Vacuum Pack ☐ Not Applicable	14. Nominal Gross Wt: (Box 1 + Box13 − Box 13a =)

	Pkg 1	**Pkg 2**	**Pkg 3**	**Pkg 4**	**Pkg 5**	**Pkg 6**	**Pkg 7**	**Pkg 8**	**Pkg 9**	**Pkg 10**
a. Gross										
b. Tare Wt										
c. Net Wt										

−	+	−	+	−	+	−	+
1.		13.		25.		37.	
2.		14.		26.		38.	
3.		15.		27.		39.	
4.		16.		28.		40.	
5.		17.		29.		41.	
6.		18.		30.		42.	
7.		19.		31.		43.	
8.		20.		32.		44.	
9.		21.		33.		45.	
10.		22.		34.		46.	
11.		23.		35.		47.	
12.		24.		36.		48.	
Total:	Total:	Total:	Total:	Total:	Total:	Total:	Total:

15. Total Error:	16. Number of unreasonable minus (−) errors (compare each package error with Box 4)	17. Is Box 16 greater than Box 8? ☐ Yes, lot fails ☐ No, go to Box 18	18. Average error in dimensionless units (Box 15 ÷ Box 6 =)	19. Average error in labeled units: (Box 18 x Box 2 =)

20. Does Box 18 = Zero (0) or Plus (+)? ☐ Yes, lot passes, go to Box 25 ☐ No, go to Box 21	21. Compute Sample Standard Deviation	22. Sample Correction Factor	23. Compute Sample Error Limit (Box 21 x Box 22 =)

24. Disregarding the signs, is Box 18 larger than Box 23? ☐ Yes, lot fails, go to Box 25 ☐ No, lot passes, go to Box 25	25. Disposition of Inspection Lot ☐ Approved ☐ Rejected
Comments:	Official's Signature Acknowledgement of Report

Date: *January 20, 2010*	**Standard Package Report – Example**	Sampling Plan: ☒ A ☐ B	Report Number: *16*

Location (name, address)	Product/Brand Identity	Manufacturer	Container Description
Volunteer Market *18765 Alcoa Highway* *Knoxville, TN 37920*	*Community Group Cookies (Thin Mints)* Lot Codes: *April 2009 A & B*	*ABC Cookies Inc.* *1069 Capitol Aveue* *Nashville, TN 37204*	*Cardboard Box/* *Plastic Liner*

1. Labeled Quantity:	2. Unit of Measure:	3. MAV:	4. MAV (dimensionless units) (Box 3 ÷ Box 2 =)	5. Inspection Lot Size:	6. Sample Size (n):
453 g (l lb)	*0.001 lb*	*0.044 lb*	*44*	*172*	*12*

7. Initial Tare Sample Size:	8. Number of MAVs Allowed:	9. Range of Package Errors (Rc):	10. Range of Tare Weights (Rt):	11. Rc/Rt: (Box 9 ÷ 10 =)	12. Total Number. of Tare Samples:
2	*0*	*24*	*2*	*12*	*2*

13. Average Tare Wt:	13a.	14. Nominal Gross Wt:
0.014 lb ☒ Used Dry Tare ☐ Wet Tare ☐ Unused Dry Tare	☐ Tare Correction ☐ Moisture Allowance ☐ Vacuum Pack ☒ Not Applicable	(Box 1 + Box13 − Box 13a =) *1.014 lb*

	Pkg 1	Pkg 2	Pkg 3	Pkg 4	Pkg 5	Pkg 6	Pkg 7	Pkg 8	Pkg 9	Pkg 10
a. Gross	*1.052 lb*	*1.026 lb*								
b. Tare Wt	*0.015 lb*	*0.013 lb*								
c. Net Wt	*1.037 lb*	*1.013 lb*								

−	+	−	+	−	+	−	+
1.	*38*			25.		37.	
2.	*12*	14.		26.		38.	
3.	*8*	15.		27.		39.	
4.	*4*	16.		28.		40.	
5. *3*		17.		29.		41.	
6. *2*		18.		30.		42.	
7.	*12*	19.		31.		43.	
8. *2*		20.		32.		44.	
9.	*4*	21.		33.		45.	
10. *1*		22.		34.		46.	
11. *0*		23.		35.		47.	
12.	*6*	24.		36.		48.	
Total: *9*	Total: *84*	Total:	Total:	Total:	Total:	Total:	Total:

15. Total Error:	16. Number of unreasonable minus (−) errors (compare each package error with Box 4)	17. Is Box 16 greater than Box 8?	18. Average error in dimensionless units (Box 15 ÷ Box 6 =)	19. Average error in labeled units: (Box 18 x Box 2 =)
+ 72	*0*	☐ Yes, lot fails ☒ No, go to Box 18	*+ 6.25*	*+ 0.006 lb*

20. Does Box 18 = Zero (0) or Plus (+)?	21. Compute Sample Standard Deviation	22. Sample Correction Factor	23. Compute Sample Error Limit (Box 21 x Box 22 =)
☒ Yes, lot passes, go to Box 25 ☐ No, go to Box 21			

24. Disregarding the signs, is Box 18 larger than Box 23?	25. Disposition of Inspection Lot
☐ Yes, lot fails, go to Box 25 ☐ No, lot passes, go to Box 25	☒ Approved ☐ Rejected

Comments:	Official's Signature
Lot Passes	Acknowledgement of Report

Glazed Seafood Worksheet

STEP

1. Package Price (if standard pack) $ _____ Price Per Pound (if random pack) $ _____

   Lot Size:_____ Sample Size:_____ Unit of Measure:_____

2. Number each package. Weigh each package for Gross Package Weight and enter Row 1.
3. Enter Labeled Net Weight in Row 2. (If dual units determine the larger unit.) _____
4. Record the MAV in Row 3.
5. Weigh the receiving pan = _____ (enter in Row 4). (Clean and dry the receiving pan after each use. Check the weight and thoroughly clean the sieve.)
6. Deglaze the product. Remove the package from the low temperature storage. Open the package immediately and place the product in the sieve under a gentle spray of cold water. Carefully agitate the product, handling the product with care to avoid breaking the product. Continue the spraying process until all ice glaze that is seen or felt is removed.
7. Without shifting the product, incline the sieve to an angle of 17° to 20° (incline to facilitate drainage) and drain for 2 minutes using a stopwatch.
8. Transfer the entire product to the receiving pan to determine the net weight.
9. To calculate the net weight (receiving pan + product) – (receiving pan) = Net Weight (enter in Row 5)
10. Calculate ± Package error (net weight [Row 5] – labeled net weight [Row 2]) = ± Error, (enter in Row 6).

Row	Package	1	2	3	4	5	6	7	8	9	10	11	12
1	Gross Pkg. Weight												
2	Labeled Net Weight												
3	MAV												
4	Receiving Pan Weight (Step 5)												
5	Net Weight (Step 9)												
6	± Error (Step 10												

Used Dry Tare _____

Transfer data from the "Glazed Seafood Worksheet" to the "Glazed Seafood Form"

Glazed Seafood Worksheet – Example

STEP

1. Package Price (if standard pack) $ *6.99* Price Per Pound (if random pack) $ _____

   Lot Size: *6* Sample Size: *6* Unit of Measure: *0.001*

2. Number each package. Weigh each package for Gross Package Weight and enter Row 1.
3. Enter Labeled Net Weight in Row 2. (If dual units determine the larger unit.) *1 lb/453 g*
4. Record the MAV in Row 3.
5. Weigh the receiving pan = *0.795* (enter in Row 4). (Clean and dry the receiving pan after each use. Check the weight and thoroughly clean the sieve.)
6. Deglaze the product. Remove the package from the low temperature storage. Open the package immediately and place the product in the sieve under a gentle spray of cold water. Carefully agitate the product, handling the product with care to avoid breaking the product. Continue the spraying process until all ice glaze that is seen or felt is removed.
7. Without shifting the product, incline the sieve to an angle of 17° to 20° (incline to facilitate drainage) and drain for 2 minutes using a stopwatch.
8. Transfer the entire product to the receiving pan to determine the net weight.
9. To calculate the net weight (receiving pan + product) – (receiving pan) = Net Weight (enter in Row 5)
10. Calculate ± Package error (net weight [Row 5] – labeled net weight [Row 2]) = ± Error, (enter in Row 6).

Row	Package	1	2	3	4	5	6	7	8	9	10	11	12
1	Gross Pkg. Weight	*1.180*	*1.205*	*1.110*	*1.15*	*1.00*	*1.21*						
2	Labeled Net Weight	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*						
3	MAV	*0.044*	*0.044*	*0.044*	*0.044*	*0.044*	*0.044*						
4	Receiving Pan Weight (Step 5)	*0.795*	*0.795*	*0.795*	*0.795*	*0.795*	*0.795*						
5	Net Weight (Step 9)	*0.985*	*0.975*	*1.00*	*1.03*	*0.930*	*0.980*						
6	± Error (Step 10	*! 0.015*	*! 0.025*	*0*	*+ 0.030*	*! 0.070*	*! 0.020*						

Used Dry Tare *0.025*

Transfer data from the "Glazed Seafood Worksheet" to the "Glazed Seafood Form"

Date:	**Glazed Seafood Package Report**	Sampling Plan: ☐ A ☐ B	Report Number:
Location (name, address):	Product/Brand Identity: Lot Codes:	Manufacturer:	Container Description:

1. Standard Pack Labeled Quantity: (If random packed, enter weight for each package in Column 1 below.)	2. Unit of Measure:	3. MAV: Look up the MAV for each package with a minus (−) error, enter value in Column 4.	5. Inspection Lot Size	6. Sample Size (n)

7. Price per lb: 7a. Standard Pack: Package Price _____ divide by (Box 1) = _____ 7b. Random Pack: Labeled Price per lb _____	8. No. of MAVs Allowed

	Pkg 1	**Pkg 2**	**Pkg 3**	**Pkg 4**	**Pkg 5**	**Pkg 6**	**Pkg 7**	**Pkg 8**	**Pkg 9**	**Pkg 10**	**Pkg 11**	**Pkg 12**
Pkg. Gross Wt												
a. Labeled Net Wt												
b. Gross: Rec. Pan & deglazed product Wt												
c. Tare: Rec. Pan Wt												
d. Net Wt (Box b − Box c=)												
e. Package Error (Box d − Box a =)												

Package #	**Column 1 Labeled Net Weight** (random pack only)	**Package Errors**		**Column 4. MAV**
		−	**+**	
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Totals		**f.**	**g.**	

9. Total Error (Box f + Box g =):	10. Number of unreasonable minus (−) errors (compare each package error with the MAV in Column 4):	11. Is Box 10 greater than Box 8? ☐ Yes, lot fails ☐ No, go to Box 12	12. Avg. error (Box 9 ÷ Box 6 =):

13. Is Box 12 Zero (0) or Plus (+)? ☐ Yes, lot passes, go to Box 18 ☐ No, go to Box 14	14. Compute Sample Standard Deviation:	15. Sample Correction Factor:	16. Compute Sample Error Limit (Box 14 x Box 15 =)

17. Disregarding the signs, is Box 12 larger than Box 16? ☐ Yes, lot fails, go to Box 18 ☐ No, lot passes, go to Box 18	18. Disposition of Inspection Lot ☐ Approved ☐ Rejected	19. Economic Impact: (Box 12 x Box 7 x Box 5 =)

Comments:	Official's Signature: Acknowledgement of Report:

Date: *January 20, 2010*	**Glazed Seafood Package Report - Example**	Sampling Plan: ☒ A ☐ B	Report Number: *103*
Location (name, address): *Ocean Fresh Market 101 8th Street Key West, FL*	Product/Brand Identity: *Raw/Peeled Shrimp 71 – 90 Count* Lot Codes:	Manufacturer: *Ocean Fresh*	Container Description: *Plastic*

1. Standard Pack Labeled Quantity: *453 g (1 lb)* (If random packed, enter weight for each package in Column 1 below.)	2. Unit of Measure: *0.001 lb*	3. MAV: Look up the MAV for each package with a minus (−) error, enter value in Column 4. *0.044 lb*	5. Inspection Lot Size *6*	6. Sample Size (n) *6*

7. Price per lb:
7a. Standard Pack: Package Price $ *6.99* divide by (Box 1) = $ *6.99* 7b. Random Pack: Labeled Price per lb _____

8. No. of MAVs Allowed *0*

	Pkg 1	Pkg 2	Pkg 3	Pkg 4	Pkg 5	Pkg 6	Pkg 7	Pkg 8	Pkg 9	Pkg 10	Pkg 11	Pkg 12
Pkg. Gross Wt	*1.180*	*1.205*	*1.10*	*1.15*	*1.00*	*1.21*						
a. Labeled Net Wt	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*						
b. Gross: Rec. Pan & deglazed product Wt												
c. Tare: Rec. Pan Wt	*0.795*	*0.795*	*0.795*	*0.795*	*0.795*	*0.795*						
d. Net Wt (Box b − Box c=)	*0.985*	*0.975*	*1.00*	*1.03*	*0.930*	*0.980*						
e. Package Error (Box d − Box a =)	*! 0.015*	*! 0.025*	*0*	*+0.030*	*! 0.070*	*! 0.020*						

Package #	Column 1 Labeled Net Weight (random pack only)	Package Errors −	Package Errors +	Column 4. MAV
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
Totals		**f.**	**g.**	

9. Total Error (Box f + Box g =): *! 0.100*	10. Number of unreasonable minus (−) errors (compare each package error with the MAV in Column 4): *1*	11. Is Box 10 greater than Box 8? ☒ Yes, lot fails ☐ No, go to Box 12	12. Avg. error (Box 9 ÷ Box 6 =): *! 0.016*

13. Is Box 12 Zero (0) or Plus (+)? ☐ Yes, lot passes, go to Box 18 ☐ No, go to Box 14	14. Compute Sample Standard Deviation:	15. Sample Correction Factor:	16. Compute Sample Error Limit (Box 14 x Box 15 =)

17. Disregarding the signs, is Box 12 larger than Box 16? ☐ Yes, lot fails, go to Box 18 ☐ No, lot passes, go to Box 18	18. Disposition of Inspection Lot ☐ Approved ☒ Rejected	19. Economic Impact: (Box 12 x Box 7 x Box 5 =) ! 0.016 x $6.99 x 6 = $0.67

Comments: *Product found to contain less than the stated net contents. Failed due to MAV.*	Official's Signature: Acknowledgement of Report:

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Appendix H

Agricultural Seed Count Rule

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AMERICAN SEED TRADE ASSOCIATION

September 11, 2009

Don Onwiler
Executive Director
c/o Laws & Regulations Committee
National Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, NE 68508

Jonelle Brent
Chair, Central Weights & Measures Association
Illinois Department of Agriculture
801 Sangamon Ave
PO Box 19281
Springfield, IL 62794-9281

Re: Seed Count Rule for Agricultural Seeds

Dear Mr. Onwiler and Ms. Brent:

The American Seed Trade Association ("ASTA") submits this proposal to request that the National Conference on Weights and Measures ("NCWM") amend Handbook 133 by adopting the mechanical seed count procedures for agricultural seed promulgated by the Association of Official Seed Analysts ("AOSA") in its *Rules for Testing Seeds*. ASTA is the national trade association representing about 750 companies involved in seed production and distribution, plant breeding, and related industries in North America on matters involving the purchase and sale of seed. ASTA advocates science and policy issues of industry importance and is informed by the seed industry's experience and expertise. Our mission is to enhance the development and free movement of quality seed worldwide. ASTA's members are directly affected by the method used for determining the accuracy of seed count declarations on seed labels and appreciate the opportunity to work with NCWM on this important issue.

As widely adopted planting technologies have modernized agriculture in recent years, farmers increasingly prefer to purchase bulk seed by count (versus weight). Because of changes in industry practice, field inspectors commonly are conducting compliance checks by verifying count rather than net weight. The current Handbook 133 standard for packages labeled by count is not practicable to apply to verify statements of count for corn seed, soybean seed, field bean seed, and wheat seed. While the Handbook 133 standard for packages labeled by count functions well for products that are manufactured to precise size and weight specifications, seed that is sold for planting is still produced in seed production fields resulting in inevitable size and

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weight variations between seeds or kernels. Against this backdrop, the seed industry and AOSA, along with state and federal seed regulators and academics at leading agricultural universities, have developed a uniform and practical method for determining seed count that is widely accepted and used. 1/ NCWM's adoption of the AOSA consensus standard for seed count would ensure that a fair, uniform system for seed count is applied in a manner that ensures an accurate statement of count to the benefit of purchasers and sellers alike.

I. Background on Issue

The American seed industry has had a long and rich history of producing quality products that meet rigorous seed standards, including purity. Members of the seed industry aim to deliver high quality seed products that meet or exceed federal and state standards, as well as customer expectations, and to label seed accordingly. To that end, the AOSA *Rules for Testing Seeds* provide a practical approach for sampling and verifying seed count. In recent months, it has come to our attention through conversations with the Iowa Department of Agriculture that the two different standards regarding seed count labeling, one in Handbook 133 and the other in AOSA's *Rules for Testing Seeds*, are causing confusion. The broad consensus that had developed in the seed industry and among state seed control officials and academics on seed count labeling is threatened unless regulatory clarity is provided through adoption of a uniform method for verifying seed count in Handbook 133.

The manner in which seed is purchased and sold has significantly changed in recent years. Planting equipment has become more sophisticated and precise and producers have become more focused on plant populations on a per acre/per hectare basis. Instead of being sold by weight measurements, seed is increasingly sold and labeled by count. Further, in most instances, even when sold by weight, the seed count per pound is provided on the package. Such information is critically important to modern farming techniques and highly desired by industry's farmer customers. The underlying impetus for the proposal is demand-driven. That is, the seed industry has moved to sale by count in response to the purchasing preferences of its farmer customers.

Selling and labeling by count (rather than by weight or volume) reflects the nature of the product and customary channels of trade that have emerged for seed in recent years. However, because seed is the product of a natural process and is not uniform in size and weight, traditional methods for determining count have proven impractical when applied to seed. Seed is a living biological product. Differing weather conditions, storage conditions, and genetics result in a disparity in

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1/ AOSA is an organization of official state, federal, and university seed laboratories and regulators from the U.S. and Canada whose mission is to promote uniform laws, regulations, and laboratory test methods. The organization publishes *Rules for Testing Seeds* to promote uniformity among testing labs in seed qualities and characteristics.

The *Rules for Testing Seeds* were developed to aid the agriculture industry in avoiding some of the hazards of crop production by furnishing needed information about seeds that are to be used for planting purposes. The *Rules for Testing Seeds* set definitions and fundamental procedures that are based on a thorough knowledge of the principles involved with seeds and attempt to summarize and make useful the accumulated experience of seed analysts.

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the size and weight of seeds grown not only in the same production field, but also on the same plant or even on the same pod (in the case of soybeans). Environmental factors that cause seed size variability include the growing season length, heat unit accumulation, rainfall, soil type, fertility, and individual variety response to stress conditions. The impacts of these factors are particularly pronounced for corn and soybeans. For example, corn kernels can range from round to flat and can have different sizes and shapes depending on their location on an ear of corn. Additional handling to increase uniformity, such as sizing or sieving, cannot be undertaken because it may significantly damage the seed and render it unsuitable for sale.

The challenges for weights and measures officials conducting accurate, uniform regulatory compliance checks have been managed historically by Handbook 133's methods relating to packages sold by weight. The now widespread use of count promoted the development and acceptance of the AOSA method. At the request of farmers, the seed industry is increasingly providing seed count information on the package and is selling seed by count rather than by weight or volume to provide farmers with the information they desire and to maximize the value they obtain in each bag of seed. Because planting equipment has become more precise, farmers are able to better control the plant populations in their fields. Additionally, as there is increased seed value (due to traits, genetics, and treatment), farmers prefer not to retain any surplus seed. Selling by seed count also allows farmers to make purchasing decisions solely on the basis of agronomic considerations, rather than discriminating against some varieties of seed because of large seed size, which was the case when seed was sold by weight. Therefore, the seed industry has sought to deliver and market products that reflect this purchase preference of the growers. Knowing the number of seeds needed for the specific planting rates of their fields, farmers are better able to determine the cost of planting associated with seeding their fields. Because seed count is an important service provided to customers to assist with planting accuracy, seed companies have a strong interest in accuracy of their seed count and have worked together with regulators to develop reliable methods for determining seed count. The proposal directly advances the important role that Handbook 133 plays in ensuring accuracy and fair-dealing in the sale of agricultural seed.

II. Regulatory History

Interest in selling and labeling seed by seed count arose in the mid-1990s. In response, a number of AOSA and Society of Commercial Seed Technologists ("SCST") laboratories began offering seed count services. The addition of seed counts to the seed bag and label required the development of a standardized sampling and testing procedure that allowed for an appropriate level of variation that is scientifically validated and verifiable.

In 1995, AOSA established a committee to research and establish procedures for conducting seed counts. This committee was chaired by Dr. Richard Payne, Chief of the USDA-AMS Seed Regulatory and Testing Branch. The committee recognized that Handbook 133 stipulates a maximum allowable variation ("MAV") in packages labeled by count of 1.5% for packages containing over 1,334 items, which applies to almost all types of products and is not a seed

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specific standard. 2/ The industry's experience indicated that the standard in Handbook 133 was unattainable, and very difficult to apply, when applied to seed labeled by count. Because seed is a living biological product sold in very high quantities, it differs from the uniformly produced commodities to which the "packages labeled by count" provisions of Handbook 133 are typically applied.

The AOSA committee conducted "referee tests" in 1996 and 1997. 3/ In 1998, the AOSA Board of Directors approved a tentative rule for seed counts to be included in the AOSA *Rules for Testing Seeds*. Additional referee projects were conducted in 1998 and 1999, after analysts had an opportunity to become familiar with the procedure and to suggest modifications. The final proposal was approved in 2000. This standard is widely used and accepted now by many state regulatory seed officials, as well as by industry.

During this time period, NCWM's Laws and Regulations Committee worked with members of the seed industry, trade associations, and other interested parties to develop a proposal for NCWM consideration regarding agricultural seed count. 4/ Around 1998, two differing standards were proposed for determining seed count. One standard was based on studies undertaken by ASTA and Iowa State University and the other was based on AOSA's studies. 5/ Due to the disparity in the recommended allowable variations from labeled count determined by the two studies, and despite efforts to develop a joint proposal, the NCWM committee voted in 2000 to withdraw consideration of amending Handbook 133 seed count procedures. 6/ The Committee stated that "variations on seed count make it impossible to determine and establish an appropriate MAV. The Committee believes that it will be some time before such standards can be determined and considered." 7/ Since this time, AOSA's rule has been adopted as the uniform standard for the seed industry and seed control community. Indeed, collective experts in this field have come together to establish and validate the AOSA rule for seed count. A validated, consensus method provides NCWM with the opportunity to revisit this issue and to adopt the proposal that would align Handbook 133 with the AOSA method.

III. Current Seed Count Standards

Currently, both Handbook 133 and AOSA's *Rules for Testing Seeds* have rules governing labeled weight and/or count on agricultural seed packages. Handbook 133 sets a general

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2/ *See* Handbook 133, Table 2-7, Maximum Allowable Variations for Packages Labeled by Count; § 4.4, Packages Labeled by Count of More than 50 Items.

3/ A referee test is a specially designed test which is sent out to a number of seed laboratories in order to obtain information intended to improve seed testing and to provide valuable feedback to the participating laboratories. Referee tests promote precision, standardization, and uniformity among seed laboratories with regard to seed testing methods. They also allow for testing of new methods, which may prove to produce more uniform results than existing methods.

4/ NIST, Special Publication No. 932, 83rd NCWM, L&R 18 (1998).

5/ *Id.*

6/ NIST, Special Publication No. 957, 85th NCWM, L&R 13 (2000).

7/ *Id.*

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standard of maximum allowable variation at 1.5% of labeled count for products containing over 1,334 units, rounded to the nearest whole number. 8/ The AOSA's *Rules for Testing Seeds* set the "tolerance" specifically for labeled seed count at 2.0% for corn seed, 4.0% for soybean seed, 5.0% for field bean seed, and 3.0% for wheat seed based on a properly calibrated mechanical seed counter and a properly obtained representative sample. 9/ The "allowances" specifically account for biological variables that are not only unique to agricultural seed, but that also vary by seed type, as noted above.

The standards in Handbook 133 were not developed specifically for agricultural seeds labeled by count. Handbook 133 applies the same standard for products labeled by count to seed as to items where size and weight are precisely controlled in the manufacturing process. Because seed is a living biological product with variable sizes and weights for individual seeds in a single package, it differs from manufactured commodities that only have slight variation in size and weight between individual products. Environmental and storage factors can result in variations in the appearance, size, and weight of a single variety of seeds. As explained above, the need for adoption of the proposal arose only as a result of the growing prevalence of sale by count of agricultural seed.

Applying Handbook 133's standards that were developed based on uniform manufacturing production to this biological product can prove to be quite onerous in the context of modern agriculture. For example, under current test procedures, a package containing 80,000 seeds would require a manual count of 8,000 seeds by the inspector. 10/ As bags of agricultural seeds are often labeled with count declarations of over to 200,000 seeds, these requirements are impractical, if not impossible to apply in a regulatory context. Of course, neither industry nor purchasers are well-served if weights and measures officials lack a practical, effective means for conducting field package checks.

The AOSA *Rules for Testing Seeds* were thoughtfully developed to apply specifically to labeled seed count. They are used across the United States by private laboratories, official state seed testing laboratories, and state seed control officials in sampling, inspecting, analyzing, testing, and examining agricultural seeds. The AOSA *Rules for Testing Seeds* are therefore the standard most often used by state and federal regulators when enforcing the accuracy of seed count on seed labels. Many states have expressly adopted these rules into their state code. Accordingly, seed companies rely on the AOSA *Rules for Testing Seeds* as the source of the rules on the appropriate labeling of seed.

Although the AOSA *Rules for Testing Seeds* have been adopted by many states, some states are have indicated that they may be legally bound to apply the NIST Handbook 133 procedures to

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8/ Handbook 133, Table 2-7, Maximum Allowable Variations for Packages Labeled by Count. *See also* Handbook 133, § 4.4.

9/ AOSA, *Rules for Testing Seeds*, § 12. AOSA terminology differs from that used in the Weights & Measures community. That is, "tolerance" is understood to essentially specify the maximum allowable variation between labeled count and actual count contained within a package.

10/ *See* Handbook 133, § 4.4.

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agricultural seed due to a lack of clarity in their individual state regulations. 11/ While each state could certainly amend its laws to establish the AOSA *Rules for Testing Seeds* as the appropriate standard for agricultural seed labeling, it is more efficient and appropriate to amend Handbook 133 to include workable standards for agricultural seeds. This proposal is ripe for consideration and adoption because there is now uniformity in the industry and consensus among federal and state seed regulators about the appropriate approach that should be adopted. Furthermore, amending of Handbook 133 will also function to ensure the Handbook maintains its proper role as the authoritative source used by state weights and measures officials conducting net weight compliance inspections. The scope of the proposal is limited by the scientifically valid basis for the MAV values for the particular seed varieties. In the future, further amendment may be appropriate based on development of data validating values for other seed varieties.

IV. Considerations of an Accurate Seed Count

It is appropriate for NCWM to adopt the proposal, paralleling the AOSA's seed count rules, because the rules are based on comprehensive studies and will ensure accuracy. Research has indicated that there are a number of factors that must be considered when conducting a seed count. First, a representative sample of at least 500 grams must be drawn according to the sampling protocol and procedures specified in the AOSA *Rules for Testing Seeds*. The automatic seed counter also must be calibrated daily prior to use. For these reasons, detailed directions for maintaining a calibration sample and the calibration technique are included in AOSA's *Rules for Testing Seeds* and should be incorporated into Handbook 133.

Additionally, a purity analysis must be conducted on the sample so that only pure seeds will be counted. There are specific pure seed unit definitions for corn and soybeans described in the AOSA *Rules for Testing Seeds*, which would be adopted into Handbook 133 under this proposal. The rule provides a calculation for determining the number of seeds per pound based on the sample analyzed.

The final component of the AOSA's current seed count rule provides "tolerances" for comparing results between laboratories or comparing the label against a regulatory laboratory test. Because the wording of this section does not conform to the function of Handbook 133 as it was written for a different purpose (although is entirely applicable), this proposal suggests making a slight modification to this language. 12/ The variation levels were established from the research gathered during the referee projects. AOSA's rule establishes "tolerances" based on the typical variation in size and weight of different types of agricultural seed.

V. Proposed Amendment to Handbook 133

ASTA requests that Handbook 133 be amended by adding the language in Section 12 (Mechanical Seed Count) of the AOSA *Rules for Testing Seeds* as Section 4.11 of Handbook 133,

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11/ For example, Iowa's Attorney General recently determined that the state is bound to use Handbook 133's MAV standard for seed because the state Department of Agriculture lacks legal authority to use the AOSA standard.

12/ *See* Section V., below.

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to be titled "Procedure for Checking the Content of Certain Agricultural Seed Packages Labeled by Count." The language will be altered to conform the headings and section numbers.

In addition, AOSA *Rules for Testing Seeds* Section 12.6 will be changed as follows to adopt the provisions to Handbook 133's purposes (*i.e.*, packaging and labeling for sale): 13/

12.6 ~~Tolerances~~ *Maximum Allowable Variations* ~~for results from different laboratories.~~

Multiply the labeled seed count ~~or first seed count test result~~ by four percent for soybean samples, two percent for corn (round, flat or plateless) samples, five percent for field bean samples and three percent for wheat samples. Express the ~~tolerance~~ *maximum allowable variation* (the number of seeds) to the nearest whole number. Consider the results of two tests in ~~tolerance~~ *accord with the maximum allowable variation* if the difference, expressed as the number of seeds, is equal to or less than the ~~tolerance~~ *maximum allowable variation*.

Example:

Kind of seed: Corn
Label claim ~~(1st test)~~: 2275 seed/lb.

Lab Test ~~(2nd test)~~: Purity working weight = 500.3 g
Seed count of pure seed = 2479 seeds

$$\text{Number of seeds per pound} = \frac{453.6 \text{ g/lb} \times 2479 \text{ seeds}}{500.3 \text{ g}} = 2247.6 \text{ seeds/lb}$$

Rounded to the nearest whole number = 2248 seeds/lb

Calculate ~~tolerance~~ *maximum allowable variation* value for corn:

multiply label claim by 2%
2275 seeds/lb × 0.02 = 45.5 seeds/lb;
rounded to the nearest whole number = 46 seeds/lb

Determine the difference between label claim and lab test:

2275 seeds/lb – 2248 seeds/lb = 27 seeds/lb

The difference between the lab test ~~(2nd test)~~ and the label claim ~~(1st test)~~ is less than the ~~tolerance~~ *maximum allowable variation* (27 < 46); therefore, the two results are in ~~tolerance~~ *accord with the maximum allowable variation.*

13/ Language in italic would be added. Language crossed out would be deleted.

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In addition, Table 2-10 should be modified to add an exception to MAV for seed count. This table would be renamed to add "agricultural seed labeled by count" to the list of covered topics and a box would be added to the table explaining the specific MAVs for agricultural seeds (*i.e.*, 2.0% for corn seed, 4.0% for soybean seed, 5.0% for field bean seed, and 3.0% for wheat seed, all based on a properly calibrated mechanical seed counter). Table 1-1 would have a minor corresponding change, adopting the new name of Table 2-10.

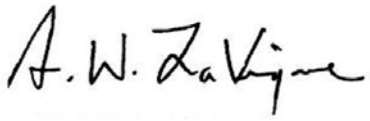
This proposal is structured so that the new MAV only applies to those seeds that fall within the scope of the new standard (*i.e.*, soybeans, corn, field beans, and wheat in packages labeled by count). Within Handbook 133, the accuracy of labeling for other seeds types and seeds labeled by weight would continue to fall under the Handbook's current provisions.

* * *

Historically, the sale of seed by weight has allowed regulatory officials to conduct accurate, uniform package checks to assess net weight compliance. Although Handbook 133 is an essential tool for checking and ensuring the accuracy of the net contents of packaged goods, Handbook 133 does not account for the unique factors that pertain to agricultural seed labeling when sold by count. In order to promote uniformity in labeling standards, ASTA requests that NWCM adopt the AOSA *Rules for Testing Seeds* provisions pertaining to mechanical seed count as part of Handbook 133.

Thank you for your consideration of this proposal. We would be pleased to make experts and technical resources available to the Conference on this matter. We look forward to working with you to ensure the accuracy of seed counts for agricultural products.

Sincerely,



Andrew W. LaVigne
President & CEO
American Seed Trade Association

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ASSOCIATION OF OFFICIAL SEED ANALYSTS

SECTION 12: MECHANICAL SEED COUNT

The following method shall be employed when using a mechanical seed counter to determine the number of seeds contained in a sample of soybean (*Glycine max*), corn (*Zea mays*), wheat (*Triticum aestivum*) and field bean (*Phaseolus vulgaris*).

12.1 Samples.

Samples for testing shall be of at least 500 grams for soybean, corn and field beans and 100 grams for wheat and received in moisture proof containers. Samples shall be retained in moisture proof containers until the weight of the sample prepared for purity analysis is recorded.

12.2 Seed counter calibration.

The seed counter shall be calibrated daily prior to use.

(a) Prepare a calibration sample by counting 10 sets of 100 seeds. Visually examine each set to insure that it contains whole seeds. Combine the 10 sets of seeds to make a 1,000 seed calibration sample. The seeds of the calibration sample should be approximately the same size and shape as the seeds in a sample being tested. If the seeds in a sample being tested are noticeably different in size or shape from those in the calibration sample, prepare another calibration sample with seeds of the appropriate size and shape. Periodically re-examine the calibration samples to insure that no seeds have been lost or added.

(b) Carefully pour the 1,000 seed calibration sample into the seed counter. Start the counter and run it until all the seeds have been counted. The seeds should not touch as they run through the counter. Record the number of seeds as displayed on the counter read out. The seed count should not vary more than ±2 seeds from 1,000. If the count is not within this tolerance, clean the mirrors, adjust the feed rate and/or reading sensitivity. Rerun the calibration sample until it is within the ±2 seed tolerance. If the seed counter continues to fail the calibration procedure and the calibration sample has been checked to ensure that it contains 1,000 seeds, do not use the counter until it has been repaired.

12.3 Sample preparation.

Immediately after opening the moisture proof container, mix and divide the submitted sample, in accordance with section 2.2, to obtain a sample for purity analysis and record the weight of this sample in grams to the appropriate number of decimal places (refer to section 2.3 a). Conduct the purity analysis to obtain pure seed for the seed count test.

RULES FOR TESTING SEEDS

12.4 Conducting the test.

After the seed counter has been calibrated, test the pure seed portion from the purity test and record the number of seeds in the sample.

12.5 Calculation of results.

Calculate the number of seeds per pound to the nearest whole number using the following formula:

$$\text{Number of seeds per pound} = \frac{453.6 \text{ g/lb} \times \text{no. of seeds counted in d.}}{\text{weight (g) of sample analyzed for purity}}$$

12.6 Tolerances for results from different laboratories.

Multiply the labeled seed count or first seed count test result by four percent for soybean samples, two percent for corn (round, flat or plateless) samples, five percent for field bean samples and three percent for wheat samples. Express the tolerance (the number of seeds) to the nearest whole number. Consider the results of two tests in tolerance if the difference, expressed as the number of seeds, is equal to or less than the tolerance.

Example:

Kind of seed: Corn
Label claim (1st test): 2275 seed/lb.

Lab Test (2nd test): Purity working weight = 500.3 g
Seed count of pure seed = 2479 seeds

$$\text{Number of seeds per pound} = \frac{453.6 \text{ g/lb} \times 2479 \text{ seeds}}{500.3 \text{ g}} = 2247.6 \text{ seeds/lb}$$

Rounded to the nearest whole number = 2248 seeds/lb

Calculate tolerance value for corn:

multiply label claim by 2%
2275 seeds/lb × 0.02 = 45.5 seeds/lb;
rounded to the nearest whole number = 46 seeds/lb

Determine the difference between label claim and lab test:

2275 seeds/lb – 2248 seeds/lb = 27 seeds/lb

The difference between the lab test (2nd test) and the label claim (1st test) is less than the tolerance (27 < 46); therefore, the two results are in tolerance.



AASCO

Association of American Seed Control Officials

September 11, 2009

Vicky L. Dempsey, Secretary-Treasurer
Central Weights and Measures Association
451 West Third Street, PO Box 972
Dayton, OH 45422

Jonelle Brent, Chair of Executive Committee
Central Weights and Measures Association
c/o IL Department of Agriculture
PO Box 19281
Springfield, Illinois 62794-9281

RE: Seed Count Rule for Agricultural Seeds

Dear Vicky and Jonelle:

The Association of American Seed Control Officials (AASCO) supports the methods and acceptable variances to determine seed counts as established in the Association of Official Seed Analyst (AOSA) "Rules for Testing Seed". The Recommended Uniform State Seed Law (RUSSL) establishes that the methods used to sample, analyze and test seed shall be those as established by the Association of Official Seed Analysts Rules for Testing Seed.

Seed is a biological unit and as such, it is subject to environmental influences that introduce variation in size and density. Seed cannot be produced utilizing a standardized manufacturing process that controls size and density. Utilizing a process of referee testing and scientific review, The Association of Official Seed Analyst, has established in the Rules for Testing Seed, acceptable testing methods and variances for Corn, Soybeans, Field Beans, and Wheat that are recognized and utilized by state seed control officials in the administration of their respective state seed laws. These standards are also acceptable to the regulated seed industry as a fair and valid means for determining that their products are in compliance with the respective state seed laws.

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AASCO

Association of American Seed Control Officials

The Association of American Seed Control Officials is a professional organization of state seed control officials organized in 1945 for purposes of maintenance and amendment of the Recommended Uniform State Seed Law, promotion of uniformity in state seed laws and regulations, and promotion of cooperation between the administrators of the seed laws of the US States, the Dominion of Canada and the Federal Seed Act.

The Association of American Seed Control Officials respectfully requests that NIST adopt the methods and variances used to establish seed counts for Soybeans, Corn, Field Beans and Wheat as established in the Association of Official Seed Analyst Rules for Testing Seed.

Best Regards,

Ronald R. Pence
President – AASCO

Assistant Administrator, Commodity Inspection Division
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National Corn Growers Association
www.ncga.com

January 22, 2010

Mr. Don Onwiler Executive Director National Conference on Weights and Measures 1135 M Street, Suite 110 Lincoln, Nebraska 68508

Dear Mr. Onwiler:

The National Corn Growers Association (NCGA) supports adoption of the proposal requesting the National Conference on Weights and Measures amend the National Institute for Standards and Technology (NIST) Handbook 133 by adopting the mechanical seed count procedures for agricultural seed promulgated by the Association of Official Seed Analysts (AOSA) in its *Rules for Testing Seeds*. Founded in 1957, NCGA represents approximately 35,000 dues-paying corn growers and the interests of more than 300,000 farmers who contribute through corn checkoff programs in their states. NCGA and its 48 affiliated state associations and checkoff organizations work together to help protect and

advance corn growers' interests.

We believe that farmers currently prefer to purchase bulk seed by count rather than weight. We also believe that a 2% Maximum Allowable Variation (MAV) for corn would be a more accurate way for farmers to purchase the right amount of seed.

We believe the National Conference on Weights and Measures should approve the use of AOSA's seed count rules and that the AOSA documented MAV's for corn seed count be harmonized into NIST.

Sincerely,

Darrin Ihnen
President

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American Soybean Association

January 14, 2010

Andrew W. LaVigne
President and CEO
American Seed Trade Association

Dear Andrew:

On behalf of the American Soybean Association (ASA), I would like to express our support for the seed count procedures for agricultural seed recommended by the Association of Official Seed Analysts (AOSA). Adoption of the AOSA standard would provide a consistent seed count that benefits both seed customers and seed merchants.

Soybean producers prefer to purchase bulk seed by count rather than weight. Since soybean seeds vary in size, newer, more precise planting equipment is designed to plant by numbered populations rather than by weight. Larger seeds weigh more, so purchasing by weight could end up shorting a farmer on population density. Therefore, having a count (within the 4% maximum allowable variance established by AOSA) is a more accurate way for farmers to purchase the right amount of seed.

AOSA has developed uniform and practical methods for testing seed which are widely accepted. We believe the National Conference on Weights and Measures should approve the use of AOSA's seed count rules, relying on the extensive testing that has gone into the accuracy of the process. We also ask that the National Institute for Standards and Technology (NIST) adopt the methods and variances for soybean seed count as found in AOSA rules.

Sincerely,

Robinson L. Joslin, President
American Soybean Association

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November 23, 2009

Andrew W. LaVigne
President and CEO
American Seed Trade Association

Dear Andrew:

On behalf of Iowa's soybean farmers, the Iowa Soybean Association wishes to speak in support of adopting the seed count procedures for agricultural seed as put forth by the Association of Official Seed Analysts (AOSA). We believe that farmers currently prefer to purchase bulk seed by count rather than weight. Soybean seeds vary in size but newer, more precise planting equipment plants by numbered populations rather than by weight. Larger seeds weigh more, so purchasing by weight could end up shorting a farmer on population density. Therefore, having a count (within the 4% maximum allowable variance established by AOSA) is a more accurate way for farmers to purchase the right amount of seed.

We believe that AOSA has developed uniform and practical methods for testing seed which are widely accepted. Adoption of the AOSA standard would provide a consistent seed count that benefits both seed customers and seed merchants.

We believe the National Conference on Weights and Measures should approve the use of AOSA's seed count rules, relying on the extensive testing that has gone into the accuracy of the process. We also ask that the National Institute for Standards and Technology (NIST) adopt the methods and variances for soybean seed count as found in AOSA rules.

Sincerely,



Delbert Christensen, President
Iowa Soybean Association

January 7, 2010

Don Onwiler, Executive Director National
Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, Nebraska 68508

RE: Seed Count for Agricultural Seeds

Dear Mr. Onwiler,

The Association of Official Seed Control Analysts (AOSA) strongly supports the amendment of NIST Handbook 133 to adopt the procedures and maximum acceptable variances to determine seed counts as established in the Association of Official Seed Analysts' (AOSA) "Rules for Testing Seeds". These standardized seed testing methods and procedures are the primary basis for seed testing and seed labeling in the United States seed community. The vast majority of states recognized the AOSA Rules in their state seed laws and the Federal Seed Act incorporates AOSA testing methods and is periodically updated with AOSA Rule amendments. Adoption of these rules by the weights and measures community would promote uniformity and consistency in state laws.

Precision planting of seeds has led to changes in the way seed is labeled and sold. Farmers need to know the number of seeds in a bag in order to predetermine their planting rates and to figure the costs associated with seeding a field. Seed is the product of a natural, biological process and therefore is not uniform in size and weight. Differing weather conditions and genetics will result in disparity in the size and weight of varieties of seed corn, soybeans, field beans and wheat seed. In order to compensate for the variability of these seeds, seed companies have started to sell seed by seed count rather than by weight. Selling seed by seed count provides farmers the information they need to purchase a specific and accurate amount of seed to plant their fields.

Research had indicated that there are a number of factors that must be considered when conducting a seed count. The AOSA Rules for Testing Seeds specify sampling procedures, calibration of mechanical seed counters, pure seed unit analysts, formulas for determining the number of seeds per pound and provides scientifically based tolerances for comparing results between laboratories or comparing the label against a regulatory laboratory test.

The AOSA Seed Count Rule is the industry standard and has been accepted practice for more than a decade. It is also the standard used by seed control regulatory officials in the states that have adopted the AOSA *Rules for Testing Seeds*. There is clear, scientific evidence to support the procedures and tolerances included in the AOSA *Rules for Testing Seeds*. Seed companies are serving the consumer by selling their seed by seed count. Seed companies should be held to a consistent, fair, and practical standard in all states. It is our position that this standard should be the AOSA Rules for Testing Seeds.

Sincerely,



Michael G. Stahr, AOSA President Iowa State
University Seed Science Center 128A Seed Science
Center Iowa State University Ames, Iowa 50011
515-294-0117 (phone) Email: mgstahr@iastate.edu

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

College of Agriculture
Seed Science Center
Ames, Iowa 50011
FAX 515 294-2014

September 13, 2009

National Conference on Weights & Measures
Attention: Executive Director, info@ncwm.net
1135 M Street
Suite 110
Lincoln, Nebraska 68508

Jonelle Brent
Chair, Central Weights & Measures Association
Illinois Department of Agriculture
P.O. Box 19281
Springfield, Illinois 62794-9281
Fax: (217) 524-7801
e-mail: jonelle.brent@illinois.gov

Re: Proposal for Amendment to NIST Handbook 133 with respect to Seed Count Labeling

Dear Conference Members:

The Iowa State University Seed Science Center supports amending NIST Handbook 133 to establish Maximum Allowable Variation ("MAV") levels and related procedures for seed count verification that are scientifically obtainable given the unique nature of seed as a biological product subject to environmental factors that cause very significant seed size variability.

The issue of appropriate MAV's for seed count based labeling of different crops has been the subject of study and deliberation by the National Conference of Weights & Measures ("NCWM") for many years, beginning at least as early as 1995. NCWM has carefully considered research data presented by Iowa State University personnel and many others over the subsequent years; however, action on the issue was withdrawn at prior Conferences because it was felt that "variations on seed count make it impossible to determine and establish an appropriate MAV" and "it will be some time before such standards can be determined and considered." (*Interim Meeting Action, 1999 NCWM Interim Meeting report).*

The issue has grown in importance over the past ten years. The Iowa Department of Agriculture has recently taken the position that the Maximum Allowable Variation (MAV) values provided in Table 2-7 (NIST Handbook 133) should also apply to all packages containing seed that are labeled by count. The table provides a stepwise sequence of different MAV levels for various package sizes, converging to 1.5% of labeled count (rounded to the nearest whole number) for packages containing more than 1,334 items. Due to customer demand, package quantity or seed

count based labeling has been increasingly popular for seed applications in recent years. The seed containers currently in commercial use in Iowa and other states are relatively large, with traditional bags typically containing at least 80,000 seeds for seed corn and possibly exceeding 200,000 seeds for other crops. Quantity based labeling is also being introduced for bulk packaging in large bags or boxes, with potential individual package quantities easily exceeding 4,000,000 seeds. The related research conducted at the Iowa State Seed Science Center in the late 1990's was previously presented to the NCWM and demonstrated that a 1.5% MAV for seed count is not appropriate.

The Iowa State Seed Science Center has worked over the years with the Association of Official Seed Analysts ("AOSA") on the issue of the appropriate MAV's for seed count labeling for different kinds of seed. The AOSA *Rules for Testing Seed* reflect an appropriate consideration of scientific data and are frequently referenced in state laws and regulations as an official source of methods for the analytical testing of seed. The AOSA documentation currently provides seed count variation allowances for corn (2%), soybeans (4%), field beans (5%) and wheat (3%). These values are commonly used by the seed industry due to the prevalence of seed count testing for multiple seed industry applications. Standard industry practices also exist for many related operations, including package sampling plans, seed sampling methods, and the proper use of mechanical seed counters and moisture measurement devices.

The Iowa State University Seed Science Center believes it is time to harmonize the NIST MAV provisions with those set forth in Section 12 of the AOSA *Rules for Testing Seed.* The availability of a single uniform standard that is science based will add clarity and certainty that is seriously needed by not only seed companies and regulatory agencies but also seed customers and other personnel directly affected by the seed industry.

Best Regards,

Alan D. Gaul

Alan D. Gaul
Seed Conditioning Specialist
ISU Seed Science Center

Iowa Department of Agriculture and Land Stewardship
Bill Northey - Secretary of Agriculture

Mr. Don Onwiler, Executive Director
National Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, Nebraska 68508

Re: Seed Count for Agricultural Seeds

Dear Mr. Onwiler:

The Iowa Department of Agriculture has been following with interest the amendment of the NIST Handbook 133 to adopt the procedures and maximum acceptable variances to determine seed counts. Our understanding is that this initiative continues to gain the support and endorsement of key agricultural groups, including the Iowa State Soybean Association.

Precision planting reinforces the benefits of this proposed amendment to the Handbook. Iowa farmers, like farmers all across the country rely on seed count when making their planting decisions each season. And, because seed is a natural biological product, it is not uniform in size and weight. In fact, differing weather conditions, storage, genetics can and often does result in disparity as it relates to weight. Farmers continue to utilize both seed count and weight when they purchase their seed. For their part, seed companies continue to respond to the farmers and are selling by count and working closely with their customers to ensure that they receive the information they need when making this important investment each planting season.

Research in seed count has indicated that there are a number of factors that must be considered when conducting a seed count. Currently, the Association of Official Seed Analysts (AOSA) has compiled its official Rules for Testing Seeds. This industry standard has been accepted practice for more than a decade. In fact, seed control regulatory officials reference these standards and use them and endorse them, too.

The Iowa Department of Agriculture and Land Stewardship is pleased to join the Iowa Soybean Association, the Association of Official Seed Analysts and the American Association of Seed Control Officials in supporting the amendment to Handbook 133. One other key ally supporting these efforts is the Iowa State University.

In summary, farmers in Iowa rely on seed count when purchasing their seed. We appreciate the leadership of the National Conference on Weights and Measures on this important initiative. We believe that this amendment is consistent and complementary to our mission to ensure that our farmers are protected and informed when purchasing seed. Confidence in seed count labeling is important to our farmers and we believe that the AOSA standards reinforce this practice and will provide additional protection, information and assistance to our farmers.

Sincerely,

Bill Northey

Bill Northey
Iowa Secretary of Agriculture

Henry A. Wallace Building • Des Moines, Iowa 50319 • 515-281-5321 • agri@idals.state.ia.us
The Iowa Department of Agriculture and Land Stewardship is an equal opportunity employer and provider

IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP

Bill Northey, Secretary of Agriculture

Mr. Don Onwiler, Executive Director
National Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, Nebraska 68508

Dear Mr. Onwiler:

The Iowa Department of Agriculture has been following with interest the amendment of the NIST Handbook 133 to adopt the procedures and maximum acceptable variances to determine seed counts. Our understanding is that this initiative continues to gain the support and endorsement of key agricultural groups, including the Iowa State Soybean Association.

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In summary, farmers in Iowa rely on seed count. We appreciate the leadership of the National Conference on Weights and Measures on this important initiative. We believe that this amendment is consistent and complementary to our mission to ensure that our farmers are protected and informed when purchasing seed. Confidence in seed count labeling is important to our farmers and we believe that the AOSA standards reinforce this practice and will provide additional protection, information and assistance to our farmers.

Sincerely,

Bill Northey

Bill Northey
Iowa Secretary of Agriculture

Henry A. Wallace Building • Des Moines, Iowa 50319 • 515-281-5321 • agri@idals.state.ia.us
The Iowa Department of Agriculture and Land Stewardship is an equal opportunity employer and provider

June 16, 2010

Don Onwiler, Executive Director
National Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, Nebraska 68508

RE: AOSA Rules for Testing Seeds Vol. 1, Section 12. Mechanical seed count editorial correction

Dear Mr. Onwiler,

The Association of Official Seed Analysts (AOSA) recently learned of an error in the seed count procedures in the AOSA Rules for Testing Seeds, Section 12, Mechanical seed count. As explained below, the AOSA Rules Committee is correcting this typographical error in the 2010 edition of the AOSA Rules for Testing Seeds. We would like to advise the National Conference on Weights and Measures of this revision so that it may consider making a corresponding change to the currently pending proposal to adopt the AOSA's procedures for mechanical seed counts.

The AOSA Rules were reorganized in 2008 and Section 12 was renumbered. The procedure for mechanical seed count was moved from Section 3.7, Examinations, to Section 12, a new section devoted exclusively to mechanical seed counts. The 2007 version of the mechanical seed count procedure included an equation for calculating the number of seeds per pound. This equation referenced Section 3.7.d, the number of seeds counted by the mechanical seed counter. In the 2008 reorganized version of the AOSA Rules, Section 3.7.d was renumbered to 12.4. Inadvertently, the equation was not updated to reference Section 12.4. The 2009 version of the AOSA Rules for Testing Seeds Section 12 is identical to the 2008 version and includes the erroneous reference in the equation

The AOSA Rules Committee is changing the equation to reference the "number of seeds counted" in the 2010 AOSA Rules for Testing Seeds, instead of section "d" that no longer exists. I have attached the pertinent pages from the 2007 version of the AOSA Rules, the 2008 version, and the corrected pages that will be included in the 2010 AOSA Rules for Testing Seeds Vol. 1. The 2010 version of the Rules will be distributed October 1, 2010.

Please contact me if you have any questions.
Sincerely,

Michael G. Stahr, AOSA President
Iowa State University Seed Science Center
128A Seed Science Center
Iowa State University
Ames, Iowa 50011
515-294-0117 (phone)
Email: mgstahr@iastate.edu

Enclosures: 2007 AOSA Rules for Testing Seeds, pp. 3-7, 3-8. 2008 AOSA Rules for Testing Seeds, pp. 12-1, 12-2. 2010 AOSA Rules for Testing Seeds, pp. 12-1, 12-2.

101 East State St., #214, Ithaca, NY USA Phone: 607-256-3313 aosa.office@twcny.rr.com

Il

1605 Commerce Parkway
Bloomington, IL 61704
(309) 663-7692 telephone
(309) 663-6981 fax
E-mail: ilsoy@ilsoy.org
www.ilsoy.org

June 29, 2010

Mr. Andrew W. LaVigne
President and CEO
American Seed Trade Association
225 Reinekers Lane, Suite 650
Alexandria, VA 22314-2875

Dear Andrew:

On behalf of Illinois soybean farmers, the Illinois Soybean Association wishes to speak in support of the seed count procedures for agricultural seed as put forth by the Association of Official Seed Analysts (AOSA). When purchasing soybean seed, most farmers focus on count rather than weight. Soybean seeds vary in size but newer, more precise planting equipment plants by numbered populations rather than by weight. Having a count within the 4% maximum allowable variance established by AOSA is a more accurate way for farmers to purchase and use the right amount of seed.

We believe that AOSA has developed uniform and practical methods for testing seed which are widely accepted. Adoption of the AOSA standard would provide a consistent seed count that benefits both seed customers and seed merchants.

We believe the National Conference on Weights and Measures should approve the use of AOSA's seed count rules, relying on the extensive testing that has gone into the accuracy of the process. We also ask that the National Institute for Standards and Technology (NIST) adopt the methods and variances for soybean seed count as found in AOSA rules.

Sincerely,

ILLINOIS SOYBEAN ASSOCIATION

Ron Moore

Ron Moore
President

The National Association of State Departments of Agriculture (NASDA)
1156 15th Street, N.W., Suite 1020
Washington, D.C. 20005
(202) 296-9680
www.nasda.org
President: Ed Kee, Secretary, Delaware Department of Agriculture

March 1, 2010

Don Onwiler
Executive Director
National Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, Nebraska 68508

Dear Mr. Onwiler:

The American Seed Trade Association (ASTA) has submitted a proposal to the National Conference on Weights and Measures (NCWM) to amend Handbook 133 to provide a method for using seed count as a means of verifying label guarantees for certain seeds. Specifically, ASTA is requesting that verification of statements of count be approved for use for corn seed, soybean seed, field bean seed and wheat seed. NASDA supports ASTA's petition to make this modification to Handbook 133.

NASDA (the National Association of State Departments of Agriculture) is a nonprofit, nonpartisan association of the commissioners, secretaries and directors of the state departments of agriculture in all fifty states and 4 US territories. The state regulation of seeds is housed in the NASDA members' agency in 47 states. The associations of the states technical experts, AASCO (the Association of American Seed Control Officials) and AOSA (the Association of Official seed Analysts) – housed in NASDA agencies in 40 states, both support these changes. In fact, AOSA established mechanical seed count procedures for agricultural seed in its *Rules for Testing Seed*; it is these procedures that ASTA is requesting be adopted in Handbook 133.

NASDA supports this action for the following reasons:

- Precision farming techniques have made seed count a more valuable measure of these products.
- Confusion exists currently, depending upon whether seed count or weight is used to determine compliance.
- The NCWM standards were established for manufactured products, not living biological products; as a result, the modification of the NCWM standards to include provisions for seeds does not undermine the intent or use of the NCWM standards for other products.
- While the NCWM standards are used by some states to apply to seeds, it is the seed divisions of the state agencies that administer and enforce seed laws. Since the need for standards to verify statements of count for corn, soybean, field bean and wheat seeds has been recognized and codified by the seed control experts, it is consistent with good

regulatory practices to use the protocols developed by the seed regulatory experts to provide consistent, uniform and practical standards for compliance. This does not affect the use of the Handbook by weights and measures inspectors for determining compliance with other products – an inspection program housed in 33 NASDA members' agencies; however, generally not in the same division as seed control.

- This change will not undermine the customer protection provisions provided by either the NCWM or the *Rules of Testing Seeds*.

In order to keep standards up to date with current industry practices, provide consistency, reduce confusion, assure customer and consumer protection, we urge you to amend Handbook 133, as requested in the petition from ASTA.

Sincerely,

Ed Kee

Ed Kee, President

cc: Ms. Jonelle Brent

Appendix I

Polyethylene Sheeting

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Sigma Stretch Film I5
Berry Plastics (June 26, 2010) I6
Safety Data Sheets I8

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BERRY PLASTICS CORPORATION
AND SUBSIDIARIES
LEADERSHIP BY DESIGN

101 Oakley Street
P.O. Box 959
Evansville, IN 47706-0959
Phone: 812-424-2904
Fax: 812-424-0128

January 8, 2009

NIST, Weights & Measures Division
100 Bureau Drive
Gaithersburg, MD 20899-2600
E-mail: lisa.warfield@nist.gov

Attn: Lisa Warfield
Weights & Measures, Coordinator

RE: **Proposed Changes to Handbook 130, Method of Sale Regulation Section 2.13.4. "Declaration of Weight"**

Dear Ms. Warfield:

This letter is in reference to the proposed changes to Handbook 130, Method of Sale Regulation Section 2.13.4. "Declaration of Weight" (copy attached).

Background
Berry Plastics Corporation is a leading manufacturer and marketer of HDPE and LLDPE Institutional Can Liners. Berry Plastics is a long time participant in this market and is well versed in the mechanics of the category.

Recommendation
For the following reasons, Berry Plastics respectfully requests the NCWM Laws and Regulations Committee reject the above referenced proposal.

Rationale
We urge the Committee to reject the proposed rule change for three reasons. First, the proposed change will cause a significant increase in plastic entering the waste stream. Second, the proposed change would modify a clearly established and well accepted rule, thereby upsetting the settled expectations of market participants and causing confusion in the marketplace. Finally, the proposed change is unfair to manufacturers because it would require the inclusion of more HDPE material than is necessary or desirable for a useful product.

1) **Sustainability** – The strongest reason for rejecting this proposal relates to Sustainability. The Institutional Can Liner market is untracked; however, we estimate its size at 400 million pounds per year.

BERRY PLASTICS CORPORATION
AND SUBSIDIARIES
LEADERSHIP BY DESIGN

101 Oakley Street
P.O. Box 959
Evansville, IN 47706-0959
Phone: 812-424-2904
Fax: 812-424-0128

a. If the .95 density factor is adopted, product weights will have to be increased by 3%, resulting in over **12 million additional pounds** of plastic finding its way into the waste stream.
b. Just the production of this additional plastic will generate an additional **18.5 million pounds of CO2**.
c. Additional CO2 would be generated to transport and package the heavier product.

2) **Convention** – HDPE product weights based on the .92 density factor are well accepted in the industry and the category participants (manufacturers, distributors and end users) are very accustomed to these product weights. Instead of clarifying the issue, changing the density factor will actually lead to confusion in the marketplace.
3) **Blends** – Most HDPE Can Liners utilize blends of various materials (HDPE, LLDPE, LDPE and post consumer and post industrial resins as well as additives). The current use of the .92 density factor sets a bottom limit on product weight. If the .95 density factor is adopted it will require manufacturers to overstate the weight of the product.

Therefore, given the above, we strongly recommend that this proposed revision be rejected. We look forward to discussing this further with you at the upcoming conference in Nashville or at any other time and place that is convenient for you.

Thank you for your time.

Sincerely,

Randy Hobson

Randy Hobson
Executive Vice President Commercial Development
Berry Plastics Corporation
101 Oakley Street
Evansville, IN 47710
812-434-9369

Visit us online at www.berryplastics.com

Σ Sigma Stretch Film
P.O. Box 808 • Lyndhurst, NJ 07071
Phone (201) 507-9100 Fax (201) 507-0447

Joe Graves

Sigma Stretch Film
901 Commerce Circle
Shelbyville, KY 40065
Phone: 502-633-4857

Lisa Warfield
Weights & Measures, Coordinator
NIST, Weights & Measures Division

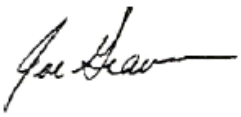
100 Bureau Drive
Gaithersburg, MD 20899
Phone: 301-975-3308

Dear Ms. Warfield

I am writing in regards to the proposed changes of NIST Handbook 133, agenda items 270-6, 270-7, and 270-8. Although a Sigma Stretch Film representative is unable to attend these important meetings, we are offering support of the changes. A clear procedure outlining and acknowledging that the densities of HDPE and LLDPE are different will help maintain a fair marketplace.

If I can be of any further assistance, please do not hesitate to contact me directly at 502-633-4857.

Best Regards,



Joe Graves
Technical Director
Sigma Stretch Film
1/22/2010

June 26, 2010

National Conference on Weights and Measures 1135 M Street
Suite 110
Lincoln, Nebraska 68508
E-mail• don.onwiler@ncwm.net
Attn: Don Onwiler

RE: **Proposed Changes to Handbook 130, Method of Sale Regulation Section 2.13.4. "Declaration of Weight"**

Dear Don:

This letter is in reference to the proposed changes to Handbook 130, Method of Sale Regulation Section 2.13.4. "Declaration of Weight" (copy attached).

As you know, we attended the NCWM meeting in Nashville this year to present Berry Plastics' opposition to the above referenced Handbook 130 proposed changes. The purpose of this letter is to reiterate our opposition to this proposal.

Background
Berry Plastics Corporation is a leading manufacturer and marketer of HDPE and LLDPE Institutional Can Liners. Berry Plastics is a long time participant in this market and is well versed in the category mechanics and needs of stakeholders (end user, distributor and manufacturer).

Recommendation
Berry Plastics respectfully requests the NCWM Laws and Regulations Committee reject the above referenced proposal for three reasons:

1) **Blends —** Most HDPE Can Liners utilize blends of various materials (HDPE, LLDPE, LDPE and post consumer and post industrial resins as well as additives). The current use of the .92 density factor sets a bottom limit on product weight. If the .95 density factor is adopted it will require manufacturers to overstate the weight of the product.

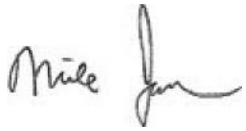
2) **Convention —** HDPE Can Liner product weights based on the .92 density factor are well accepted in the industry and the category participants (manufacturers, distributors and end users) are very accustomed to these product weights. Instead of clarifying the issue, changing the density factor will actually lead to confusion in the marketplace.

3) **Sustainability —** The strongest reason for rejecting this proposal relates to Sustainability. The Institutional Can Liner market is untracked; however, we estimate the size of the HDPE segment at 400 million pounds per year.
   a. If the .95 density factor is adopted, and if industry increases product weights an additional **12 million pounds** of plastic will find its way into the waste stream.
   b. Just the production of this additional plastic will generate an additional **18.5 million pounds of CO2.**
   c. Additional CO2 would be generated to transport and package the heavier product.

Given the above, we strongly recommend that this proposed revision be rejected.

Don, as always we appreciate all you do for the organization and we thank you for reviewing our position on this proposal.

I look forward to seeing you in St. Paul this July. Best regards,



Michael T. Jackelen
Vice President
Berry Plastics Corporation
1401 West 94th Street
Minneapolis, MN 55431
mikejackelen@berryplastics.com Telephone
Number — 952/885-9232

CC Lisa Warfield (lisa.warfield@nist.gov)

Material Safety Data Sheet

innovene

1. Chemical product and company identification

Product name	POLYETHYLENE (HDPE) HOMOPOLYMER
MSDS #	0000002010
Historic MSDS #:	None.
Code	0000002010 (NAP)
Product use	Consumer products. Industrial applications.
Supplier	Innovene USA LLC 200 E. Randolph Drive Chicago, IL 60606
Emergency phone:	1 (800) 424-9300 Outside the US: +1 703-527-3887 (CHEMTREC)
OTHER PRODUCT INFORMATION	1 (888) 260-6737 Toll free - North America email:MSDS@innovene.com

2. Composition/information on ingredients

Ingredient name	CAS #	% by weight
Polyethylene	9002-88-4	95 - 100

3. Hazards identification

Physical state	Granular solid. Pellets. Powder or flakes solid.
Color	White, translucent or colorless.
Emergency overview	
	This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.
	Handling and/or processing of this material may generate dust which may cause mechanical irritation of the eyes, skin, nose and throat.
Routes of entry	Dermal contact. Eye contact. Inhalation. Ingestion.
Potential health effects	
Eyes	No significant irritation expected other than possible mechanical irritation. Heated material can cause thermal burns. When heated to decomposition it emits acrid smoke and irritating fumes.
Skin	No significant irritation expected other than possible mechanical irritation. Heated material can cause thermal burns.
Inhalation	Dust: Exposure to airborne concentrations well above the recommended exposure limits may cause irritation of the nose, throat, and lungs. Vapor: If heated to more than 300°C, the product may form vapors or fumes which could cause irritation of the respiratory tract, coughing, and shortness of breath.
Ingestion	No significant health hazards identified.
Medical conditions aggravated by over-exposure	None identified.

See toxicological information (section 11)

4. First aid measures

Eye contact	Hot material: Flush eyes with plenty of water for at least 15 minutes. Seek medical assistance for mechanical removal of this material from the eye. The use of flush fluid, other than water, is not recommended. Cold material: flush eyes with plenty of water. Get medical attention if irritation occurs.
Skin contact	If burned by contact with hot material, flush skin immediately with large amounts of cold water. If possible, submerge area in cold water. No attempt should be made to detach polymer adhering to the skin or to remove clothing attached with molten material. Thermal burns require immediate medical attention. Cold material: Wash with soap and water.
Inhalation	If affected by fumes from heated material, remove from source of exposure and move the affected person into fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion	Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately.

5. Fire-fighting measures

Flammability of the product	May be combustible at high temperature.
Auto-ignition temperature	>343 °C
Flash point	Above 300°C decomposition occurs and flash of fumes may occur.
Products of combustion	These products are carbon oxides (CO, CO2). May also contain low levels of aldehydes, ketones, organic acids or hydrocarbons.
Unusual fire/explosion hazards	High dust concentrations have a potential for combustion or explosion. This material is not explosive as defined by established regulatory criteria.
Fire-fighting media and instructions	In case of fire, use water spray (fog), foam or dry chemicals. Do not use water jet.
Protective clothing (fire)	Fire-fighters should wear positive pressure self-contained breathing apparatus (SCBA) and full turnout gear.

6. Accidental release measures

Personal precautions	IN CASE OF A LARGE SPILL: Contact emergency personnel. Eliminate all ignition sources. Granules spilled on the floor can cause slipping. Fine dust clouds may form explosive mixtures with air. Do not touch or walk through spilled material. Use suitable protective equipment (See Section: "Exposure controls/personal protection"). Follow all fire fighting procedures (See Section: "Fire-fighting measures").
Environmental precautions and clean-up methods	If emergency personnel are unavailable vacuum or carefully scoop up spilled materials and place in an appropriate container for disposal. Avoid creating dusty conditions and prevent wind dispersal. Avoid contact of spilled material with soil and prevent runoff entering surface waterways. See Section 13 for Waste Disposal Information.
Personal protection in case of a large spill	Chemical/Dust Goggles. Personnel should wear protective clothing.

7. Handling and storage

Handling	There is a risk of being splashed with molten materials. Thermal burns are the most common injury caused while processing molten material. Do not inhale fumes or vapor from molten product. Use with adequate ventilation. When handling hot material, wear heat resistant protective gloves, clothing and face shield that are able to withstand the temperature of the heated product. Pneumatic conveying of powder and pellets can generate large static electrical charges. Electrical discharge in presence of air can cause an explosion. Earth all equipment. High dust concentrations have a potential for combustion or explosion. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

Storage	Keep container tightly closed. Keep container in a cool, well-ventilated area. Keep away from heat and direct sunlight. The main hazards are related to pallet stock slippage and forklift truck maneuvers, which can cause injury to personnel. It is highly recommended that adequate procedures covering storage handling of pallets are established and maintained. These procedures must be kept up to date and regularly audited. In most cases, best practice is to stack pallets no more than 2 high. However, facilities responsible for storing the material should perform a site specific risk assessment to determine whether pallets can be stacked safely.

8. Exposure controls/personal protection

Occupational exposure limits

Ingredient name	Occupational exposure limits
Polyethylene	**ACGIH TLV (United States, 2005).** TWA: 10 mg/m³ 8 hour(s). Form: Inhalable fraction PNOS TWA: 3 mg/m³ 8 hour(s). Form: Respirable fraction PNOS

Control Measures	Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.
Hygiene measures	Wash hands after handling compounds and before eating, smoking, using lavatory, and at the end of day.
Personal protection	
Eyes	Safety glasses with side shields. Use dust goggles if high dust concentration is generated.
Skin and body	Hot material: Wear heat-resistant protective gloves, clothing and face shield that are able to withstand the temperature of the molten product. Cold material: None required; however, use of protective clothing is good industrial practice.
Respiratory	Product processing, heat sealing of film, or operations involving the use of wires or blades heated above 300°C may produce dust, vapor or fumes. To minimize risk of overexposure to dust, vapor or fumes it is recommended that a local exhaust system is placed above the equipment, and that the working area is properly ventilated. If ventilation is inadequate, use certified respirator that will protect against dust/mist.
Hands	Hot material: Wear heat-resistant protective gloves that are able to withstand the temperature of molten product. Cold material: None required; however, use of gloves is good industrial practice. The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only a short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions. Consult your supervisor or S.O.P. for special handling directions

Consult local authorities for acceptable exposure limits.

9. Physical and chemical properties

Physical state	Granular solid. Pellets. Powder or flakes solid.
Odor	Odorless.
Color	White, translucent or colorless.
Melting point / Range	126 to 135 °C
Specific gravity	0.93 to 0.97
Density	Pellet density: 930-970 kg/m³ (0.930 to 0.970 g/cm³)
Solubility	Insoluble in cold water.

10. Stability and reactivity

Stability and reactivity	The product is stable.
Conditions to avoid	Stable under recommended storage and handling conditions (See Section: "Handling and storage"). If heated to more than 300°C, the product may form vapors or fumes which could cause irritation of the respiratory tract, coughing, and shortness of breath. Avoid dusting when handling and avoid all possible sources of ignition (spark or flame). To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.
Incompatibility with various substances	None identified.
Hazardous decomposition products	These products are carbon oxides (CO, CO_2). May also contain low levels of aldehydes, ketones, organic acids or hydrocarbons.
Hazardous polymerization	Will not occur.

11. Toxicological information

Chronic toxicity

Carcinogenic effects	No component of this product at levels greater than 0.1% is identified as a carcinogen by ACGIH or the International Agency for Research on Cancer (IARC). No component of this product present at levels greater than 0.1% is identified as a carcinogen by the U.S. National Toxicology Program (NTP) or the U.S. Occupational Safety and Health Act (OSHA).
Mutagenic effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a mutagen.
Reproductive effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as a reproductive toxin.
Teratogenic effects	No component of this product at levels greater than 0.1% is classified by established regulatory criteria as teratogenic or embryotoxic.

12. Ecological information

Ecotoxicity	No testing has been performed by the manufacturer.
Persistence/degradability	Not inherently biodegradable (polymer).
Mobility	This product is lighter than water and will float on the surface. This product is not likely to move rapidly with surface or groundwater flows because of its low water solubility.
Bioaccumulative potential	This product is not expected to bioaccumulate through food chains in the environment.
Other ecological information	Wildlife may ingest plastic pellets or bags. Although not toxic, such materials may physically block the digestive system, causing starvation or death.

13. Disposal considerations

Waste information	Recycle to process, if possible. Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Dispose of in accordance with all applicable local and national regulations.

Consult your local or regional authorities.

14. Transport information

Not classified as hazardous for transport (DOT, TDG, IMO/IMDG, IATA/ICAO)

15. Regulatory information

U.S. Federal regulations	US INVENTORY (TSCA): In compliance.
	This product is not regulated under Section 302 of SARA and 40 CFR Part 355.
	This product does not contain any hazardous ingredients at or above regulated thresholds.
SARA 313	
Form R - Reporting requirements	This product does not contain any hazardous ingredients at or above regulated thresholds.
Supplier notification	This product does not contain any hazardous ingredients at or above regulated thresholds.
	CERCLA Sections 102a/103 Hazardous Substances (40 CFR Part 302.4):: This material is not regulated under CERCLA Sections 103 and 107.
State regulations	No products were found.
Inventories	AUSTRALIAN INVENTORY (AICS): In compliance. CANADA INVENTORY (DSL): In compliance. CHINA INVENTORY (IECS): In compliance. EC INVENTORY (EINECS): In compliance. (Polymer, exempt from listing.) JAPAN INVENTORY (ENCS): In compliance. KOREA INVENTORY (ECL): In compliance. PHILIPPINE INVENTORY (PICCS): In compliance.

16. Other information

Label requirements

This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria.

HMIS® Rating :

Health	0
Flammability	1
Physical Hazard	0
Personal protection	X

National Fire Protection Association (U.S.A.)



History

Date of issue	08/03/2005.
Date of previous issue	No Previous Validation.
Prepared by	Product Stewardship

Notice to reader

NOTICE : This Material Safety Data Sheet is based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We are not responsible for any damage or injury resulting from abnormal use, from any failure to follow appropriate practices or from hazards inherent in the nature of the product.

Technical Information

HDPE High Density Polyethylene

Description

High Density Polyethylene (HDPE) of The Dow Chemical Company (Dow) encompasses a range of products to balance excellent impact strength, toughness and stiffness as required. The HDPE products are high-purity powders made without any hydrocarbon comonomers and contain no secondary additives.

The following technical information notes a range of product capabilities. Your Dow representative is available to answer your questions and to provide reasonable technical support.

Physical Properties

Resin Properties	Test Method	Values[1]
Melt Index, I10 g/10 min	ASTM D 1238	1-120
Density, g/cc	ASTM D 792	0.95-0.97
Melting Point, °	DSC[2]	130-140
Average Particle Size, µm	Sieve[2]	<300

[1] Typical values, not to be construed as specifications. Users should confirm results by their own tests.

[2] Internal test method

Standard packages consist of supersacks of approximately 840 kg (1850 lb).

Handling Considerations

Material Safety Data Sheets (MSDS) for the product are available from Dow providing among other things, use, handling and disposal information. Request current MSDS from your Dow representative prior to working with these products, and read, understand, and practice the information provided. The standard practice of The Dow Chemical Company is to mail applicable MSDS when customers place an initial order and again when subsequent orders are placed if there has been a revision.

Spills, Disposal

Clean-up of spills is a matter of good general housekeeping. Preferred options for disposal are (1) recycling, (2) incineration with energy recovery, and (3) landfill. The high fuel value of this product makes option 2 very desirable for material that cannot be recycled.

Any disposal procedures must be in compliance with all applicable laws and other governmental enactments.

Health Hazards

The HDPE products are very low in single dose oral toxicity, may cause only minor irritation upon eye or skin contact due to mechanical effects, and are not absorbed through the skin. Therefore, they can be handled safely if reasonable care and caution are observed.

Combustibility

HDPE powders can be processed safely. The end user is responsible for hazard evaluation to ensure the compatibility of the HDPE in a specific process. Fine polyethylene dust formation or accumulation may lead to an explosive mixture with air. In addition, conveying or handling the product may cause a static ignition hazard. Refer to National Fire Protection Association (NFPA) RP77 "Recommended Practice on Static Electricity" for guidance in reducing the fire hazards associated with static electricity.

Form No. 776-00045-1005

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Product Stewardship

The Dow Chemical Company and its subsidiaries (Dow) has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our Product Stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our Product Stewardsh program rests with each and every individual involved with Dow products — from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use o Dow products. Current safety data sheets are available from Dow.

Dow Medical Application Policy

Dow will not knowingly sell or sample any product or service ("Product") into any commercial or developmental application that is intended for:

a. permanent (Long term) contact with internal body fluids or internal body tissues. Long term is a use which exceed 72 continuous hours (except 30 days for PELLETHANE™ polyurethane elastomers);
b. use in cardiac prosthetic devices regardless of the length of time involved; (Cardiac prosthetic devices include, but are not limited to, pacemaker leads and devices, artificial hearts, heart valves, intra-aortic balloons and contro systems, and ventricular bypass assisted devices);
c. use as a critical component in medical devices that support or sustain human life; or
d. use specifically by pregnant women or in applications designed specifically to promote or interfere with human reproduction.

Additionally, all Products intended for use in pharmaceutical applications, other than pharmaceutical packaging, must pass the current Pharmaceutical Liability Guidelines.

- For the products sold by the Plastics Portfolio, new business opportunities require a business assessment prior to sale or sampling of Dow products.
- Authorized distributors and resellers will adhere to this medical policy.
- The Dow Chemical Company does not endorse or claim suitability of their products for specific medical applicatio It is the responsibility of the medical device or pharmaceutical manufacturer to determine that the Dow product is safe, lawful, and technically suitable for the intended use. DOW MAKES NO WARRANTIES, EXPRESS OR IMPLIED, CONCERNING THE SUITABILITY OF ANY DOW PRODUCT FOR USE IN MEDICAL APPLICATIONS

Disclaimer

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, the Customer is responsible for determining whether products and the information in this document are appropriate for the Customer's use and for ensuring that the Customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Dow assumes no obligation or liability for the information in this document. **NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

NOTICE: If products are described as "experimental" or "developmental": (1) product specifications may not be fully determined; (2) analysis of hazards and caution in handling and use are required; and (3) there is greater potential for Dow to change specifications and/or discontinue production.

Additional Information

North America
U.S. & Canada: 1-800-441-4369
1-989-832-1426
Mexico: +1-800-441-4369

Latin America
Argentina: +54-11-4319-0100
Brazil: +55-11-5188-9222
Colombia: +57-1-319-2100
Mexico: +52-55-5201-4700

Europe/Middle East +800-3694-6367
+32-3-450-2240

South Africa +800-99-5078

Asia Pacific +800-7776-7776
+60-3-7958-3392

www.dowplastics.com

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Form No. 776-00045-1005

Material Safety Data Sheet

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PE3408 (HDPE) Pipe & Fittings (Various Colors)

COMPANY IDENTIFICATION

Performance Pipe, a Division of
Chevron Phillips Chemical Company LP
2929 North Central Expressway #300
Richardson, TX. 75080

EMERGENCY TELEPHONE NUMBERS

HEALTH (24 hr): (800)231-0623 or
(510)231-0623 (International)
TRANSPORTATION (24 hr): CHEMTREC
(800)424-9300 or (703)527-3887
Emergency Information Centers
are located in U.S.A.
Int'l collect calls accepted

PRODUCT INFORMATION: (972) 705-6543

2. COMPOSITION/INFORMATION ON INGREDIENTS

100.0 % PE3408 (HDPE) Pipe & Fittings (Various Colors)

CONTAINING

COMPONENTS	AMOUNT	LIMIT/QTY	AGENCY/TYPE
POLYETHYLENE Chemical Name: ETHENE, HOMOPOLYMER CAS9002884	> 96.00%	NONE	NA
OR			
POLYETHYLENE-BUTENE COPOLYMER Chemical Name: 1-BUTENE, POLYMER WITH ETHENE CAS25087347	> 96.00%	NONE	NA
OR			

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POLYETHYLENE-HEXENE COPOLYMER			
Chemical Name: 1-HEXENE, POLYMER WITH ETHENE			
CAS25213029	> 96.00%	NONE	NA
ADDITIVES INCLUDING THE FOLLOWING			
LEAD CHROMATE PIGMENT			
Chemical Name: C.I. PIGMENT YELLOW 34			
CAS1344372	< 1.00%	NONE	NA
CARBON-BLACK			
Chemical Name: CARBON-BLACK			
CAS1333864	< 4.00%	3.5 mg/m3	ACGIH TWA
		3.5 mg/m3	OSHA PEL

COMPOSITION COMMENT:
All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********

Colored plastic (red, white, blue, grey, black, orange)

****

IMMEDIATE HEALTH EFFECTS
EYE:
Not expected to cause prolonged or significant eye irritation. If this material is heated, thermal burns may result from eye contact.
SKIN:
Contact with the skin is not expected to cause prolonged or significant irritation. Not expected to be harmful to internal organs if absorbed through the skin. If this material is heated, thermal burns may result from skin contact.
INGESTION:
Not expected to be harmful if swallowed.
INHALATION:
Not expected to be harmful if inhaled. If this material is heated, fumes may be unpleasant and produce nausea and irritation of the upper respiratory tract.
SIGNS AND SYMPTOMS OF EXPOSURE:
Thermal burns to the eye: may include pain, tearing, reddening, swelling, and impaired vision. Thermal burns to the skin: may include pain or feeling of heat, discoloration, swelling, and blistering. Respiratory irritation: may include coughing and difficulty breathing.

4. FIRST AID MEASURES

EYE:

If heated material should splash into eyes, flush eyes immediately with fresh water for 15 minutes while holding the eyelids open. Remove contact lenses, if worn. Get immediate medical attention.

SKIN:

If the hot material gets on skin, quickly cool in water. See a doctor for extensive burns. Do not try to peel the solidified material from the skin or use solvents or thinners to dissolve it. The use of vegetable oil or mineral oil is recommended for removal of this material from the skin.

INGESTION:

No specific first aid measures are required because this material is not expected to be harmful if swallowed.

INHALATION:

Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

5. FIRE FIGHTING MEASURES

FIRE CLASSIFICATION:

Classification (29 CFR 1910.1200): Not classified by OSHA as flammable or combustible.

FLAMMABLE PROPERTIES:

FLASH POINT: NA
AUTOIGNITION: NA
FLAMMABILITY LIMITS (% by volume in air): Lower: NA Upper: NA
EXTINGUISHING MEDIA:
C02, dry chemical, foam and water fog

NFPA RATINGS: Health 0; Flammability 1; Reactivity 0.

FIRE FIGHTING INSTRUCTIONS:

This material will burn although it is not easily ignited. For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.

If possible, water should be applied as a spray from a fogging nozzle since this is a surface burning material. The application of high velocity water will spread the burning surface layer.

COMBUSTION PRODUCTS:

Normal combustion forms carbon dioxide, water vapor and may produce carbon monoxide, original monomer, other hydrocarbons and hydrocarbon oxidation products, depending on temperature and air availability.

6. ACCIDENTAL RELEASE MEASURES

CHEMTREC EMERGENCY NUMBER (24 hr): (800)424-9300 or (703)527-3887
International Collect Calls Accepted

ACCIDENTAL RELEASE MEASURES:

Not applicable.

7. HANDLING AND STORAGE

Avoid contact of heated material with eyes, skin, and clothing. Avoid breathing vapor or fumes from heated material.

Improper or careless handling of these products can result in serious personal injury or possibly death, especially during loading, unloading, movement or installation. Please take all necessary precautions and follow manufacturer's published procedures f0r safely handling these products,

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS
Use in a well-ventilated area. If heated material generates vapor, or fumes, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure. Ventilation requirements must be locally determined. If handling results in dust generation, special ventilation may be needed to ensure that dust exposure does not exceed the OSHA PEL for nuisance dust.

PERSONAL PROTECTIVE EQUIPMENT
EYE/FACE PROTECTION:
No special eye protection is normally required. If this material is heated, wear chemical goggles and a face shield if engineering controls or work practices are not adequate to prevent eye contact.
SKIN PROTECTION:
No special protective clothing is normally necessary. If this material is heated, wear insulated clothing to prevent skin contact if engineering controls or work practices are not adequate to prevent skin contact.
RESPIRATORY PROTECTION:
No respiratory protection is normally required. If heated material generates vapor or fumes that are not adequately controlled by ventilation, wear a NIOSH approved respirator. Use the following

respirators: Organic Vapor.

9. PHYSICAL AND CHEMICAL PROPERTIES

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PHYSICAL DESCRIPTION:
Colored plastic (red, white, blue, grey, black, orange)

pH:	NA
VAPOR PRESSURE:	NA
VAPOR DENSITY (AIR=1):	NA
BOILING POINT:	NA
MELTING POINT:	122C (252F)
SOLUBILITY:	Insoluble in water
SPECIFIC GRAVITY:	0.95
DENSITY:	0.95 g/cm3
EVAPORATION RATE:	0
PERCENT VOLATILE (VOL):	0%

10. STABILITY AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
Low molecular weight hydrocarbons, alcohols, aldehydes, acids and ketones can be formed during thermal processing.
CHEMICAL STABILITY:
Stable.
CONDITIONS TO AVOID:
Do not heat without adequate ventilation.
INCOMPATIBILITY WITH OTHER MATERIALS:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc. Avoid contact with organic solvents. May react with free halogens.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

EYE EFFECTS:
The eye irritation hazard is based on data for a similar material.
SKIN EFFECTS:
The skin irritation hazard is based on data for a similar material. The acute dermal toxicity is based on data for a similar material.
ACUTE ORAL EFFECTS:

The acute oral toxicity is based on data for a similar material.
ACUTE INHALATION EFFECTS:
The acute respiratory toxicity is based on data for a similar material.
ADDITIONAL TOXICOLOGY INFORMATION:
This product contains polymerized ethylene. During thermal processing, this polymer can degrade. The three variables which control its degradation are the temperature, the length of time at that temperature, and the amount of oxygen available. Depending on the local processing conditions, a variety of low molecular weight hydrocarbons, alcohols, aldehydes, acids, and ketones can be formed. These materials are respiratory irritants. Prolonged and repeated breathing of fume

components has been shown to cause other adverse health effects. Exposure to processing emissions should be minimized by following all recommendations in this MSDS.

Pigments containing carbon black, lead chromate, nickel, antimony, or titanium compounds may have been incorporated into this product. The International Agency for Research on Cancer (IARC) has classified carbon black as a Group 2B carcinogen (possibly carcinogenic to humans) based on "sufficient evidence" in animals and "inadequate evidence" in humans. However, the pigments in this product are bound in a polymer matrix which severely limits its extractability, bioavailability and toxicity. The lead chromate pigment is also silica-encapsulated as well as bound in the polymer matrix. None of these pigments is likely to cause adverse health effects under recommended conditions of use.

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12. ECOLOGICAL INFORMATION

ECOTOXICITY:
This material is not expected to be harmful to aquatic organisms.
ENVIRONMENTAL FATE:
This material is not expected to be readily biodegradable.

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13. DISPOSAL CONSIDERATIONS

Contact local environmental or health authorities for approved disposal of this material.

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14. TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT SHIPPING NAME: NOT DESIGNATED AS A HAZARDOUS MATERIAL BY THE FEDERAL DOT
DOT HAZARD CLASS: NOT APPLICABLE

DOT IDENTIFICATION NUMBER: NOT APPLICABLE
DOT PACKING GROUP: NOT APPLICABLE

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15. REGULATORY INFORMATION

SARA 311 CATEGORIES:
1. Immediate (Acute) Health Effects: NO
2. Delayed (Chronic) Health Effects: NO
3. Fire Hazard: NO
4. Sudden Release of Pressure Hazard: NO
5. Reactivity Hazard: NO

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REGULATORY LISTS SEARCHED:

01=SARA 313	11=NJ RTK	22=TSCA Sect 5(a)(2)
02=MASS RTK	12=CERCLA 302.4	23=TSCA Sect 6
03=NTP Carcinogen	13=MN RTK	24=TSCA Sect 12(b)
04=CA Prop 65-Carcin	14=ACGIH TWA	25=TSCA Sect 8(a)
05=CA Prop 65-Repro Tox	15=ACGIH STEL	26=TSCA Sect 8(d)
06=IARC Group 1	16=ACGIH Calc TLV	27=TSCA Sect 4(a)
07=IARC Group 2A	17=OSHA PEL	28=Canadian WHMIS
08=IARC Group 2B	18=DOT Marine Pollutant	29=OSHA CEILING
09=SARA 302/304	19=Chevron TWA	30=Chevron STEL
10=PA RTK	20=EPA Carcinogen	

The following components of this material are found on the regulatory lists indicated.

CARBON-BLACK
is found on lists: 02,08,10,11,13,14,17,28,
C.I. PIGMENT YELLOW 34
is found on lists: 01,03,04,05,10,11,28,

---

16. OTHER INFORMATION

NFPA RATINGS: Health 0; Flammability 1; Reactivity 0;
HMIS RATINGS: Health 0; Flammability 1; Reactivity 0;
(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT:
This revision updates Sections 1 and 3.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:
TLV - Threshold Limit Value TWA - Time Weighted Average

STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	PEL - Permissible Exposure Limit
C - Ceiling Limit	CAS - Chemical Abstract Service Number
A1-5 - Appendix A Categories	() - Change Has Been Proposed
NDA - No Data Available	NA - Not Applicable

Prepared according to the OSHA Hazard Communication Standard
(29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1) by the Toxicology
and Health Risk Assessment Unit, CRTC, P.O. Box 1627, Richmond, CA 94804

****

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may

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be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

****
THIS IS THE LAST PAGE OF THIS MSDS
****

Revision Number: 3 **Revision Date: 11/28/00** **MSDS Number: 005873**

PTT Chemical Public Company Limited

123 Suntowers Building B, 31st - 35th Floor, Vibhavadi Rangsit Rd.,
Chompon,Chatuchak, Bangkok 10900, Thailand
Tel. +66 (0) 2265 8400 Fax. +66 (0) 2265 8500

MATERIAL SAFETY DATA SHEET

SECTION 1 – CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product:	**InnoPlus HDPE Black Compound**
Chemical Name and Synonyms:	High Density Polyethylene Black Compound
CAS No.:	Mixture
Company Identification/Supplier:	- PTT Chemical Public Company Limited 14 I-1 Road, Tambon Map Ta Phut, Amphoe Mueang Rayong, Rayong 21150,Thailand - Bangkok Polyethylene Public Company Limited Maptaphut Industrial Estate 4-I10 Rd., Maptaphut , Muang, Rayoung 21150 Thailand
Emergency Telephone No:	+66(0)-3892-1191

SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	CAS NO.	AMOUNT
Polyethylene	9002-88-4	< 100% weight
Carbon Black	1333-86-4	< 3% weight
Additive	Various	< 3% weight

NOTE:
This product is not considered a hazardous material at temperatures below the melting point as determined in Section 9.

SECTION 3 – HAZARDS IDENTIFICATION

PHYSICAL/CHEMECAL HAZARDS:
This product has been evaluated and does not require any hazard warning on the label under established regulatory criteria. High dust concentrations have a potential for combustion or explosion.

HUMAN HEALTH HAZARDS:
Not classified as dangerous. Handling and/or processing of this material may generate dust which may cause mechanical irritation of the eyes, skin, nose and throat.

ENVIRONMENTAL HAZARDS:
Not classified as dangerous.

EFFECTS AND SYMTOMS:

Eyes

No significant irritation expected other than possible mechanical irritation. Heated material can cause thermal burns. When heated to decomposition it emits acid smoke and irritating fumes.

Skin

No significant irritation expected other than possible mechanical irritation. Heated material can cause thermal burns.

Inhalation

Dust: Exposure to airborne concentrations well above the recommended exposure limits may cause irritation of the nose, throat, and lungs.

Vapor: If heated to more than 300℃, the product ma y form vapors or fumes which could cause irritation of the respiratory tract, coughing, and shortness of breath.

Ingestion

No significant health hazards identified.

SECTION 4 – FIRST AID MEASURES

EYE CONTACT

Flush eyes with running water immediately while holding the eyelids open. Remove contact lens, if worn, after initial flushing, and continue flushing for at least 15 minutes. Get medical attention.

SKIN CONTACT

Molten resin: If molten material comes in contact with the skin, cool under ice water or running steam of water. Do not attempt to remove the material from the skin. Remove could result in severe tissue damage. Get medical attention.

INGESTION

If swallowed, do not induce vomiting. Give a person a glass of water or milk to drink and get immediate medical attention. Never give anything by mouth to an unconscious person.

INHALATION

Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.

SECTION 5 – FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING AGENTS: Water haze, Foam, Chemical powder.

FOR SAFETY REASONS UNSUITABILITY EXTIGUISHING AGENTS: Water jet.

SPECIAL HAZARDS:

Caused by the material, its product of combustion or resulting gases: In case of fire it can release: Water (H_2O), Carbon dioxide (CO_2), and when lacking oxygen (O_2), Carbon monoxide (CO). The products of the burning are dangerous.

PROTECTIVE EQUIPMENT:

Use a mask with universal filler. Use self-contained breathing apparatus within confined rooms.

InnoPlus

SECTION 6 – ACCIDENTAL RELEASE MEASURE

PROTECTIVE MEASURES: Eliminate all sources of ignition in vicinity of spilled material. Wear appropriate personal protective equipment when cleaning up spills.

SPILL MANAGEMENT: Avoid creating dust clouds. Shovel, sweep up or use industrial vacuum cleaner to pick up. Place in container for proper disposal. Reduce airborne dust and prevent scattering by moistening with water. Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. If heated material is spilled, allow it to cool before proceeding with disposal method.

SECTION 7 – HANDLING AND STORAGE

INFORMATION FOR SAFE HANDLING:
No special requirements necessary, if handled at room temperature.
Avoid spilling the product, as this might cause falls.
Potential toxic/irritating fumes may be evolved from heated material.
Provide appropriate ventilation for such processing conditions.
Take precautionary measures against explosion risks, as all types of polymers may develop dust during transporting or grinding of granules.
REQUIREMENTS TO BE MET BY STOREROOMS AND CONTAINERS:
Take precautionary measures to prevent the formation of static electricity.
Do not smoke.
Ground equipment electrically.
INFORMATION ABOUT STORAGE IN ONE COMMON STORAGE FACILITY:
Not required.
FURTHER INFORMATION ABOUT STORAGE CONDITIONS:
Protect from heat and direct sunlight.
Store under dry conditions.
SPECIFIC APPLICATIONS:
For safe stacking follow the storage recommendations specific for this product.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:
Use in a well-ventilated area. If handling results in dust generation, special ventilation may be needed to ensure that dust exposure does not exceed the OSHA PEL for nuisance dust. If heated material generates vapor or fumes, use process enclosures, local exhaust ventilation, or other engineering controls to control exposure.
PERSONALPROTECTIVE EQUIPMENT:
Respiratory system
Product processing, heat sealing of film or operations involving the use of wires or blades heated above 300℃ may produce dust, vapor or fumes . To minimize risk of overexposure to dust, vapor or fumes it is recommended that a local exhaust system is placed above the equipment, and that the working area is properly ventilated.
If ventilation is inadequate, use certified respirator that will protect against dust/mist.

Skin and body
Hot material: Wear heat-resistant protective gloves, clothing and face shield able to withstand the temperature of the molten product.
Cold material: None required; however, use of gloves is good industrial practice.
Hand
Hot material: Wear heat-resistant protective gloves able to withstand the temperature of the molten product. Cold material: None required; however, use of gloves is good industrial practice.
The correct choice of protective gloves depends upon the chemicals being handled, the conditions of work and use, and the condition of the gloves (even the best chemically resistant glove will break down after repeated chemical exposures). Most gloves provide only short time of protection before they must be discarded and replaced. Because specific work environments and material handling practices very, safety procedures should be developed for each intended application. Gloves should therefore be chosen in consultation with the supplier/manufacturer and with a full assessment of the working conditions.
Eyes
Safety glasses with side shields. Use dust goggles if high dust concentration is generated.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Pellets.
ODOR:	Slight waxy odor.
COLOR:	Black.
FREEZING POINT:	Not Applicable.
MELTING POINT:	125 – 135 ℃
BOILING POINT:	Not Applicable.
FLASH POINT:	Not Applicable.
DENSITY:	0.955 – 0.980 g/cm^3
SPECIFIC GRAVITY:	Not Applicable.
AUTOIGNITION TEMPERATURE:	Not Applicable
EXPLOSIVE PROPERTIES	High dust concentrations have a potential for combustion or explosion
PERCENT VOLATILE:	Not Applicable.
VAPOR PRESSURE:	Not Applicable.
WATER SOLUBILITY:	Insoluble.

SECTION 10 – STABILITY AND REACTIVITY

CHEMICAL STABILITY:
This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
CONDITIONS TO AVOID: Not Applicable.
INCOMPATIBILITY WITH OTHER MATERIALS:
May react with oxygen and strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
HAZARDOUS POLYMERIZATION: Hazardous polymerization will not occur.
HAZARDOUS DECOMPOSTION PRODUCTS:
Low molecular weight hydrocarbon, carbon dioxide, carbon monoxide, unidentified organic compounds.

SECTION 11 – TOXICOLOGICAL INFORMATION

PRIMARY IRRITANT EFFECT:
ON THE SKIN: No irritant effect.
ON THE EYES: No irritant effect.
SENSITIZATION: No sensitizing effect known.
ADDITIONAL TOXICOLOGICAL INFORMATION:
When used and handled according to specifications, the product does not have any harmful effects according to our experience and the information provided to us.

SECTION 12 – ECOLOGICAL INFORMATION

MOBILITY AND BIOACCUMULATION POTENTIAL:
Floats on water. There is no bioaccumulation.
OTHER INFORMATION:
This product is not biodegradable.
GENERAL NOTES:
The product is not toxic, small particles can have physical effects on water and Soil organisms.

SECTION 13 – DISPOSAL CONSIDERATIONS

DISPOSAL COSIDERATION/WASTE INFORMATION:
Recycle to process, if possible. Avoid contact of spilled material and runoff with soil and surface waterways. Consult an environmental professional to determine if local, regional or national regulations would classify spilled or contaminated materials as hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Dispose of in accordance with all applicable local and national regulations.

SECTION 14 – TRANSPORT INFORMATION

TRANSPORT/ADDITIONAL INFORMATION:
According to national and international guidelines, which regulate the road-, rail-, air- and sea-transport, this product is classified as not dangerous.

SECTION 15 – REGULATION INFORMATION

U.S. Federal Regulations;	US INVENTORY (TSCA)	: In compliance.
Inventories;	AUSTRALIAN INVENTORY (AICS)	: In compliance.
	CANADA INVENTORY (DSL)	: In compliance.
	CHINA INVENTORY (IECS)	: In compliance.
	EC INVENTORY (EINECS)	: In compliance.
	JAPAN INVENTORY (ENCS)	: In compliance.
	KOREA INVENTORY (ECL)	: In compliance.

SECTION 16 – OTHER INFORMATION

Date of issue: Feb-2008
Prepare by: Technical Support, Polymer VC, PTT Chemical PLC.
NOTICE: This Material Data Sheet has been based upon data considered to be accurate at the time of its preparation. Despite our efforts, it may not be up to date or applicable to the circumstances of any particular case. We take no responsibility for inappropriate use, processing and handling by purchasers and users of the product.

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Product Name: PAXON CROSS-LINKABLE HDPE - All Colors Except Red
Revision Date: 04 May 2010

MATERIAL SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: PAXON CROSS-LINKABLE HDPE - All Colors Except Red
Product Description: Polymer, see Section 16 for applicable grades.

Intended Use: Rotational molding

COMPANY IDENTIFICATION

Supplier:	**EXXONMOBIL CHEMICAL COMPANY** P.O. BOX 3272 HOUSTON, TX. 77253-3272 USA
24 Hour Health Emergency	(800) 726-2015
Transportation Emergency Phone	(800) 424-9300 or (703) 527-3887 CHEMTREC
Product Technical Information	(281) 870-6000/Health & Medical (281) 870-6884
Supplier General Contact	(281) 870-6000

SECTION 2 COMPOSITION / INFORMATION ON INGREDIENTS

No Reportable Hazardous Substance(s) or Complex Substance(s).

NOTE: The product may contain varying levels of additives such as slip and anti-blocking agents, anti-oxidants, stabilizers and processing aids.

SECTION 3 HAZARDS IDENTIFICATION

This material is not considered to be hazardous according to regulatory guidelines (see (M)SDS Section 15).

POTENTIAL PHYSICAL / CHEMICAL EFFECTS

High dust levels may create potential for explosion. Spilled pellets present a slipping hazard on hard surfaces. Thermal burn hazard - contact with hot material may cause thermal burns. Material can accumulate static charges which may cause an ignition.

POTENTIAL HEALTH EFFECTS

Material is essentially non-toxic. However, if dust is generated, it could scratch the eyes and cause minor irritation to the respiratory tract. When heated, the vapors/fumes given off may cause respiratory tract irritation.

NFPA Hazard ID:	Health:	1	Flammability:	1	Reactivity: 0
HMIS Hazard ID:	Health:	1	Flammability:	1	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

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SECTION 4 FIRST AID MEASURES

INHALATION

In case of adverse exposure to vapors and / or aerosols formed at elevated temperatures, immediately remove the affected victim from exposure. Administer artificial respiration if breathing is stopped. Keep at rest.

SKIN CONTACT

Wash contact areas with soap and water. For hot product: Immediately immerse in or flush affected area with large amounts of cold water to dissipate heat. Cover with clean cotton sheeting or gauze and get prompt medical attention.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

First aid is normally not required. Seek medical attention if discomfort occurs.

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Assure an extended cooling down period to prevent re-ignition. Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: High dust levels may create potential for explosion.

Hazardous Combustion Products: Smoke, Fume, Aldehydes, Oxides of carbon, Flammable hydrocarbons, Acetic acid

FLAMMABILITY PROPERTIES

Flash Point [Method]: 343C (649F) [Estimated ASTM E136]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: 343°C (649°F) [Estimated]

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The

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National Response Center can be reached at (800)424-8802.

SPILL MANAGEMENT

Land Spill: Spilled pellets present a slipping hazard on hard surfaces. Prevent dust cloud. Small Dry Spills: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

Water Spill: Stop leak if you can do it without risk. Confine the spill immediately with booms. Skim from surface.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Prevent entry into waterways, sewers, basements or confined areas. For Large Spills: Cover spill with plastic sheet or tarpaulin to minimize spreading.

SECTION 7 HANDLING AND STORAGE

HANDLING

Avoid conditions which create dust. Avoid elevated temperatures for prolonged periods of time. Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Prevent small spills and leakage to avoid slip hazard. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Material can accumulate static charges which may cause an electrical spark (ignition source). Care should be taken when storing and handling this product. Apart from the specific nature of the polymer product, conditions such as humidity, sunlight, and temperature have an influence on the way the product behaves during storage and handling. Special attention should be paid to avoid inappropriate stacking of palletized bags or other package units. Indeed, polymer products may be dimensionally unstable under certain conditions. Avoid conditions generating heat during transfer operations.

Loading/Unloading Temperature: 20°C (68°F) [Ambient]

Transport Temperature: 20°C (68°F) [Ambient]
Transport Pressure: 101 kPa (15 psia) [Ambient]

Static Accumulator: This material is a static accumulator.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Store in a cool, dry place with adequate ventilation. Keep away from incompatible materials, open flames, and high temperatures. Do not store in open or unlabelled containers.
Storage Temperature: 20°C (68°F) [Ambient]
Storage Pressure: 101 kPa (15 psia) [Ambient]

Suitable Containers/Packing: Boxes; Bags; Hopper Cars

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

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Exposure limits/standards for materials that can be formed when handling this product: For dusty conditions, OSHA recommends for particulates not otherwise regulated an 8-hour TWA of 15 mg/m3 (total dust), 5 mg/m3 (respirable fraction); ACGIH recommends for insoluble and poorly soluble particles not otherwise specified an 8-hour TWA of 10 mg/m3 (inhalable particles), 3 mg/m3 (respirable particles).

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Adequate ventilation should be provided so that exposure limits are not exceeded. SPECIAL PRECAUTIONS: Should significant vapors/fumes be generated during thermal processing of this product, it is recommended that work stations be monitored for the presence of thermal degradation by-products which may evolve at elevated temperatures (for example, oxygenated components). Processors of this product should assure that adequate ventilation or other controls are used to control exposure. It is recommended that the current ACGIH-TLVs for thermal degradation by-products be observed. Contact your local sales representative for further information.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Particulate air-purifying respirator approved for dust / oil mist is recommended.

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

If product is hot, thermally protective, chemical resistant gloves are recommended. If contact with forearms is likely, wear gauntlet style gloves.

Eye Protection: If contact is likely, safety glasses with side shields are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

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If product is hot, thermally protective, chemical resistant apron and long sleeves are recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

See Sections 6, 7, 12, 13.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Typical physical and chemical properties are given below. Consult the Supplier in Section 1 for additional data.

GENERAL INFORMATION

Physical State: Solid
Form: Pellet, Powder
Color: Variable
Odor: Odorless
Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 60 F): 0.95 - 0.953
Flash Point [Method]: 343C (649F) [Estimated ASTM E136]
Flammable Limits (Approximate volume % in air): LEL: N/D UEL: N/D
Autoignition Temperature: 343°C (649°F) [Estimated]
Boiling Point / Range: N/A
Vapor Density (Air = 1): N/A
Vapor Pressure: N/A
Evaporation Rate (n-butyl acetate = 1): N/A
pH: N/A
Log Pow (n-Octanol/Water Partition Coefficient): N/D
Solubility in Water: Negligible
Viscosity: N/A
Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/A
Melting Point: 126°C (259°F) - 132°C (270°F)
Hygroscopic: No

SECTION 10 STABILITY AND REACTIVITY

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Avoid elevated temperatures for prolonged periods of time. High dust concentrations., Do not heat above flashpoint.

MATERIALS TO AVOID: Strong oxidizers, Fluorine

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HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY

Route of Exposure	Conclusion / Remarks
Inhalation	
Toxicity: Data available.	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Negligible hazard at ambient/normal handling temperatures. Based on test data for structurally similar materials.
Ingestion	
Toxicity: Data available.	Minimally Toxic. Based on test data for structurally similar materials.
Skin	
Toxicity: Data available.	Minimally Toxic. Based on test data for structurally similar materials.
Irritation: Data available.	Negligible irritation to skin at ambient temperatures. Based on test data for structurally similar materials.
Eye	
Irritation: Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials.

CHRONIC/OTHER EFFECTS

For the product itself:

Dust may be irritating to the eyes and respiratory tract.
Elevated temperatures or mechanical action may form vapors, mists or fumes which may be irritating to the eyes and respiratory tract.

Contains additives that are encapsulated in the polymer. Under normal conditions of processing and use the encapsulated additives are not expected to pose a health hazard, however, grinding of the polymer is not recommended.

Contains:

This material may contain carbon black inextricably bound in a polymer. Certain carbon blacks have proved carcinogenic in animal studies. Inhalation animal studies of high concentrations resulted in chronic inflammation, lung fibrosis and lung tumors. Epidemiology studies of workers include findings of bronchitis, pneumonia, emphysema and excess cancer. Carbon black inextricably bound in a polymer or other matrix should present little or no hazard.

Additional information is available by request.

The following ingredients are cited on the lists below: None.

--REGULATORY LISTS SEARCHED--

1 = NTP CARC	3 = IARC 1	5 = IARC 2B
2 = NTP SUS	4 = IARC 2A	6 = OSHA CARC

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SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Not expected to be harmful to aquatic organisms.
Material -- Not expected to be harmful to terrestrial organisms.

MOBILITY

Material -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be persistent.

Hydrolysis:

Material -- Transformation due to hydrolysis not expected to be significant.

Photolysis:

Material -- Transformation due to photolysis not expected to be significant.

Atmospheric Oxidation:

Material -- Transformation due to atmospheric oxidation not expected to be significant.

BIOACCUMULATION POTENTIAL

Material -- Potential to bioaccumulate is low.

SECTION 13 DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Suitable routes of disposal are supervised incineration, preferentially with energy recovery, or appropriate recycling methods in accordance with applicable regulations and material characteristics at the time of disposal.

REGULATORY DISPOSAL INFORMATION

RCRA Information: The unused product, in our opinion, is not specifically listed by the EPA as a hazardous waste (40 CFR, Part 261D), nor is it formulated to contain materials which are listed as hazardous wastes. It does not exhibit the hazardous characteristics of ignitability, corrosivity or reactivity and is not formulated with contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). However, used product may be regulated.

SECTION 14 TRANSPORT INFORMATION

LAND (DOT): Not Regulated for Land Transport

LAND (TDG): Not Regulated for Land Transport

SEA (IMDG): Not Regulated for Sea Transport according to IMDG-Code

AIR (IATA): Not Regulated for Air Transport

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: When used for its intended purposes, this material is not classified as hazardous in accordance with OSHA 29 CFR 1910.1200.

NATIONAL CHEMICAL INVENTORY LISTING: TSCA

EPCRA: This material contains no extremely hazardous substances.

CWA / OPA: Plastic pellets are defined by the US EPA under the Clean Water Act (40CFR122.26) as a "significant material" which requires any industrial plant that may expose pellets to storm water to secure a storm water permit. Violations of the rule carry the same penalties as other Clean Water Act violations. Pellets found in storm water runoff are subject to EPA regulations with the potential for substantial fines and penalties.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: None.

SARA (313) TOXIC RELEASE INVENTORY: This material contains no chemicals subject to the supplier notification requirements of the SARA 313 Toxic Release Program.

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
CARBON BLACK	1333-86-4	1, 4, 10, 16

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16 OTHER INFORMATION

N/D = Not determined, N/A = Not applicable

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:
Revision Changes:
Section 06: Notification Procedures - Header was modified.

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Product Name: PAXON CROSS-LINKABLE HDPE - All Colors Except Red
Revision Date: 04 May 2010
Page 9 of 10

Section 10 Stability and Reactivity - Header was modified.
Section 13: Disposal Recommendations - Note was modified.
Section 08: Personal Protection was modified.
Section 08: Hand Protection was modified.
Section 07: Handling and Storage - Handling was modified.
Section 07: Handling and Storage - Storage Phrases was modified.
Hazard Identification: Physical/Chemical Hazard was modified.
Section 07: Loading/Unloading Temperature C(F) was modified.
Section 07: Transport Temperature C(F) was modified.
Section 07: Transport Pressure kPa was modified.
Section 07: Storage Temperature C(F) was modified.
Section 07: Storage Pressure kPa was modified.
Section 05: Hazardous Combustion Products was modified.
Section 06: Accidental Release - Spill Management - Water was modified.
Section 09: Relative Density - Header was modified.
Section 09: Autoignition Temperature was modified.
Section 08: Hand Protection was modified.
Section 08: Eye Protection was modified.
Section 14: Sea (IMDG) - Header was modified.
Section 14: Air (IATA) - Header was modified.
Section 14: LAND (TDG) - Header was modified.
Section 14: LAND (DOT) - Header was modified.
Section 15: List Citation Table - Header was modified.
Section 14: LAND (DOT) - Default was modified.
Section 14: LAND (TDG) Default was modified.
Section 14: Sea (IMDG) - Default was modified.
Section 14: Air (IATA) - Default was modified.
Section 16: Materials Covered was modified.
Section 08: Exposure limits/standards was modified.
Section 15: OSHA Hazard Communication Standard was modified.
Section 11: Tox Table - Header was modified.
Hazard Identification: OSHA - May be Hazardous Statement was modified.
Section 06: Notification Procedures was modified.
Composition: Footnotes was modified.
Section 09: Oxidizing Properties was modified.
Section 11: Chronic Tox - Product was added.
Section 01: Product Code - Header was deleted.
Section 11: Chemical Name - Header was deleted.
Section 11: CAS Number - Header was deleted.
Section 11: List Citation - Header was deleted.
Section 11: Tox List Cited Table was deleted.

THIS MSDS COVERS THE FOLLOWING MATERIALS: Crosslinkable HDPE grades for which the grade name consists of a base polymer followed by a suffix referring to an additive package. Paxon 7203 and 7204 are black colored only (carbon black). Applicable designations follow. | Base polymers : | PAXON 7000X | PAXON 7003 | PAXON 7004 | PAXON 7203BLK (Black) | PAXON 7204BLK (Black) | Possible additive packages for PAXON 7003 and PAXON 7004: | BGE | BLK | BLU | BRN | DGR | GRY | JDG | NAT | ORG | PEL | RWK | WHT | YEL

PRECAUTIONARY LABEL TEXT:

This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer.

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Caution! Excessive exposure to dust may cause irritation of the nose and throat, and mechanical irritation of the eyes. Avoid generating dust. Use adequate ventilation under dusty conditions to keep airborne levels below recommended exposure limits. If inhaled and symptoms develop, remove to fresh air and get medical attention.

The information and recommendations contained herein are, to the best of ExxonMobil's knowledge and belief, accurate and reliable as of the date issued. You can contact ExxonMobil to insure that this document is the most current available from ExxonMobil. The information and recommendations are offered for the user's consideration and examination. It is the user's responsibility to satisfy itself that the product is suitable for the intended use. If buyer repackages this product, it is the user's responsibility to insure proper health, safety and other necessary information is included with and/or on the container. Appropriate warnings and safe-handling procedures should be provided to handlers and users. Alteration of this document is strictly prohibited. Except to the extent required by law, re-publication or retransmission of this document, in whole or in part, is not permitted. The term, "ExxonMobil" is used for convenience, and may include any one or more of ExxonMobil Chemical Company, Exxon Mobil Corporation, or any affiliates in which they directly or indirectly hold any interest.

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Appendix J

Amerigrow Mulch Proposal and Documentation

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National Conference on Weights and Measures / National Type Evaluation Program

Form 15: Proposal to Amend Handbooks

Date: September 11, 2009	**Regional Association (s) you wish to consider this proposal:** ☐Central ☐Northeast ☒Southern ☐Western
Submitter Name: C. Tomlinson/Amerigrow Recycling **Address:** 10320 W. Atlantic Ave, Delray Beach, FL 33446 **Phone:** 561-499-8148 **Fax:** 561-499-5896 **Email:** chuck@amerigrow.com	**Regional Actions:** (for use by regional standing committee-votes for and against)

Please attach any background Information, test data, research or additional Documentation that will help the Committee consider the proposal.

Purpose: (Provide a concise statement as to the intent or purpose of this proposal.)
To request that the NIST update their Handbook 133 regarding the methods of measurement of the volume of bagged mulch to take into consideration, the major changes in the mulch industry which have occurred since the last update in 1999.

Proposal: (Provide solutions to problems in specific language in amendment form to handbooks; if a proposal involves a new area of weights and measures activity, provide recommendations for both, regulations and test methods for proper enforcement.) Identify the specific handbook, section and paragraph that would be changed (e.g., Amend Handbook 44, Sec 1.10. General Code, paragraph G-A.1. Commercial and Law-Enforcement Equipment as follows:).
See attached # 1 - Proposals

Justification: (Provide justification for national consideration of this proposal.)
See attached # 2 - Justification

Other Contacts: (Provide position statements, comments, etc. with names and addresses of individuals, firms, manufacturers, and/or trade associations included in developing the proposal.)
None

Other Reasons For: (If none, please indicate none have emerged.)
None

Other Reasons Against:
None

Provide evidence of consistency with other NCWM publications, such as other specific device code section and applicable federal laws and regulations (e.g., USDA):
Unknown

Additional Considerations: (Provide cost estimates and the anticipated benefits for all stakeholders or indicate how the proposal may affect other requirements, programs, etc.)
Unknown

List of Attachments: (documents, data, studies, etc.) -Penn State Cooperative Extension, Home Gardeners Headline Newsletter, Summer 2004. Page 3 of 17. -University of Florida Publication ENH103, Mulches for the Landscape. Page 5 of 5 -Amerigrow Recycling February 13, 2008 - March 28, 2008 test of red and Gold colored mulch.	**Suggested Action:** (Be specific as to the action you request of the committee on this proposal.) Recommend NCWM ☒ Adoption ☐ Withdraw ☐ Developing Item ☐ Informational Item ☐ Other (Please describe)
Send submissions for Regional Associations to: National Conference on Weights & Measures 1135 M Street Suite 110 Lincoln, NE 68508 Attention: Executive Director, info@ncwm.net	**Regional Standing Committees and Sectors submit form to:** National Institute of Standards & Technology Weights & Measures Division 100 Bureau Drive, Stop 2600 Gaithersburg, Maryland 20899-2600 Attention: Committee cc: Attention: Executive Secretary, owm@nist.gov

Revised: September, 2009

ATTACHMENT # 1 - PROPOSALS

Problem #1: Over time bagged mulch suffers from decomposition and desiccation. Unlike most other products, it turns into "dirt" as it ages.

In an article published by the Penn State Cooperative Extension, in Home Gardeners Newsletter, Summer 2004, it is stated that "like other organic matter, wood and bark decompose over time. The primary organisms involved with their decomposition are bacteria and fungi, which derive their energy for growth from carbon-based compounds found in wood and bark. Some fungi, such as artillery fungus are "recyclers" and break down woody tissue directly".

In an article published by the University of Florida Extension Service, Mulches for the Landscape, Publication #ENH103, it is stated "do not store organic mulches, because they will rapidly decompose in the bag".

In addition, wood, which is ground into mulch, contains moisture (one of the desired qualities of mulch is its ability to hold water) and colored mulch contains even more, since approximately 8.26 gallons of water per yard or .60 gallons per bag is added to the mulch during the coloring process. Also, if processing is done in the rain, the moisture content will be even higher. Obviously, over a period of time, especially in the hot Florida sun, there is a major moisture loss and volume from evaporation.

On February 13, 2008 Amerigrow bagged 2 pallets of red mulch and 2 pallets of gold mulch. These 4 pallets were produced in bagging runs during which we more frequently sampled bags off the line to ensure an accurate 2 cu. ft. fill rate. These pallets of mulch were allowed to sit outside until March 28, 2008, at which time 4 bags from the top of each of these 4 pallets were re-measured. The gold bags measured 13.75% less volume and the red bags measured 12.50% less volume. This loss in volume can be attributed to a combination of the decomposition of the mulch and a loss in the volume of water content of the mulch.

There is also the temporary affect of compaction when mulch is stored under weight (which typically may be other bags of mulch). An unscreened bag of colored mulch (which these bags were) typically weighs approximately 37 lbs and a pallet consists of 75 bags weighing a total of approximately 2800 lbs. The bags on the bottom of the pallet with approximately 1 ton of weight above will be compressed, resulting in a temporary loss in volume. Additionally, if the bags tested had been pulled from the bottom of the pallets, the decrease in the volume of the mulch would have been even greater from the compaction.

Solutions to Problem #1: NIST Handbook 133, 4th Edition needs to add in Chapter 3.11 Mulch and Soils Labeled by Volume, a paragraph to cover the decomposition of wood mulch over a period of time. The purchase date of the product needs to be proven so that a reasonable estimate can be made as to whether an upward adjustment needs to be made to properly reflect decomposition since the purchase date.

Under 1.1 Scope, retail "shortages may also be caused by moisture loss (desiccation) if the product is packaged in permeable media", such as is the case with ventilated mulch bags, however, this apparently is not applied to the testing of mulch volumes. Moisture allowances over time need to be determined as they have been for flour and then used in the adjustment of MAV as in section 2.3, How is The Maximum Allowable Variation MAV corrected for the Moisture Allowance?

NIST Handbook #133 4th Edition needs to add in Chapter 2 section 2.3 Moisture Allowances a category including mulch and soil in addition to the current category for flour and dry pet food. It should be required that the purchase date of the product is proven so that a reasonable estimate can be made as to whether an upward adjustment needs to be made to properly reflect desiccation since the purchase date. The Handbook now covers on page 3, "deviations from the net quantity of contents caused by the loss or gain of moisture from the package are permitted when they are caused by ordinary or customary exposure, that normally occur in good distribution practices and that unavoidably result in change of weight or measure", however, this apparently is not applied to the testing of mulch volumes.

In addition, under 3.11 Mulch and Soils Labeled by Volume, evaluation of results, the 5% MAV allowed on one bag in twelve, may compensate for deviations in filling, but doesn't compensate for all twelve bags in a test of mulch being short because of decomposition and desiccation. Theoretically the shortage of all the bags produced and sold at the same point in time should be consistently short and an adjustment needed for decomposition and desiccation.

Problem # 2: It is easy to tamper with mulch bags (open and reseal the bags), which depending upon possible hidden agendas, as there was in our case, can create a major problem. Not only can the fill rate be altered, but also contaminants can be put into the bag. We had a situation several years ago, in which a competitor of ours visited a customer with several of our mulch bags, proceeded to open one in front of our customer, poured it on the ground and a soda can came out. Obviously, it is hard to conceive that he was lucky enough to pick a bag that had a soda can in it, and because of the size of the soda can, it would have been next to impossible for it to pass through our equipment.

Solution to Problem # 2: Testing of mulch bag volumes should require the establishment of a chain of custody, beginning with the purchase date, in order to determine the age of the mulch and the conditions of storage (which is also necessary for the solution to Problem 1). It is too easy to tamper with mulch bags to not determine the chain of custody from the manufacturer to the point of sale. This may not be a problem when the mulch is delivered to the point of sale (e.g. big box store) by the manufacturer, but when there is another party involved, who doesn't account for the purchase details (such as someone with a hidden agenda), this is a problem.

Problem # 3: Bags of mulch with different sizes of grind can produce different fill rates when measured in the measuring box specified in table 3-4 in the NIST Handbook 133. For a 2 cubic foot bag, the specifications call for a box with interior wall dimensions of 16" in length, 9" in width and 48" in height.

We ran a volume test of a competitor's mulch following the required procedures and found that, even though their bags weight 9-10 pounds less than ours, theirs still almost filled the 2 cubic foot measuring box. Upon examination, the reason became obvious – their grind was much larger with some very long pieces, which created substantial air pockets when the standard procedures were used (fluffing the mulch into the measuring container). The bags technically, but not really, meet the legal requirements. This results in the Division of Weights and Measures being satisfied with the fill rate and the public buying pockets of air.

The mulch produced by Amerigrow is a much finer grind and does not benefit from rolling the bags and fluffing the mulch. Under the current regulations, there is no maximum acceptable size of the wood mulch pieces, and to take it to the extreme, what if the bag of mulch contained 10% pieces over 9" (the width of the required measuring box), and 50% +/- of these pieces end up angled form front to back, creating many large air pockets; would that be fair to the public?

Solution to Problem # 3: Make the specifications for the measuring box for a 2 cubic foot bag of mulch, 12" x 12" x 24", which would reduce the effect of any larger pieces causing the large pockets of air.

In fact, it is questionable why the NIST made the width specification for measuring a 1 c.f. bag different than that for measuring 2 c.f. and 3 c.f. bags. The NIST made the measuring box for 2 c.f. and 3 c.f. bags so that one box can be used for measuring both size bags, but why did it make the width for the 1 c.f. measuring box different, while at the same time creating a situation where the public is buying air in the 2 c.f. and 3 c.f. bags? Obviously, the measuring box for all 3 size bags should be the same length and width, and only different in height. This box should be 12" x 12" x 36".

ATTACHMENT # 2 - JUSTIFICATION

In Amerigrow's opinion, the procedures used for the measurement of volume of bagged mulch in accordance with the NIST Handbook 133 implemented 10 years ago, are outdated, inconsistent, and questionable and resulted in Amerigrow's bags failing a Florida Department of Agriculture, Division of Weights & Measures, measurement test.

In November 2007 a lawsuit was filed against Amerigrow Recycling and 5 other defendants for "deceptive and unfair trade practices" in the production and sale of bagged mulch. Subsequently, the plaintiff and their attorneys filed with the Court to convert this to a class action lawsuit against the defendants. This lawsuit, which was dismissed by the Court in July 2009, cost our company well in excess of $75,000 to defend, and in all likelihood, the cost to all defendants was in excess of $500,000 which does not include the cost of company personnel providing information and support to the attorneys.

Tests in December 2007 by the Florida Department of Agriculture, of bags of mulch produced by the 6 defendants and located at the plaintiff's place of business, found many of the bags short packed, and these tests became the cornerstone for furthering the lawsuit and opening the door for certifying the class action.

Amerigrow cannot speak for the other defendants in this lawsuit, but obviously can in regard to our own bags failing the measurement tests. If the procedures for the measurement of bag mulch are not updated ASAP, failed tests will increase and the cost associated with these failed tests, including legal fees such as those having to be absorbed by Amerigrow and its co-defendants in this lawsuit, will occur more often and nationwide and reputations will be unjustifiably ruined.

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Penn State Cooperative Extension, Berks County

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Home Gardeners Headline Newsletter
Summer 2004

In this newsletter:
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- What Is Growing In My Landscape Mulch?
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- Container Gardening Outdoors
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- Chrysanthemums For The Home
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- Berks County Calendar of Events
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Dear Home Gardener,

This has been an interesting spring in Berks County. We've had infestations of cicadas and of cankerworms in certain areas, but these pests-despite all the media hype-have been invisible over much of the county.

We've had multiple storms-but again, the effects have been spotty. Until recently, some areas were quite dry, while others were soggy. Steady rainfall in early June has now replenished our aquifers and we're going into the heat of summer in good shape nearly everywhere in the county.

With the spring lawn and garden work behind us, it's time to savor the results. Vegetables are coming on strong, flowers are lush, and lawns are green. Now is the time to enjoy gardening events that celebrate our abundance: strawberry festivals, garden tours, the Master Gardener Demo Garden Open House, and of course our county fair.

Happy Gardening!

Beth Finlay, Master Gardener Coordinator
Nancy Bosold, Extension Educator

Correction

In the spring issue, we printed an article on "Lawn Management Through the Seasons." It stated under the mowing section that you should cut your lawn to 1½ to 2 inches. This should have read 2-3" for most home lawns. At 2-3", you'll have better weed management and turf survival through the seasons.

Nancy Bosold, Extension Educator Turfgrass Management

Nuss says orchids, tulip bulbs, chrysanthemums, and dahlias can be allergenic to some individuals.

Skin irritant plants. The chemicals that plants have in leaves, bark, roots, bulbs, or flowers can cause direct skin irritations. "In many cases, the sap within the plant is the cause of the problem," Nuss explains. "Often the irritating substance is released only when the plant tissue has been damaged or mishandled."

Nuss says some common houseplants can cause skin irritation, including poinsettias, penciltrees, daffodils, hyacinths, and ornamental buttercups.

Stinging plants. Most nettles can cause a toxic reaction when touched, but the reaction does not have lasting effects and requires no medical treatment.

Thorny plants. The most common plant-related injuries are caused by thorns. "Most people don't seek medical help after getting stuck by a thorn," Nuss says. "But implanted thorns, needles or spines can cause infections or other medical problems."

Nuss says thorns embedded near joints can cause chronic arthritis. Thorns embedded near bones can mimic a bone tumor. Thorny plants that can cause painful injuries include roses, black locust and honeylocust trees, and blackberry bushes.

"Clothing, tools, and even smoke from burning plants can carry toxins," Nuss says. "Be sure to wash all clothing and tools after working with problem plants. The residues can be hazardous for a long time."
Source: Penn State University PenPages

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What Is Growing In My Landscape Mulch?

Landscape mulches are used to protect soil, conserve moisture, moderate soil temperature, and limit weed growth, as well as beautify and unify landscape plantings. Most mulches are mixtures of shredded wood and bark residues from lumber and paper mills, arboricultural and land-clearing operations, and wooden pallet disposal or recycling facilities.

Like other organic matter, wood and bark decompose over time. The primary organisms involved with their decomposition are bacteria and fungi, which derive their energy for growth from the carbon-based compounds found in wood and bark. These compounds include cellulose, lignin, and simple sugars. Bacteria are microscopic organisms that are not visible in the mulch. Fungi also may be microscopic, but many develop visible reproductive structures.

The fungi involved in the decomposition of landscape mulches are natural components of the mulch environment. Some fungi, such as the artillery fungus, are "recyclers" and break down woody tissue directly. Other fungi, such as slime molds, consume bacteria and other organisms living in the mulch. These fungi are not harmful to landscape plants, and no known health hazards are associated with them unless they are eaten. They can be found from April through October, usually following rainy weather.

ENH103

UF UNIVERSITY of FLORIDA
IFAS Extension

Mulches for the Landscape[1]

Robert J. Black, Edward F. Gilman, Gary W. Knox and Kathleen C. Ruppert[2]

A mulch is any material applied to the soil surface for protection or improvement of the area covered. Mulches are frequently applied around plants to modify the soil environment and enhance plant growth. The mulch material may be organic such as bark, wood chips, leaves, pine needles, grass clippings or similar material; or inorganic such as gravel, pebbles, polyethylene film or woven ground cloth.

BENEFITS OF MULCHING

Mulching has the following beneficial effects upon the soil and plants.

- Mulches can prevent loss of water from the soil by evaporation. Moisture moves by capillary action to the surface and evaporates if the soil is not covered by a mulch.
- Mulches suppress weeds when the mulch material itself is weed-free and applied deeply enough to prevent weed germination or to smother existing small weeds.
- A more uniform soil temperature can be maintained by mulching. The mulch acts as an insulator that keeps the soil cool under intense sunlight and warm during cold weather.
- Mulching will prevent crusting of the soil surface, thus improving absorption and percolation of water into the soil and, at the same time, reducing erosion.
- Organic materials used as a mulch can improve soil structure and tilth. As mulch decays, the material becomes topsoil. Decaying mulch may also add nutrients to the soil.
- Mulches also add to the beauty of the landscape by providing a cover of uniform color and interesting texture to the surface.

1. This document is ENH103, one of a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date March 1992. Revised March 1994. Reviewed October 2003. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

2. Associate Professor & Associate Professor, Environmental Horticulture Department; Associate Professor in Environmental Horticulture, North Florida Research and Education Center; and Assistant Professor, Environmental Horticulture Department, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville FL 32611.

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Bagged mulch is also available in amounts such as 1.25 cubic feet or 2.0 cubic feet. If you purchase the mulch needed for the shrubbery example given above in amounts of 1.25 cubic feet, you will need 20 bags (25 cubic feet r 1.25 cubic feet = 20 bags). If you purchase bags of 2.0 cubic feet, you will need 12.5 bags (25 cubic feet r 2 cubic feet = 12.5 bags). Therefore, you will purchase 13 bags.

However, as discussed above, always remember to pull mulch 1 to 2 inches away from the stems and trunks of plants to lessen the chances of stem or trunk rot. So, whether the shrubs are single or multi-stemmed, you will not need all of the mulch determined above; the calculations did not include either the area used by the stems and/or low branches, or the extra 1 to 2 inches around the stem(s). Therefore, you can purchase less mulch than the calculations indicate. If you are using an organic mulch and buy more bags than you need, return the extras for a refund, if possible (check store policy). Do not store organic mulches, because they will rapidly decompose in the bag. Inorganic mulches, however, may be stored.

REFERENCES

Khatamian, H. 1985. "Mulching-how, when, why and with what". *Grounds Maintenance* June: p. 102-104.

Stinson, J. M., G. H. Brinen, D. B. McConnell and R. J. Black. 1990. "Evaluation of landscape mulches". *Proc. Fla. Hort. Soc.* 103:372-377.

Amerigrow

STUDY OF DECOMPOSITION OF BAGGED RED & GOLD COLORED MULCH

On February 13, 2008 Amerigrow bagged two (2) pallets of red mulch and two (2) pallets of gold mulch. These 4 pallets were bagged in runs during which we more frequently sampled bags taken off the line to ensure a fill rate of 2 cubic feet per bag.

On March 28, 2008 we tested four (4) bags form the top of each of the four (4) pallets and measured their contents. The content for the gold bags measured an average of 1.725 cubic feet per bag and the red bags averaged 1.75 cubic feet per bag.

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Appendix K

National Pasta Association (NPA)

Proposal to Establish a Moisture Allowance for Pasta Products

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September 16, 2009

Don Onwiler
Executive Director
c/o Laws & Regulations Committee
National Conference on Weights and Measures
1135 M Street, Suite 110
Lincoln, NE 68508

Joe Benavides
Chairman, Laws & Regulations Committee
Southern Weights and Measures Association
Texas Department of Agriculture
1700 North Congress Avenue, 11th Floor
Austin, TX 78701

Re: Proposal to Establish a Moisture Allowance for Pasta Products

Dear Messrs. Onwiler and Benavides:

The National Pasta Association ("NPA") submits this proposal to request that the National Conference on Weights and Measures ("NCWM") amend Handbook 133 by adopting a 3 percent moisture allowance for macaroni, noodle, and like products ("pasta products"). NPA is the national trade association representing companies that manufacture, market, and distribute pasta throughout the United States. NPA's allied members include wheat producers and millers, companies that manufacture pasta making equipment, and others who support the production of high quality pasta.

The allowance for pasta products has been previously proposed and accepted as reasonable and valid. 1/ Amendment of Handbook 133 will simplify the ability of inspectors to evaluate moisture loss for this discrete class of products. The change will assist jurisdictions in promoting fair trade and equity in the marketplace in a manner that is consistent with applicable law and regulations.

1/ Although referred to herein as an "allowance," NPA's request is for the establishment of a "gray area." Handbook 133 explains this concept as follows: "When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the 'gray area,' the lot is said to be in the 'gray' or 'no decision area.' The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the 'moisture allowance' or 'gray area.'"

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Discussion

A. Background and Legal Basis for Modification of Handbook 133

The Federal Food, Drug, and Cosmetic Act ("FDCA") requires that food packages bear an "accurate" statement of net weight. 2/ States generally have established and enforce an identical requirement. As contemplated by the FDCA, federal regulations also mandate that "reasonable variations caused by loss or gain of moisture during the course of good distribution practice or by unavoidable deviations in good manufacturing practice will be recognized." 3/ States impose parallel requirements. The required allowance for moisture loss was recognized by the U.S. Supreme Court in the case of *Jones v. Rath Packing Company*. 4/ Accordingly, inspectors must adjust for moisture loss when determining compliance with the federal and state net weight requirement.

Handbook 133 serves as an important tool that informs jurisdictions' good inspection practices. Currently, Handbook 133 includes specific moisture allowances for meat and poultry, flour, and dry pet food. 5/ No moisture allowances are expressly established for pasta products. For commodities other than those specifically listed, Handbook 133 provides limited guidance on the determination and application of moisture allowances. In recent years, NCWM's Laws and Regulations Committee has considered a series of proposals to address aspects of this issue, leading to formation of a "Working Group." 6/ The lack of guidance specific to pasta products causes challenges for state weights and measures officials across the country when conducting package inspections. Some inspectors mistakenly conclude that the absence of a specific moisture allowance for pasta products in Handbook 133 means that no consideration of moisture loss is necessary or required. That is, of course, not the case.

Over the past two decades, there has been interest in, and a sound factual basis for, establishing an allowance for moisture loss in pasta. A proposed rule issued by the Food and Drug Administration ("FDA") provided the first impetus for NPA's efforts. In 1980, FDA proposed to quantitatively define permissible "reasonable variations" from stated net weights for several food categories, including foods subject to moisture loss. 7/ FDA's proposal only specified a moisture allowance for a limited number of foods. The agency acknowledged the narrow scope of its proposed rule and explained that only a few express allowances were being proposed because FDA had a limited amount of moisture loss data available that were developed under

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2/ 21 U.S.C. § 343(e) (Foods in package form must bear "an accurate statement of the quantity of the contents in terms of weight . . . except that . . . reasonable variations shall be permitted").
3/ 21 C.F.R. § 101.105(q).
4/ *Jones v. Rath Packing Co.*, 430 U.S. 519 (1977).
5/ NIST Handbook 133: Checking the Net Contents of Packaged Goods, at 17.
6/ The Working Group has examined primarily mechanical issues (*e.g.*, when and how to account for moisture loss in the course of an inspection). This proposal advances the current efforts of the Working Group and the Conference's goal in maximizing the utility of Handbook 133 in promoting uniform, well-conceived, good inspection practices.
7/ 45 Fed. Reg. 53023 (Aug. 8, 1980). This proposed rule was later withdrawn. 56 Fed. Reg. 67440 (Dec. 30, 1991).

well-defined conditions. 8/ FDA encouraged interested persons having pertinent data on moisture loss to provide the information to the agency so that additional moisture loss categories could be proposed.

Following FDA's request for data, NPA commissioned a comprehensive study regarding moisture loss in pasta products. The protocol for this study was reviewed and accepted by FDA. NPA submitted the findings of this study to NCWM in 1988. 9/ The conclusions of the study were published and are summarized herein. 10/ The packaging used for pasta products has not changed since this study was conducted, nor have the packing methods or the basic formulations relative to moisture content. The findings of the 1989 study are consistent with more recent, discrete data which validate that the hygroscopic nature of pasta products results in unavoidable moisture loss.

Based on the strength of the pasta industry data submissions, FDA included in a 1997 proposal an express allowance of 3 percent for pasta. 11/ FDA specifically proposed a 3 percent allowance for a number of commodities, including pasta, if more than 7 days had passed following the day of pack. 12/ The proposed rule was ultimately withdrawn after many years of inaction, but not for reasons relating to the merit of the proposed moisture loss allowance for pasta products. 13/

During the 1990s, NIST continued to work toward establishing additional moisture allowances for pasta and certain other products (*e.g.*, rice). 14/ As an interim measure, NIST issued guidance to State Directors to facilitate appropriate recognition of "reasonable" moisture loss. Between 1995 and 2006, NIST issued instructions to weights and measures officials advising them to recognize a 3 percent moisture loss for pasta, rice, and other products not specifically included in Handbook 133. 15/

8/ 45 Fed. Reg. at 53029.

9/ Letter from G. Kushner to R. Thompson, February 2, 1988.

10/ Dick, Joel; Shelke, Kantha; "Net Weight Variation in Packaged Pasta," *Cereal Foods World*, Vol. 34, No. 2, pg. 201 (February 1989).

11/ 62 Fed. Reg. 9826 (Mar. 4, 1997). FDA's proposed establishment of an allowance in this rule did not adopt the "gray area" concept. Although the agency found "considerable merit" in this approach, it determined that it was not viable because there were too few limits established for foods subject to moisture loss at that time. 62 Fed. Reg. at 9850-51.

12/ 62 Fed. Reg. at 9851-52, 9869.

13/ 69 Fed. Reg. 68831, 68837 (Nov. 26, 2004).

14/ 62 Fed. Reg. at 9851 ("[L]imits are being developed for rice and pasta."); Weights and Measures Division Memorandum from Carroll S. Brickenkamp, July 12, 1994 ("Work is underway in the NCWM to develop gray areas for rice and pasta and a wide variety of meat and poultry products."); Weights and Measures Division Memorandum from Gilbert M. Ugiansky, Ph.D., April 3, 1995 (same).

NPA also was actively engaged in moisture loss allowance efforts during the early 1990s. Meetings were held between NPA's Moisture Loss Task Force and NCWM regarding establishment of a gray area for pasta products.

15/ Weights and Measures Division Memorandum from Gilbert M. Ugiansky, Ph.D., April 3, 1995 (concerning the impact of the Nutrition Labeling and Education Act of 1990 ("NLEA") on net content testing by State and local weights and measures officials); Weights and Measures Division Memorandum from Ken Butcher, January 1, 2006 (withdrawn for reasons unrelated to moisture loss guidance).

There is a broad consensus within the Conference, at NIST, and among State Directors and local programs, that it is necessary and appropriate to consider a 3 percent moisture allowance when conducting a Handbook 133 inspection. As a matter of law, such an allowance must be considered and accounted for or the inspection results are invalid and a finding that such pasta products are impermissibly underweight would be invalid (*i.e.*, pasta products should not be ordered off-sale absent consideration of moisture loss). The inevitable changes in institutional knowledge, the influx over time of inspectors, and the challenges of training state and local inspectors all point to the inherent value and need for an express 3 percent moisture allowance for pasta in Handbook 133. Failure to codify this allowance will inevitably lead inspectors to unwittingly "fail" an inspection lot, and order pasta products off retail shelves, for products that bear an accurate statement of net weight. 16/

NCWM has appropriately recognized that the issue of moisture loss is "complex" and, because Handbook 133 currently provides specific guidance on the determination and application of moisture allowances for a limited number of commodities, "[w]eights and measures jurisdictions across the country have been struggling with how to properly handle moisture loss during packaging inspections." 17/ The Work Group was created because "more definite guidance on this issue" is needed for commodities other than those specifically listed. 18/ The Work Group has also recommended that industry petition for specific moisture allowances. NPA heeds this call and has developed this proposal to begin the process of NCWM consideration and ultimate adoption of the addition to Handbook 133 for a 3 percent moisture loss allowance for pasta products.

This proposal surveys the substantial body of data that has been developed regarding moisture loss in pasta products. These data support a moisture allowance up to 5 percent, however NPA is only requesting an allowance of 3 percent. It will remain the responsibility of individual packers to minimize and account for moisture loss, consistent with good manufacturing practices, and to over-pack if anticipated moisture loss exceeds the 3 percent allowance.

B. Pasta Industry Practices

NPA member companies engage in a variety of practices regarding processing, distribution, and net quantity control. The following discussion is a typical example of such processes. Because every company is unique, however, companies may engage in different practices than those discussed herein depending on their specific circumstances. Notwithstanding these differences, the properties of pasta products, the method of packing, the nature of packaging, methods of distribution, and other industry practices that could have an impact on moisture loss are largely consistent.

16/ The practical impact of an erroneous inspection where moisture loss in pasta is not accounted for goes far beyond the retail inspection lot of 12 or more packages. Retailers often will remove the entire lot code from not just one store, but from its entire system.

17/ NCWM Laws and Regulation Committee, 2008 Interim Meeting Agenda, Work Group on Moisture Loss, available at http://www.ncwm.net/pdf/LR-08-Pub15-Final.pdf.

18/ *Id.*

Pasta is produced by an extrusion method of semolina dough made from durum wheat flour and water. The shapes are obtained from a series of dies and inserts and high speed cutters to maintain size and dimension. After various stages of mixing, moisture is removed by a drying process utilizing different levels of heat, humidity, ventilation, and cooling. The dryers are set according to specific profiles that control the rate at which moisture is removed. Final moisture results achieved range from 10.5% to 13%, depending on the pasta shape and production line. Product is typically evaluated for moisture, among other traits, during drying cooling, and after final packaging. As discussed further below, monitoring of all package net weights are performed on individual cartons after the package fill process sealing. Manufacturing takes approximately 3 to 12 hours at the processing stage. The length of time for the drying process depends on the shape but generally ranges from 3 hours to 12 hours. This time varies in conjunction with the processing line and type of product.

After the drying and cooling stage, product is stored short term for packaging. Storage times are typically brief, totaling less than 8 hours. For packaging, the product passes through a set of calibrated scales that feed the bagging or cartoning machine. Sealed, non-airtight product packages are then machine cased into paperboard cases. Typically, a fully automated system sends cartons to case packers and then to fully automated palletizers. Warehouse operators receive possession of the product from the palletizer, scan bar coding, and place the pallets in a racking system where it is held for distribution. Packaging takes between 1 and 3 hours.

Product is stored at ambient temperatures and distributed according to sales orders. Inventory of most products is usually no more than a month, but is also subject to sales orders. Inventory turnover is monitored so that no inventory becomes aged. The lag time between shipment and purchase of the product by a consumer varies greatly, usually taking at least 22 weeks.

Net weight quantity control is monitored using calibrated in-line weight system equipment. Scale systems on all packaging lines are computer monitored and calibrated. The monitoring of these checks, and all aspects of the process that can effect package weights are typically monitored and reviewed to ensure that best packing practices are followed in a given processing plant. Some production lines also make use of "check-weighers" to guard against unanticipated unreasonable variation in package weights. Individual packages that are "kicked-off" the check-weigher due to low weights are segregated and designated for "rework procedures" adopted by the particular packager. In other instances where automation is not as complete, Mettler Balances are used on each packaging line for regular sampling (*e.g.*, every 30 minutes) to verify weights.

Compliance with Handbook 133 is also obtained through planned quality systems and utilization of standard operating procedures. All weighing systems are programmed to meet declared packaged weights in compliance with NIST Handbook 133. Specifically, the average net weight of the run must equal or exceed the package label weight and there must be no single package that exceeds Handbook 133's maximum allowable variance at the time of packaging. Although the weight control program is designed to meet declared weights at point-of-pack, a moisture loss deviation will occur over time, which can be caused by ordinary exposure to conditions that normally occur in good distribution practices. The length of time in distribution, environmental

conditions, and other storage conditions may also contribute to an unavoidable loss in moisture.

C. Published Data Support a 3 Percent Moisture Allowance for Pasta Products

Pasta is made in many geographic locations across the United States and is shipped throughout the country. Although pasta exhibits weight loss in all geographic locations, extremes in climate, altitude, and temperature have a significant impact over time. As well, additional losses result when packages are uncased and placed in an air conditioned or heated retail environment.

Both carton and flexible (plastic) packaging experience moisture loss for pasta, though greater loss occurs in cartons. Industry studies indicate that moisture loss for pasta products is reasonably predictable over time. The degree of loss is inevitably influenced by the environment in which it is stored. The studies summarized below are based both on "real world" data in the retail marketing chain and studies designed to simulate these conditions.

The 1989 study is the result of a thoughtful, comprehensive approach that remains relevant today. The packaging used for pasta products has not changed since this study was conducted, nor have the packing methods. Also, the findings of the 1989 study are consistent with more recent, discrete data.

1. NDSU 1989 Study

A published study (hereinafter "Dick and Shelke study") evaluating the moisture loss of products in a typical retail storage situation recommended the establishment of a net weight allowance of 5.0 percent for pasta packaged in paperboard cartons and 3.2 percent for pasta packaged in flexible bags. 19/ The authors reached this conclusion after reviewing (1) the results of an FDA survey of moisture loss in flour packaged in Kraft paper bags, (2) FDA guidelines for moisture-loss surveys, (3) guidelines offered to the NPA by FDA officials on March 30, 1981, (4) the results of a 1981 NPA Packaging Survey, and (5) the unpublished results of a private manufacturer's research and development study on pasta net weight.

Importantly, NPA conducted the 1981 packaging study in accordance with FDA guidelines for moisture-loss surveys. This study monitored the moisture loss of pasta products in three typical storage sites: a retail supermarket in metropolitan New Jersey, a warehouse in metropolitan New Jersey, and a warehouse in Minneapolis, Minnesota. The retail store was a large air conditioned facility, representative of typical supermarkets used to display the bulk of the pasta sold in the U.S. The moisture loss of the pasta stored in the retail stores and the warehouses ranged from 2.24 to 5.02 percent for the pasta in paperboard packaging and from 1.22 to 3.18 percent for pasta sold in flexible packaging.

Additionally, the Dick and Shelke study reported the results from a private research and development study that monitored moisture loss over a 16-week period under the following controlled conditions: desert (90º F, 10% R.H.), ambient (70º F, 50% R.H.) and tropical (80º F,

19/ Dick, Joel; Shelke, Kantha; "Net Weight Variation in Packaged Pasta," *Cereal Foods World*, Vol. 34, No. 2, pg. 201 (February 1989).

80% R.H.). The pasta had a moisture loss of greater than 6 percent under desert conditions, a moisture loss of greater than 1 percent under ambient conditions, and a moisture gain of greater than 1 percent under tropical conditions.

It is also reported that, because pasta is hygroscopic, it eventually reaches an equilibrium with the surrounding atmosphere. The final equilibrium depends upon the temperature, the relative humidity of the ambient air, and the initial moisture content of the pasta. Further, pasta in paperboard cartons loses weight relatively fast within the first two to three months after production. After that, its weight fluctuates up and down with the change in ambient conditions. Pasta packaged in flexible bags loses weight at a rate which is more gradual and less responsive to change in ambient storage conditions than paperboard cartons.

After reviewing the available data on the moisture loss in pasta, Dick and Shelke concluded that it would be appropriate to establish a net weight allowance of 5.0 percent for pasta packaged in paperboard and 3.2 percent for pasta packaged in flexible bags.

2. Industry Studies on Moisture Loss

The pasta industry has conducted several moisture loss studies in recent years. The results of these studies are consistent with Dick and Shelke and indicate that no technological developments have occurred to alter the validity of Dick and Shelke's findings today. The series of studies discussed below demonstrate a good correlation between moisture loss and weight loss. Given both variation in product age at the time of purchase and the impact of environmental and geographic conditions, loss of weight due to moisture at retail can vary more than 4 percent. Similar losses can be seen in both very dry environments and other areas, depending on product age and local conditions.

The studies, drawn largely from company-specific analyses considered proprietary and confidential, validate the published studies and further support the following conclusions:

- Weight loss in pasta is directly related to moisture loss.
- Moisture loss from the time of production to the customer at the retail outlet shows considerable variation.
- The manufacturer cannot make process adjustments based on average loss in dealing with moisture loss extremes.
- Moisture loss occurs for pasta products that are packed in both film and cartons.
- Pasta products moved from warehouse storage to an air conditioned environment begin to show immediate moisture loss.
- Average weight loss was found to be between 2-3%, but when product was moved into a simulated retail environment, it reached 4% and in extreme cases 5%.

i. Study One: Deviation of Actual Net Weight from Declared Label Weight

One industry study sought to determine, by manufacturer and on the average, how the actual net weight of each sample deviates from the declared label weight. Retail product samples were

collected from five U.S. manufacturers in film and cartons from ten geographic areas throughout the United States. The products were long and short goods in cartons and film and cartons of lasagna. 20/ These samples were sealed in plastic to retain ambient humidity for each geographic area. After shipping to a testing facility, the products were immediately weighed.

In this study, the retail samples collected demonstrated that products packed in paperboard cartons generally weighed less with respect to labeled weight in hot, dry environments and at higher altitudes. Humidity change is part of the reason for variability in moisture loss in different geographical areas. However, not all of the extremes in moisture loss were found in hot, dry, or high altitude locations. This would suggest that the conditions under which pasta is stored and held for sale, among other factors, also influence moisture loss in pasta.

The average retail moisture across brands for products packaged in cartons was roughly 2% below typical production moistures (12+%) and extremes are 4% below. This study did not have access to the actual pack weight at the time of production.

ii. Study Two: Immediate Weight Loss After Production

Another experiment was designed to understand the immediate weight loss after production of pasta products and to simulate the impact of moving product from one warehouse to another in a significantly different geographic region. Three cases of production samples of 5 products in cartons and film were pulled from the production line and weighed at 0 and 3 days and every 7 days thereafter. Initial moisture was also taken. Moistures were also tested every month throughout the testing period. Following 30 days, two of the cases from each shape and package type were shipped to other product plants for continued testing every 7 days. At the end of 60 days, the samples are tested for moisture and weight monthly through 6 months from production. The plants used in the study are located in various regions of the U.S., including the desert and the coasts.

The results of this study show that products packed in film remain reasonably stable with little moisture loss while that in cartons drops by 1-1.5% within the first two weeks following production. This supports the data seen with the retail samples. As this trend continues, weight loss approaches 2.5% at 2 months, on the average, in a warehouse environment, and continues when product is uncased and subjected to a retail environment. Additional testing over the course of a year would, in all probability, show more impact from geography as seasonal low temperature and humidity extremes begin to take effect.

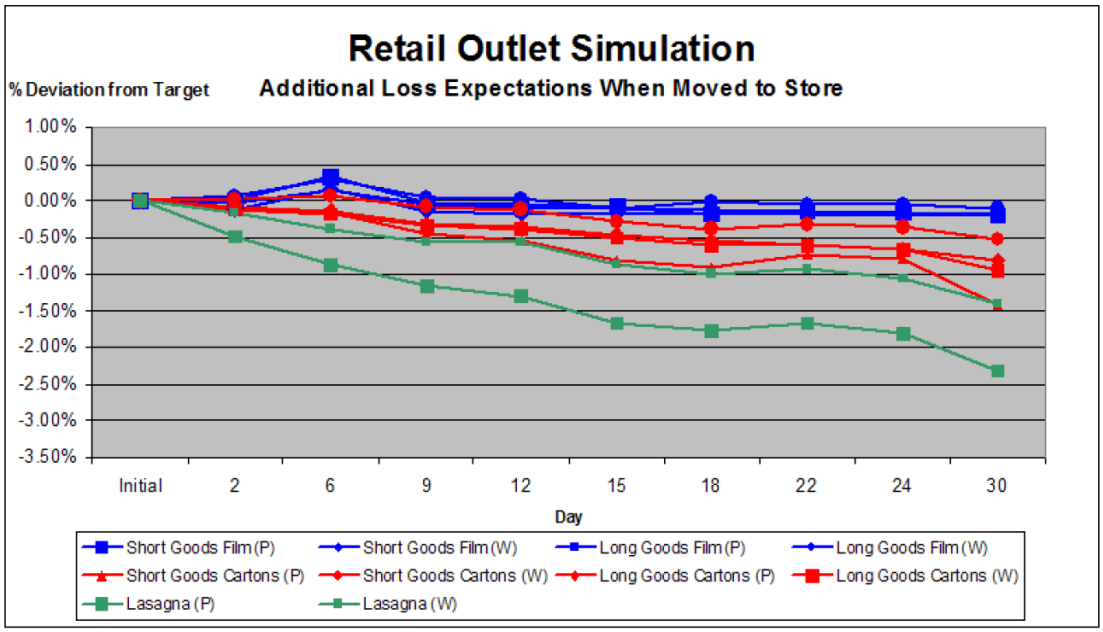
iii. Study Three: Impact of Retail Environment

An additional industry experiment sought to understand over the short-term how package weight changes when moved from a non-climate controlled environment to an air-conditioned retail outlet. In this study, one case of 5 products in cartons and film was pulled from a Midwest production facility and similar cases at least 80 days old were pulled from the production facility

20/ Although lasagna is tested in this study, it is not included in most of the data regarding weight loss in finished packages.

warehouse. All of these cases were moved to an air conditioned environment and weighed initially and every three days for 2 weeks to simulate the retail environment.

The moisture loss in products packaged in cartons ranged between 0.5 and 1.5%. The study also determined that both freshly packed samples ("P" on chart below) and older warehouse samples ("W" on chart below) tend to lose 0.5-1.0% when removed from cases and placed individually in an air conditioned retail environment.



iv. Study Four: Moisture Loss Over Product Life Cycle

Another industry experiment was designed to measure moisture loss over the average life of one company's pasta products through their distribution cycle from packaging to consumer sale. This study was designed to test the "worst case" scenario, using paperboard cartons and conducting the study during the fall and winter, the seasons with the lowest relative humidity in warehouses and retail stores. The pasta was stored at ambient conditions in the distribution system for about 8 weeks and then for another 4 weeks to simulate distribution on its path to the consumer. The product was then held in an air conditioned environment (a plant lab) simulating the store shelf for an additional three weeks. Actual moisture loss over the 15 week study at each location was 2.5% (Midwest), 3.38% (Eastern Seaboard), and 5% (Eastern Canada).

D. Proposed Amendment to Handbook 133

NPA requests that Handbook 133 be amended as follows to incorporate a 3 percent moisture allowance for pasta products, adding the language in bold below:

- On page 17 (in Section 2.3), *Moisture Allowances*:
  - *What is the moisture allowance for flour**, pasta products,** and dry pet food?* The moisture allowance for flour**, pasta products,** and dry pet food is 3% of the labeled net weight.
  - **Note: Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13% or less at the time of pack.**

- On page 18 (in Section 2.3), *How is the average error for the moisture allowance corrected?*:
  - This handbook provides "moisture allowances" for some meat and poultry products, flour, **pasta products,** and dry pet food.

- On page 3 (in Section 1.2), *Why do we allow for moisture loss or gain?*
  - This handbook provides "moisture allowances" for some meat and poultry products, flour, **pasta products,** and dry pet food.
  - Test procedures for flour, **pasta products,** some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area.

E. Requested Interim Action

NPA requests that, while this proposal is under consideration, NCWM issue a letter or formal memorandum to all state weights and measure officials advising them that a 3 percent moisture loss allowance is appropriate for pasta products. Such an action would ensure an end to state and local enforcement that yields flawed findings of a legal violation when moisture loss is not considered. NIST's Weights and Measures Division has stated that it "considers the need for allowances for affected commodities to be pressing and believes that States must make some allowance for these commodities until other data can be obtained for the respective commodities." 21/ Interim guidance would serve the weights and measures regulatory community, the pasta industry, and consumers alike.

* * *

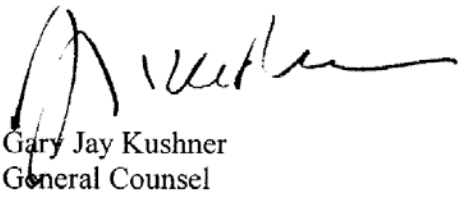
NPA requests that the NCWM establish a moisture loss allowance of 3 percent for pasta products. The historical and most recent data affirm that a 3 percent moisture loss allowance is appropriate and scientifically valid and justified. We look forward to working with the

21/ NCWM Laws and Regulation Committee, 2008 Interim Meeting Agenda, Work Group on Moisture Loss, available at http://www.ncwm.net/pdf/LR-08-Pub15-Final.pdf.

Conference and NIST on this initiative and to reaching an agreeable conclusion for this longstanding topic of concern for the pasta industry.

Please do not hesitate to contact me if you have questions after you have had an opportunity to review the enclosed materials. Thank you for your attention to this proposal. We look forward to working with NCWM on this initiative.

Sincerely,



Gary Jay Kushner
General Counsel
National Pasta Association

Enclosure

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Net Weight Variation in Packaged Pasta[1]

Joel W. Dick
Kantha Shelke
North Dakota State University
Fargo, ND

The U.S. Food and Drug Administration (FDA) in 1980 proposed amendments in the net weight labeling regulations (1) that would quantitatively define permissible variations from stated net weights for several food categories, including foods subject to moisture loss. However, while recognizing that macaroni and noodle products lose moisture during storage, FDA did not propose a moisture-loss tolerance for pasta, because while "macaroni and noodle products have been reported to lose moisture during storage, a reasonable judgment regarding an acceptable level of moisture loss could not be made for one of the following reasons: Adequate data quantifying moisture loss were not provided to FDA, conditions for data acquisition were improper or ill-defined, or reported ranges of observed moisture loss were too broad to support recommendation for a proposed level of moisture loss" (1). FDA further stated that, "providing a sufficiently narrow range of moisture loss for a food under well-defined conditions enables a critical evaluation of the data to be made. This, in turn, enables a tolerance to be proposed that is intended to protect consumer interests while not creating undue hardships for manufacturers and packagers."

Based on the apparent lack of adequate data to defend a specific change in net weight due to changes in moisture content during distribution and storage, the National Pasta Association (NPA) initiated a study to provide data about variations between net weight stated on the package and the actual weight of the pasta.

Basis for Design of Net Weight Study

The design of the study was based on a) the results of an FDA survey of moisture loss in flour packaged in Kraft paper bags (2), b) FDA guidelines for moisture-loss surveys (3), c) guidelines offered to the NPA by FDA officials on March 30, 1981 (4), d) the results of a 1981 NPA Packaging Survey (5), and e) the unpublished results of a private manufacturer's R&D study on pasta net weight.

The results of the private R&D study showed the influence of storage conditions over a 16-week period on net weight variations of different pasta products (shapes and formulations) and package sizes. Controlled storage environments used for the study included desert (90° F, 10% R.H.), ambient (70° F, 50% R.H.), and tropical (80° F, 80% R.H.) conditions. Paperboard containers in 8, 12, and 16 oz sizes were used to package the commercial pasta used in the study. Conclusions from the study were:

a) Pasta packaged and stored in paperboard cartons gains or loses moisture depending on environmental temperature and humidity;
b) The commercial pasta products tested exhibited weight loss of >6% under desert conditions, >1% under ambient conditions, and showed a weight gain of >1% under tropical conditions;
c) Neither product size, shape, composition, nor source of manufacturer showed a significant effect on weight gain or loss.

Published data (6) also indicate that pasta is hygroscopic and eventually reaches an equilibrium with the atmosphere surrounding it. That equilibrium point varies depending on the temperature and relative humidity of the ambient air as well as the initial moisture content of the pasta.

Realizing that not all manufacturers used the same type of containers for packaging retail pasta, the NPA conducted a survey of the pasta industry in 1981 to determine the most commonly used packaging materials and package sizes (5). Responses from companies representing 75% of the domestic pasta production at that time indicated that paperboard cartons made up 42% of the total retail volume, and flexible bags (mostly polyethylene) accounted for the remaining 58%. A report in the literature (7) shows that the loss or gain of moisture in pasta is affected by the water vapor permeability of the material in which it is packaged.

Design of the Study

Commercially produced and packaged pasta was to be examined periodically for net weight under environmental conditions typically encountered in the United States grocery product distribution system. Since previous work showed that pasta weight gain or loss was not affected by product shape or package size, 16 oz samples of spaghetti were chosen to be studied. Spaghetti was packaged in the two most common retail pasta packaging materials—paperboard cartons and flexible polyethylene bags.

Two well-known brands of spaghetti were tested. Brand A was produced and packaged in flexible bags on January 25, 1984 at a midwestern manufacturing location. Brand B was produced and packaged in paperboard cartons on January 28, 1984 by a manufacturer located in the northeastern U.S. Oven moisture content (8) for spaghetti samples taken after exiting from the

[1]Published with the approval of the Director of the Agricultural Experiment Station as Journal Series No. 1709.

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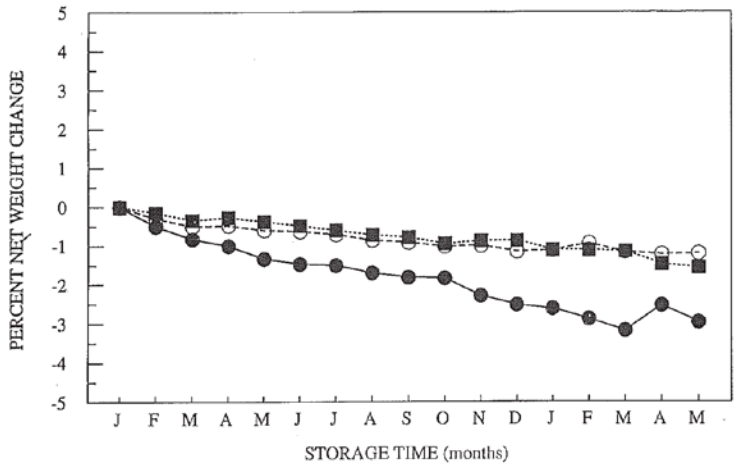


Fig. 1. Net weight change in spaghetti in flexible bags during storage under ambient conditions, in NJ retail store (•), NJ warehouse (o), and MN warehouse (■).

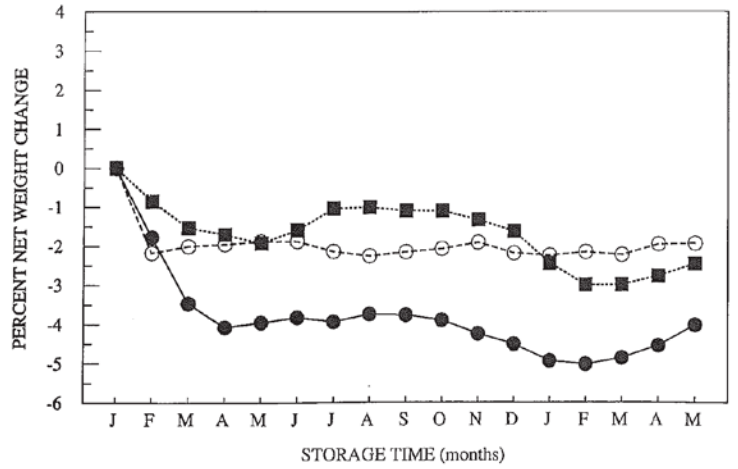


Fig. 2. Net weight change in spaghetti in paperboard cartons during storage under ambient conditions, in NJ retail store (•), NJ warehouse (o), and MN warehouse (■).

Table I. Average Net Weights of Spaghetti from Initial Production to Completion of 15-month Storage in Three Locations

	Brand A (Midwestern U.S. manufacture)			Brand B (Northeastern U.S. manufacture)		
Time Identity	NJ Retail	NJ Warehouse	MN Warehouse	NJ Retail	NJ Warehouse	MN Warehouse
Initial Production:						
Gross weight, g	465.69	465.14	467.28	493.13	494.75	491.32
Tare weight, g	4.31	4.10	4.31	20.40	20.40	20.40
Net weight, g	461.38	461.04	462.97	472.73	474.35	470.92
Initial Storage, g (2 weeks post production)	459.08	459.68	462.30	464.34	464.04	466.90
Final (15 mo.) net weight, g	447.72	455.52	455.76[c]	453.74	465.12	459.32
15 mo. weight loss, g	13.66	5.52	7.21	18.99	9.23	11.60
15 mo. weight loss, %	2.96	1.20	1.56	4.02	1.95	2.46
Maximum weight loss, %	3.18	1.22	1.56	5.02	2.24	2.99
Shown after (mo.)	13	14	15	12	6, 11	12, 13

dryer was 12.4% (Brand A) and 12.5% (Brand B), which met the federal standard of identity specification of 13.0% maximum moisture content for dry pasta.

One randomly selected case of spaghetti each of Brand A (24 package case) and Brand B (20 package case) was shipped from the manufacturers to three typical storage sites: a retail supermarket in metropolitan New Jersey and warehouses in metropolitan New Jersey and Minneapolis, MN. Each case was labeled "Test Sample—Not for Sale" and was accompanied by ten empty 16 oz-size containers to be used for determining tare weight. Storage locations were selected to represent neither environmental extremes of desert nor tropical conditions.

The New Jersey retail store used in this study was a large air-conditioned facility, chosen because it was thought to represent a supermarket situation typical of the storage conditions used to display the bulk of the pasta sold in the U.S. domestic market. The test package (labeled "Not for Sale") of pasta was placed in a location adjacent to the pasta displayed for sale in the store. Because the store was air-conditioned, it was assumed *not* to be a "worst case" situation for net weight variation in a retail storage situation.

Initial storage weights (to the nearest 0.1 g) for individual packages in each of the cases tested were determined on February 11, 1984, and at approximately the same day of the month for the next 15 months. Each periodic measurement included both the actual gross weight of each 16 oz-size package, and the tare weight, the average weight of ten empty 16 oz-size containers. Net weight of each package was the actual gross weight minus the mean tare weight.

Net weight measurements were submitted monthly to the Department of Cereal Science and Food Technology at North Dakota State University for tabulation. The accumulated measurements were analyzed upon completion of the 15-month storage survey to obtain the final data now published.

Results of the Net Weight Study

The results of the study are shown graphically in Figures 1 and 2, and summarized numerically in Tables I and II. Highlights of the study have been presented previously (9).

Table I shows the maximum percentage change in pasta weight over time from the three storage locations and two packaging materials. Pasta stored in all three locations and in both packaging materials showed a net loss in weight when compared to the initial net weight at the time of production. The retail storage location showed a larger percentage change in pasta net weight than either warehouse storage location. Pasta stored

in paperboard cartons showed a larger percentage change in net weight than did pasta stored in flexible bags. Maximum loss in pasta net weight ranged from a low of 1.2% when stored in flexible bags at the New Jersey warehouse location, to a high of 5.0% when stored in paperboard cartons at the New Jersey retail store.

Figures 1 and 2 show graphically the percentage change in pasta net weight when compared with the initial net weight at the time of production. Pasta packaged in paperboard cartons loses weight relatively fast within the first two to three months after production, then fluctuates up and down thereafter with the change in ambient conditions (Fig. 1). Pasta packaged in flexible bags loses weight at a rate which is more gradual and less responsive to change in ambient storage conditions than paperboard cartons (Fig. 2).

Discussion of Results

Since FDA is unlikely to be concerned with testing packages from the warehouse, discussions about this study will be based on the retail storage data.

It is likely that the initial weight loss rate for pasta is dependent on climatic conditions during manufacture as well as on the original pasta moisture. Nonetheless, the pasta would be expected at some time to reach an equilibrium point of minimum net weight, with the higher the initial moisture content of the pasta at the time of manufacture, the greater the maximum weight loss expected. Had the initial moisture content of the pasta studied been 13.0%—the maximum allowed by the federal standard of identity—instead of 12.4% (Brand A) or 12.5% (Brand B), a greater maximum loss in net weight would have been expected than was actually observed. Even under conditions of this study, which were not necessarily conducive to dehydration, pasta lost up to 5% new weight.

Keeping the above comments in mind, the results of this study should represent a retail storage situation not atypical for dry pasta in the U.S., although typical shelf storage time is difficult to predict because of differences in shelf stocking methods. Based on the result of this study and on additional supporting information not presented here, it would seem appropriate for FDA to consider establishing a net weight tolerance for pasta manufacturers of 5.0% of the labeled weight for pasta packaged in paperboard cartons and 3.2% of the labeled weight for pasta packaged in flexible bags. Thus, for a 16 oz (1 lb) paperboard package of pasta, a minimum net weight of 15.2 oz at the point of purchase should be allowed, and for a 16 oz (1 lb) flexible bag package of pasta, a minimum net weight of about 15.5 oz (15.49 oz) should be allowed. Institution of these net weight tolerance limits would seem to afford the pasta manufacturers the benefit of the doubt in being found "under weight" in a retail situation in which they have little or no control of ambient conditions, and at the same time assure consumers that they are not purposely being shorted by the manufacturer.

Table II. Summary of 15-Month Pasta Net Weight Study

Package and Location	Net Weight Maximum g (oz)	Net Weight Minimum g(oz)	Loss %
Flexible bags			
NJ - Retail	461.38 (16.27)	446.71 (15.76)	3.2
NJ - Warehouse	461.04 (16.26)	455.42 (16.06)	1.2
MN - Warehouse	462.97 (16.33)	455.76 (16.07)	1.6
Paperboard cartons			
NJ - Retail	472.73 (16.68)	448.98 (15.84)	5.0
NJ - Warehouse	474.35 (16.73)	463.73 (16.36)	2.2
MN - Warehouse	470.92 (16.61)	456.84 (16.11)	3.0

Acknowledgment

The authors wish to recognize and thank the following: 1) The National Pasta Association for initiating and supporting this study; and 2) the Food and Drug Administration for guidance offered to make the study technically acceptable.

References

1. Federal Register. 45(155):53029, August 8, 1980.
2. U.S. Food and Drug Administration. Data for proposed net weight tolerances, internal memorandum, Feb. 13, 1979.
3. U.S. Food and Drug Administration. Net weight sampling plans, internal memorandum, October 23, 1978.
4. Formost McKesson. Moisture loss tolerance for pasta, internal memorandum, March 31, 1981.
5. National Pasta Association. Internal memorandum on packaging materials survey, December 7, 1981.
6. Taufig, F. Moisture in pasta: Its causes and effects. Technica Molitoria 28(6):119, 1977.
7. Cardoso, G. and Labuza, T. P. Prediction of moisture gain and loss for packaged pasta subjected to a sine wave temperature/humidity environment. J. Fd. Technol. 18:587, 1983.
8. Official Methods of Analysis. Association of Official Analytical Chemists, 14th ed., Method 14.04, The Association: Arlington, VA, 1984.
9. NPA study on net weight seeks to establish industry guidelines. Pasta Journal 2(1):25, 1986.

The Authors



Dr. **Joel W. Dick** is an associate professor in the Department of Cereal Science and Food Technology at North Dakota State University, Fargo, ND, where he received his Ph.D. degree in cereal chemistry and technology. Dick now directs the quality evaluation and testing program for durum wheat utilization at NDSU. In addition, he is active in teaching, research, and service activities. He previously held the positions of food technologist with the USDA Spring Wheat Quality Laboratory in Fargo and director of Quality Assurance with the Rahr Malting Co. in Shakopee, MN. Since joining NDSU, he has traveled extensively internationally, promoting wheat on behalf of U.S. wheat producers. Dick has directed the the AACC short course, *Pasta and Durum Wheat Quality* and is coauthor of chapters in the AACC books, *Durum Wheat: Chemistry and Technology,* and, *Wheat: Chemistry and Technology.*



Dr. **Kantha Shelke** is a research associate in the Department of Grain Science and Industry at Kansas State University, Manhattan, KS, and also serves as an instructor for a newly introduced class, entitled "Principles of Pasta and Noodle Technology." Shelke received a Ph.D. degree from NDSU and has M.S. degrees in both food and nutrition and in organic chemistry. She previously worked as an instructor in the Department of Food and Nutrition at North Dakota State University, Fargo, and was a staff nutritionist for the Fargo Senior Commission on Aging. Her current research principally involves cake batters, with a special emphasis on their rheology. She has also done research on pasta and noodle technology. Besides AACC, Shelke is a member of the Institute of Food Technologists.

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Report of the Specifications and Tolerances Committee

Brett Saum, Chairman
San Luis Obispo County, California
Weights and Measures

Reference
Key Number

300 INTRODUCTION

This is the final report of the Committee on Specifications and Tolerances (S&T) (hereinafter referred to as the "Committee") for the 95th Annual Meeting of the National Conference on Weights and Measures (NCWM). The report is based on the Interim Report offered in the NCWM Publication 16, "Committee Reports," testimony at public hearings, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting.

Table A identifies the agenda items in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting agenda. Voting items are indicated with a "**V**," or if the item was part of the Voting Consent calendar by the suffix "**VC**" after the item number. Items marked with an "**I**" after the Reference Key Numbers are Information items. Items marked with a "**D**" after the Key Numbers are Developing items. The Developing designation indicates that an item, while it has merit, may not be adequately developed for action at the national level. Items marked "**W**" have been withdrawn from consideration. Items marked with a "**W**" will generally be referred to the regional weights and measures associations because they either need additional development, analysis, and input or did not have sufficient Committee support to bring them before the NCWM. Table B lists the appendices to the report, Table C identifies the acronyms for organizations and technical terms used throughout the report, and Table D provides a summary of the results of the voting on the Committee's items and the report in its entirety.

This report contains recommendations to amend the National Institute of Standards and Technology (NIST) Handbook 44, 2010 Edition, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." Proposed revisions to the handbook are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **<u>underlining</u>** information to be added. New items proposed for the handbook are designated as such and shown in **bold face print**.

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as submitted. Therefore, the report may contain references to inch-pound units.

Table A
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Table C
Glossary of Acronyms

AWS	Automatic Weighing Systems	NCWM	National Conference on Weights and Measures, Inc.
AWWA	American Water Works Association	NEWMA	Northeastern Weights and Measures Association
BCS	Belt-Conveyor Scales	NIST	National Institute of Standards and Technology
CC	Certificate of Conformance	NTEP	National Type Evaluation Program
CWMA	Central Weights and Measures Association	NTETC	National Type Evaluation Technical Committee
EPO	Examination Procedure Outline	NW&SA	National Weighing and Sampling Association
GS	NTETC Grain Analyzer Sector	OEM	Original Equipment Manufacturer
GIPSA	Grain Inspection Packers & Stockyards Administration	Pub 14	NCWM Publication 14
GMM	Grain Moisture Meters	RMFD	Retail Motor-Fuel Dispenser
GPMA	Gasoline Pump Manufacturers Association	SI	International System of Units
HB 44	NIST Handbook 44	SMA	Scale Manufacturers Association
HB 130	NIST Handbook 130	SWMA	Southern Weights and Measures Association
LMD	Liquid-Measuring Device	WG	Work Group
LPG	Liquefied Petroleum Gas	WMD	NIST Weights and Measures Division
MDMD	Multiple Dimension Measuring Devices	WS	NTETC Weighing Sector
MFM	Mass Flow Meter	WWMA	Western Weights and Measures Association
MMA	Meter Manufacturers Association	USNWG	NIST/OIML U.S. National Working Group
MS	NTETC Measuring Sector	VTM	Vehicle-tank Meters

"Handbook 44" (HB 44) means the 2010 Edition of NIST Handbook 44, "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices"

"Handbook 130" (HB 130) means the 2009 Edition of NIST Handbook 130 (including subsequent amendments), "Uniform Laws and Regulations in the Areas of Legal Metrology and Fuel Quality"

Note: NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.

Table D
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
Consent Calendar: 320-4,331-1, 336-2, 336-3	33	0	46	0	Adopted
320-2	34	0	48	0	Adopted
320-3	34	0	48	0	Adopted
322-1	34	0	47	0	Adopted
324-1	34	0	46	0	Adopted
360-1	33	0	45	0	Adopted
300 (To Accept the Report on its Entirety)	Voice Vote				Adopted

Details of All Items
(In Order by Reference Key Number)

310 GENERAL CODE

310-1 I G-S.8. Provision for Sealing Electronic Adjustable Components, G-S.8.1. Adjustment Mode Indication, and Definitions for Adjustment and Adjustment Mode

Source: 2009 Carryover Item 310-1. This item originated from the Southern Weights and Measures Association (SWMA) Committee and first appeared on the Committee's 2008 agenda.

Purpose: The purpose of the proposed changes is to clarify what is considered an effective method of sealing metrological feature, and what information is required to be indicated and recorded when a device is in a metrological adjustment mode.

Item Under Consideration:

Amend General Code paragraph G-S.8. and subsequent subparagraphs as follows:

G-S.8. Provision for Sealing Electronic Adjustable Components. *- A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.* ***That is:***

(a) It shall not be possible to apply a physical security seal to the device while it is in the calibration and/or configuration mode nor to access the calibration and/or configuration (adjustment) mode when sealed, or

(b) The calibration and/or configuration adjustments are protected by an approved method for providing security (e.g. data change audit trail).

A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

During any mode of operation in which adjustments can be made, devices shall not provide indications that can be interpreted, transmitted into memory, or printed as a usable (legal) measurement value. *

(Added 1985) (Amended 1989**, ~~and~~** 1993**, and 201X**)
[Nonretroactive as of January 1, 1990]
[Nonretroactive as of January 1, 201X]

G-S.8.1. Adjustment Mode Indication. For electronic devices protected by an approved means for providing security (e.g. data change audit trail), the device shall clearly and continuously indicate and print, if equipped with a printer, that the calibration and configuration adjustment modes are enabled. [Nonretroactive as of January 1, 201X]

Renumber subsequent paragraphs.

Add applicable definitions to Appendix D from a white paper on the "Metrological Requirements for Audit Trails" adopted by the NCWM in July 1993.

Adjustment mode. – An operational mode of a device which enables the user to make adjustments to sealable parameters, including changes to configuration parameters.

Adjustment. – A change in the value of any of a device's sealable calibration parameters or sealable configuration parameters.

Background/Discussion: At its fall 2007 meeting, the SWMA received a proposal to address inconsistent application of the requirements in paragraph G-S.8. by the National Type Evaluation Program (NTEP) weighing labs by modifying paragraph G-S.8. to ensure that: (1) a device could not be sealed in the configuration mode and continue to operate normally; and (2) to either:

- clearly indicate (and print when interfaced with a printer) that is it in an adjustment mode;
- not operate (present usable measurement values); or
- exit the adjustment mode after 60 minutes.

The proposal, as submitted in the Committee's 2008 Interim Agenda, only required that a device continuously indicate when access to the set-up mode was enabled.

At the 2008 Interim Meeting, the Committee received comments during the open hearing supporting the intent of the proposed language. However, some expressed concern that automatically exiting the adjustment(s) mode after 60 minutes is not a workable solution due to numerous examples where either it could be used fraudulently during the 60 minute period or the 60 minute period was not enough time to complete necessary adjustments during calibration.

The Committee agreed that, to comply with paragraph G-S.8. Provision for Sealing Electronic Adjustable Components, a device must be equipped with an approved audit trail or that a physical seal is required to be broken before any metrological adjustments can be made.

The Committee also believed that an indication that the adjustment mode is in operation is only necessary for devices with approved electronic methods of sealing. Additionally, the adjustment mode indicator should not be operable during normal weighing or measuring operations. The Committee agreed that if a device designed for commercial applications is capable of being "sealed" and still allows external or remote access to the calibration or configuration mode, then that device is clearly in violation of the current provisions in G-S.8. Provision for Sealing Electronic Adjustable Components and G-S.2. Facilitation of Fraud and, therefore, no change to the existing language in paragraph G-S.8. is needed.

In 2008, the Committee amended the proposal due to continuing concerns raised about inconsistent interpretations of G-S.8. by NTEP participating laboratories.

At the 2008 Annual Meeting, the Committee heard comments from the Weights and Measures Division (WMD) that noting that the alternate language submitted by SMA would require that *all* devices provide the operator with indications that a device is in the calibration mode. This would encompass mechanical and electronic devices and devices that use Category 1 physical seals. Additionally, WMD suggested the Committee consider that a device does not need indications that it is in a calibration or configuration mode if it is incapable of providing indications that can be interpreted, printed, or transmitted to a memory device as a correct measurement value.

The Committee agreed with comments from the 2008 CWMA Annual Meeting and from WMD and amended paragraph G-S.8.1. to:

- delete the references to the sealing categories since they are not consistently referenced in all codes;
- clarify printing requirements; and
- include an option that the device not operate or provide metrological indications that can be interpreted or transmitted into memory or to recording elements while in the adjustment mode.

Just prior to the 2008 voting session, the Committee noted that the revised language in G-S.8.1.(a) was inadvertently changed to where it could be literally read that the physical seal itself disabled access to the adjustment mechanisms, instead of preventing access to the mechanism. Consequently, the Committee changed the status of the item from Voting to Information. The Committee believed that the intent of the recommendation is to ensure that the access to the calibration and configuration modes is disabled.

The Committee redrafted the language in paragraph G-S.8.1. in an attempt to clarify the intent of the proposal and submitted the revised draft to the regional Weights and Measures associations and other interested parties for further review and consideration.

During the 2009 NCWM Interim Meeting, the Committee reviewed comments from the fall 2008 WWMA, CWMA, and NEWMA meetings that supported the language submitted to the regional Weights and Measures associations and other interested parties. At its fall 2008 Annual Meeting, the SWMA recommended that: (1) additional work is needed before the item is ready for a vote; (2) the NCWM S&T Committee may wish to consider at least incorporating interpretations and guidelines for the existing language in its reports; and (3) this item should remain an Information item on the NCWM S&T agenda. After considering these comments, the Committee recommended that this item move forward as an Information item to allow further review, comments, and recommendations.

WMD added that it had received comments questioning how the application of a physical seal (as recommended by the manufacturer and listed on the Certificate of Conformance [CC]) ensures that the calibration and configuration modes are disabled. Specifically, what does that presence of the physical seal (pressure sensitive or lock and wire) do to the device that disables the calibration and configuration modes?

In considering these comments, WMD suggested that the Committee consider the following changes:

- Modify G-S.8. Provision for Sealing Electronic Adjustable Components to reduce the potential for misinterpreting the paragraph by outlining the different requirements between physical seals and electronic seals (audit trails);

- Add new specifications for externally and remotely configurable devices since remotely configurable devices are required to have an audit trail in several codes;

- Amend G-UR.4.5. Security Seal to require the user to verify that the device is correctly configured to disable the external configuration feature to deter service agents from leaving a device configured with external access to the adjustments;

- Add definitions from the white paper on the “Metrological Requirements for Audit Trails” adopted by the NCWM in July 1993 since there is some confusion on the meaning of “adjustment” and “adjustment mode;” and

- Add a new definition for “externally configurable (external and on the device)” to distinguish it from “remotely configurable (external but not located on the device).”

Mr. Steve Patoray, Consultants on Certification LLC (CoC), expressed concerns that the language proposed in the 2009 Interim Agenda would require a manufacturer to design a device where the application of the physical seal (e.g., lock and wire, pressure sensitive, etc.) would disable external access to the configuration mode. He believes that the language in the proposal would force the manufacturer to redesign access covers to devices so that the cover disables the external adjustment capability. Consequently, the application of the security seal secures the cover in place and then, if broken, provides an indication that the device may have been adjusted.

The Committee also received a comment from Mr. Will Wotthlie, Maryland, stating that he was concerned with the language that requires that the physical seal “shall ensure” that external access to the configuration mode is disabled. He provided examples of mechanical automatic temperature compensation (ATC) elements where a specially designed sealing pin had to be installed before the physical seal could be applied and where electronic motor-fuel devices have a specially designed cover plate where the closing of the cover plate disables the electronic

configuration. The manufacturer has the option under this proposal to either specially design the device with a physical seal as a method of sealing (e.g., a specially designed sealing pin on the aforementioned mechanical ATC element) or design the device with an electronic method of sealing (i.e., an approved audit trail).

Several manufacturers stated that this proposal was not ready and that designs for the method of providing security to the metrological adjustments should be left to the manufacturers. Mr. Darrell Flocken, Mettler-Toledo, added that the intent of the proposal is that the manufacturer can either design a device so that a security seal cannot be applied without placing the device into the proper mode *or* design the device so that it has an approved audit trail.

The Committee agreed with the comments that the proposal is not ready to become a Voting item and suggested that further development to the proposal address the following subjects:

1. Avoid language that allows the indication of usable metrological values while a device is in the adjustment mode for devices that do not have an event logger.

2. Recognize that more than one method of sealing is acceptable on a single device; for example, using a lock and wire seal for the mechanical adjustments and an audit trail for electronic adjustments.

3. Delete or modify references to specific "categories of devices" since the sealing category criteria differ among the specific codes and not all HB 44 codes have such criteria.

4. Require an obvious indication when a device is being adjusted if its method of sealing is a physical security seal.

5. Clarify that the application of a physical security seal to a specially designed and sealable plate or cover that disables external access to the configuration and adjustment mode is not the only method to seal adjustable components.

At its spring 2009 meeting, the CWMA received a comment from the SMA along with a revised version of its previous recommendation that removed the word "adjustment" where appropriate; added the word "modes;" and removed the reference to "Category 1, 2, and 3" in G-S.8.1.(b). The CWMA supported the intent of the SMA proposed language from its 2009 spring meeting and believed that the specific wording should be thoroughly reviewed and that the terms "calibration and configurations modes" are not widely understood. The CWMA suggested that the definitions for the word "adjustment" and "adjustment mode" from the 1993 white paper on Audit Trails be included in HB 44 so that the proposed SMA language might read ". . . the calibration and/or configuration <u>adjustment</u> modes . . ."

Mr. Patoray, CoC, submitted comments to the NCWM and NEWMA S&T Committees providing additional background information on how some devices can have external access to the adjustment mode after the application of a physical seal (and not equipped with an audit trail). In his May 2009 letter to the Committees, he added that the NTEP labs were, and still are, in a bad position because (in the opinion of some of the lab evaluators) the labs have no clear method or description in HB 44 to prohibit a design as described above. However, all lab evaluators believe that the method described above does not provide a truly "effective method of sealing." Mr. Patoray stated there may be nothing wrong with the current G-S.8. wording as part of the general code and this issue does need to be addressed in each of the individual or specific codes. There may be several solutions for newly designed devices, but it is not the role of HB 44 to attempt to actually put design constraints on manufacturers, only to place requirements that must be met by some type of design solution.

At its spring 2009 meeting, NEWMA supported the intent of this item. However, NEWMA is concerned that this item is getting over-complicated and asks the Committee to consider requiring a simple enunciator indicating the device is in "cal mode." NEWMA also reviewed comments from the SMA 2009 spring meeting supporting the intent of the item submitted in its revised proposal to the Committee.

During the 2009 NCWM Annual Meeting, the Committee received comments during the open hearing that no action may be needed and that the existing language in HB 44 is sufficient. Oregon and Maryland believe that requirements for sealing are needed by the NTEP labs and field officials in order to consistently interpret and apply

sealing requirements.

The Committee believes that all parties agree with the intent of the proposal, which is to prevent metrological adjustments to weighing and measuring devices without breaking a physical seal, or indicate through other approved means (e.g., audit trail) that adjustments have been made while providing flexibility for manufacturers. Both the WMD and SMA proposals included language that restates the existing language in G-S.8., but is essentially reformatted for clarification. Additionally, both proposals included new requirements for providing indications when a device is in adjustment mode. WMD included further language to address devices that may have more than one method of sealing.

After assessing the comments and discussing the issue, the Committee agreed that the proposal *was not ready* for a vote and, consequently, did not include proposed language in its Interim and Final Reports. However, the Committee agreed to keep this item on its agenda as an Information item with the expectation that proposed language will be submitted for the 2010 Interim Meeting.

At its 2009 meeting, the NTETC Weighing Sector (WS) reviewed the comments from the S&T Committee, the background information in the NCWM 2008 Final and 2009 Interim Reports, and the summary of proposals provided by the NIST Technical Advisor. The WS believes that existing language in HB 44 is sufficient. The WS has amended its evaluation procedures so that a physical seal will not be accepted as the means to secure metrological adjustments if the scale allows external access to the adjustment mode after an adjustment has been accepted by the device. In these cases, the device must be designed with a data change audit trail. The WS amended Publication 14 for digital electronic scales to require that devices be equipped with:

1. provision(s) for applying a physical security seal that must be broken before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism; or

2. other approved means of providing security to document any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism (e.g., data change audit trail available at the time of inspection).

At its fall 2009 meeting, the CWMA commented that the Committee's redrafted language in the 2009 NCWM Interim Report still had some contradictory language. However, the CWMA did not define what is considered "a clear indication" of a device's calibration or configuration status. The CWMA recommended this item remain an Information item in 2010, and amended the NCWM Committee's recommendation by limiting the indication that the device is in the adjustment mode only to devices with approved electronic method of sealing (e.g., audit trails). Devices with an effective security seal would not have to indicate or print that it was in the adjustment mode.

During the fall 2009 WWMA Technical Conference, Mr. Flocken, Mettler-Toledo, speaking as chairman of the WS, reported the Sector's position as stated above, and noted that the Sector can develop additional guidance in the NCWM Publication 14 to ensure uniform interpretation of the requirement during type evaluation. Mr. Lou Straub, Fairbanks, representing SMA, stated that SMA supported the intent of the proposed changes, but had presented specific suggestions for modifying the language to the NCWM S&T Committee as noted in the 2009 CWMA Annual Meeting discussions. Mr. Straub noted that SMA had not met since prior to the 2009 NCWM Annual Meeting, so SMA would need to reconsider any additional thoughts presented during that meeting and the August 2009 WS meeting.

The WWMA reviewed this issue and expressed concerns about a device which could be sealed in a mode that would allow access to calibration or configuration changes without breaking a seal. The WWMA agreed with the position of the NCWM S&T Committee that the current language in paragraph G-S.8. requires that a security seal be broken before a metrological change can be made to a device (or other approved means of security, such as an audit trail provided). Thus, once a security seal is applied, for example, it should not be possible to make a metrological change to the device without breaking that seal. Since this philosophy addresses provisions for protecting access to metrological adjustment, the philosophy should be applied consistently to all device types. Therefore, the Committee recommends this remain an Information item.

At its October 2009 meeting, the NTETC Measuring Sector agreed that Measuring Devices with NTEP CCs have been evaluated to either:

1. not function in the calibration or configuration mode;

2. not be sealed in the calibration or configuration mode; or

3. clearly indicate the device is in the calibration or configuration mode.

The MS agreed that these options reflect the intent of paragraph G-S.8. and, because the intent of the paragraph is understood and appropriately applied by the measuring community, the Sector recommends that no changes be proposed to paragraph G-S.8.

At its fall 2009 Annual Meeting, the SWMA recommended that this proposal be made an Information item. The SWMA agreed that a device should be designed so that it can either not operate or not be capable of indications that might be interpreted as a valid measurement while it is in the calibration or configuration mode. The SWMA S&T Committee is concerned that a device left to operate while in this mode may facilitate fraud since adjustments might be inadvertently or intentionally made to metrologically significant features.

The SWMA is interested in the input the NCWM S&T Committee receives from the fall 2009 Technical, Industry, and Regional Weights and Measures Association meetings on this issue for the 2010 NCWM Interim Meeting. The SWMA S&T Committee recommended that the final modifications to the General Code ensure that the intent of the requirement is clear and is uniformly interpreted.

NEWMA supported this item remaining as an Information item at its fall 2009 meeting.

At the 2010 NCWM Interim Meeting, the Committee received testimony from the SMA restating its November 2009 position that supported the conclusions of the 2009 Weighing and Measuring Sectors recommending that no change to HB 44 is required, as the wording of G-S.2. and G-S.8. is sufficient. WMD states that it remains concerned about devices which could be sealed while allowing access to calibration or configuration changes without breaking that seal. WMD agreed with the position of the NCWM S&T Committee that the current language in paragraph G-S.8. requires that a security seal be broken before a metrological change can be made to a device (or other approved means of security such as an audit trail provided). Thus, once a security seal is applied, it should not be possible to make a metrological change to the device without breaking that seal. Since this philosophy addresses provisions for protecting access to any metrological adjustment, the philosophy should be applied consistently to all device types. WMD encouraged the Committee to reiterate in its Interim and Final Reports the correct interpretation of G-S.8. as the Committee and the MS have done in the past, and as demonstrated in more recent actions by the WS.

The Committee agreed with comments that no changes are needed to paragraph G-S.8. and that type evaluation procedures have been amended in applicable sections of the NCWM Publication 14 to address the issues of incorrectly applying the requirements in G-S.8. The Committee also noted that there was some confusion regarding the meaning of the terms “adjustment” and “adjustment mode” in the CWMA Annual Meeting reports.

The Committee received no comments addressing potential inconsistent interpretations of the requirements by field officials, requirements for adjustment mode indications, and limitations on metrological indications while in the adjustment mode in any proposals. Consequently, the Committee developed a revised proposal that:

1. did not change the existing text in G-S.8.;

2. added language that restates the intent of G-S.8.;

3. added language to address metrological (legal for trade) measurements while in an adjustment mode;

4. added a new paragraph G-S.8.1. that requires an indication and recorded representations (if equipped with a printer) while in the adjustment mode (if equipped with a printer); and

5. added new definitions for "adjustment" and "adjustment mode" from the white paper on the "Metrological Requirements for Audit Trails" adopted by the NCWM in July 1993 to facilitate a common understanding of the terms.

The Committee also recommended that the amended proposal be designated as an Information item to allow interested parties sufficient time to analyze and comment on the most recent language that appears in the "Item Under Consideration."

Key Points Considered by the Committee:

- All agree that the intent of the proposal is that metrological adjustments shall be secured with: 1) physical seals that must be broken to access metrological adjustments; or 2) other approved means (e.g., data change audit trail) that indicate that metrological adjustments have been made.

- Devices must be equipped with either an approved audit trail or designed such that a physical seal is required to be broken before performing metrological adjustments.

- For devices with approved ***electronic method*** of sealing, an indication that the adjustment mode is in operation is necessary unless the device does not operate or provide metrological indications that can be interpreted or transmitted into memory or to recording elements.

- Devices that use physical seals to secure metrological adjustments are clearly in violation of G-S.8. if they allow external or remote access to metrological adjustment modes without breaking a physical seal.

- Any changes to General Code paragraph G-S.8. should ensure that the intent of the requirement is clear and is uniformly interpreted.

At NEWMA's May 2010 Annual Meeting open hearing, Mr. Flocken, speaking as chairman of the NTETC Weighing Sector (WS), stated that the Sector concluded at its August 2009 meeting that existing language in HB 44 is sufficient and that the Sector has established a small work group to review existing type evaluation criteria to suggest procedures in Publication 14 to verify that devices are designed with effective means to ensure compliance with HB 44. Consequently, NEWMA stated that it will await the WS recommendations for changes to Publication 14 before taking a position on this item.

At its spring 2010 Annual Meeting, the CWMA agreed with a proposal from Mr. Paul Lewis, Rice Lake Weighing, to delete the subparagraph (a) in the item under consideration since it restates the language in G-S.8.

At the Committee's 2010 NCWM Annual Meeting open hearings, Mr. Flocken, Mettler Toledo, speaking as chairman of the NTETC Weighing Sector restated his report from the spring 2010 NEWMA Meeting. Mr. Straub, Fairbanks Scales, speaking on behalf of the SMA, stated that SMA opposes this item and recommends that this item be Withdrawn. The SMA believes that the current wording is a step back from previous proposals. The SMA continues to support the recommendation from the 2009 Weighing and Measuring Sectors stating that no change to HB 44 is required because the wording of G-S.2. and G-S.8. is sufficient.

WMD suggested that it might be appropriate for the Committee to consider withdrawing the item. In its comments to the NCWM in 2008, WMD stated that its interpretation of G-S.8. and S.1.11. Provision for Sealing, in the Scales Code, clearly does not allow a device to be "sealed" in a mode that allows a change that detrimentally affects the metrological integrity of the device without breaking that "seal." WMD suggested that the Publication 14 procedures for evaluating the method of sealing in the checklist for electronic scales be amended to more closely align it with the procedures in the liquid-measuring devices checklist Section 9 which states:

> Measuring elements shall be designed with adequate provisions to prevent changes from being made to the measuring element or the flow rate control (if the flow rate control affects the accuracy of deliveries) without evidence of the change being made. These provisions can be an approved means of security (e.g., data change audit trail) or physically applying a security seal

which must be broken before adjustments can be made. When applicable, the adjusting mechanism shall be readily accessible for the purposes of affixing a security seal.

The Committee agreed that the current language in paragraph G-S.8. requires that a security seal be broken before a metrological change can be made to a device (or that other approved means of security such as an audit trail be provided). Thus, once a security seal is applied, for example, it should not be possible to make a metrological change to the device without breaking that seal. Since this philosophy addresses provisions for protecting access to metrological adjustment, the philosophy should be applied consistently to all device types.

The Committee is concerned about a device which could be sealed in a "mode" that would allow access to calibration or configuration changes without breaking a seal. Since the NTEP tests and procedures are based on interpretations of HB 44, the Committee supports the efforts of the Weighing Sector and is recommending that this item remain and Information item until the WS can review and revise (as needed) Publication 14 type evaluation procedures to verify compliance with G-S.8. provisions for sealing consistent with the Committee's interpretation of G-S.8. stated in the previous paragraph.

See the 2008 and 2009 NCWM Final Reports for additional background information.

310-2 W Appendix D – Definition of Electronic Devices, Software-Based and Built-For-Purpose Device

(This item was withdrawn.)

Source: 2009 Carryover Item 310-2. This item originated from the NTETC Software Sector and first appeared on the Committee's 2007 agenda as Developing Item Part 1, Item 2.

Purpose: This proposal deletes the current term and definition of "built-for-purpose device" and replaces them with the term and definition for "software-based electronic devices." The definitions proposed by the NTETC Software Sector are intended to develop a clear understanding of the use of software in today's weighing and measuring instruments by:

1. clarifying that all electronic weighing and measuring devices include software;

2. providing a common understanding of software terminology; and

3. classifying the types of software to assist officials in determining applicable inspection procedures and tests when the examination is based on the way the software is installed or modified.

Item Under Consideration: Delete the current definition of built-for-purpose device as follows:

~~**built-for-purpose device. Any main device or element which was manufactured with the intent that it be used as, or part of, a weighing or measuring device or system. [1.10]**~~
~~**(Added 2003)**~~

Add a new definition and a cross-reference to Appendix D in HB 44 for "Electronic devices, software-based" as follows to replace the current definition of "built-for-purpose device":

electronic devices, software-based. – Weighing and measuring devices or systems that use metrological software to facilitate compliance with HB 44. This includes:

(a) Embedded software devices (Type P), aka built-for-purpose. – A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security and will be called a "P," or

(b) Programmable or loadable metrological software devices (Type U), aka not-built-for-purpose. – A personal computer or other device and/or element with PC components with programmable or

loadable metrological software and will be called "U." A "U" is assumed if the conditions for embedded software devices are not met.

software-based devices – See Electronic devices, software-based.

Background/Discussion: In 2005, the NTEP Committee established an NTETC Software Sector. The scope of the Software Sector, as documented by the NTEP Committee in it 2006 Final Report, is to develop:

1. A clear understanding of the use of software in today's weighing and measuring instruments;

2. HB 44 specifications and requirements, as needed, for software incorporated into weighing and measuring devices, which may include, tools for field verification, security requirements, identification, etc.;

3. The NCWM Publication evaluation criteria; and

4. Training guidelines for Weights and Measures officials.

At the Software Sector's October 2007 Meeting, it was initially suggested that the term "not-built-for-purpose" be removed from the wording in NIST HB 44 paragraph G-S.1.1. since there is no definition for a not-built-for-purpose device in HB 44. After a lengthy discussion related to the terms "built-for-purpose" and "not-built-for-purpose," the Sector agreed these terms were not clear and should be replaced with the terminology proposed in the "Item Under Consideration" section above. The proposed definitions are based on the revision of OIML R 76 Non-automatic weighing instruments Subsections 5.5.1. (Type P) and 5.5.2. (Type U).

During the 2009 NCWM Annual Meeting, the Committee considered the comments from the SMA on the language in the Committee's Interim Report, a report from Mr. Patoray, and an article on software in the spring 2009 NCWM newsletter. The Committee agreed to keep this item as an Information item to allow updated comments from the regional Weights and Measures associations and other interested parties based on the discussions and recommendations in the summary of the March 2009 Meeting of the Software Sector.

At its fall 2009 meeting, the CWMA received comments that the proposal was sufficiently developed and recommended moving this item forward as a Voting item on the Committee's agenda.

At its fall 2009 Technical Conference, the WWMA received comments from SMA, indicating that it continues to oppose this item, noting that requirements should apply equally to the two different device types described in the definitions (e.g., "embedded" and "programmable" software devices). The WWMA received no other input on this item and recommended this item remain an Information item until the Software Sector has had an opportunity to review comments from the 2009 NCWM Annual Meeting and any comments made at subsequent regional weights and measures association meetings.

At their fall 2009 regional Weights and Measures Association Meetings, the SWMA, and NEWMA recommended keeping the status of this proposal as an Information item and agreed that the Software Sector should continue to work on the proposal until it arrives at some final language.

At the 2010 NCWM Interim Meeting, the Committee received comments from SMA, reiterating its opposition to any requirements for software that are different between "types of devices" described in the definitions (e.g., "embedded" and "programmable" software devices) and that this item be Withdrawn from the Committee's agenda. SMA added that its comments are based on the proposed "Item Under Consideration" in the Interim Agenda. Mr. Ross Andersen, New York Weights and Measures, asked the Committee to state the reasons why there is a need for two definitions for software. Mr. Jim Pettinato, FMC Technologies and Chairman of the Software Sector, replied that the mission of the Sector is, among other objectives; to develop a clear understanding of the use of software in today's weighing and measuring instruments and to develop HB 44 specifications and requirements, as needed, for software incorporated into weighing and measuring devices. The Sector considered terms and definitions already developed by OIML and the European Community recognizing that software can influence an instrument's measurement, computations, and operation (controlling). Additionally, the Sector agreed that the terms "built-for-purpose" and "not-built-for-purpose" were not clear and should be replaced with the terminology proposed in this

item. The Committee also received comments from the regional associations and during the 2010 open hearing that the definitions are not needed and that this item should be Withdrawn.

WMD asked the Committee to consider combining related software agenda Items 310-2 and 310-3. These items were originally submitted as separate items, but now both are sufficiently developed to be considered as one item. Originally, the Sector requested that the software definitions and terms in Item 310-2 be placed on the agenda to promote consistent understanding of metrological software. The Sector's recommendation for the identification of software in Item 310-3 was not yet sufficiently developed. WMD inquired if there may be cases where devices contain both Type P (embedded) and/or Type U (universal or programmable) software. In this case, software may need each type of software application identification (e.g., devices with both embedded and downloadable software, or more than one downloadable software module). How might this be addressed or identified?

The Committee understands that software can be used in fixed hardware applications in environments such as stand-alone scales and stand-alone retail-motor fuel devices and is not subject to interfaces that can change the metrological software. In these cases, a physical seal may be a suitable method of sealing. Alternatively, devices with software that is readily changeable without breaking a seal may need to be evaluated or scrutinized differently in areas such as sealing (seals or audit trail), methods of software changes (chip replacement or downloads), and verification (performance testing or checksums). It seems reasonable to the Committee that a distinction between the type of software environment may be necessary to determine appropriate sealing and verification procedures.

The Committee decided not to combine the two agenda items at this time since the Software Sector may recommend withdrawing this proposal as a result of the comments during the 2010 Interim Meeting. The Committee agreed that the status of this item should remain an Information item and asks for additional input from the Software Sector after it has reviewed these and other comments since its last meeting. The Committee will reevaluate the status of this item and the WMD suggestion to combine Items 310-2 and 310-3 during the July 2010 NCWM Annual Meeting.

Additional background information on this item can be reviewed in the 2007, 2008, and 2009 Final Reports of the Committee.

At its March 2010 meeting, the Software Sector recommended withdrawing the proposed definitions after the Sector suggested minor revisions to the proposed identification language in agenda Item 310-3, while managing to achieve the Sector's objective. The revised language no longer references the terms Type U and P software and, therefore, no longer requires a reference to the proposed definitions in the "Items under Consideration" above. The proposed definitions may be revised and resubmitted in the future if further work indicates that the terms will be referenced in HB 44.

During their 2010 spring meetings, NEWMA and the CWMA stated support of the Software Sector's March 2010 recommendation to Withdraw this item

At the 2010 NCWM Annual Meeting open hearing, the SMA stated that it opposes this item and added that there is no longer a technological basis for making this distinction in device types. The SMA supports the recommendation from the March 2010 Software Sector Meeting to Withdraw this item. The Committee agreed with the recommendation from the Software Sector and comments it received since the 2010 NCWM Interim Meeting and withdrew the item.

310-3 I G-S.1. Identification. – (Software)

Source: 2009 Carryover Item 310-3. This item originated from the NTETC Software Sector and first appeared on the Committee's 2007 agenda as Developing Item Part 1, Item 1.

Purpose: This proposal is intended to amend the identification marking requirements for all electronic devices manufactured after a specified date by requiring that metrological software version or revision information be identified. Additionally, the proposal proposes to list methods, other than "permanently marked," for providing the required information.

Item Under Consideration: Amend G-S.1. Identification and G-S.1.1. Location of Marking Information for Not-Built for-Purpose, Software-Based Devices as follows:

G-S.1. Identification. – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model identifier that positively identifies the pattern or design of the device;

(1) The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lowercase.
[Nonretroactive as of January 1, 2003]
(Added 2000) (Amended 2001)

(c) *a nonrepetitive serial number, except for equipment with no moving or electronic component parts* ~~***and not built for-purpose software-based software device;***~~
[Nonretroactive as of January 1, 1968]
(Amended 2003)

(1) The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.
[Nonretroactive as of January 1, 1986]

(2) Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).
[Nonretroactive as of January 1, 2001]

(d) the current software version or revision identifier for ~~***not built for-purpose***~~ ***software-based electronic*** *devices;*
[Nonretroactive as of January 1, 2004]
(Added 2003) **(Amended 201X)**

(1) The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.
[Nonretroactive as of January 1, 2007]
(Added 2006)

(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2007]
(Added 2006)

(e) an NTEP CC number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation of that

word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Amended 1985, 1991, 1999, 2000, 2001, 2003~~, and~~, 2006 **and 201X**)

G-S.1.1. Location of Marking Information for ~~Not Built For Purpose~~ all Software-Based Devices. – *For ~~not built for purpose~~, software-based devices, either:*

(a) The required information in G-S.1. Identification. ~~(a), (b), (d), and (e)~~ shall be permanently marked or continuously displayed on the device; or

(b) The CC Number shall be:

(1) permanently marked on the device;

(2) continuously displayed; or

(3) accessible through ***one or, at most, two levels of access****. ~~an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."~~*

(i) For menu based systems, "Metrology," "System Identification," or "Help."

(ii) For systems using icons, a metrology symbol "(M)", "(SI)," or a help symbol ("?," "i," or an "i" within a magnifying glass).

Note: *For (b), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*

[Nonretroactive as of January 1, 2004]

(Added 2003) (Amended 2006 **and 201X**)

Background/Discussion: In 2005, the Board of Directors established an NTETC Software Sector. One of the Sector's tasks, as reported in related agenda Item 310-2, is to recommend HB 44 specifications and requirements, as needed, for software incorporated into weighing and measuring devices, which may include, tools used for software identification.

During its October 2007 meeting, the Sector discussed the value and merits of required markings for software. This included the possible differences in some types of software-based devices and methods of marking requirements. After hearing several proposals, the Sector agreed to the following technical requirements applicable to the marking of software:

1. The NTEP CC Number must be continuously displayed or hard-marked;

2. The version must be software-generated and shall not be hard-marked;

3. The version is required for embedded (Type P) software;

4. Printing the required identification information can be an option;

5. Command or operator action can be considered as an option in lieu of a continuous display of the required information; and

6. Devices with Type P (embedded) software must display or hard-mark make, model, and serial number to comply with G-S.1. Identification.

After the 2008 NCWM Annual Meeting, the Committee received the Software Sector's Proposal to amend G-S.1. Identification and/or G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices in the Committee's 2008 Interim Report. The proposal listed "acceptable" and "not acceptable" methods for presenting:

NTEP CC number	Serial Number
Make	Software Version/Revision Number
Model	

At the 2009 NCWM Interim Meeting, SMA commented that it has consistently opposed having different requirements between embedded and downloadable/programmable software-based devices and added that it continues to support the intent of the proposal and will continue to participate in the Software Sector discussions to develop alternate proposals for the marking of software-based devices. Several Weights and Measures officials expressed concerns that the proposed language does not specify how the identification information is to be retrieved if it is not continuously displayed, noting this could result in several ways to access the information (e.g., passwords, display checks, dropdown menus). SMA added that the identification location information on the NTEP CC will become outdated anytime a manufacturer changes the way the information can be retrieved. SMA suggested that a limited number of methods to access the identification information be developed and specified as the only acceptable methods to retrieve identification information. This would make it easier for the inspector to verify the required identification information.

WMD noted that in 1992, the NCWM adopted S&T Committee agenda Item 320-6, S.6.3. Marking Requirements; Capacity by Division and recommended that Tables S.6.3.a. and S.6.3.b. (Note 3) be interpreted to permit the required capacity and scale division markings to be presented as part of the scale display (e.g., displayed on a video terminal or in a liquid crystal display), rather than be physically marked on the device. WMD agrees with the interpretation and suggested that this interpretation could be expanded to other marking requirements (e.g., flow rates, capacity, interval, etc.) and codes on a case-by-case basis, and that specific language (based on the above interpretation) be added to the applicable sections in HB 44.

Software Sector Co-chairman Mr. Pettinato, FMC Technologies, stated that the Software Sector recommended that this remain an Information item to allow conference members to further study the proposal in order to develop a consensus on the format for Table G-S.1. Identification in its 2009 meeting summary.

At its spring 2009 meeting, NEWMA received similar comments from SMA and the Software Sector and took no position on this item pending its member review of the Software Sector's report.

At the 2009 NCWM Annual Meeting, the Committee reviewed the following recommendations and comments, which may be reviewed in greater detail in the 2009 NCWM Final Report:

- the 2009 meeting of the Software Sector;

- a report of the spring 2009 SMA Meeting opposing the marking requirement differences for Type P and Type U devices;

- comments from Mr. Patoray, CoC, supporting the Software Sector's position with his suggested changes in his April 2009 letter to the Committee; and

- comments from WMD on the Software Sector's proposed "Table G-S.1. Identification."

Consequently, the Committee agreed that this remain an Information item and that the regional Weights and Measures associations review the above information and provides the Committee with comments and recommendations.

At its fall 2009 meeting, the CWMA had lengthy discussions about providing the required identification information in a single uniform method. Some of the topics addressed were:

- A single operation or button is needed to view all software version information.
- Use a single function key to access or continuously display software version information.
- Electronic data for both Type U and Type P devices could be hard marked, continuously displayed or accessed by command (operator action).
- The data is useless if it is not easy to access in the field.
- Concern about the cost of requiring a single designated button to access software version information.

The CWMA recommended this remain an Information item with changes to the Committee's recommendations in its 2009 Interim Report as shown in the 2009 NCWM S&T Committee's Final Report and summarized as follows:

1. In proposed paragraph G-S.1.1.(a), add "or accessed by a command (operator action)" **and** delete subparagraph G-S.1.1.(b) (3). to read as follows:

   G-S.1.1. Location of Marking Information for Type U (Not-Built-For-Purpose), Software-Based Devices. – *For* ***Type U not built for purpose, software based*** *devices* ***manufactured prior to January 1, 201X,*** *either**:***

   *(a) The required information in G-S.1. Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device**;*** ***or accessed by a command (operator action);***

   (b) The CC Number shall be:

   (1) permanently marked on the device; ***or***

   (2) continuously displayed.

2. Delete Note 8 in "Table G-S.1. Notes on Identification."

3. Amend "Table G-S.1. Identification . . ." by deleting the three references to "via menu display," "Print Option (8)," adding "by command (operator action)," and deleting the language at the bottom of the table.

During the open hearings at the fall 2009 WWMA Technical Conference, Mr. Straub, speaking on behalf of SMA, indicated SMA continues to oppose this item, referring to comments made in conjunction with Item 310-2. He also noted that even if the designations of Type U and Type P were adopted, SMA would continue to oppose the proposed changes to G-S.1., noting that requirements should apply equally to the two different device types described. The WWMA also heard from Mr. Gordon Johnson, Gilbarco, who agreed with SMA's assessment. He also indicated that it would be desirable to have the option of using a menu to provide information, citing increasingly limited space in which to provide marking information, and noted it would be virtually impossible for their company to provide a full time display.

Based on the comments received and its position relative to corresponding definitions for the device types developed by the Software Sector, the WWMA recommended that this remain an Information item until the Software Sector has had an opportunity to review comments from the 2009 NCWM Annual Meeting and any comments made at subsequent regional Weights and Measures association meetings.

At its fall 2009 meeting, the SWMA agreed that the Software Sector should continue to work on the proposal until it arrives at some final language for amending paragraphs G-S.1. Identification and G-S.1.1. Location of Marking Information for Not-Built-For Purpose, Software-Based Devices. The Software Sector should work with manufacturers in its development of the requirement, and any table or other tools should provide further clarity on the intent of the marking requirements.

During its fall 2009 meeting, NEWMA stated that it supports the Committee's decision to keep this as an Information item to have sufficient time to consider the most recent comments from the regional Weights and Measures associations and other interested parties.

At the 2010 NCWM Interim Meeting, the Committee received comments from Mr. Straub, speaking on behalf of the SMA, reiterating SMA's spring 2009 position opposing any requirements for software that are different between types of devices and recommending that this item be Withdrawn from the Committee's agenda. Mr. Straub added that SMA comments are based on the proposed "Item Under Consideration" in the Interim Agenda and not the alternate proposal submitted by the Software Sector after its 2009 spring meeting. Mr. Lewis, Rice Lake Weighing, stated that metrologically significant software should have the same version number marking requirements in Type P (fixed hardware and software) devices or in Type U software (not built-for-purpose) devices. The Software Sector chairman responded that the only difference in the Sector's proposed language is that software identification requires version numbers and not serial numbers. In addition to the comments regarding the "hard marked" terminology presented at the 2009 Annual Meeting, WMD noted that devices with only Type U software are not required to have serial numbers. However, WMD asks the Sector to clarify its position on marking devices with both Type U and Type P software. Are devices required to have a serial number if it uses both Type P and Type U software?

Mr. Jim Truex, NTEP Administrator, asked the members of the NCWM to provide direction to the Software Sector and the Committee for what is needed during field verification of software-based devices in order to determine that the software used in weighing and measuring devices represents the devices that were certified during type evaluation. What does a field inspector need to know about the software version in vehicle scales, electronic indicators, electronic cash registers interfaced with weighing and/or measuring devices, controllers with metrological software, etc.

Ms. Julie Quinn, Minnesota, reported that the state has problems because its officials find software versions that appear to be older than the version listed on the CC. Ms. Quinn added that NTEP evaluates software in these devices to verify that the accuracy of the first indication of the final measurement and the security of metrological adjustments.

Mr. Bryce Wilke, GIPSA, stated that most of the livestock investigations and other regulatory issues most commonly involve software that has not been developed by the original device manufacturer. He noted that any language in HB 44 and NTEP Publication 14 will help GISPA.

Mr. Andersen, New York, stated that there is still some confusion about where the scope of NTEP ends and Weights and Measures' jurisdiction ends. He cited an example on a vehicle scale where a typewriter is used to issue the printed ticket. Weights and measures still has the authority to regulate the way that measurement is used to accurately or inaccurately represent the transaction. Weights and measures authority still exists when the measurement takes place in one jurisdiction and is recorded and subsequently invoiced through a software system in a different jurisdiction.

Ms. Judy Cardin, Wisconsin, stated that NTEP is required if the software can change the measurement result and NTEP should evaluate software up to the point that the first indication of the final weight is presented.

Mr. Steve Malone, Nebraska, added that every electronic weighing and measuring device evaluated by NTEP has software and that the software is needed to make the device work. The problem is that the field inspector has no way of determining if the software in the device is the same as the software evaluated by NTEP without having to carry a hard copy of the CC with them. Nebraska and other states within the CWMA would like to see a simple and standardized method an inspector could use to obtain the relevant software identification and version information.

Mr. Truex thanked the members who commented and reminded them that the Software Sector is not proposing to reopen the "first final" discussion, but to develop recommendations to help field officials to verify that software in a weighing or measuring device represents the type of software covered by an NTEP CC. The Committee concurs with Mr. Truex's comments. The Committee agreed to replace the agenda language in the "Item Under Consideration" with the Software Sector's 2009 proposed language in the Committee's Interim Report. The Committee appreciates the work of the Sector and asks that it review the discussions on this item from the reports from regional Weights and Measures associations as well as comments in writing from interested parties and from the open hearing during the 2010 Interim Meeting.

The Committee agreed that the status of this should remain as an Information item and asks for additional input from the Software Sector after it has reviewed these and other comments received since its last meeting.

Additional background information on this item can be reviewed in the Committee's 2008 and 2009 Final Reports.

At its March 2010 meeting, the Software Sector, in response to comments heard during the 2010 Interim Meeting, revised the proposed language as described in Item 310-3. These revisions removed the differentiation between device types while still managing to achieve the Sector's objective.

In summary, for S&T Item 310-3 the Sector recommended amending the 2010 item under consideration by removing the proposed words "**and manufactured after January 1, 201X**" from the first sentence in paragraph G-S.1. and added that the remainder of the proposal remains unchanged. The Sector agreed that the added words are not necessary since the current proposal to amend G-S.1. includes applicable nonretroactive dates for the amended subparagraphs.

The Software Sector also initiated discussion on two new concepts, which may eventually result in additional recommendations to amend G-S.1. It should be noted that these new ideas are in the developmental stage, and are included here by request of the Sector, since comments from the regions and other interested parties would be appreciated by the Software Sector members.

First, the Sector sees merit to requiring some "connection" between the software identifier (i.e., version/revision) and the software itself. The proposal was to add a new sub-subparagraph (3) to G-S.1.(d) to read as follows (with the expectation that examples of acceptable means of implementing such a link would be included in Pub 14).

> ***The version or revision identifier shall be directly and inseparably linked to the software itself. The version or revision identifier may consist of more than one part, but at least one part shall be dedicated to the metrologically significant software.***

Second, it seems that at each meeting of the Sector, state weights and measures officials reiterate the problems they have in the field locating the basic information required when the CC number is marked via the rather general current HB 44 requirement of "accessible through an easily recognizable menu, and if necessary a sub-menu" [G-S.1.1 (b)(3)]. States have indicated that this is too vague and field inspectors often cannot find the certificate number on unfamiliar devices.

The Sector would like feedback on the proposal to specify a limited number of menu items/icons for accessing the CC number (it is not hard-marked or continuously displayed) in subparagpraph (c) as follows:

(b) The Certificate of Conformance (CC) Number shall be:

(3) *accessible through* ***one or, at most, two levels of access.***

(i) For menu-based systems, "Metrology", "System Identification", or "Help".

(ii) For systems using icons, a metrology symbol ("M" or "SI"), or a help symbol ("?," "I," or an "i" within a magnifying glass).

Note that this is not suggested to be the final list of valid options; the Sector would like to have feedback specifically on additional menu text/icon images that should be considered acceptable. The Sector feels that the number of acceptable options (within reason) is less of an issue than the fact that the list is finite. The Sector realizes this may affect manufacturers so feedback from associate members and representative groups is appreciated as well.

At its spring 2010 meeting, NEWMA recommended leaving this as an Information item to allow review of the software Sector's newly proposed language from its March 2010 meeting.

During the 2010 NCWM Annual Meeting, the SMA stated that the proposal from the Software Sector addresses one of SMA's concerns dealing with the use of the term "not built for purpose;" however, it still has concerns with the requirement in G-S.1 stating that the software version or revision identifier must be clearly and permanently marked. The SMA recommends that the Software Sector and the S&T Committee review and correct what appears to be conflicting requirements as stated in G-S.1. and G-S.1.1. dealing with the marking requirement.

The Committee also received a summary of the 2010 meeting of the NTETC laboratories where some of the NTEP evaluators were concerned that the revised language could be interpreted such that no markings are required on a device. These evaluators expressed concern that an inspector would have to guess which of the eight methods recommended in the Software Sector Summary is to be used to find the CC number and questioned whether this would mean that a weighing or measuring device might not be marked with any identifier markings including the manufacturer.

The Committee agreed to amend the item under consideration based on the recommendations of the Software Sector at its March 2010 meeting. The Committee agreed to clarify and document the SMA concerns with the requirements in G-S.1. where it states that states that "all equipment . . . shall be permanently marked . ." and G-S.1.1. that allows alternate methods, other than "permanently marked," to identify software-based devices. Consequently, the Committee will revise the first paragraph of G-S.1. to read as follows in the 2011 NCWM Interim Agenda:

> **G-S.1. Identification. –** All equipment, except weights**,** ~~**and**~~ separate parts necessary to the measurement process but not having any metrological effect, ***and software-based devices covered in G-S.1.1. Location of Marking Information,****** shall be clearly and permanently marked for the purposes of identification with the following information:
> ***[*Nonretroactive as of January 1, 201X]***
>
> . . .

310-4 I G-A.6. Nonretroactive Requirements (Remanufactured Equipment)

Source: WWMA and SWMA

Purpose: Clarify the intent of the 2001 NCWM position on the application of nonretroactive requirements to devices which have been determined to have been "remanufactured."

Item Under Consideration: Amend HB 44 General Code paragraph G-A.6. Nonretroactive Requirements by amending subparagraphs (a) and (b) as follows:

> **G-A.6. Nonretroactive Requirements.** – "Nonretroactive" requirements are enforceable after the effective date for:
>
> (a) devices manufactured **and remanufactured** within a state after the effective date;
>
> (b) both new**,** ~~**and**~~ used**, and remanufactured** devices brought into a state after the effective date; and
>
> (c) devices used in noncommercial applications which are placed into commercial use after the effective date.

Nonretroactive requirements are not enforceable with respect to devices that are in commercial service in the state as of the effective date or to new equipment in the stock of a manufacturer or a dealer in the state as of the effective date.
[*Nonretroactive requirements are printed in italic type.]*

(Amended 1989 **and 201X**)

Background/Discussion: WMD received an inquiry from a state Weights and Measures Director regarding whether or not a nonretroactive paragraph in the Liquid-Measuring Devices Code of HB 44 would apply to a remanufactured device. In researching this inquiry, WMD discovered an unintended gap in the General Code requirements relative to remanufactured equipment.

- Paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements is a nonretroactive requirement for marking a device with the remanufacturer's information and was enforceable as of January 1, 2002. WMD believes that this paragraph was intended to apply to remanufactured devices and remanufactured main elements that have been placed into commercial service as of the effective date of the requirement, which was January 1, 2002.

- Paragraph G-A.6. Nonretroactive Requirements. (which provides the various conditions in which nonretroactive requirements apply) does not include references to "remanufactured devices" or "remanufactured main elements." Subparagraph (a) (of G-A.6.) references and applies to "manufactured" devices within a state. Appendix D of HB 44 defines a "manufactured" device as any commercial weighing or measuring device shipped as new from the original equipment manufacturer (OEM). Subparagraph (b) could be applied to remanufactured devices that are brought into a state, but could not be applied to those devices installed by a remanufacturer or distributor operating within the state. Subparagraph (c) applies to devices placed into commercial service that had previously been used in noncommercial applications.

Research into past NCWM Conference Reports indicates that a proposal to change the HB 44 definition of "manufactured device" was adopted by the NCWM in 2001. The definition was amended and new definitions for "remanufactured" and "repaired" devices were added; these changes were made based on the recommendations of the NCWM Remanufactured Devices Task Force to provide a recommendation to distinguish remanufactured devices from repaired devices and, thus, give the field official tools to determine what requirements apply to both types of devices. The previous definition, shown below and identified as the "2001 HB 44 definition," included text that WMD believes was intended to include remanufactured devices. The new definition deleted the text "new device or any other device" to the extent that the definition from 2002 forward only applies to devices shipped as new from the OEM.

2001 HB 44 Definition

manufactured device. – Any new device or any other device that has been removed from service and substantially altered or rebuilt.

2002 HB 44 definition

manufactured device. – Any commercial weighing or measuring device shipped as new from the original equipment manufacturer.

Is should be noted that the definitions for repaired and remanufactured devices were also adopted to provide guidance to officials to determine if a device has been remanufactured to "be made to operate like a new device of the same type" or repaired to bring it "back into proper operating condition" (see the 86th NCWM Final Report, S&T Item 310-1, page S&T - 5).

Since paragraph G-A.6. is silent with respect to remanufactured devices and remanufactured main elements, G-S.1.2., in WMD's opinion, cannot be applied. This was clearly not the intent since, as indicated by its title, it was designed to apply to "remanufactured" equipment.

Because remanufactured devices compete with newly manufactured devices, WMD believes the intent of G-A.6. Nonretroactive Requirements is intended to include such equipment in the scope of the paragraph. That is, remanufactured devices and remanufactured main elements should have to comply with the most current nonretroactive requirements in effect as of the date the devices or elements are remanufactured.

A change is needed to G-A.6. to clarify the application of G-S.1.2. and other nonretroactive requirements, which WMD believes should apply to remanufactured devices and remanufactured main elements.

An additional reason to adopt the proposed language is that the proposed modification to G-A.6. would clearly support their actions in the event that Weights and Measures officials are challenged regarding the application of G-S.1.2. or other nonretroactive paragraphs.

It should be noted that device owners and remanufacturers may experience difficulty in complying with applicable nonretroactive requirements in instances where states have not previously applied them to remanufactured equipment. The extent to which this has occurred may become more evident as this issue is discussed within the regional Weights and Measures and industry associations and alternatives to alleviate this burden on existing equipment could be considered.

While developing this proposal, WMD contacted two retail motor fuel dispenser (RMFD) original equipment manufacturers and representatives from those companies both indicated that remanufactured RMFD's should comply with the most recent HB 44 nonretroactive requirements in effect as of the date they are remanufactured.

WMD also contacted the chairman of the Remanufactured Device Task Force that was formed by the NCWM BOD in 1999. The chairman indicated that to the best of his recollection, there was no conscious discussion from the task force of how nonretroactive requirements were to apply to remanufactured equipment. He believes that different states may be enforcing nonretroactive requirements differently with respect to remanufactured equipment.

The following is a brief history of paragraph ***G-S.1.2. Remanufactured Devices and Remanufactured Main Elements:***

- 1997 – A proposal to add a new paragraph addressing the required marking on RMFD's that had been resold for placement into service first appeared as an Information item on the NCWM Specifications and Tolerances Committee agenda.

- 1999 – The NCWM appoints a task force to examine the required marking issues of remanufactured equipment. The primary responsibility of the task force was to develop a marking requirement proposal for the NCWM consideration.

- 2001 – The task force proposed to add several new definitions and a General Code requirement (G-S.1.2.) to HB 44. They also proposed changing the existing HB 44 definition of "manufactured device." Of importance, the task force proposal removed language from the definition that linked devices that had been substantially altered or rebuilt to G-A.6.

- 2002 – This was the first year the marking requirement for remanufactured devices and remanufactured main elements appeared in HB 44 along with new definitions for "remanufactured devices (and elements)" and "repaired devices (and elements)."

The proposed change in the "Item Under Consideration" will clarify how nonretroactive paragraphs apply to remanufactured equipment.

WMD notes that the issue of applying paragraph G-A.6. to remanufactured equipment is separate from that of determining when a device or element has been "remanufactured." Definitions found in Appendix D of HB 44 along with guidance developed by the NCWM Remanufactured Equipment Task Force can be used to assist jurisdictions in determining when a device or main element has been "remanufactured." The proposed change does

not suggest changing these tools or their application. The proposed change is only to clarify the application of G-A.6. to devices that have been determined to have been "remanufactured."

Even if the proposed direction of solving this problem is not supported as written, WMD believes that some alternate language needs to be added to G-A.6. to clarify its application to remanufactured equipment.

At its fall 2009 meeting, the CWMA suggested that this item be given Developmental status. The CWMA requested that the following questions need to be addressed prior to considering this as an Information item.

1. How would the remanufacture date be verified?

2. Is there enough of a metrological change to a device to warrant a new CC?

3. Are the current definitions for remanufactured devices in HB 44 adequate to support this proposal?

4. Would the device be out of service pending a possible NTEP approval?

During their fall 2009 meetings, the WWMA and SWMA agreed that nonretroactive requirements are applicable to remanufactured equipment that is remanufactured after the effective date. The WWMA believed these devices are competing with new and used devices and should, therefore, be subject to the same requirements. The WWMA and SWMA supported the original language proposed by NIST WMD, but asked the Committee to consider the alternate language proposed by the WWMA by adding the words "and remanufactured" to G-A.6. subparagraphs (b) and (c) and deleting proposed subparagraph (d). The WWMA and SWMA recommended the proposal be included as a Voting item on the Committee's 2010 Agenda.

At its fall 2009 meeting, NEWMA stated it does not support this proposal because it is not clear what problem the proposal is trying to solve. Additionally, NEWMA stated that this proposal is redundant, since a remanufactured device is considered a new device with its own CC and, therefore, already has to meet code requirements.

At the 2010 NCWM Interim Meeting, the Committee received comments from Mr. Straub, Fairbanks, speaking on behalf of the SMA, who supported the item as proposed in the WWMA recommendation. Some other industry members, including at least one device remanufacturer testified that they have not had sufficient time to review and analyze the impact of the proposal which is intended to clarify existing language. Others stated remanufactured devices need to be treated as new and that they compete with new devices manufactured after the nonretroactive date of new and amended requirements in effect after the device was remanufactured. Mr. Andersen, New York, stated that this proposal should not be part of "Application" paragraphs.

The Committee agreed that the proposed amendment is supported by the intent of the NCWM Remanufactured Devices Task Force when it recommended making a distinction between repaired and remanufactured devices since such a distinction may impact applicable tolerances, NTEP status, and fair competition when a remanufactured device is represented as "good as new." The Committee also believes that many of the questions raised by the CWMA are answered in the 2000 Report of the NCWM Remanufactured Device Task Force in Appendix A of the 86th NCWM Final Report page S&T - 58 through S&T - 69. The Committee also noted that not all remanufactured devices are required to have a new CC and are still traceable to the original CC as noted in the "List of Examples" in the task force report in pages S&T - 64 through S&T - 66.

The Committee recommended that this item, as amended by the WWMA, move forward as a Voting item.

At its 2010 Annual Meeting, NEWMA recommended that this remain an Information item until questions raised during the discussion at its open hearing have been addressed.

At its spring 2010 Annual Meeting, the CWMA recommended that the nonretroactive requirements should be applicable to all new devices. That is, the requirement would apply to remanufactured devices defined in HB 44 as being made to operate like a new device of the same type (i.e., work done to a device or element to the extent that it is required to be marked as "remanufactured" in the Remanufactured Task Force table of scenarios). The CWMA further recommends that this be made an Information item to address some of the concerns raised by manufacturers

and to review the Task Force guidelines. The CWMA also recommended that the list be posted on the NCWM and/or WMD websites according to the recommendation in the 2002 NCWM Final Report.

At the 2010 NCWM Annual Meeting, the Committee received several comments from remanufacturers requesting the item be made an Information item to give the device remanufacturers additional time to evaluate the impact of the proposed amendment to G-A.6.

The Committee also received a letter from Mr. Thomas McGee, PMP Corporation, stating that he disagrees with WMD that the proposed changes to G-A.6. is a clarification of the intent of the Remanufactured Devices Task Force. As it currently reads in the 2010 version of HB 44, G-A.6 Nonretroactive Requirements applies to new devices based on the "Original Manufacturing Date" as compared to the effective date of a requirement. Therefore, a device originally manufactured in January 2002 and remanufactured January 2007 would need to meet all nonretroactive requirements added to the handbook up to and including January 2007. In his letter, Mr. McGee provided an example of a retail motor-fuel dispenser removed from an installation and remanufactured. The dispenser was disassembled and checked for wear, and a new mechanical computer and new outer skins were installed. The dispenser was checked for accuracy and everything checked out per HB 44. Because this dispenser was out of production prior to the adding of the nonretroactive marking requirement specifying that the CC number be clearly marked on the dispenser, it could be rejected by a state and not allowed to be installed.

Mr. McGee added that, as stated in the discussion of the item, NIST makes a direct comparison between a new device and a remanufactured device indicating they directly compete with each other. This is true as far as competing in the same market as a whole, but not if you factor in technology, features, warranty, etc. Sometime in the 1990s the Remanufactured Task Force recognized that Remanufacturing has been going on for a long time and is just part of the business. T he remanufactured devices do not directly compete with new devices, but they do fill a void. A smaller low volume operation can buy remanufactured devices at a reduced price, which keeps them competitive with the large volume operations. It provides a means to extend the life of equipment that maybe has gone out of production but is still very accurate and reliable. Mr. McGee recommended that this be moved back to an Information item or removed from the agenda. If made an Information item, it would give all of those companies that could be impacted by the change to review and comment on this issue. He added that this is not just a clarification. It is clearly a change in the philosophy of applying Nonretroactive Requirements. A complete copy of Mr. McGee's letter (less extracts of HB 44 and above background information) can be viewed in Appendix A of this Report.

Mr. Don Graff, Graffco Inc., submitted a list of remanufacturers of liquid-measuring devices that may be impacted by the enforcement of nonretroactive requirements on remanufactured devices and requested that this be designated as an Information item. A complete copy of Mr. Graff's letter can be viewed in Appendix A of this Report.

The Committee also received a letter of support for this item from Mr. R. Michael Carlson, President, Dresser Wayne North America. Mr. Carlson expressed his company's concerns about a growing trend to extend that lifecycle by refurbishing or "remanufacturing" the equipment after its removal from the original site and then placing it back into the stream of commerce without first bringing it into compliance with current NTEP standards. This failure to meet applicable NTEP certification standards increases the chances of errors, misuse, and fraud and puts consumers as well as station owners at risk. The current practice of extending the usable life of fuel dispensers without a system of checks and balances to help ensure that, at the time of sale, such used and remanufactured equipment meets current NTEP standards results in inconsistency in the marketplace and an unacceptable risk of error.

Mr. Carlson added that the consistency and accuracy of fuel-dispensing equipment is an issue of critical and growing importance. For decades the industry has been able to safely and reliably operate within a fueling and payment infrastructure that remained relatively stable. However, the last few years have brought significant changes to the marketplace, including the following:

- Payment security including:
    - Increasing threats of fraud through sophisticated fuel and identity-theft schemes;

- Credit card industry mandates for increasingly rigorous payment-security standards; and
- Dispenser manufacturers have enhanced fuel-meter technology and associated electronics to deter tampering with measurement and calibration.

- Fuel evolution including:
  - Ultra-low-sulfur diesel (ULSD) and diesel exhaust fluid (DEF) have taxed the capabilities of dispensers' hydraulic systems; and
  - Higher levels of ethanol in today's fuels require specially fabricated seals and components.

- Communications interface (and security) including:
  - Download of dispenser software from remote sources; and
  - The potential for automatic meter-calibration.

As such, Dresser Wayne supports maintaining Item 301-4 G-A.6. as a Voting item at the National Conference on Weights and Measures on July 11-15, 2010. It is in the best interest of the general public, station owners and the fuel-dispensing industry in general. A complete copy of Mr. Carlson's letter can be viewed in Appendix A of this Report.

Mr. Andersen (New York) stated that one of the primary issues that led to the marking requirements was original manufacturers' concern over warranty and liability concerns when devices were remanufactured with unauthorized parts. Mr. Lewis, Rice Lake Weighing, expressed concern about a remanufacturer's ability to remanufacture a device without the original manufacturer's blueprints and parts lists. Additionally, Mr. Lewis stated that VCAP should also be applicable to remanufacturers that work on devices subject to testing for influence factors.

The SMA stated its support for this item during the open hearings. WMD reiterated that the current issue was proposed because paragraph G-A.6. does not specifically reference "remanufactured" devices and elements and that WMD has received questions on how or if nonretroactive requirements are to be applied to "remanufactured" devices and elements. WMD believes that it was the intent of the 2001 and 2002 Committees that remanufactured devices would be subject to nonretroactive requirements according to the definition for "remanufactured devices" in Appendix D. Other original equipment manufacturers have also stated that they remanufacture their own devices and typically to the current applicable nonretroactive devices.

WMD also provided the Committee with the following "real life" examples outlining when a device is considered as "repaired" or "remanufactured."

Weighing Devices

Example 1: A scale service agency replaces all of the load cells of a vehicle scale's weighing/load-receiving element with load cells of a different manufacture that are metrological equivalent cells and of the same basic type. The replacement cells have been issued an NTEP CC and are replaced without any modification to the load cell mounting assembly.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 9-W, Section I Examples of Repaired Devices/Repaired Elements (no metrological change).

According to the guideline, this is an example of a repaired device. *The weighing/load-receiving element would still be traceable to the original NTEP CC and would not be required to comply with the most recent nonretroactive requirements.*

Example 2: A scale service agency completely rebuilds a used retail-computing scale that they acquired from a grocery store that had had it in service for over 15 years. The scale is completely disassembled, parts inspected for wear, and all worn parts replaced with remanufactured parts that are not OEM, but are the same design. The

load cell, found to still be functioning satisfactorily, is not replaced. The scale is then reassembled and sold to a delicatessen located within the same state as the service agency.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 3-W, Section II Examples of Remanufactured Devices/Remanufactured Elements (no metrological change).

According to the guideline, this is an example of a remanufactured device. *The scale would still be traceable to the original NTEP CC, but would need to marked in accordance with paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements and also would be required to comply with the most recent HB-44 nonretroactive requirements in effect as of the date the scale is installed in its new location. For example, if the remanufactured scale were installed July 1, 2010, it would need to comply with paragraph G-S.1., bullet (e) which requires an NTEP Certificate of Conformance (CC) or CC Addendum Number for devices that have a CC be permanently marked. This particular requirement is nonretroactive as of January 1, 2007.*

Measuring Devices

Example 1: A used equipment dealer replaces a meter that cannot be brought into proper calibration with a used meter of the same model taken from a used dispenser. This work is performed at the used equipment dealer's shop. The replacement meter is recalibrated after installation and then placed back into service.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 8-M, Section I Examples of Repaired Devices/Repaired Elements (no metrological change).

According to the guideline, this is an example of a repaired device. *The device is still traceable to the original NTEP CC and would not be required to comply with the most recent nontroactive requirements in effect as of the time this work was completed.*

Example 2: A remanufacturer of dispensers completely disassembles a retail motor fuel dispenser and replaces the meter with the same model meter remanufactured by another firm. They then fix and replace all other parts as needed, reassemble the dispenser, and offer it for sale as a "remanufactured" dispenser.

The associated guideline adopted by the NCWM in 2002 is "Guideline Item" 6-M, Section II - Examples of Remanufactured Devices/Remanufactured Elements (no metrological change).

According to the guideline, this is an example of a remanufactured device. *It would need to be marked in accordance with paragraph G-S.1.2. Remanufactured Devices and Remanufactured Main Elements and also would be required to comply with the most recent HB-44 nonretroactive requirements in effect as of the date the dispenser is installed into commercial service. For example, if a 15 year old dispenser were remanufactured and returned to service on July 1, 2010, it would need to comply with Liquid-Measuring Devices Code, paragraph S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers, which is nonretroactive as of January 1, 2003.*

Significant points considered by the Committee are:

- If it was not the intent of the NCWM in adopting the definitions and marking requirements for "remanufactured" devices and elements to subject remanufactured devices to Nonretroactive requirements, then how should G-S.1.2. be applied since the "remanufactured" marking requirement in G-S.1.2. was adopted as a nonretroactive requirement?

- The terms "manufactured" and "remanufactured" have distinct definitions in that manufactured devices are shipped as new and remanufactured devices are made to operate as new as defined in Appendix D.

- Paragraph G-A.6. is currently silent with respect to remanufactured devices and elements.

- There is a lot of misunderstanding of the original findings and recommendations of the original task force.

- The report of the Remanufactured Task Force and table of scenarios in not readily available outside of the 2001 NCWM Final Report.

After considering these points and the comments received on this issue, the Committee agreed to designate this as an Information item to allow interests parties to review the report of the Remanufactured Task Force and associated table of scenarios. The Committee also requested that the NIST Technical Advisor contact the NTEP Administrator to discuss the potential impact of VCAP on remanufacturers with regard to how these guidelines would be integrated into the VCAP system.

320 SCALES

320-1A W S.2.3.4. through S.2.3.7. Value of Tare Indication and Recorded Representations, and Appendix D. Definitions for Gross Weight Value, Net Weight Value, Net Weight, Tare, and Tare Weight Value

(This item was withdrawn.)

Source: 2009 Carryover Item 320-1C. (This item originated from the NTETC WS and first appeared on the Committee's 2007 agenda.)

Purpose: The tare proposals and proposed definitions were intended to: (1) promote uniform application of tare requirements during field inspections; and (2) provide additional support for the requirements that may apply to the operation of tare and preset tare and to the indications and recorded representation of tare. To address the subject of "Tare," NTEP has relied only on the interpretations of General Code requirements and the NCWM Report of the 65th (1980) Committee on Specifications and Tolerances, agenda Item 301-3 Tare (Pages 216 - 218).

Item Under Consideration: This recommendation was intended to clarify the requirements for tare by adding new paragraphs S.2.3.2. through S.2.3.6., and adding new definitions to Appendix D for "gross weight," "net weight," "net weight value", "tare," and "tare weight value."

(The proposed language and definitions may be reviewed in the Committee's 2009 Final Report.)

Background/Discussion: Additional background information on this item can be found in the Background/Discussion paragraphs on agenda Item 320-1A in the Committee's 2009 Final Report.

During the 2009 Annual Meeting, the Committee received no additional comments on this proposal. However, Tare Items 320-1A and 320-1B on the 2009 Committee's agenda were not adopted. Consequently, the Committee recommended that the WS discuss and provide the Committee with an update on the WS position on this and all other remaining tare proposals carried over to the Committee's 2010 Interim Agenda.

At its August 2009 Annual Meeting, the WS reviewed the background information regarding comments and actions on these issues during the 2009 NCWM Annual Meeting. The WS recommended that the remaining tare items (Items: 320-1A, 320-1B, 324-2A, 324-2B, and 324-C on the Committee's 2009 agenda) be Withdrawn from the 2010 S&T Committee Agenda since the NCWM agreed with the SMA position that the tare proposals are not needed for HB 44.

Based upon comments received during the 2009 NCWM Annual Meeting and their respective fall 2009 meetings, the CWMA, WWMA, SWMA, and NEWMA recommended the remaining tare items be Withdrawn from the NCWM S&T Committee's 2010 Interim Agenda.

At the 2010 NCWM Interim Meeting, the Committee agreed that there was no longer any support for the proposal and withdrew this item from its agenda.

320-1B W S.2.4. Preset Tare Mechanism and Appendix D – Definitions for Preset Tare

(This item was withdrawn.)

Source: 2009 Carryover Item 320-1D. (This item originated from the NTETC WS and first appeared on the Committee's 2007 agenda.)

Purpose: The tare proposals and proposed definitions were intended to: (1) promote uniform application of tare requirements during field inspections; (2) allow the identification and printing of preset tares with the abbreviation "PT;" and (3) provide additional support for the requirements that apply to the operation of tare and preset tare and to the indications and recorded representation of tare. NTEP has relied only on the interpretations of HB 44 General Code requirements and Final Report of the 65th NCWM Committee on Specifications and Tolerances, agenda Item 301-3, Tare (Pages 216-218) to address the subject of tare.

Items Under Consideration: Add a new paragraph S.2.4. and new preset tare definitions.

(The proposed language and definitions may be reviewed in the Committee's 2009 Final Report.)

Background/Discussion: Additional background information on this item can be found in the Background/Discussion paragraphs on agenda Item 320-1A in the Committee's 2009 Final Report.

During the 2009 Annual Meeting, the Committee received no additional comments on this proposal. However, Tare Items 320-1A and 320-1B on the Committee's 2009 agenda were not adopted and, consequently, the Committee recommended that the WS provide the Committee with an update on the WS position on the remaining tare proposals carried over to the Committee's 2010 Interim Agenda.

At its August 2009 Annual Meeting, the NTETC WS reviewed the background information regarding comments and actions during the 2009 NCWM Annual Meeting. Since the NCWM agreed with the SMA position that the tare proposals are not needed for HB 44, the WS recommended that the remaining tare Items (320-1A, 320-1B, 324-2A, 324-2B, and 324-2C in the Committee's 2009 agenda) be Withdrawn from the Committee's agenda.

Based upon comments received during the 2009 NCWM Annual Meeting and their respective fall 2009 meetings, the CWMA, WWMA, SWMA, and NEWMA recommended the remaining tare items be Withdrawn from the NCWM S&T Committee's agenda.

At the 2010 NCWM Interim Meeting, the Committee agreed that there was no longer any support for the proposal and withdrew this item from its agenda.

320-2 V S.2.1.1. General (Zero) and Appendix D Definitions for Initial Zero-Setting Mechanism and Automatic Zero-Tracking Mechanism

(This item was adopted.)

Source: 2009 Carryover Item 320-3. This item originated from the NTETC WS and the S&T Committee and first appeared on the Committee's 2009 Interim Agenda as a proposal to add a new definition to Appendix D - Automatic Zero-Setting Mechanism and amend paragraph S.2.1.1. to specifically prohibit the feature.

Purpose: Many scales throughout the world are equipped with an automatic zero-setting feature that is typically disabled for the U.S. marketplace. This feature is not addressed or defined in HB 44 and is not listed on NTEP CCs.

Item Under Consideration: Amend paragraph S.2.1.1. as follows:

S.2.1. Zero-Load Adjustment.

S.2.1.1. General. – A scale shall be equipped with means by which the zero-load balance may be adjusted. Any loose material used for this purpose shall be enclosed so that it cannot shift in position and alter the balance condition of the scale.

Except for an Initial Zero-Setting Mechanism, an automatic zero adjustment outside the limits specified in S.2.1.3. for an automatic zero-tracking mechanism is prohibited.

(Amended 2010)

Amend the Appendix D. definition of "automatic zero-tracking mechanism" (including incorporating the SMA suggestions to retain the word "automatic") and amend the definition for "initial zero-setting mechanism" as follows:

automatic zero-tracking (AZT) mechanism. – Automatic means provided to maintain the zero balance indication, within specified limits, without the intervention of an operator. ~~**See "automatic zero-tracking mechanism" under "zero-setting mechanism."**~~[2.20, 2.22, 2.24]

(Amended 2010) ***(HB 44 [2010] on page D-2)***

initial zero-setting mechanism. – See "initial zero-setting mechanism" under "zero-setting mechanism." ~~**Automatic means provide**~~d ~~**to set the indication to zero at the time the instrument is switched on and before it is ready for use.**~~ [2.20]

(Added 1990) **(Amended 2010)** ***(HB 44 [2010] on page D-10)***

zero setting mechanism – Means provided to attain a zero balance indication with no load on the load-receiving element. Three types of these mechanisms are: [2.20] *(HB 44 [2010] on pages D-25 &26)*

~~**automatic zero-tracking mechanism.** – Automatic means provided to maintain the zero balance indication, within certain limits, without the intervention of an operator. [2.20, 2.22, 2.24]~~

initial zero-setting mechanism. – Automatic means provided to set the indication to zero at the time the instrument is switched on and before it is ready for use.[2.20]

(Added 1990)

manual zero-setting mechanism. – Nonautomatic means provided to attain a zero balance indication by the direct operation of a control.[2.20]

semiautomatic zero-setting mechanism. – Automatic means provided to attain a direct zero balance indication requiring a single initiation by an operator.[2.20]

(Amended 2010)

Background/Discussion: At its 2008 Annual Meeting, the NTETC WS discussed the fact that an increasing number of scales submitted for NTEP evaluations include an automatic zero-setting feature, which is not addressed in NIST HB 44. It has been noted that many devices are built for a global marketplace and that the operation of this automatic zero-setting device may be functional on a device when installed in the United States. Currently, HB 44 does not define this function and the NCWM Publication 14 has no test to determine if the device submitted for evaluation has such a function or if it is sealable. Additionally, NTEP reported that, on a scanner/scale that had been submitted for NTEP evaluation, the automatic zero-setting feature was discovered and found to work in both the positive and negative directions. Additionally, the feature could be activated or deactivated without breaking a security seal or changing the audit trail information. NTEP also found that the operation of the feature in the positive direction does not even comply with OIML R 76. Competitors have also commented to NTEP that they had to disable this feature because it was not allowed by other NTEP weighing labs.

In the past, several of the NTEP labs, when asked about this feature, have indicated that since it does not meet the definition of an "automatic zero-tracking mechanism," it is not allowed. Additionally, the NTETC WS agreed that

HB 44 does not clearly state that this function is not allowed. This led to incorrect interpretations of Section 2.20. Scales paragraphs S.1.1.(c) (Zero Indication – ". . . return to a continuous zero indication") and S.1.1.1.(b) (Digital Indicating Elements – *"a device shall either automatically maintain a "center-of-zero" condition. . ."*) and could also be interpreted to allow the automatic zero-setting device as described in OIML R 76. This interpretation was not the intent of the HB 44 requirements referenced above.

In its initial assessment of this issue, the WS concluded the following:

1. There is a problem that needs to be solved regarding the operation of an "automatic zero-setting" feature, based on the current information or lack of information in HB 44.

2. There are no technical reasons why the automatic zero-setting feature as described in OIML R 76 should not be included in NIST HB 44.

3. The feature may not be suitable for all applications if it is allowed to function with both positive and negative weight indications.

4. Language will need to be developed for the NCWM Publication 14 to either test for the correct function of "automatic zero-setting" or test to determine that the device does not have "automatic zero-setting" and it is a sealable parameter.

The WS established a small WG to develop language to be submitted to the NCWM S&T Committee and to make a recommendation addressing the suitability of scales with the capability of automatically setting a positive weight indication to zero. The WG developed a proposal to add a retroactive requirement for the automatic zero-setting feature. The group is aware that the feature has been included on several scales for nearly 20 years although it may not have been activated. The group amended Appendix D to include a new definition for "automatic zero-setting mechanism" and to modify term "automatic zero-tracking mechanism" to eliminate any redundancy in its definition. The original WG proposal can be reviewed in the Committee's 2009 Final Report.

The WG did not have sufficient time to both develop the proposal and ballot the NTETC WS prior to the cutoff date for submitting items to the 2009 Committee. The responses to the ballot indicated that eight WS members responded to the ballot, of which six voted in favor of the proposed language. It should be noted that two of the affirmative votes stated that their vote was provisional on the basis that the reference to the 4 % of scale capacity limitation be removed from the proposal. Two members opposed that item stating that the language should not be rushed through the S&T Committee and that the feature should operate with either negative or positive weight indications.

At the 2009 NCWM Interim Meeting, the Committee reviewed the WS ballot results and comments it received during the open hearing. The Committee agreed that there was no clear consensus among the WS members and recommended that this proposal remain an Information item. The Committee agreed with the suggestion made by Mr. Flocken, Mettler-Toledo, to move the definition of "automatic zero-tracking." The Committee also asked that the NTEP labs and the WS further discuss this item, develop a consensus position, forward its recommendations to the Committee, and consider the suggestion from Mr. Steve Cook, NIST WMD, Committee Technical Advisor, to amend the term automatic-zero tracking.

During the Committee's open hearing at the 2009 NCWM Annual Meeting, support for the SMA position on this item was reiterated by several scale manufacturers who stated that the feature should be allowed to operate with either a negative or a positive weight indication. WMD stated that if the Committee chooses to allow the automatic zero-setting feature, the language should be consistent with OIML R 76 in regards to the stipulation that only the negative weight indication be permitted to automatically rezero and added that there is too great a potential for a load that is intended to be weighed to be unintentionally (or fraudulently) zeroed. Should the Committee choose to prohibit this feature, WMD recommended that the Committee develop a proposal that expressly prohibits the automatic zero-setting feature. In either case, access to enable or disable the feature should be protected by an approved security means on any scale that can be configured with this feature. Additionally, the Committee agreed that the WS needs support from HB 44 in order to evaluate the feature if the requirement is adopted or verify that it can be disabled if the feature is to be prohibited on weighing devices.

The Committee agreed to leave this proposal on the agenda as an Information item and requested that the NTETC WS discuss the comments and suggestions from the 2009 Interim and Annual Meetings and provide additional feedback to the Committee on the recommendation that either supports the proposal or recommends language for HB 44 prohibiting the feature.

At the August 2009 NTETC WS Meeting, the NIST Technical Advisor provided the WS with an update on the status of this item and outlined the Committee's request. The WS was asked to develop a consensus position on this item and then forward its conclusion to the 2010 S&T Committee. The WS discussed the possible positions it might forward to the S&T Committee (see agenda Item 320-2).

The WS discussed the options in great detail and reached a consensus among the attendees that this feature does not have any value in the U.S. marketplace and can potentially facilitate inaccurate weight determinations against either the buyer or the seller. The WS changed its 2008 position and now recommends that no changes are needed in to address this feature in HB 44.

At its fall 2009 meeting, the CWMA recommended that this remain an Information item. The CWMA added that this feature should be disallowed and recounted comments from its 2009 Annual Meeting about the accidental zeroing of weights during an inspection. The CWMA believes that the potential for this to happen still exists.

During the open hearings at the fall 2009 WWMA Annual Technical Conference, SMA indicated it opposes this item, noting that a scale should be able to zero off loads in both positive and negative directions. WS Chairman Mr. Flocken, Mettler-Toledo, speaking on behalf of the WS, indicated that the WS originally proposed this issue to address a situation in which one company's device was permitted to automatically re-zero unlimited amounts of weight from the scale after a programmable period of time. While the WS was not comfortable with the operation of this feature when it was ultimately brought to light, they made an attempt to propose the addition of language to NIST HB 44 to recognize the feature in order to avoid putting other manufacturers at a competitive disadvantage. After much discussion and hearing many comments on this issue, the WS has since reconsidered its position and believes that its original inclination to oppose the recognition of the feature was correct. The WS indicated that all devices will be appropriately addressed through the type evaluation process and believes that the proposed changes to HB 44 are no longer necessary.

Based upon the comments received during this meeting and the 2009 NCWM Annual Meeting, the WWMA recommended this item and corresponding agenda Items 322-1 and 324-1 be Withdrawn from the NCWM S&T Committee's 2010 Interim Agenda.

At its 2009 Annual Meeting, the SWMA recommended making the proposal to add a new paragraph S.2.1.7. and associated definition for automatic zero-setting mechanism as an Information item. The SWMA heard the feature conflicts with the current operation of zero-tracking and the feature is not clearly defined. Furthermore, one manufacturer has configured the feature to operate with both positive and negative weight indications, thus conflicting with OIML R 76 requirements. If the NCWM S&T Committee agrees to address this feature, the language should harmonize with OIML R 76.

During its 2009 Interim Meeting, NEWMA agreed with the comments and recommendations from the WWMA and recommends this item be Withdrawn.

At the 2010 NCWM Interim Meeting, the Committee received input echoing comments from the WS, SMA, and the regional weights and measures associations. The Committee agreed that the proposal to allow the feature and to add a new device specification paragraph that aligns HB 44 with a similar recommendation in OIML R 76 as written in the 2010 Interim Agenda does not have sufficient support to pass. The Committee did agree with WMD comments that the feature should be defined and prohibited since there was little support for the proposal. Therefore, the Committee recommends that the definition and alternative retroactive language prohibiting the feature developed by WMD move forward as a Voting item as shown in the "Item Under Consideration" above.

The Committee also recommended that this item be considered in conjunction with similar proposals in agenda Items 322-1 and 324-1 since the proposals provide the same prohibitions in all three codes.

At its 2010 Annual Meeting, NEWMA stated its support for the intent of this item and suggested moving the sentence **"An automatic zero-setting mechanism is prohibited."** to the end of the paragraph to clarify the potential confusion caused by the order of the language in the item under consideration.

At its 2010 Annual Meeting, the CWMA stated its support for this item and suggested that the Committee consider the SMA alternate language.

At the open hearing during the CWMA, NEWMA, and the NCWM Annual Meetings, the SMA stated its support for the intent of prohibiting the use of an automatic zero-setting mechanism and proposed that the current recommendation in S.2.1.1. and definition of automatic zero setting mechanism be replaced with the following.

> **S.2.1.1. General. –** A scale shall be equipped with means by which the zero-load balance may be adjusted. Automatic zero adjustment outside the limits of automatic zero-tracking (S.2.1.3.) (sometimes referred to as automatic zero setting) is prohibited. Any loose material used for this purpose shall be enclosed so that it cannot shift in position and alter the balance condition of the scale.
> (Amended 201X)
>
> automatic zero-setting mechanism. – Automatic means provided to set the zero-balance indication without the intervention of the operator.

SMA added that it opposes the removal of the word "automatic" in the term "automatic zero-tracking mechanism." and noted that its removal would lead to confusion in other locations in HB 44 and existing inspector training material.

WMD believes that the language in the "item under consideration" and the SMA and NEWMA alternate language satisfy the intent of the proposal. WMD suggests that the Committee consider SMA's suggested language for S.2.1.1. since the term automatic zero-setting mechanism (AZSM) was changed to automatic zero-tracking (AZT) in 2007. WMD believes that many officials still use the term "AZSM" when they mean "AZT."

Additionally, WMD has received questions regarding the differences between AZT and AZSM. WMD agrees that the AZT is similar to, but not the same as the AZSM. The differences in applying the AZT requirements include:

- AZT may operate continuously to a maximum limit of correction (i.e., 0.5d, or 3d) to prevent interaction with the normal weighing process; and
- AZSM is activated by an event without limits (e.g., scale capacity) without the intervention of an operator, such as part of every automatic weighing cycle (AWS code, automatic bulk-weighing systems or after a programmed time interval).

The Committee agreed to amend the item under consideration with the SMA and NEWMA editorial suggestions in S.2.1.1. to read as shown in the "Item Under Consideration."

320-3 V T.N.4.5.1. Time Dependence: Class II, III, and IIII, T.N.4.5.2. Time Dependence: Class III L, and T.N.4.5.3. Zero Load Return: Non-automatic Weighing Instruments

(This item was adopted.)

Source: NTETC-WS

Purpose: This proposal is intended to align creep recovery tolerances on scales with the equivalent creep recovery tolerances for load cells that were adopted at the 2009 NCWM Annual Meeting.

Item Under Consideration: Amend HB 44 Section 2.20 Scales Code paragraphs T.N.4.5.1. Time Dependence: Class II, III, and IIII Non-Automatic Weighing Instruments, and T.N.4.5.2. Time Dependence: Class III L Non-

Automatic Weighing Instruments, and add new paragraph T.N.4.5.3. Zero-Load Return - Non- Automatic Weighing Instruments as follows:

T.N.4.5.1. Time Dependence: Class II, III, and IIII Non-automatic Weighing Instruments. – A non-automatic weighing instrument of Classes II, III, and IIII shall meet the following requirements at constant test conditions. During type evaluation, this test shall be conducted at 20 °C ± 2 °C (68 °F ± 4 °F):

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed 0.5 e. However, the difference between the indication obtained at 15 minutes and the indication obtained at 30 minutes shall not exceed 0.2 e.

(b) If the conditions in (a) are not met, the difference between the indication obtained immediately after placing the load on the instrument and the indication observed during the following 4 hours shall not exceed the absolute value of the maximum permissible error at the load applied.

~~**(c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes, shall not exceed 0.5 e.**~~

~~**For a multi-interval instrument, the deviation shall not exceed 0.5 e_1 (where e_1 is the interval of the first partial weighing range or segment of the scale).**~~

~~**On a multiple range instrument, the deviation on returning to zero from Max_i (load in the applicable weighing range) shall not exceed 0.5 e_i (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max_1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e_1 (interval of the first weighing range) during the following 5 minutes.**~~

(Added 2005) (Amended 2006 **and 2010**)

T.N.4.5.2. Time Dependence: Class III L Non-automatic Weighing Instruments. – A non-automatic weighing instrument of Class III L shall meet the following requirements:

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed 1.5 e. However, the difference between the indication obtained at 15 minutes and the indication obtained at 30 minutes shall not exceed 0.6 e.

(b) If the conditions in (a) are not met, the difference between the indication obtained immediately after placing the load on the instrument and the indication observed during the following 4 hours shall not exceed the absolute value of the maximum permissible error at the load applied.

~~**(c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes, shall not exceed one-half of the absolute value of the applicable tolerance for the applied load for Class III L devices.**~~

(Added 2005) **(Amended 2010)**

T.N.4.5.3. Zero Load Return: Non-automatic Weighing Instruments. – A non-automatic weighing instrument shall meet the following requirements at constant test conditions. During type evaluation, this test shall be conducted at 20 °C ± 2 °C (68 °F ± 4 °F). The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes shall not exceed:

(a) 0.5 e for Class II and IIII devices;

(b) 0.5 e for Class III devices with 4000 or fewer divisions;

(c) 0.83 e for Class III devices with more than 4000 divisions; or

(d) one-half of the absolute value of the applicable tolerance for the applied load for Class III L devices.

For a multi-interval instrument, the deviation shall not exceed 0.83 e_1 (where e_1 is the interval of the first partial weighing range or segment of the scale).

On a multiple range instrument, the deviation on returning to zero from Max_i (load in the applicable weighing range) shall not exceed 0.83 e_i (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max_1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e_1 (interval of the first weighing range) during the following 5 minutes.

(Added 20XX)

Background/Discussion: During the 2009 NCWM Annual Meeting, the Committee agreed with comments from the WS that the relaxation of tolerances may impact existing zero-tracking and creep recovery requirements for scales and may result in increased rejection rates unless the language is amended. The Committee encouraged the NTETC WS and other interested parties to submit proposals that address areas affected by the proposed relaxation of tolerances.

The recently adopted changes to zero-load return tolerance for load cells created a technical inconsistency between load cells and scales that incorporate these load cells (i.e., in some cases, the tolerance is larger for the load cell than the equivalent tolerance for the scale). This proposal will correct the inconsistencies to ensure that scales will not fail creep recovery due to the increased tolerance applicable to a suitable and appropriate load cell installed in the scale.

At its 2009 meeting, the NTETC WS reviewed the report of the S&T Committee and the language adopted by the NCWM. The WS noted that the Committee discussion included comments that there is a relationship between load creep recovery and a scale's ability to return to a zero-balance condition after a load had been on the load-receiving element over a period of time. The Committee also recommended that the WS review the zero-tracking requirements and creep recovery tolerances for scales.

The WS agreed that HB 44 Scales Code paragraph T.N.4.5.1. should be amended to coincide with the changes to T.N.4.6. Mr. Nigel Mills, Hobart, submitted a proposal to the WS to amend creep recovery requirements for scales to coincide with the creep recovery tolerance adopted for load cells. The WS agreed with the proposed language and requested that Mr. Cook, NIST, and Mr. Scott Davidson, Mettler-Toledo, submit the proposal to the Committee.

The WS considered the Committee's comments on the impact of the amended load cell creep recovery tolerance and agreed with comments from scale manufacturers that this proposal has little impact on zero-tracking requirements. The manufacturers stated that they typically design scales and separable weighing/load-receiving elements with load cell capacities that are larger than the scale capacities. Additionally, the Committee believes that loading a scale for 30-minutes rarely occurs in most Class III applications. Note that NTEP verifies compliance with requirements by performing creep and creep recovery tests according to the current T.N.4.5.1. These tests are performed with the zero-tracking mechanism either disabled or with a load near zero load and beyond the zero-tracking effect.

At the 2009 NCWM Interim Meeting, the Committee received comments supporting this item. The Committee agreed with the SMA suggestion to remove the reference to "Class I" devices that was inadvertently included in the proposal and recommend the proposal move forward as a Voting item as amended in the "Item Under Consideration" above.

At their respective Annual Meetings, NEWMA and the CWMA stated their support for the intent of the item and agreed with the changes made to the "item under consideration" by the Committee after the 2010 NCWM Interim Meeting.

At the 2010 NCWM Annual Meeting, the SMA recommended deleting the reference to Class I scales paragraph T.N.4.5.3. WMD confirmed that the Class I reference was inadvertently left in the proposed language and agreed that it should be removed.

The Committee agreed with the comments since the 2010 Interim Meeting and deleted the "Class I" reference from paragraph T.N.4.5.3 in the "Item Under Consideration."

320-4 VC UR.2.6. Approaches

(This item was adopted.)

Source: Western Weights and Measures Association

Purpose: This proposal is intended to provide clear guidelines for the width and length and a level plane for approaches at temporary vehicle scales installed for a period of six months or less.

Item Under Consideration: Amend Scales Code paragraph UR.2.6.1. as follows:

UR.2.6.1. Vehicle Scales. *– On the entrance and exit end(s) of a vehicle scale* ~~***installed in any one location for a period of 6 months or more***~~*, there shall be a straight approach as follows:*

(a) the width at least the width of the platform,

(b) the length at least one-half the length of the platform but not required to be more than 12 m (40 ft), and

(c) not less than 3 m (10 ft) of any approach adjacent to the platform shall be constructed ~~***of concrete or similar durable material to ensure that this portion remains smooth and level and in the***~~ ***in the*** *same plane as the platform.* ~~***However, grating of sufficient strength to withstand all loads equal to the concentrated load capacity of the scale may be installed in this portion.***~~ *Any slope in the remaining portion of the approach shall ensure (1) ease of vehicle access, (2) ease for testing purposes, and (3) drainage away from the scale.*

In addition to (a), (b), and (c), scales installed in any one location for a period of 6 months or more shall have not less than 3 m (10 feet) of any approach adjacent to the platform constructed of concrete or similar durable material to ensure that this portion remains smooth and level and in the same plane as the platform; however, grating of sufficient strength to withstand all loads equal to the concentrated load capacity of the scale may be installed in this portion.

[Nonretroactive as of January 1, 1976]

(Amended 1977, 1983, 1993, ~~**and**~~ 2006**, and 201X**)

Background/Discussion: At the 2009 WWMA Annual Technical Conference, Mr. Doug Deiman, Alaska Department of Transportation, submitted the above proposal, stating that this amendment to Scales Code paragraph UR.2.6.1. will clarify design requirements and instructions for installing approaches at vehicle scales temporarily located at a site for less than six months. Currently, HB 44 leaves approaches for temporary vehicle scales unregulated and does not address: a) safety; b) access to testing; and c) scale maintenance/perseveration issues that were originally considered when UR.2.6.1. was adopted in 1975. Mr. Deiman added that discussions with two scale manufacturers have indicated that there would be universal agreement to this addition to the scale code. Although costs to scale owners were not part of the analysis, typical manufacturers' approach installation instructions are usually more stringent than this proposed change. The benefits will be measured in greater scale longevity, reduced maintenance costs, greater safety for employees, and better access for calibration and testing.

The WWMA agreed to request that the NCWM S&T Committee recommend for a vote the above proposal to amend Scales Code paragraph UR.2.6.1. Vehicle Scales, to provide clear guidelines for installing approaches at temporary vehicle scale installations.

At the 2010 NCWM Interim Meeting, Mr. Deiman described examples of temporary vehicle scale installations in Alaska that were not installed with level approaches. He stated that vehicle scales are subjected to enormous amounts of stresses when vehicles are not smoothly rolled on to the scale deck. Vehicles struggling to climb curved and steeply ramped approaches tend to shock-load the ends of the scale and violently push the deck into the bumper bolts or checking mechanisms (i.e., methods to limit scale deck movement). Similar forces affect the scale deck in the same direction when the vehicle pulls (downhill) off the scale. Alaska has documented several instances where "bumper bolts" and other mechanical checking mechanisms were damaged and broken. There were other instances where load cells became displaced from the load cell mounts.

Not only does lack of good approaches reduce Weights and Measures officials' confidence that the scale will maintain accuracy for the duration of the installation, it also impacts safety and ease of testing. Mr. Deiman cited a safety incident where an inspector was injured at a temporary scale installation. This incident occurred when an inspector became pinned between the test truck and test cart that were parked on a steeply ramped approach. This lost-time crushing injury could have been prevented by specifying level approach surfaces in the first 10 feet of all scale installations.

Mr. Andersen, New York, noted that the format of the proposal language makes it unclear what part of the language applies only to temporary installations. Mr. Deiman provided the Committee with revised language to clarify the intent of the proposal. Mr. Richard Suiter, Richard Suiter Consulting, suggested amending the existing language in HB 44 by deleting "installed in any one location for a period of six months or more," eliminating any differences between temporary and permanent installations.

The Committee considered the comments and agreed with the WWMA that the requirements for vehicle scales installed for six months or less need to be clarified. The Committee believes that concrete approaches significantly improve scale longevity, reduce maintenance costs, provide greater safety for employees, and allow better access for calibration and testing for permanent scale installations. However, the Committee does not believe installing concrete approaches on temporary scale installations provides significant enough benefits to warrant the additional installation expense, provided the installation does not conflict with the manufacturer's installation instructions (See paragraph G-UR.2.1.). The Committee notes that the user is still required to maintain the straight approach requirements in the proposed amendments to UR.2.6.1. subparagraphs (a), (b), and (c).

The Committee recommended that the proposal move forward as a Voting item as amended by the Committee in the "Item Under Consideration" above.

NEWMA stated its support for the intent of the item at its 2010 Annual Meeting and agreed with the changes made to the "item under consideration" by the Committee after the 2010 NCWM Interim Meeting.

The CWMA supported this item at its 2010 Annual Meeting and recommended that additional guidance be provided to clarify what material(s) other than concrete can be considered as "similar durable material" and suggested that "(e.g., steel plates)" be added following the words "similar durable material."

At the 2010 NCWM Annual Meeting, the SMA stated its support for this item. WMD acknowledged the position of the CWMA at its 2010 Annual Meeting regarding the phrase "similar durable material" as being subjective in the 2010 HB 44. WMD believes that the language in UR.2.6.1.(c) was adopted to include asphalt as a "similar durable material" as long as that portion of the approach remains smooth and level and in the same plane as the platform. WMD also made reference to the Report of the 73rd National Conference on Weights and Measures – 1977 (pages 168-170). In that report, the S&T Committee stated that "It is the view of the committee that: (a) grating in an approach is certainly acceptable if it is so constructed that test weights can be moved across it; (b) bituminous material is adequate providing it is maintained in such a manner that the approaches are smooth and level; (c) a slope in the approach for drainage is proper; and (d) it is not necessary to amend the code to provide for directional signs, since any jurisdiction experiencing problems may so require." WMD added that it believes that the use of asphalt (solid or semisolid mixture of bitumens) will likely require more effort to maintain approaches with smooth and level planes than concrete that uses cement as the binding material.

The Committee agreed with the comments from WMD and recommended no changes to the item under consideration.

321 BELT-CONVEYOR SCALE SYSTEMS

321-1 I N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length

Source: 2009 Carryover Item 321-2. This item originated from the 2008 Western Weights and Measures Association (WWMA) Meeting. (This item first appeared on the 2008 Committee's Developing Items Section of its agenda as Item 360-2, Part 3, Item 2. This paragraph was renumbered from N.3.1.4. to N.3.1.3. in the HB 44 2010 Edition based on the adoption of the recommendation to combine paragraphs N.3.1.1. and N.3.1.2. in 2009.)

Purpose: The BCS Work Group agrees that the existing language in N.3.1.3. results in an excessive allowance for the variation in the totalizers for a belt with larger minimum division sizes. Conversely, the three division requirement can impose an excessively narrow restriction for belt-conveyor scales with smaller minimum divisions. The proposed amendment corrects the issue and makes the allowable variation independent of division size.

Item Under Consideration: Amend NIST HB 44, Section 2.21. Belt-Conveyor Scales (BCS) Systems Code, paragraph N.3.1.4. as follows:

> **N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. – <u>During a zero-load test, the total change indicated in the totalizer during one revolution of the belt shall not exceed 0.18 % of the load that would be totalized at scale capacity for the duration of the test. The end value of the zero-load test must meet the ± 0.06 % requirement of paragraph N.3.1.2. Test for Zero Stability.</u> ~~After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus (± 3 d) 3.0 scale divisions from its initial indication during one complete belt revolution.~~**
>
> (Added 2002) (Amended 2004 **<u>and 201X)</u>**

Background/Discussion: At its fall 2007 Annual Technical Conference**,** the WWMA received a proposal from the Belt-Conveyor Scale Work Group (BCS WG) to amend paragraph N.3.1.3. The BCS WG stated that existing language in N.3.1.3. results in an excessive allowance for the variation in a belt. However, for belt-conveyor scales that can benefit from a smaller minimum division, the three division requirement can impose an excessively narrow restriction. It should be noted that variations in belt weight tend to be sinusoidal. In other words, the error caused by belt variations would be canceled if the material test were conducted using complete revolutions. The maximum belt variation would occur at 0.5, 1.5., 2.5, etc., revolutions. However, material tests are rarely conducted using complete revolutions of the belt.

During the 2009 NCWM Interim Meeting, the Committee heard a comment from Mr. Bill Ripka, Thermo Ramsey, supporting the proposal as written in the Committee's recommendation and adding that the current language in HB 44 stating the current three scale interval deviation from an initial indication can lead to significant errors in scale accuracy. The Committee agreed with the comments from Mr. Ripka and recommended this item move forward as a Voting item.

At the 2009 NCWM Annual Meeting, the Committee received comments and recommendations from the February 2009 meeting of the BCS WG. The members of the WG came to general agreement that, with regard to these systems, the conveyor belt needs to be uniform (minimum variations in the weight per unit of length of the belt), but the proposal as it exists in the Committee's Interim Report is not well understood. The variation during a revolution of the belt is most important and will exhibit the most impact for BCS applications that may use a portion of a belt revolution to deliver a weighment (e.g., 2.5 belt revolutions). This could occur when loading individual trucks or railcars, or in some cases, with the quantity of material used for material tests. For larger quantities, such as loading a unit train, the error becomes insignificant.

The BCS WG reported that, after their meeting adjourned, an extended session of the meeting took place with a smaller group. The smaller group developed an amended proposal. However, the smaller group recommended that this item <u>not</u> go forward as a Voting item, but be designated as an Information item to allow more time to consider developing a revised proposal and to conduct additional research on the appropriate tolerance. The entire BCS WG was polled on the smaller group's recommendation on the amended proposal and its proposed status. The majority

of the responses agreed with the recommendation that this item needs further review and development and its status should be an Information item.

During its open hearing at the 2009 NCWM Annual Meeting, the Committee received comments from Mr. Ripka, Thermo Ramsey and NIST WMD supporting the recommendation from the BCS WG. The Committee agreed with the WG that more time is needed to conduct additional research on this item to determine the appropriate tolerance and revise the proposal. The Committee agreed to keep this on its agenda as an Information item.

At the 2010 NCWM Interim Meeting, the SMA submitted a comment supporting the intent of this item and encouraged additional research to determine the correct allowable value to verify suitable belt consistency. The Committee agreed to keep this item on its agenda as an Information item.

At its February 2010 meeting, the UNSWG on Belt-conveyor Scales discussed this item. There was much discussion on the original purpose of the existing language that was added to HB 44 in 1985 as part of the revised Belt-Conveyor Scale Systems Code (developed by the Belt-Conveyor Scale Task Force). The WG did not reach a consensus on this item and will continue its work to develop a consensus position.

At the 2010 NCWM Annual Meeting, Mr. Ripka provided the Committee with a letter regarding the status of the USNWG. Based on the progress of the sub-committee on this issue, and the pending receipt of actual field information as it relates to belt consistency, the sub-committee of the USNWG requests the National S&T committee to consider moving the proposal from Information to Developing. The sub-committee expects to have data ready for the fall 2010 regional conferences, or if data is slow in being provided, by the NCWM interim meeting in January, 2011. A complete copy of Mr. Ripka's letter can be viewed in Appendix A of this Report.

The Committee agreed with the recommendation to give this item Developmental status and move it to the list of Developing items on the Committee's 2011 Interim Agenda.

(See also the Committee's 2008 Final Report for additional background information in Developing Item 360-2, Part 3, Item 2.)

322 AUTOMATIC BULK-WEIGHING SYSTEMS

322-1 VC S.2.1. Zero-Load Adjustment

(This item was adopted.)

Source: 2009 Carryover Item 322-1. This item originated from the NTETC Weighing Sector and S&T Committee and first appeared on the Committee's 2009 Interim Agenda.

Purpose: This proposal is intended to prohibit the automatic zero-setting mechanism for the same reasons that zero-tracking is prohibited (incorrect net weight determinations may occur when unintentional and unobserved zeroing or tracking off of material retained in a hopper).

Item Under Consideration: Amend HB 44 Section 2.22. Automatic Bulk-Weighing Systems by amending paragraph S.2.1. as follows:

> **S.2.1. Zero-Load Adjustment.** – The weighing system shall be equipped with manual or semiautomatic means by which the zero-load balance or no-load reference value indication may be adjusted. ~~**An a**~~**A**utomatic zero-tracking **and automatic zero-setting** mechanism**s** ~~**is**~~**are** prohibited.
>
> **(Amended 2010)**

Background/Discussion: At its 2008 Annual Meeting, the NTETC WS discussed the fact that an increasing number of scales submitted for NTEP evaluations include an automatic zero-setting feature, which is not addressed in NIST HB 44. Additional background information prohibiting the feature includes the actions and

recommendations from a WG formed by the WS in 2008 to address automatic zero-setting mechanism encountered during field inspections and type evaluations; this background information may be reviewed in agenda Item 320-2 (Scales Code paragraph S.2.1.1. General (Zero) and Appendix D Definitions for Automatic Zero Setting Mechanism and Automatic Zero-Tracking Mechanism).

In the process of developing the original proposal for agenda Item 320-2 to establish requirements for an "automatic zero-setting" feature, the WG recommended that the automatic zero-setting mechanism be prohibited for devices covered by Section 2.22. Automatic Bulk-Weighing Systems for the same reasons that zero-tracking is prohibited for that device type (incorrect net weight determinations may occur when unintentional and unobserved zeroing or tracking off of material retained in a hopper occurs between drafts).

Based upon the comments received at the fall 2009 WWMA Annual Technical Conference and the 2009 NCWM Annual Meeting, the WWMA recommended this item and corresponding items in Item 320-2 and Item 324-1 be Withdrawn from the NCWM S&T Committee's agenda.

At its fall 2009 Interim Meeting, the CWMA supported the language as shown above and recommended this move forward as a Voting item.

During its fall 2009 Interim Meeting, NEWMA agreed with the comments and recommendations from the WWMA and recommended this item be Withdrawn.

At the 2010 NCWM Interim Meeting, the Committee received a comment from the SMA supporting this item as written. The Committee recommended that this item be considered in conjunction with a similar proposals in agenda Items 320-2 and 324-1 since the proposals provide the same prohibitions in all three codes. Based on its assessment as outlined in Item 320-2, the Committee recommended this item forward as a retroactive Voting item as shown in the "Item Under Consideration" above.

There was no additional discussion or comments on this item at the 2010 NCWM Annual Meeting.

324 AUTOMATIC WEIGHING SYSTEMS

324-1 V S.2.1.1. Automatic Zero-Tracking Mechanism

(This item was adopted.)

Source: 2009 Carryover Item 324-1. This item originated from the NTETC Weighing Sector and S&T Committee and first appeared on the Committee's 2009 Interim Agenda as a proposal to add a new paragraph S.2.1.3. Automatic Zero-Setting Mechanism.

Purpose: An automatic zero-setting mechanism is a feature used in many scales throughout the world. This feature is not addressed or defined in HB 44 nor is it listed on NTEP CCs. The intent of this amended proposal is to retroactively prohibit the use of this feature.

Item Under Consideration: Amend HB 44 Section 2.24. Automatic Weighing Systems by amending paragraph S.2.1.1. as follows:

S.2.1.1. Automatic Zero-Tracking Mechanism. – Except for automatic checkweighers, under normal operating conditions the maximum load that can be "rezeroed," when either placed on or removed from the platform all at once, shall be 1.0 scale division.

Except for an initial zero-setting mechanism, an automatic zero adjustment outside these limits is prohibited.

(Amended 2004 **and 2010**)

Background/Discussion: At its 2008 Annual Meeting, the NTETC WS discussed the fact that an increasing number of scales submitted for NTEP evaluations include an automatic zero-setting feature, which is not addressed in NIST HB 44. Additional background information concerning prohibiting the feature includes the actions and recommendations from the WG formed by the WS in 2008 to address automatic zero-setting mechanism encountered during field inspections and type evaluations. This information may be reviewed in agenda Item 320-2 (Scales Code paragraph S.2.1.1. General (Zero) and Appendix D. Definitions for Automatic Zero-Setting Mechanism and Automatic Zero-Tracking Mechanism).

In the process of developing the original proposal for agenda Item 320-2 to establish requirements for an automatic zero-setting feature, the WG recommended that the automatic zero-setting mechanism should be permitted for devices covered by Section 2.24. Automatic Weighing Systems since equivalent requirements can be found in OIML R 51 Recommendation for Automatic Catchweighing Instruments.

The Committee agreed that this item should remain as an Information item pending the development of the proposal to add the term "automatic zero-setting mechanism" in agenda Item 320-2.

At the August 2009 NTETC WS Meeting, the NIST Technical Advisor provided the WS with an update on the status of this item and outlined the Committee's request. The WS discussed the possible positions it might take on this item in great detail. The WS reached a consensus among the attendees that this feature does not have any value in the U.S. marketplace and can potentially facilitate inaccurate weight determinations against either the buyer or the seller. Consequently, the WS changed its 2008 position and recommended that no changes be made to address this feature in HB 44.

Based upon the comments received at the 2009 NCWM Annual Meeting and its fall 2009 Annual Technical Conference, the WWMA recommended this item and corresponding items in Item 320-2 and Item 322-1 be Withdrawn from the NCWM S&T Committee's agenda.

During its 2009 Interim Meeting, NEWMA agreed with the comments and recommendations from the WWMA and recommended this item be Withdrawn.

At the 2010 NCWM Interim Meeting, the Committee received input echoing comments from the WS, SMA, and regional Weights and Measures associations. The Committee agreed that that the proposal to allow the feature and to add a new device specification paragraph that aligns HB 44 with a similar recommendation in OIML R 51 as written in the 2010 Interim Agenda does not have sufficient support to pass. However, the Committee did agree with WMD comments that the feature should be defined and prohibited since there was little support for the proposal. Therefore, the Committee recommends that the definition and alternative retroactive language prohibiting the feature developed by WMD move forward as a Voting item as shown in the "Item Under Consideration" above.

The Committee recommended that this item be considered in conjunction with similar proposals in agenda items 320-2 and 322-1 since the proposals provide the same prohibitions in all three codes.

During their 2010 Annual Meetings, both NEWMA and the CWMA stated their support of this item.

During the open hearing at the 2010 NCWM Annual Meeting, the SMA stated its support for this item. The Committee noted that the proposed term and definition of "automatic zero-setting mechanism" in Appendix D were no longer used in corresponding agenda Items 320-2 and 324-1 and agreed to move the proposal for the term and definition of "Automatic zero-setting mechanism" in Appendix D to agenda Item 322-1. To be consistent with the SMA proposed changes to Item 320-2, WMD suggested the Committee amend the proposal by adding language S.2.1.1. and withdraw the proposed language to add new paragraph S.2.1.3. The Committee agreed with the WMD and SMA suggestions and amended this item as shown in the "Item Under Consideration" as a Voting item.

324-2A W S.2.2.4. Visibility of Operation and S.2.2.5. Subtractive Tare Mechanism

(This item was withdrawn.)

Source: 2009 Carryover Item 324-2C. (This item originated from the S&T Committee and first appeared on the Committee's 2007 agenda.)

Purpose: The tare proposals and proposed definitions were intended to: (1) promote uniform application of tare requirements during field inspections; and (2) provide additional support for the requirements that may apply to the operation of tare and preset tare and to the indications and recorded representation of tare. NTEP has relied only on interpretations of General Code requirements and the NCWM Report of the 65th (1980) Committee on Specifications and Tolerances agenda Item 301-3 Tare (Pages 216-218) to address the subject of Tare.

Item Under Consideration: This recommendation was intended to clarify the requirements for tare by adding new paragraphs S.2.2.4. and S.2.2.5. that provide new requirements for visibility and subtractive tare (i.e., balancing off tare objects does not increase the nominal scale capacity).

(The proposed language to add new paragraphs S.2.2.4. and S.2.2.5. may be reviewed in the Committee's 2009 Final Report .)

Background/Discussion: Additional background information on this item can be found in the Background/Discussion paragraphs on agenda Item 320-1A in the Committee's 2009 Final Report.

During the 2009 NCWM Annual Meeting, the Committee received no additional comments on this proposal. However, related Tare Items 320-1A and 320-1B were not adopted. Consequently, the Committee withdrew the corresponding items in 324 Series Voting items and recommended that the NTETC WS discuss and provide the Committee with an update on the WS position on this and all other remaining tare proposals carried over to the Committee's 2010 Interim Agenda.

At its August 2009 Annual Meeting, the WS reviewed the background information regarding comments and actions on these issues during the 2009 NCWM Annual Meeting. The WS recommended that the remaining tare items (Items: 324-2A, 324-2B, and 324-C on the Committee's 2009 agenda) be Withdrawn from the Committee's agenda since the NCWM agreed with the SMA position that the tare proposals are not needed for HB 44.

Based upon comments received during the 2009 NCWM Annual Meeting and their respective fall 2009 association meetings, the CWMA, WWMA, SWMA, and NEWMA recommended the remaining tare items be Withdrawn from the Committee's agenda.

At the 2010 NCWM Interim Meeting, the Committee agreed that there was no longer any support for the proposal and withdrew this item from its agenda.

324-2B W S.2.2.6. Consecutive Tare Operations and S.2.2.7. Indication and Printing of Weighing Results

(This item was withdrawn.)

Source: 2009 Carryover Item 324-2D. (This item originated from the S&T Committee and first appeared on the Committee's 2007 agenda.)

Purpose: The tare proposals and proposed definitions were intended to: (1) promote uniform application of tare requirements during field inspections; and (2) provide additional support for the requirements that may apply to the operation of tare and preset tare and to the indications and recorded representation of tare. NTEP has relied only on interpretations of General Code requirements and the NCWM Report of the 65th (1980) Committee on Specifications and Tolerances, agenda Item 301-3, Tare (Pages 216-218), to address the subject of "Tare."

Item Under Consideration: This item was considered jointly with Item 320-1A. and was intended to clarify the requirements for tare by adding new paragraphs S.2.2.6. and S.2.2.7. that specify the requirements for transactions that use multiple tare, tare mechanisms, and the indications and recording of weighing results.

(The proposed language to add new paragraphs S.2.2.6. and S.2.2.7. may be reviewed in the Committee's 2009 Final Report.)

Background/Discussion: Additional background information on this item can be found in the Background/Discussion paragraphs on agenda Item 320-1A in the Committee's 2009 Final Report.

During the 2009 Annual Meeting, the Committee received no additional comments on this proposal. However, related Tare Items 320-1A and 320-1B were not adopted. Consequently, the Committee "Withdrew" the corresponding items in 324 Series "Voting items" and recommended that the NTETC WS discuss and provide the Committee with an update on the WS position on this and all other remaining Tare proposals carried over to the Committee's 2010 Interim Agenda.

At its August 2009 Annual Meeting, the WS reviewed the background information regarding comments and actions on these issues during the 2009 NCWM Annual Meeting. The WS recommended that the remaining tare items (Items: 324-2A, 324-2B, and 324-2C in the Committee's 2009 agenda) should be Withdrawn from the 2010 S&T Committee Agenda since the NCWM agreed with the SMA position that the tare proposals are not needed for HB 44.

Based upon comments received during the 2009 NCWM Annual Meeting and their respective fall 2009 association meetings, the CWMA, WWMA, SWMA, and NEWMA recommended the remaining tare items be Withdrawn from the NCWM S&T Committee's 2010 Interim Agenda.

At the 2010 NCWM Interim Meeting, the Committee agreed that there was no longer any support for the proposal withdrew this item from its agenda.

324-2C W S.2.3. Preset Tare Mechanism and S.2.3.1. Indication of Operation

(This item was withdrawn.)

Source: 2009 Carryover Item 324-2E. (This item originated from the S&T Committee and first appeared on the Committee's 2007 agenda.)

Purpose: The tare proposals and proposed definitions were intended to: (1) promote uniform application of tare requirements during field inspections; (2) allow the identification and printing of preset tares with the abbreviation "PT;" and (3) provide additional support for the requirements that apply to for the operation of tare and preset tare and to the indications and recorded representation of tare. NTEP has relied only on the interpretations of General Code requirements and NCWM Report of the 65th Committee on Specifications and Tolerances agenda Item 301-3 Tare (Pages 216 - 218) to address the subject of Tare.

Item Under Consideration: (**NOTE:** This item was considered jointly with Item 320-1B.) This recommendation was intended to clarify the requirements for tare by adding new paragraphs S.2.3. and S.2.3.1. that provide new requirements for metrological tare (e.g., tare objects weighed or balanced off at the time of the transaction), tare accuracy, operating range, visibility, and preset tares (e.g., manually entered or stored tares for multiple transactions).

(The proposed language to add new paragraphs S.2.3. and S.2.3.1. may be reviewed in the Committee's 2009 Final Report.)

Background/Discussion: Background information on this item can be found in the Background/Discussion paragraphs on agenda Item 320-1A in the Committee's 2009 Final Report.

During the 2009 Annual Meeting, the Committee received no additional comments on this proposal. However, related Tare Items 320-1A and 320-1B were not adopted. Consequently, the Committee "Withdrew" the corresponding items in 324 Series Voting items and recommended that the NTETC WS discuss and provide the Committee with an update on the WS position on this and all other remaining are proposals carried over to the Committee's 2010 Interim.

At its August 2009 Annual Meeting, the WS reviewed the background information regarding comments and actions during the 2009 NCWM Annual Meeting. The WS recommended that the remaining tare items (Items: 324-2A, 324-2B, and 324-2C in the Committee's 2009 agenda) be Withdrawn from the Committee's agenda since the NCWM agreed with the SMA position that the tare proposals are not needed for HB 44.

Based upon comments received during the 2009 NCWM Annual Meeting and their respective fall 2009 association meetings, the CWMA, WWMA, SWMA, and NEWMA recommended the remaining tare items be Withdrawn from the NCWM S&T Committee's 2010 Interim Agenda.

At the 2010 NCWM Interim Meeting, the Committee agreed that there was no longer any support for the proposal and withdrew this item from its agenda.

330 LIQUID-MEASURING DEVICES

330-1 W Temperature Compensation for Liquid-Measuring Devices Code

(This item was withdrawn.)

Source: 2009 Carryover Item 330-1. This item originated from the NCWM S&T Committee and first appeared on the Committee's 2007 agenda.

Purpose: The intent of this proposal was to establish specifications, tolerances, and other technical requirements that can be uniformly applied to retail liquid-measuring devices equipped with temperature compensation. The proposed changes were based on similar requirements for wholesale liquid-measuring devices.

Item Considered: The Committee considered a number of proposed modifications to Section 3.30. Liquid-Measuring Devices (LMD) Code to recognize temperature compensation for retail devices. Proposed modifications considered by the Committee can be viewed in the Committee's 2009 Interim and Final Reports.

Key Points:

- The Committee has heard numerous comments in opposition to this proposal from both industry and the regulatory community.
- Industry expressed concern that the lack of uniform method of sale requirements will lead to mixed methods of sale (Automatic Temperature Compensation (ATC) and non-ATC) and result in consumer confusion.
- Jurisdictions that do not prohibit temperature compensated sales at the retail level can develop their own requirements relative to retail motor-fuel devices equipped with ATC systems.
- The proposed changes, along with past Committee background information and discussions, can serve as a basis for jurisdictions wishing to adopt their own requirements.
- Even if a model method of sale regulation were adopted, it remains up to each individual Weights and Measures authority to determine whether or not temperature compensation is permitted on a retail motor-fuel dispenser in that jurisdiction.

Background/Discussion: Prior to the 2007 NCWM Interim Meeting, the Committee recognized, via reports from the regional L&R Committees and other sources, that there was increasing support within the Weights and Measures community to address temperature compensation features for the retail sale of petroleum products in the Liquid-Measuring Devices Code. The Committee developed a proposal to provide design, performance requirements, and testing criteria for retail metering systems that incorporate temperature compensation capability in response to these concerns and to encourage uniformity in applications where temperature compensation is being used,. The Committee was also concerned that retail motor-fuel devices could be placed in service with no guidelines in NIST HB 44 for type approval and field testing if the language proposed by the L&R Committee for the Method of Sale of Commodities in NIST HB 130 was adopted. The language proposed at the time by the L&R Committee at that time would permit the temperature-compensated sale of petroleum products at all levels of distribution. Note: The L&R Committee ultimately withdrew that proposal from its agenda in 2009.

At the 2007 Interim Meeting, the Committee considered moving the proposal forward as a priority Voting item. However, the Board instructed the Committee to retain this as Information item and established a steering committee to provide the S&T and L&R Committees with guidance on temperature compensation issues.

In 2008, the Committee heard comments in both support of and opposition to the proposed changes. The Committee continued to make revisions to the proposed changes based on specific technical comments from the ATC Steering Committee as well as other stakeholders.

At the 2009 Interim Meeting, the Committee discussed whether or not this item was ready to be recommended for a vote at the 2009 Annual Meeting. The Committee recognized the need for standards to be in place to encourage uniform evaluation of RMFDs equipped with ATC, and acknowledged that some jurisdictions are already facing the imminent possibility of such equipment in their jurisdictions. While the Committee believes that these standards are necessary whether or not the issue of a model method sale regulation has been resolved, the Committee took the position that the item should be retained as an Information item until the changes outlined in the proposal have been studied by interested stakeholders based on the number of comments received on the proposed changes to the LMD code. The Committee also acknowledged that the General Code paragraph G-A.3. Special and Unclassified Equipment coupled with relevant provisions in existing code paragraphs can be used by jurisdictions to address equipment with ATC features in the meantime. The Committee also does not believe that delaying the revisions to the LMD code should delay a decision on the method of sale item before the L&R Committee.

Based on comments heard from the floor at the 2009 NCWM Annual Meeting, the Committee acknowledged that additional work may be needed to specific sections of the proposed changes to the code to address various technical points (detailed in the Committee's 2009 Interim and Final Reports). The Committee decided to keep the status of this item as an Information item and again acknowledged that some jurisdictions are already facing the imminent possibility of such equipment in their jurisdictions. The Committee believes that these standards are necessary whether or not the issue of a model method sale regulation is adopted in NIST Handbook 130 since Weights and Measures jurisdictions may decide to permit this equipment based upon their individual State laws or regulations.

See the 2007, 2008, and 2009 NCWM S&T Final Reports for additional details and background information.

At their fall 2009 meeting, the CWMA, NEWMA, and the SWMA agreed to recommend that this item be Withdrawn from the Committee's 2010 agenda. The CWMA heard no comments in support of this item, but numerous comments in opposition. The SWMA indicated that it considered the NTETC Measuring Sector's need for procedures to evaluate temperature compensated retail devices, but concluded that it is highly unlikely such devices will be submitted for evaluation. The SWMA notes that the proposal was discussed at length during the past three NCWM sessions and appears no closer to resolution. The SWMA also cites the conclusion in the report issued by the California Energy Commission that there is no economic advantage to temperature compensation at the retail dispenser.

At its fall 2009 meeting, the WWMA heard comments suggesting that: 1) this item be Withdrawn; 2) states should regulate temperature compensation individually; and 3) there is a need for a better definition distinguishing between wholesale and retail. There was concern about the display of temperature and display of net and gross, whether it needed to be deactivated and how this deviates from the Vehicle-Tank Meters code. Another comment heard was that there is confusion regarding the condition of use and the term "invoice" in UR.3.6.1.2. Further work is needed

to clarify how paragraph UR.3.6.1.2. would apply in businesses locations that sell wholesale and retail from the same device.

The WWMA reported receiving the following written comments from Ms. Andrea Martincic, Executive Director of the Arizona Petroleum Marketers Association. At the request of Ms. Martincic, these comments were entered directly into the WWMA final report as submitted.

1) Item should be Withdrawn given the NCWM's Annual Meeting outcome on ATC as a legal method of sale from L&R. Conflict for states that automatically adopt Handbook 44.

2) If an individual jurisdiction decides to allow the use of an ATC device, they should accept responsibility for the regulation of that equipment.

3) Would like better explanation for wholesale transactions using a liquid measuring device. Should there be a differentiation between a wholesale transaction made from a liquid measuring device versus a vehicle tank meter. Most background discussion and discussion on this issue seems to mostly reference retail.

4) 2.7.2 Display of temperature for testing: .2 degrees (This is the same tolerance being advocated for a mechanical ATC device for VTMs under 331-1.) Would like to hear W&M debate on why this is the appropriate tolerance.

5) 2.7.3 Display net & gross for testing. Can this occur? Have not heard from the US manufacturers of this potential ATC device.

6) 3.6.1.2 Condition of use- At a business location all pumps and all fuel must be sold ATC---would this be problematic for E-85 or other alt. fuels.

7) 3.6.1.3 Recorded Representatives (Invoices, Receipts and BOL's) Retail transactions result in receipts for customers, on the wholesale side they result in Invoices for customers. BOL's are between a shipper on the pipeline and the distributor/jobber picking up the fuel at the rack.

The WWMA also forwarded the following written comments from Mr. Jay McKeeman, Vice President, Government Relations and Communications, California Independent Oil Marketers Association (CIOMA). These comments are included as written in the submission.

- We strongly recommend that the WWMA withdraw additional discussion of ATC requirement development. It has become even clearer in these recent discussions that development of ATC requirements in Handbook 44 will legitimize the potential of dual distribution requirements in states where a permissive ATC condition is authorized or permitted. Having two distribution systems (gross and ATC) in place at the same time is the worse-case scenario for the distributing industry, the customer and the weights and measures officials. It creates confusion, competitive disadvantage, dual inspection and accuracy measurements and will sweep away the years of hard work and good efforts instilling consumer and industry confidence that there is a level, honest playing field in the purchase of motor fuels.

- States, such as California, are perfectly capable of issuing regulations if an ATC system, type-certified by the state, is put in place. We have had a long-standing offer to work with DMS and local agencies in the development of such regulations, but have not seen that offer taken up. Trying to take California's situation (CIOMA strongly believes state law prohibits ATC at retail) of a possible permissive condition and use it as justification for national standards is inappropriate and unwarranted.

- We strongly believe, based upon statements made in open session and during the S&T Committee deliberations that the national consensus will be to withdraw further discussion of ATC requirements in Handbook 44.

- We believe a table or matrix needs to be devised that better articulates the various Handbook 44 provisions related to petroleum sales ATC, with organization by transaction type (wholesale, retail), area of governance (accuracy testing, labeling, signage, conditions of use, invoice requirements, etc.) and which provides insight into stationary location vs. mobile fueling device requirements. This would be a useful guide for the regulated community, as well as a place where a state could determine what regulations might be needed to cover any gaps, if they needed to do their own regulations.

The WWMA acknowledged that this item needs further work and recommended that it be maintained as an Information item on the NCWM S&T Committee's 2010 agenda. This recommendation is based on comments heard at the NCWM Annual Meeting and at the WWMA open hearings stressing that jurisdictions and manufacturers need criteria in HB 44 in order to ensure uniformity in instances where needed.

At the 2010 NCWM Interim Meeting, the Committee heard numerous comments from both industry and regulators in opposition to this item. Additionally, industry expressed concerns that, if adopted, the proposed changes would permit mixed methods of sale for petroleum products within the same jurisdiction. The Committee also heard an additional technical comment, noting concern that some electronic indicators are not able to simultaneously display gross and net. Based on the continued opposition to the item, the Committee decided to Withdraw the item from its agenda. With regard to the Committee's concerns over uniformity, the Committee noted that the information in the discussions and recommendations in the Committee's 2007 through 2009 Final Reports may be considered by and serve as a resource to jurisdictions seeking guidance in developing their own regulations for ATC.

330-2 D Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD) --- Moved to Section 360-3, Item 3.30, Part 1

At the 2010 Interim Meeting, the Committee concluded that this item required further development and this would best be accomplished in a small S&T work group. NIST agreed to reallocate resources to this effort and will work with the Committee to re-form the work group originally established in 2008. As a result of this decision, this item has been moved to the Developing Items agenda under Item 360-3; see Item, Part 3.30 – Item 1 in Appendix C for additional details.

331 VEHICLE-TANK METERS

331-1 VC T.2.1. Automatic Temperature-Compensating Systems

(This item was adopted.)

Source: 2009 Carryover Item 331-1. This item originated from the WWMA and first appeared on the Committee's 2008 agenda.

Purpose: To reduce tolerances applicable to comparisons of test results for compensated and non-compensated test runs to better reflect the performance of these systems.

Item Under Consideration: Amend paragraph T.2.1. as follows:

T.2.1. Automatic Temperature-Compensating Systems. – The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:

(a) **~~0.4~~0.2 %** for mechanical automatic temperature-compensating systems; and

(b) **~~0.2~~0.1 %** for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.

(Added 2002) **(Amended 201X)**

Key Points Considered by the Committee:

- The proposed change may result in a test that better reflects meter condition and operation.
- The same size and type of meter is currently treated differently in a stationary location than when vehicle-mounted.
- The proposed change would align the related ATC tolerances in the LMD and VTM codes that compare TC results with and without ATC enabled.
- Only a limited amount of data has been collected to support the change.
- Data collected in routine field tests supports the proposed change.
- No data has been submitted in opposition of the proposed change.
- Manufacturers' concerns about the proposal focus primarily on associated test procedures and test equipment.
- NIST WMD has agreed to expand on associated Examination Procedure Outlines and equipment guidelines to encourage consistency.

Background/Discussion: For more than 13 years (and before the adoption of T.2.1.), Alaska has been testing mechanical and electronic temperature-compensating vehicle-tank meters with flow rates ranging from 100 gpm to 300 gpm. They have applied the tolerances of 0.2 % for mechanical and 0.1 % for electronic wholesale meters as specified in the LMD Code, and have found that the devices are fully capable of meeting these tolerances. When devices are found out of tolerance, it is usually because of a broken cable at the probe for the mechanical devices, an electrical fault at the probe on electronic devices, or an incorrect API setting. By keeping the current tolerances that are double the equivalent tolerances in the LMD Code, there is a risk these problems will be missed.

To illustrate how the current tolerances may mask problems, such as broken temperature probes or incorrect settings, consider the following example:

1000 gal prover
Diesel #2
API 34.5
Temperature 60 °F
Mechanical compensated VTM

- A net test draw is run and the result is + 2.0 gal or + 0.2 %. This meets the maintenance tolerance of 0.3 % or 3.0 gal.

- A gross draw is run and the result is – 2.0 gal or – 0.2 %. This still meets the tolerance and the difference between the two runs is 0.4 %.

- With the temperature of the fuel at 60 °F, both of these runs should have been equal.

- If an inspector used the system indication of temperature rather than using a certified thermometer in the meter temperature well, calculations show that the current tolerance of 0.4 % for a mechanical automatic temperature-compensating system could allow a system malfunction that provided a temperature error of up to 9 °F difference from the actual temperature taken in the prover and not be recognized as being caused by a faulty system.

At its fall 2007 meeting, the WWMA recommended that the item move forward for a Vote and cited a letter from a manufacturer in support of the proposal as a means to align the LMD and VTM code requirements. Current NIST HB 44 language will require this manufacturer to produce different stationary and vehicle-mounted meters; the proposed change will align the United States with Canada and OIML, who currently do not have different standards for these meters.

In 2008 and 2009, the Committee heard mixed comments on this item. The MMA, some individual meter manufacturers, and some Weights and Measures officials opposed the proposal. While being comfortable with a tighter tolerance for type evaluation applications, they were generally uncomfortable with applying the tighter tolerances applied to routine field examinations, citing greater uncertainties in field testing and expressing concern over the consistency and adequacy of test equipment used in some field tests. Several regional associations expressed the opinion that additional data is needed in order to better evaluate the proposal, with the CWMA and the WWMA noting that if no more information is received by the 2009 Interim Meeting, the item should move forward for a vote in 2009. NIST WMD supported the collection of additional data and suggested that the Committee re-examine and compare the tolerances for stationary and vehicle-mounted meters to ensure consistency across codes for the same meter type as part of this effort. NIST also highlighted comments made by some manufacturers and Weights and Measures officials regarding the importance of using NIST Handbook 105-compliant and traceable standards (e.g., thermometers) and following appropriate test procedures for assessing compliance with ATC tolerances.

The Committee repeatedly requested additional data in support of the proposal, as well as data from those who oppose the proposal indicating why the proposed change is inappropriate. The NIST Technical Advisor contacted multiple states (including the majority of those along the northern U.S. border) for possible input, but found that many jurisdictions are not finding equipment with activated ATC systems in use on VTMs.

During the 2009 NCWM Annual Meeting, the Committee reported receiving additional VTM test data from the State of Maine which supported the proposed change to the tolerance. The Committee reiterated its request for additional data, including input from equipment manufacturers.

At its spring 2009 meeting, the CWMA requested more data to support the item, noting that if none was received the CWMA would recommend the item move to a Voting item. Hearing no further comments at its fall 2009 meeting, the CWMA recommended that this proposal move forward as a Voting item.

At its fall 2009 meeting, NEWMA recommended that this remain an Information item, noting that New York has offered to provide alternative proposed tolerances and offering the following additional comments:

- Tolerances should be based on the expansion coefficient of the product being tested.

- The higher the expansion coefficient, the more accurate the thermometer must be.

- The tolerance should be based on temperature (e.g., ± 2 ºF) of the given product's expansion coefficient.

At its fall 2009 meeting, the WWMA reiterated its 2008 position, the item should be moved forward for a vote, noting that only data supporting the proposed change has been received in response to repeated requests for data.

The WWMA received written comments from Ms. Martincic as follows:

> Petroleum tankers and tank wagons do not have VTMs equipped with ATC—why is there a tolerance change being proposed for VTMs? Again seems to be a problem for 2 states. What products are being delivered by VTMs ATC? Is this to address an issue with heating oil?

The SWMA received no input on this item at its 2009 Annual Meeting and, therefore, took no position, recommending that this remain an Information item.

At the 2010 Interim Meeting, the Committee heard comments from Mr. Dmitri Karimov, Liquid Controls, speaking on behalf of the MMA, indicating that they have no data to provide, suggesting that the proposed tolerance is not appropriate; therefore, they can no longer oppose the item.

Mr. Deiman, Alaska, reiterated his jurisdiction's experience with testing VTMs equipped with ATC and how the current requirements may mask underlying problems with the equipment, as outlined at the beginning of this discussion. Mr. Deiman provided a written copy of his comments to the Committee for reference during the Committee's review of the item. He also noted that he does not believe much more data is available; thus, if there is insufficient support for the item without additional data, then the only other recourse would be to withdraw it.

Ms. Martincic, Arizona Petroleum Marketers Association, again suggested that the issue is a local problem and questioned why it couldn't be addressed locally rather than in HB 44.

NIST WMD commented that the amount of data provided to support the proposed change is somewhat limited; however, attempts to collect additional data either in support of or in opposition to the proposal have been unsuccessful. Comments from manufacturers opposing the change have been primarily focused on concerns surrounding whether or not inspectors will use suitable equipment and follow consistent, appropriate test procedures. In an effort to address these concerns, WMD plans to make further revisions to its EPOs for VTMs to include more detailed test procedures relative to temperature compensators and accessories as well as guidance regarding the use of equipment complying with relevant NIST Handbook 105 criteria.

The Committee noted that manufacturers' concerns were focused not so much on the ability of the equipment to meet the proposed tolerance, but rather on the impact of associated procedures and equipment used by field officials when applying the tolerance. The Committee recognized that the data provided does support the proposed change and it was collected during field inspections by more than one jurisdiction, suggesting that, if proper procedures are followed, the tighter tolerance is achievable. The Committee had some remaining concern about the limited amount of data provided while recognizing that the proposed tolerance is identical to that which currently applies to meters covered under the Liquid-Measuring Devices Code. At present, the same design and size of meter would be treated differently depending on whether it were mounted on a vehicle (in which case the VTM Code applies) or installed in a stationary location (in which case the LMD Code applies). Moving forward with the proposed change would align the requirements in the two codes, resulting in a more consistent treatment of similar and even identical equipment.

After considering these points, the positions of the regional Weights and Measures associations, and the comments heard during its open hearings, the Committee agreed to recommend this item for a Vote.

At their spring 2010 meetings, the CWMA and NEWMA both supported this proposal, noting that their members have seen no data that suggests that the devices are not capable of meeting the proposed tolerances. NEWMA further added that it looks forward to an update to the EPOs that provide guidance for the use of suitable test equipment (e.g., thermometers). NEWMA also reported hearing comments questioning whether the tolerances should be based on a percentage because of different coefficients of expansion for different products in both the LMD and VTM codes. These comments indicated that tolerances will not be equal from one product density to another and suggested that tolerances should be tied to product coefficient of expansions; however, it was noted that this approach would have to apply to all affected codes, so it would be more appropriate to develop such a proposal at a later date rather than attempt to incorporate it with the proposal under consideration in this item.

At the 2010 NCWM Annual Meeting, WMD reported to the Committee that it has accomplished the following to facilitate consistent inspection and testing of VTMs equipped with ATCS:

1. Developed revisions to its EPOs for VTMs to include more detailed test procedures relative to VTM's equipped with temperature compensators and accessories;

2. Updated the NIST training materials to include guidance regarding the testing of VTMs equipped with ATCS and the use of equipment complying with relevant NIST Handbook 105 criteria; and

3. Developed suggested report forms for VTMs to reflect procedures for testing VTMs equipped with ATC.

Since making the revisions, one class has been taught and feedback from the class incorporated into subsequent revisions. This information will be posted on the NIST web site. WMD is looking for continued feedback on the report form and procedure.

During the voting session at the 2010 Annual Meeting, the Committee noted that it plans to submit a proposal for consideration by the regional weights and measures associations to non-retroactively require provisions (e.g., a thermometer well) for determining the temperature of the product at the meter for all vehicle-tank meters. This would reduce uncertainties in the test process and enable the inspector or service company to correct for any changes in volume resulting from differences in liquid temperatures between the time of passage at the meter and the time of volumetric determination in the prover, as required by VTM Code paragraph N.5. There is already a similar provision for all wholesale meters (not just those equipped with ATCS) in the Liquid-Measuring Devices Code.

331-2 W UR.2.5.2.1. Automatic Temperature Compensation for Refined Petroleum Products

(This item was withdrawn.)

Source: 2009 Carryover Item 331-3. This item originated as a companion proposal to 2009 Interim Agenda Item 331-2.

Purpose: Add a user requirement to address continual use of a compensator and consistent use of automatic temperature compensation equipment for all fuel products in a single business location.

Item Considered: Add the following subparagraphs to the Vehicle-Tank Meters Code:

UR.2.5.1.3. Condition of Use. – At a business location which offers fuel products for sale on the basis of a temperature-compensated volume, all vehicle-tank meters shall have active automatic temperature compensation and all fuel products offered for sale shall be dispensed on the basis of temperature-compensated volume.

Key Points Considered by the Committee:

- The proposed language was intended to prevent a device owner from selectively using Automatic Temperature Compensation (ATC) to an advantage.

- VTMs serve retail consumers who are not generally familiar with the distinction between compensated and non-compensated deliveries; thus, the selective use of ATC may not be readily apparent.

- Proponents of the proposal have indicated that the variations of the proposed paragraph considered thus far do not yet adequately address their concerns.

- Variations of the proposed paragraph considered thus far are viewed as too restrictive when considering special instances such as VTMs dedicated to serving a single customer.

- The language needs to clarify how devices used in multiple jurisdictions (e.g., across state lines) would be addressed.

- Terminology such as "business location" need to be further defined in order to ensure consistent use and interpretation.

- Application of the requirement to all fuel products sold by a single company is viewed by some as overly restrictive.

- Further development is needed before the item is ready for action at the national level.

- The Committee is willing to reconsider this issue if it is further developed and resubmitted.

Background/Discussion: Currently, there are no published guidelines for how a company has to use or operate their VTM with or without temperature compensation. Companies could choose to operate only part of their fleet with ATC or use ATC only part of the year when it is to their benefit. They may choose to use ATC only for certain products or deliveries, such as home heating oil, and not use ATC with diesel, kerosene, or gasoline.

The Committee was originally asked by the SWMA to consider adding two paragraphs intended to help (1) eliminate the potential for facilitation of fraud with ATC; and (2) eliminate consumer confusion regarding why certain products are currently sold using ATC and others are not. The Committee was able to reach agreement on a proposal to address the "Period of Use" and put forward a proposal as outlined in Item 331-2 in the Committee's 2009 Interim and Final Reports. Under that item, the NCWM ultimately adopted the following changes at the 2009 Annual Meeting: (1) Proposed changes to UR.2.5.1. When to Be Used to require continual use of an automatic temperature compensator; and (2) the addition of a new UR.2.5.2. Period of Use to require year-round use of temperature compensation unless otherwise agreed to in writing by the buyer and the seller.

In discussing the larger issue of ATC use on VTMs in January 2009, the Committee was not able to reach agreement on the "Conditions of Use" for ATC systems; that is, criteria for stipulating how ATC is used to sell similar products within a single company. Consequently, the Committee created this item at the 2009 Interim Meeting as a companion to 2008 Item 331-2 to enable further review and discussion of the proposed criteria for the condition of use.

In reaching this decision, the Committee considered comments received during the 2008 Interim and Annual Meetings, as well as comments from the regional associations regarding "condition of use." See the Committee's 2008 Final Report for details.

At the 2009 Interim and Annual Meeting, the Committee heard concerns indicating that the alternative changes to the code considered thus far are considered overly restrictive by some and insufficient by others. See Item 331-2 in the Committee's 2009 Interim and Final Reports for additional background information.

At their spring 2009 meetings, the CWMA and NEWMA, and SWMA at its fall 2009 meeting, heard no comments on the item; these regions did not take a position on the item and recommended it remain an Information item. At its fall 2009 meeting, the CWMA heard a comment from one jurisdiction in opposition of the item, but no other comments. At its fall 2009 meeting, NEWMA offered the following additional comments:

- A problem exists where businesses deliver gross/net from the same vehicle (e.g., different states with different requirements).

- This item is device focused but should be customer focused.

At its fall 2009 meeting, the WWMA also recommended this remain an Information item, commenting that use of an ATC device should be linked to the customer, not the business location, because it appears that the way the

section is currently written, all customers would be required to receive compensated deliveries where ATC is not required or desired.

The WWMA also received written comments from Andrea Martincic, Executive Director of the Arizona Petroleum Marketers Association. At the request of Ms. Martincic, these comments were entered directly into the WWMA final report as submitted:

> "Still presents a problem for jobbers/distributors operating in multiple states. Could S&T somehow tie it to the customer—so there must be consistency of ATC usage for those customers sold product ATC through VTMs?"

The WWMA heard comments reiterating concerns about how the current proposed language in paragraph UR.2.5.2.1. would apply in instances where a single VTM is used to make both retail and wholesale deliveries, both in jurisdictions where ATC is permitted and in jurisdictions where ATC is prohibited.

The WWMA believes this language is not yet ready for adoption and encourages further refinement to address the concerns noted above.

At its 2010 Interim Meeting, the Committee continued to hear comments both in opposition and support of proposed changes; however, even those in support of proposed changes agreed that additional work is needed to develop acceptable language. Mr. Andersen, New York, commented that the user requirement should be "customer driven" rather than "device driven." Mr. Tim Tyson, Kansas, opposed the proposed language, noting that they have instances where owners dedicate a device to serving a single customer. Others questioned how the language would apply to devices used in multiple jurisdictions. Mr. Keilty, Endress and Hauser, expressed support for the item. The use of the term "business location" was questioned, with some suggesting that a definition is needed to clarify instances such as businesses having different branches. NIST WMD commented that additional work is needed to develop language that provides jurisdictions with a tool to control inappropriate use, but does not unnecessarily restrict businesses. Ms. Martinsic, Arizona Petroleum Marketers, noted that there is already a prohibition from switching from ATC to non-ATC when the seasons change and perhaps those provisions in paragraphs UR.2.5.1. and UR.2.5.2. would address the concerns raised in conjunction with this item.

The Committee has heard multiple variations of proposed language; however, none of the proposals appears to be close to solving the problems originally identified (see the initial paragraph of this Background/Discussion). The Committee believes that further development is needed before this issue is ready for action at the national level. This item was originally part of a larger item addressing the use of ATC on VTMs. Since this item was created by the Committee following deliberations on a larger issue, the Committee did not think it appropriate to return it to a particular regional Weights and Measures association. Consequently, the Committee is Withdrawing this item, but is receptive to reconsidering the issue if it is further developed. If the proposal is to be resubmitted, the Committee suggests for future reference that the following points (based on comments heard by the Committee on this issue) be considered and addressed in any proposed language before resubmitting the item:

- Include a definition of "business location." For example, how does the term apply to a business with multiple locations? A business with a service station and VTMs and loading racks?

- Consider how any proposed language will apply to businesses that operate in multiple jurisdictions.

- Consider whether exceptions should be made to the requirement. For example, should a business be permitted to dedicate a VTM not using ATC to servicing a single customer, while allowing its other VTMs to operate with ATC? If so, what restrictions should apply such as approval by the Weights and Measures authority? What other conditions would apply to the exception?

- Consider whether any proposed language could be directed to the seller (and/or user) instead of the device.

In discussing this issue during its work session, the Committee developed the following language. The Committee was not confident that this alternative would address the range of comments heard and believes additional work is

still needed; however, the Committee is including it along with the above suggestions as a possible starting point for further development.

UR.2.5.1.3. Condition of Use. – When a person offers a specific fuel product(s) for sale on the basis of a temperature-compensated volume, all vehicle-tank meters dispensing that product(s) shall have active automatic temperature compensation and all fuel products offered for sale shall be dispensed on the basis of temperature-compensated volume.

Exceptions to this requirement are permitted through written agreements between the specific buyer(s) and person(s) offering the product for sale with the approval of the jurisdiction with statutory authority.

336 WATER METERS

336-1 W N.3. Test Drafts and N.4. Testing Procedures

(This item was withdrawn.)

Source: 2009 Carryover Item 336-3. This item originated from the Southern and Western Weights and Measures Associations (SWMA and WWMA).

Purpose: To increase the test draft size for water meters to reduce the impact of uncertainties contributed by the test process.

Item Considered: The proposed language to modify requirements for test draft size may be viewed in the Committee's 2009 Interim and Final Reports.

Key Points Considered by the Committee:

- The WWMA forwarded several proposals (see Itens 336-2 and 336-3) to the Committee as alternatives to consider.
- Water meter manufacturers and regionals agree that this item should be Withdrawn in favor of those alternatives.

Background/Discussion: At its fall 2007 meeting, the SWMA received a proposal from a meter manufacturer with two options for modifying Section 3.36. The proposals were intended to address concerns regarding the impact of uncertainties contributed by the test process during repeatability testing by increasing the test draft size specified in the code.

Many in the community expressed support for modifying the test draft criteria in some fashion and industry and Weights and Measures officials submitted data to support some change; however, the Committee was unable to get agreement for the specific changes suggested in the proposal during its review of the proposal in 2007, 2008, and 2009.

During the Committee's 2009 Annual Meeting work session, Ms. Kristin Macey, representing CA DMS, and the water meter manufacturers present agreed to work to further review requirements for water meter testing with the goal of identifying changes or modifications to the scope of this item (336-1) in time for review by one or more of the fall 2009 regional Weights and Measures associations.

See the 2007, 2008, and 2009 S&T Committee Final Reports for additional details and background information on this issue.

At its fall 2009 meeting, the WWMA heard comments from Mr. Ed Williams, Director, CA DMS, regarding water meter compliance in California and referencing testing that has been conducted at the State and county level. Mr. Williams reported that the compliance level for both type evaluation testing and routine field testing at the county

level has been comparatively high, even after the addition of the specific repeatability tolerance to the Water Meters Code. Mr. Williams provided a written copy of these comments to the WWMA; that document is included in Appendix A to this agenda.

The WWMA heard from Mr. George DeJarlais on behalf of five water meter manufacturers including Badger Meter, Neptune Technology Group, Master Meter, Elster-AMCO, and Sensus Metering Systems that there is an inadequate draft size in HB 44 for 1½ in and 2 in size meters and there is inequity in test draft sizes in Table N.4.2. between the 5 gal and corresponding one cubic foot drafts. Since the 2008 WWMA Meeting, significant data has been submitted by the device manufacturers and CA DMS. In light of this data, Mr. DeJarlais stated that eight new proposals were submitted to the WWMA that represent alternatives to the proposals in Item 336-1, several of which would incorporate the changes proposed in this item. Mr. DeJarlais also stated that the type evaluation compliance rate was somewhat misleading because it involves only four meter product lines that have passed type evaluation since 2002. In the meantime, some manufacturers have deferred submitting meters for evaluation until some of the HB 44 issues are resolved.

The WWMA S&T Committee was advised by Mr. DeJarlais that the eight new proposals were submitted as multiple alternatives for solving the three concerns identified by the water meter manufacturers: (1) accuracy test drafts for 1½ in and 2 in meters; (2) gallon test drafts for meters 1 in size; and (3) accuracy test drafts with respect to repeatability requirements. After reviewing all eight proposals and considering the original proposal in this item (336-1), the WWMA recommended that this item be Withdrawn and forwarded two new proposals (as outlined in Items 336-2 and 336-3 of this agenda) to the NCWM S&T Committee for consideration.

At its fall 2009 meeting, the CWMA requested comments on this item; however, hearing none, the CWMA recommended that the item remain an Information item.

At its fall 2009 meeting, NEWMA recommended withdrawing this item until a solid proposal can be made.

At its fall 2009 meeting, the SWMA recommended withdrawing this proposal in favor of supporting two alternate related proposals, developed at the September 2009 WWMA Meeting (outlined in Items 336-2 and336-3 in this agenda).

At the 2010 NCWM Interim Meeting, the Committee heard support from Mr. Jeff Humphreys, Los Angeles County California; Mr. DeJarlais (representing five water meter manufacturers); and NIST WMD for withdrawing this item in favor of alternative proposals presented in Items 336-2 and 336-3. Consequently, the Committee decided to Withdraw this item from its agenda.

336-2 VC N.4.2 Special Tests.

(This item was adopted.)

Source: WWMA

Purpose: To reduce the impact of uncertainties contributed by the test process by increasing the test draft size for special tests of Utility Type Water meters.

Item Under Consideration: Modify paragraph N.4.2. Special Tests and Table N.4.2. and add a new table N.4.2.b. as follows:

N.4.2. Special Tests. – Special tests to develop the operating characteristics of meters may be made according to the rates and quantities shown in Table N.4.2.a. Flow Rate and Draft Size for Water Meters Special Tests **and Table N.4.2.b. Flow Rate and Draft Size for Utility Type Water Meters Special Tests.**

(Amended 2003 **and 2010**)

Table N.4.2.a. Flow Rate and Draft Size for Batching Water Meters Special Tests						
Meter Size (inches)	**Intermediate Rate**			**Minimum Rate**		
	Rate of Flow (gal/min)	**Meter Indication/Test Draft**		**Rate of Flow (gal/min)**	**Meter Indication/Test Draft**	
		gal	**ft^3**		**gal**	**ft^3**
Less than or equal to 5/8	**2**	**10**	**1**	**¼**	**5**	**1**
¾	**3**	**10**	**1**	**½**	**5**	**1**
1	**4**	**10**	**1**	**¾**	**5**	**1**
1½	**8**	**50**	**5**	**1½**	**10**	**1**
2	**15**	**50**	**5**	**2**	**10**	**1**
3	**20**	**50**	**5**	**4**	**10**	**1**
4	**40**	**100**	**10**	**7**	**50**	**5**
6	**60**	**100**	**10**	**12**	**50**	**5**

(Table Added 2003) **(Amended 2010)**

Table N.4.2.b. **Flow Rate and Draft Size for Utility Type Water Meters Special Tests**						
Meter Size (inches)	**Intermediate Rate**			**Minimum Rate**		
	Rate of Flow (gal/min)	**Meter Indication/Test Draft**		**Rate of Flow (gal/min)**	**Meter Indication/Test Draft**	
		gal	**ft^3**		**gal**	**ft^3**
Less than 5/8	**2**	**10**	**1**	**¼**	**5**	**1**
5/8	**2**	**10**	**1**	**¼**	**5**	**1**
5/8 x ¾	**2**	**10**	**1**	**¼**	**5**	**1**
¾	**3**	**10**	**1**	**½**	**5**	**1**
1	**4**	**10**	**1**	**¾**	**5**	**1**
1½	**8**	**100**	**10**	**1½**	**100**	**10**
2	**15**	**100**	**10**	**2**	**100**	**10**

(Table Added 2010)

Key Points Considered by the Committee:

- Test draft sizes currently specified in paragraph N.4.2. are equal to less than one complete revolution on the meter indicator for certain types of meters, which may introduce additional uncertainty into the test process.
- Manufacturers are concerned that the additional uncertainty contributed to the test process is resulting in a high number of meter failures, particularly when repeatability testing is conducted.
- Five water meter manufacturers submitted test data to illustrate their concerns (see S&T Final Reports 2007 - 2009).
- Possible approaches to address this gap are to increase the test draft size to ensure a full revolution, modify the minimum increment of the indicator, and/or modify the tolerances.
- The increased test draft size for the 1½ in and 2 in meters are not expected to significantly impact routine field testing since most jurisdictions routinely using the code only test smaller meters.
- The State of California and a number of California county jurisdictions worked to collect data to validate the proposed changes.

Background/Discussion: The WWMA heard from Mr. Andre Noel, Neptune Technology Group, representing five water meter manufacturers. The meter manufacturers state that meters 1½ in and 2 in size are guaranteed to fail type evaluation "N.4.2. Special Tests" because of inadequate test draft sizes. The test draft size only represents ten graduations on the proving indicator, which is only one-tenth of a revolution on proving indicators found on most water meters with analog dial type indicators. This results in larger meter uncertainties.

The WWMA heard that field testing to verify compliance with "N.4.2. Special Test" requirements of 1½ in and 2 in meters seldom occur in California. However, these tests are performed on meters submitted for evaluation by the California Type Evaluation Program laboratory resulting in frequent failures. The WWMA recognizes that the current draft sizes are inadequate to obtain valid test results. Increasing the test draft size in this case would not create undue hardship during field testing, since field tests are not being conducted on a routine basis.

The WWMA also received a comment regarding the consistent use of words describing non-utility, batch-type, and batching type meters. The WWMA suggests that the term "batching meters" be used throughout this code. The WWMA also recognized the need for including the $^{5}/_{8}$ in x ¾ in size meter, which is commonly found in commercial sub-metering applications.

The WWMA recommended this item be forwarded to the S&T Committee for a vote and recognized that this item and Item 336-3 represent alternative proposals to Item 336-1.

At its fall 2009 meeting, the CWMA heard no comments on this item and recommended it be maintained as an Information item.

At its fall 2009 meeting, the SWMA supported the WWMA in its proposed modifications to Table N.4.2. to address the flow rates and test draft sizes for special tests of batching meters. The SWMA also supported the WWMA's including a new "Special Test" to address the flow rates and test draft sizes for special tests of utility type water meters. The SWMA acknowledged the change in flow rates and test drafts for special tests of utility type water meters are needed to address the operating characteristics of these meters. Since tests are conducted on an infrequent basis, the increase in the test draft sizes as proposed in new "Special Test" Table would not create undue hardship for a jurisdiction. The SWMA also recognizes the proposed new "Special Test" Table now addresses meter sizes in actual use that were not previously addressed in the code. The SWMA relies on the experience and expertise of the WWMA in the regulation this technology. Consequently, the SWMA recommends this proposal be included as a Voting item on the NCWM S&T's 2010 agenda.

At the 2010 Interim Meeting, the Committee heard support for this item from Mr. Noel, Neptune Technologies, on behalf of five water meter manufacturers. Mr. Ed Williams, California, also supported the item. The Committee modified the proposal to: (1) correctly reference the original and the proposed new table in paragraph N.4.2.; and (2) change the title of the two tables to Table N.4.2.a. and N.4.2.b. to correspond to the referring paragraph.

Hearing no opposition to the proposed changes, the Committee recommended that this item move forward as a Voting item with the changes to the titles of the table noted above.

During the open hearing at the 2010 NCWM Annual Meeting, the Committee received support from water meter manufacturers Badger, Sensus, Neptune, Elster Amco, and Master Meter. Mr. Williams, California, also supported this item. The Committee heard no comments opposing the item.

336-3 VC T.1.1. Repeatability.

(This item was adopted.)

Source: WWMA

Purpose: To return the tolerances for repeatability tests of water meters to the values specified prior to 2003 for water meters (and many other measuring devices) in the General Code in an effort to reduce the impact of uncertainties contributed by the test process.

Item Under Consideration: Modify paragraph T.1.1. Repeatability as follows:

T.1.1. Repeatability. - When multiple tests are conducted at approximately the same flow rate, ~~**the range of the test results shall not exceed 0.6 % for tests performed at the normal and intermediate flow rates, and 1.3 % for tests performed at the minimum flow rate, and**~~ each test shall be within the applicable tolerance**s and the range of test results shall not exceed the following values:**

	Batching Meters	**Utility-Type Meters**
Normal Flow Rates	**0.6 %**	**0.6 %**
Intermediate Flow Rates	**0.6 %**	**2.0 %**
Minimum Flow Rate	**1.3 %**	**4.0 %**

(Added 2002) **(Amended 2011)**

Key Points Considered by the Committee:

- Prior to 2003, water meters were held to repeatability requirements specified in the General Code paragraph G-S.5.4. Repeatability of Indications " . . . repeating within prescribed tolerances. . . ."

- In 2003, requirements were added to multiple measuring codes to require that measuring devices repeat to within 40 % of the absolute value of maintenance tolerance. For the water meters code, the tolerance for the range of results was calculated and expressed as a percent value (0.6 %).

- The impact of how the 2003 changes would impact water meters may not have been fully analyzed.

- Testing to the 2003 requirements resulted in test draft sizes that are less than a full revolution of the meter indicator, thus contributing additional uncertainty to the test process.

- Manufacturers report that the higher degree of uncertainty results in overly restrictive tolerances, particularly at the intermediate and minimum flow rates, and they submitted test data to illustrate their concerns (see S&T Final Reports 2007 - 2009).

- Alternatives to overcome this problem are to return the repeatability tolerances to the pre-2003 levels and/or increase the test draft size to minimize uncertainties in the test process.

- Some suggested restricting repeatability requirements to only type evaluation. However, this would eliminate a key tool for Weights and Measures officials to use in assessing the condition of a meter and its continued suitability for a given field application.

- The tolerances proposed in this recommendation are more closely in alignment with pre-2003 tolerances.

- The State of California and a number of California county jurisdictions worked to collect data to validate the proposed changes.

Background/Discussion: This item and Item 336-2 represent an alternative proposal to Withdrawn Item 336-1. The WWMA heard from Mr. DeJarlais, with Badger Meter, representing a group of five water meter manufacturers. One of the primary concerns of the manufacturers is the inability of meters to pass repeatability requirements during type evaluation testing. Based upon the data collected by the State of California and multiple California counties, the WWMA noted that three separate ranges of repeatability are appropriate for the maximum, intermediate, and minimum flow rates when current HB 44 test draft sizes are used. The WWMA also noted that an increase to the accuracy range of the test results performed at the intermediate and minimum flow was warranted, notwithstanding the requirement for each test to be within the applicable tolerance. The WWMA recommended this item be forwarded to the S&T Committee for a vote.

At its fall 2009 meeting, the CWMA heard no comments on this item and recommended it be maintained as an Information item.

At its fall 2009 meeting, the SWMA heard from Mr. Andre Noel (Neptune Technology) about the primary concerns of the manufacturers over the inability of meters to pass repeatability requirements during type evaluation testing. Mr. Noel indicated that the data collected by the State of California and multiple California counties support the proposed new ranges of repeatability tolerances for the maximum, intermediate, and minimum flow rates when current HB 44 test draft sizes are used. The SWMA relies on the experience and expertise of the WWMA in the regulation this technology. Consequently, the SWMA recommended this proposal be included as a Voting item on the NCWM S&T's 2010 agenda.

At the 2010 Interim Meeting, the Committee heard comments from industry and regulatory officials supporting this item and, consequently, recommended that it move forward as a Voting item.

During the open hearing at the 2010 NCWM Annual Meeting, the Committee received support from water meter manufacturers Badger, Sensus, Neptune, Elster Amco, and Master Meter. Mr. Williams, California, also supported this item. Mr. Henry Oppermann, W&M Consulting, submitted a preliminary analysis on the data collected by California and noted large variations in some of the test results. Mr. Oppermann noted no objection to the proposed change; however, he believes a better understanding is needed of the source of variations, particularly the relatively large variation in test results among weights and measures officials' tests. The source of the variations may be a result of more than just resolution and test draft size. NIST WMD reported hearing some concerns expressed regarding the use of wide-neck proving equipment on some water meter test benches, noting that such provers can provide much larger variability in the test results than the narrow neck provers. The Committee heard no comments opposing the item.

360 OTHER ITEMS

360-1 V Tentative Code for Hydrogen Gas-Measuring Devices.

(This item was adopted.)

Source: WWMA and SWMA

Purpose: To provide the U.S. Weights and Measures community (manufacturers, users, and Weights and Measures officials) with legal metrology requirements to address gaseous hydrogen refueling dispensers already in operation in 24 states.

Item Under Consideration: Adopt the proposed Section 3.39. Hydrogen Gas-Measuring Devices Code outlined in Appendix B as a tentative code in HB 44.

Key Points Considered by the Committee:

- The USNWG for the Development of Commercial Hydrogen Measurement Standards (USNWG) (which developed and submitted the draft code to the regional Weights and Measures associations) is comprised of key stakeholders and experts in commercial hydrogen measurement, including manufacturers and users of commercial hydrogen measuring equipment, suppliers of hydrogen, and regulatory officials.

- The proposed tentative status of the code is expected to allow valuable feedback on how well the draft meets the needs of the measurement community in a broader number of applications.

- Additional changes can be proposed to the code prior to the time that it is recommended for "permanent" status.

- The proposed tolerances are recommended based on an assessment of the range of accuracy levels reported thus far, but will require additional validation.

- Additional work is needed to define additional testing approaches, although the USNWG has a draft test procedure for one of three test methods and is confident that additional procedures will follow.

- NIST WMD is working to conduct uncertainty analyses of the various testing methods being considered to provide the USNWG with information regarding the feasibility of each. NIST anticipates that this information will also be useful in assessing the feasibility of the proposed tolerances.

Background/Discussion: The USNWG for the Development of Commercial Hydrogen Measurement Standards recommends changing the status of the NCWM S&T Committee Developing Item proposing a new hydrogen gas code from Developing to Voting. Draft 5.0 of the proposed new NIST HB 44 Section 3.39. Hydrogen Gas-Measuring Devices Code was distributed to the four regional Weights and Measures associations in September 2009 for consideration. Note that a corresponding recommendation that proposes including hydrogen fuel quality and method of sale requirements in NIST HB 130 "Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality" (HB 130) was also submitted to the four regional Weights and Measures association Laws and Regulations (L&R) Committees.

The USNWG made the recommendation to upgrade the status of the proposal as a result of 22 months of work to ready the draft code language for national approval and adoption. The USNWG will be collecting additional data in the coming months to confirm that the proposed tolerances are adequate and fair given today's hydrogen technology and the test equipment available. These tolerances are derived from performance requirements in use for similar compressed gas applications in HB 44 and OIML R 139 "Compressed gaseous fuel measuring systems for vehicles." The USNWG will update the Weights and Measures community on its findings in the event that the proposed tolerances for these systems require further refinement.

As additional justification, the USNWG notes that the proposed new hydrogen code provides the U.S. Weights and Measures community with legal metrology requirements to address gaseous hydrogen refueling dispensers already in operation in twenty-four states. Thirty additional stationary and mobile refueling systems are in the planning stages. Existing requirements for other compressed gas refueling applications, primarily compressed natural gas (CNG), were the starting point for many hydrogen standards. CNG requirements are not entirely suitable for some of the unique features of hydrogen gas dispensers (e.g., product density). While some jurisdictions feel it is premature for hydrogen requirements because there are limited refueling stations, the USNWG feels that this is the ideal time to set the stage for Weights and Measures requirements. The hydrogen community is looking to the Weights and Measures community for their expertise, and this is the opportunity to be involved in the early stages of the development of commercial measurement standards that was not possible with CNG.

The United States has the largest number of hydrogen refueling dispensers worldwide. By taking the lead in developing appropriate requirements for this growing alternative fuel technology, the United States can fill a critical gap in the hydrogen infrastructure and can move closer to its goal for a clean fuel source and independence from imported energy.

The USNWG members represent: 1) federal and state government; 2) dispenser, meter, and related component manufacturers; 3) fuel providers; 4) fuel partnerships; 5) fuel quality administrators; 6) related standards organizations; and 7) type evaluation and research and development laboratories. The USNWG is recommending design, performance, installation, and use requirements for hydrogen dispensers based on its experience with compressed gas delivery systems and hydrogen's properties and measurement technology. The draft code is the first phase of a five-year project, which starts with a tentative code. The tentative code is necessary for providing guidelines to device manufacturers and, once finalized, will be the basis for test procedures, type evaluation criteria, and eventual training of industry and field officials.

The ongoing work to develop the hydrogen code has been documented and is under review through posting on the websites:

1. http://www.fuelcellstandards.com/ tracks over 200 hydrogen and fuel cell standards;

2. http://ts.nist.gov/WeightsAndMeasures/Developing-Commercial-Hydrogen-Measurement-Standards.cfm a NIST WMD outreach project providing the latest updates on work to develop legal metrology requirements for hydrogen measurement; and

3. http://www.hydrogenandfuelcellsafety.info/ lists updates on the latest USNWG work reported to the National Hydrogen Fuel Cell Codes and Standards Coordinating Committee (NHFCCSCC). The committee is sponsored by U.S. Department of Energy (DOE), U.S. Fuel Cell Council, and National Hydrogen Association and is chartered with coordinating the development of hydrogen codes and standards to harmonize national and international codes. The NHFCCSCC fosters this collaborative effort between industry and government to encourage sharing of information, avoiding duplication, and to ensure all essential elements are in place for a safe, cost effective, and viable commercial program.

The USNWG work on these requirements has been reported in detail in multiple outreach projects such as the:

1. Weights and Measures Quarterly news article series on "Hydrogen, What's Next?" a NIST WMD technical news publication distributed to the Weights and Measures community.

2. Open hearings of the 2008 and 2009 meetings of the National Conference on Weights and Measures, S&T and L&R Committees, and Meter Manufacturers Association Meetings.

3. Three U.S. Weights and Measures Administrators' Workshops on Commercial Hydrogen Measurement.

4. Two regional Weights and Measures association technical training seminars on Commercial Hydrogen Measurement, which like the workshop, were sponsored in part by the DOE and NIST to familiarize Weights and Measures officials with the latest developments in the operation, performance, and safety of hydrogen refueling technology.

The work to fully develop the new hydrogen infrastructure included representation and input from affected sectors, including Weights and Measures officials and equipment manufacturers and operators. This is an opportunity to influence the direction of the work prior to commercialization of this application. This work represents a unique and collaborative effort.

The USNWG initially focused its efforts on the development of requirements for retail refueling dispensers. As discussions and work progressed, the USNWG discussed at what point to address wholesale applications. The USNWG is aware that other measuring device codes address wholesale applications, but does not agree, as some have suggested, that the code should wait until some later date to address wholesale applications. The USNWG agreed that retail dispensers have the more immediate need for marketplace standards. The USNWG has begun to consider code language to address both retail and wholesale devices.

The USNWG reported working to provide guidance documents and training that are necessary for the start-up and implementation of a hydrogen device inspection and test program. The USNWG is examining the resources necessary to test hydrogen refueling equipment and has, with the assistance of California's Division of Measurement Standards, created an equipment list with an estimated average cost for a test standard of $111,000.

Jurisdictions may rely on the provisions of HB 44 General Code paragraph G-UR.4.4. Assistance in Testing Operations to ensure suitable test equipment is available. The USNWG is also considering the incorporation of User Requirements which would provide more specific equipment and assistance requirements that apply to the official test, such as those specified in paragraph UR.3.8. Return of Product to Storage, Retail Compressed Natural Gas Dispensers in the Mass Flow Meters Code. It should be noted that the USNWG and CSA/HGV 4.3 Temperature Compensation Devices for Hydrogen Gas Dispensing Systems Work Group are exploring the advantages of cost sharing a single test standard for use to test for over pressurization and over-heating as well as for the accuracy of the delivery system.

The USNWG anticipates input from both the Weights and Measures and hydrogen communities in support of the proposed code during the regional fall meetings.

At the fall 2009 meeting, the CWMA recommended changing the status of the Developing Item on the S&T Committee's agenda to a Voting item, proposing the adoption of a tentative code in HB 44 to address gaseous hydrogen refueling applications.

At its fall 2009 meeting, NEWMA stated that, if an EPO has been developed and all safety considerations have been addressed then NEWMA supports as Voting. Otherwise, NEWMA supports the proposal as an Information item. NEWMA offered the following additional points and questions to address in considering this proposal:

- Is there an urgency to move this from developing to Voting? Why not move to Information first?
- An EPO should be developed before this goes for a vote.
- What equipment will be necessary for testing?
- Are there any safety considerations?
- This is very new for Weights and Measures inspectors.
- Should a hydrogen specification chart be included as part of the code or in the EPO?

At its fall 2009 meeting, the WWMA heard from Ms. Macey, California DMS, and Chair of the USNWG on Hydrogen Device Standards Subcommittee, about the necessity for a tentative hydrogen gas-measuring device code to further the development of a retail infrastructure for commercial hydrogen as a motor fuel. There are eighteen states where hydrogen stations are under current operations. Ms. Macey urged state directors at the WWMA meeting to visit and learn more about these sites and provide written and/or oral support at upcoming NCWM meetings. The WWMA recommends this as a Voting item and also encourages the collection of data in the coming months to validate the proposed tolerances and test notes.

At its fall 2009 meeting, the SWMA supported the USNWG's proposal for a new Section 3.39 Hydrogen Gas-Measuring Devices Code and recommends the proposal move forward for adoption as a tentative code. The SWMA S&T Committee recommends the USNWG consider the comments made during its open hearing session and all other comments made at the fall 2009 regional Weights and Measures association meetings as it prepares the final draft of the hydrogen code for consideration at the January 2010 NCWM.

The USNWG met December 15, 2009, and January 13, 2010, to review and develop a position on the comments it received on the draft code. The USNWG responses to those comments and any updates to the draft code are posted on the website http://ts.nist.gov/WeightsAndMeasures/Developing-Commercial-Hydrogen-Measurement-Standards.cfm and made available to all interested parties. The USNWG notes that the WG agreed in October 2007 to simultaneously develop a device code and corresponding test procedures. Currently, the USNWG has a draft examination procedure outline (EPO 29) under review for the gravimetric test method to include safety guidelines.

At the 2010 Interim Meeting, Ms. Juana Williams, NIST WMD, provided the Committee with an update on the progress of the USNWG. She noted some editorial corrections to eliminate strikethrough in a few places. She also expressed appreciation to the DOE for supporting the work of the USNWG. Ms. Williams also commented that, if adopted as a tentative code, this would allow the United States, which leads the world in the number of hydrogen refueling stations, to move ahead with full implementation. She also provided the committee with a copy of her comments in writing for reference during the Committee's review of the item.

Mr. Keilty, Endress and Hauser, a USNWG member, also expressed support for this item, noting that it is important for the code to move ahead and indicating that the various interests represented on the work group are working together to finalize any outstanding issues.

Mr. Williams, California DMS, also expressed support for recommending the code for a vote as a tentative code.

The Committee agreed to recommend that this item move forward for a Vote based on the input heard at its open hearings and information from the USNWG indicating that work on several outstanding points is anticipated to be finalized by the July 2010 meeting.

At their spring 2010 Annual Meetings, NEWMA and the CWMA supported the adoption of the tentative code.

At the July 2010 NCWM Annual Meeting, NIST WMD suggested that in considering adoption of the tentative code, the Committee consider the addition of a new paragraph A.4. Type Evaluation to the tentative code. WMD also noted that a new paragraph might be added to the Mass Flow Meters Code to refer hydrogen gas-measuring devices to the new Hydrogen-Gas Measuring Devices Code.

The Committee also received recommendations from the USNWG for the Development of Commercial Hydrogen Measurement Standards to consider for a vote its latest draft of the tentative code, Draft 6.0, which represents USNWG modifications to the code since January 2010.

The USNWG met in January, April, May, June, and July 2010 to work through comments received on the draft code from the U.S. regional weights and measures associations and USNWG members. At the 2010 NCWM, the USNWG provided the Committee and NCWM members with a summary of its responses to 21 of 25 comments on the code to include: 1) a single page identifying recent modifications to the code; 2) Draft 6.0 of the hydrogen code (July 2010 version); 3) Draft Guideline for the Gravimetric Test Method; and 4) Draft Test Report for the Gravimetric Test Method. The Committee also agreed to further modifications to proposed Draft 6.0 of the code based on recommendations submitted from NIST WMD and Mr. Keilty (Endress-Hauser) during the July 2010 Annual Meeting. The Committee incorporated all of the modifications shown below into a final proposal of the Hydrogen Gas-Measuring Devices Code.

The USNWG noted that a tentative code is needed as a starting point for inspection and test procedures of these devices in the 2011 edition of HB44. These requirements are designed for study prior to the development and adoption of a final code. Rapid commercialization of hydrogen gas dispensers (stationary and mobile) may be anticipated before the USNWG has completed its work in 2012.

During the July 2010 open hearing session, the Committee received support for the proposed code from California's Division of Measurement Standards, Micro Motion, Inc., and NIST WMD (with modifications noted below). The Committee also received correspondence in support of the code from the U.S. Fuel Cell Council, Van Putten-Blue Energy Observatories Inc., the California Fuel Cell Partnership, Daimler, and Endress Hauser (with modifications noted below). The Committee recommended that this final draft (which includes the changes outlined below) as shown in Appendix B, move forward for a vote and adoption as a tentative code.

The USNWG and Committee modifications along with rationale for the changes proposed by the Committee are shown in the following two tables.

Draft 5.0 Proposed Hydrogen Gas-Measuring Devices - Tentative Code	**Draft 6.0 Proposed Hydrogen Gas-Measuring Devices - Tentative Code**
Rationale for Code Modification	
A.2. This code does not apply to: (a) devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges. (b) the wholesale delivery of hydrogen gas	**A.2.** This code does not apply to: (a)….. (b)….. **<u>(c) Devices used for dispensing a hydrogen gas with a hydrogen fuel index lower than 99.97 percent and concentrations of specified impurities that exceed level limits.</u>**
The Committee discussed the USNWG's decision to revisit its earlier decision to remove from paragraph S.3.4. examples of factors that affect changes in density. Eliminating the examples in this paragraph resulted in some	

Draft 5.0 Proposed Hydrogen Gas-Measuring Devices - Tentative Code	Draft 6.0 Proposed Hydrogen Gas-Measuring Devices - Tentative Code
Rationale for Code Modification	
inconsistencies with corresponding requirements in NIST HB 44 3.37 Mass Flow Meters Code for volume-measuring devices that indicate in mass. The USNWG recognized that the factors that affect measurement accuracy vary across technologies. However, hydrogen gas used for fuel cell vehicle refueling is limited to 300 ppm impurities. Similar to the product applications addressed in 3.34 Cryogenic Code, this code is intended to apply to homogeneous products and it should not be applied to deliveries of hydrogen blended products where automatic correction for variations in composition are required. Consequently, the USNWG included a new subparagraph (c) which specifies that the product application for these systems are intended to measure. The Committee agreed this modification should move forward for adoption.	
S.1.3.2. Numerical Value of Quantity-Value Divisions. - The value of a scale interval shall be equal to:	**S.1.3.2. Numerical Value of Quantity-Value Divisions. -** The value of a**n** ~~**scale**~~ interval **(i.e., increment or scale division)** shall be equal to:
The Committee agreed with the USNWG's decision to modify paragraph S.1.3.2. in response to a request for clarification of the term "scale interval." The term "scale" was deleted from the text and examples were added to paragraph S.1.3.2. to clarify that the value of an "interval" shall have a numerical value that is the difference between two successive mass units (indicated or recorded).	
S.2.3. Nonresettable Indicator. - A device may also be equipped with a nonresettable indicator if the indicated values cannot be construed to be the indicated values of the resettable indicator for a delivered quantity.	~~**S.2.3. Nonresettable Indicator. - A device may also be equipped with a nonresettable indicator if the indicated values cannot be construed to be the indicated values of the resettable indicator for a delivered quantity.**~~ Renumber subsequent paragraph S.2.4. through S.2.8. to S.2.3. through S.2.7.
The Committee agreed with the USNWG's decision to delete paragraph S.2.3. because of the confusion with paragraph S.7. which is the requirement for a nonresettable totalizer.	
T.4. Tolerance Application. **T.4.1. Type Evaluation Examinations for Devices. -** For type evaluation examinations, the tolerance values shall apply under the following conditions: (a) at any temperature and pressure within the operating range of the device; and (b) for all quantities greater than the minimum measured quantity. **T.4.2 Transfer Standard Test Method. -** To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.	~~**T.4. Tolerance Application.**~~ **T.~~4.1.~~5 Tolerance Application in Type Evaluation Examinations for Devices. -** For type evaluation examinations, the tolerance values shall apply under the following conditions: **(**a) at any temperature and pressure within the operating range of the device; and (b) for all quantities greater than the minimum measured quantity. **T.~~4.2~~. Tolerance Application on Test Using the Transfer Standard Test Method. -** To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

Draft 5.0 Proposed Hydrogen Gas-Measuring Devices - Tentative Code	Draft 6.0 Proposed Hydrogen Gas-Measuring Devices - Tentative Code
Rationale for Code Modification	
The Committee agreed with the USNWG's modification to rework paragraphs, T.4., T.4.1., and T.4.2. to clarify which requirements apply to type evaluation.	
UR.3. Use of Device. **UR.3.1. Unit Price and Product Identity for Retail Dispensers. -** The unit price at which the dispenser is set to compute shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale. **UR.3.2. Ticket Printer; Customer Ticket. -** Vehicle-mounted measuring systems shall be equipped with a ticket printer which shall be used for all sales where product is delivered through the device. A copy of the ticket issued by the device shall be left with the customer at the time of delivery or as otherwise specified by the customer. **UR.3.3. Printed Ticket. -** The total price, the total quantity of the delivery, and the price per unit shall be printed on any ticket issued by a device of the computing type and containing any one of these values. **UR.3.4. Ticket in Printing Device, Vehicle-Mounted Measuring Systems. -** A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare. **UR.3.5. Steps After Dispensing. - …** **.** **.** **.** **UR.3.8. Conversion Factors. …**	**UR.3. Use of Device.** **UR.3.1. Unit Price and Product Identity for Retail Dispensers. -** The unit price at which the dispenser is set to compute shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale. **UR.3.2. ~~Ticket Printer; Customer Ticket. -~~ Vehicle-mounted ~~m~~Measuring ~~s~~Systems Ticket Printer.** **UR.3.2.1. Customer Ticket. – Vehicle-mounted measuring systems** shall be equipped with a ticket printer which shall be used for all sales where product is delivered through the device. A copy of the ticket issued by the device shall be left with the customer at the time of delivery or as otherwise specified by the customer. **UR.3.2.2. Ticket in Printing Device. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.** **UR.3.3. Printed Ticket. -** The total price, the total quantity of the delivery, and the price per unit shall be printed on any ticket issued by a device of the computing type and containing any one of these values. **~~UR.3.4. Ticket in Printing Device, Vehicle-Mounted Measuring Systems. - A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.~~** Renumber subsequent paragraph UR.3.5. through UR.3.8. to UR.3.4. through UR.3.7.
The Committee agreed with the USNWG's modifications to paragraphs UR.3.5. through UR.3.8. which were regrouped and subsequently renumbered to include like requirements for vehicle-mounted measuring systems' ticket printers under the same paragraph designation.	

Modifications the Committee made to Draft 6.0 of the proposed code based on recommendations received from NIST WMD and Mr. Keilty are shown below:

Draft 6.0 of the Proposed Hydrogen Gas-Measuring Devices - Tentative Code	**July 2010 S&T Committee Changes Made to Draft 6.0 of the Proposed Hydrogen Gas-Measuring Devices -Tentative Code**
Rationale for Code Modification	
No Code Paragraph Existed	**Recommendation from WMD:** **A.4. Type Evaluation. –** NTEP will accept for type evaluation only those devices that comply with all requirements of this code.
The Committee agreed with the NIST WMD recommendation to include a new paragraph in the draft code to recognize systems submitted for type evaluation.	
A.2. This code does not apply to: (a) devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges. (b) the wholesale delivery of hydrogen gas (c) *(This a newly proposed paragraph shown in the previous table in the right column.)*	**Recommendation from Mr. Keilty:** **A.2.** This code does not apply to: (a)….. (b)….. (c)….. **(d) Systems that measure pressure, volume, and temperature with a calculating device to determine the mass of gas accumulated in or discharged from a tank of known volume.**
The Committee agreed with Mr. Keilty that a modification was needed to the USNWG's proposal for a new paragraph A.2.(d) to exclude pressure-volume-temperature (PVT) retail applications from the draft code. This new paragraph was included to specify that the code is not intended to address the uncertainties associated with PVT systems achieving temperature equilibrium. The Committee concurs with the USNWG that at some point the code can be revisited to recognize this technology when OEMs are ready to enter the marketplace and operate in commercial applications. In the interim period until the code includes appropriate requirements for PVT systems, officials should consider General Code paragraph G-A.3. Special and Unclassified Equipment when testing these systems. The Committee received and agreed with a recommendation from Mr. Keilty, Endress-Hauser, to further modify proposed new paragraph A.2.(d) to include the text "pressure, volume, and temperature with a calculating device to determine" to clarify the methodology that is used in PVT systems.	
S.3.4. Automatic Density Correction. - An automatic means to determine and correct for changes in product density shall be incorporated in any hydrogen gas-measuring system where measurements are affected by changes in the density of the product being measured.	**S.3.4. Automatic Density Correction.** (a) **An automatic means to determine and correct for changes in product density shall be incorporated in any hydrogen gas-measuring system where measurements are affected by changes in the density of the product being measured.** (b) **Volume-measuring devices with automatic temperature compensation used to measure hydrogen gas as a vehicle fuel shall be equipped with an automatic means to**

Draft 6.0 of the Proposed Hydrogen Gas-Measuring Devices - Tentative Code	July 2010 S&T Committee Changes Made to Draft 6.0 of the Proposed Hydrogen Gas-Measuring Devices -Tentative Code
Rationale for Code Modification	
	determine and correct for changes in product density due to changes in the temperature, pressure, and composition of the product.
The Committee agreed with a recommendation from Mr. Keilty, Endress Hauser, to add a new subparagraph S.3.4.(b) to specify the factors that can influence measurements in volume-measuring devices used to measure hydrogen gas. The Committee made one additional modification to Mr. Keilty's recommendation to delete the word "engine" because these devices are used to fuel both fuel cell and internal combustion engine vehicles.	

360-2 I International Organization of Legal Metrology (OIML) Report

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international groups are within the purview of the Committee. Additional information on OIML activities will appear in the Board of Directors agenda and Interim and Final Reports and on the OIML website at http://www.oiml.org. NIST WMD staff will provide the latest updates on OIML activities during the open hearing sessions at NCWM Meetings. For more information on specific OIML-related device activities, contact the WMD staff listed in the table below. The OIML projects listed below represent only currently active projects. For additional information on other OIML device activities that involve WMD staff, please contact WMD using the information listed below:

NIST Weights and Measures Division (WMD) Contact List for International Activities	
Contact Information	**Responsibilities**
Postal Mail and Fax for All Contacts:	NIST WMD 100 Bureau Drive MS 2600 Gaithersburg, MD 20899-2600 Tel: (301) 975-4004 Fax: (301) 975-8091
Mr. John Barton (LMDG) (301) 975-4002 john.barton@nist.gov	•R 21 "Taximeters" •R 50 "Continuous Totalizing Automatic Weighing Instruments (Belt Weighers)" •R 60 "Metrological Regulations for Load Cells" (jointly with Ken Butcher) •R 106 "Automatic Rail-weighbridges"
Mr. Kenneth Butcher (LMG) (301) 975-4859 kenneth.butcher@nist.gov	•D 1 "Elements for a Law on Metrology" •TC 3 "Metrological Control" •TC 3/SC 1 "Pattern Approval and Verification" •TC 3/SC 2 "Metrological Supervision" •TC 6 "Prepackaged Products" •R 60 "Metrological Regulations for Load Cells" (jointly with John Barton)
Mr. Steven Cook (LMDG) (301) 975-4003 steven.cook@nist.gov	•R 76 "Non-automatic Weighing Instruments"

NIST Weights and Measures Division (WMD) Contact List for International Activities	
Contact Information	**Responsibilities**
Dr. Charles Ehrlich (ILMG) (301) 975-4834 charles.ehrlich@nist.gov	•CIML Member for the United States •V1 "International vocabulary of terms in legal metrology (VIML)" •V2 "International vocabulary of basic and general terms in metrology (VIM)" •B3 "OIML Certificate System for Measuring Instruments" •B6 "OIML Directives for the Technical Work" •B 10 "Framework for a Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations" •TC 3/SC 5 "Expression of Uncertainty in Measurement in Legal Metrology Applications," "Guidelines for the Application of ISO/IEC 17025 to the Assessment of Laboratories Performing Type Evaluation Tests" •TC 3 "Metrological Control" •ISO/IEC Guide to the Expression of Uncertainty in Measurement"
Mr. Richard Harshman (LMDG) (301) 975-8107 richard.harshman@nist.gov	•R 51 "Automatic Catchweighing Instruments" •R 61 "Automatic Gravimetric Filling Instruments" •R 107 "Discontinuous Totalizing Automatic Weighing Instruments" (totalizing hopper weighers) •R 134 "Automatic Instruments for Weighing Road Vehicles In-Motion and Measuring Axle Loads"
Ms. Diane Lee (LMDG) (301) 975-4405 diane.lee@nist.gov	•R 59 "Moisture Meters for Cereal Grains and Oilseeds" •R 92 "Wood Moisture Meters – Verification Methods and Equipment" •R 121 "The Scale of Relative Humidity of Air Certified Against Saturated Salt Solution" •TC 17/SC 8 "Measuring Instruments for Protein Determination in Grains"
Mr. Ralph Richter (ILMG) (301) 975-3997 ralph.richter@nist.gov	•D 11 "General Requirements for Electronic Measuring Instruments" •R 35 "Material Measures of Length for General Use" •R 49 "Water Meters" (Cold Potable Water & Hot Water Meters) •R 71 "Fixed Storage Tanks" •R 80 "Road and Rail Tankers" (static measurement) •R 85 "Automatic Level Gauges for Measuring the Level of Liquid in Fixed Storage Tanks" •R 95 "Ship's Tanks" •R 117 "Measuring Systems for Liquids Other Than Water" (all measuring technologies) •R 118 "Testing Procedures and Test Report Format for Pattern Examination of Fuel Dispensers for Motor Vehicles" •TC 3/SC 4 "Verification Period of Utility Meters Using Sampling Inspections" •R 137 "Gas Meters" (all measuring technologies) •R 140 "Measuring Systems for Gaseous Fuel" (i.e., large pipelines) •ISO TC 30/SC 7 "Water Meters"
Dr. Ambler Thompson (ILMG) (301) 975-2333 ambler@nist.gov	•D 11 "General Requirements for Electronic Measuring Instruments" •D 16 "Principles of Assurance of Metrological Control" •D 19 "Pattern Evaluation and Pattern Approval" •D 20 "Initial and Subsequent Verification of Measuring Instruments and Processes" •D 27 "Initial Verification of Measuring Instruments Using the Manufacturer's Quality Management System" •D 31 "General requirements for software controlled measuring instruments" •R 34 "Accuracy Classes of Measuring Instruments" •R 46 "Active Electrical Energy Meters for Direct Connection of Class 2"

NIST Weights and Measures Division (WMD) Contact List for International Activities	
Contact Information	**Responsibilities**
Ms. Juana Williams (LMDG) (301) 975-3989 juana.williams@nist.gov	•R 81 "Dynamic Measuring Devices and Systems for Cryogenic Liquids" •R 139 "Compressed Gaseous Fuels Measuring Systems for Vehicles"

LIST OF ACRONYMS			
B	Basic Publication	LMDG	Legal Metrology Devices Group
CIML	International Committee of Legal Metrology	P	Project
D	Document	R	Recommendation
ILMG	International Legal Metrology Group	SC	Subcommittee
LMG	Laws and Metrics Group	TC	Technical Committee

The WWMA and the SWMA support these issues and the related device activities as an Information item.

360-3 D Developing Items

The NCWM established a category of items called Developing items as a mechanism to share information about emerging issues which have merit and are of national interest, but have not received sufficient review by all parties affected by the proposal or that may be insufficiently developed to warrant review by the Committee. The items in this section have been designated as Developing items by the submitter and/or the Committee based on an assessment of their relative stage of development. The Developing items are currently under review by at least one regional association, technical committee, or organization.

Developing items are listed in Appendix C according to the specific HB 44 code section under which they fall (e.g., a scale-related item appears in part 2.20 which corresponds to NIST HB 44 Section 2.20 Scales Code). Periodically, a proposal will be removed from the Developing item agenda without further action because the submitter recommends it be Withdrawn. Any remaining proposals will be renumbered accordingly.

The Committee encourages interested parties to examine the proposals included in Appendix C and send their comments to the contact listed in each item. The Committee asks that the regional associations and NTETC sectors continue their work to develop each proposal fully. Should an Association or Sector decide to discontinue work on an item, the Committee asks that it be notified.

In future Committee reports, the Committee plans to include only a brief summary and point of contact for each Developing item in this section and will post any additional details on the item on the Committee's web page on the NCWM web site.

Mr. Brett Saum, San Luis Obispo County, California, Chairman

Mr. Steve Giguere, Maine
Mr. Kenneth Ramsburg, Maryland
Mr. Paul Moyer, Nebraska
Mr. Doug Deiman, Alaska

Mr. Ted Kingsbury, Measurement Canada, Technical Advisor
Mr. Steven Cook, NIST, Technical Advisor
Ms. Tina Butcher, NIST, Technical Advisor

Specifications and Tolerances Committee

Appendix A - Attachments

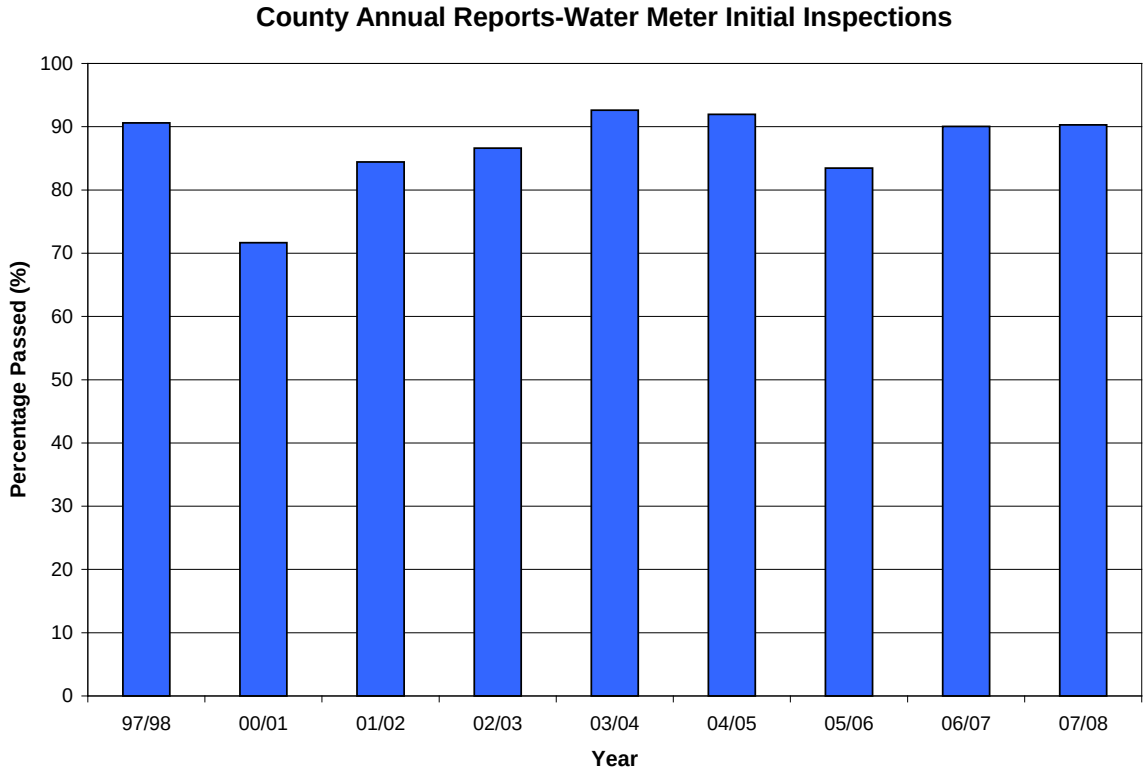
Letter from Mr. Ed Williams, Director, California Department of Agriculture Division of Measurement Standards, submitted to the 2009 WWMA Annual Meeting (see NCWM 2010 Interim Agenda Item 336-1).

Water Meter Compliance in California - 1998 to 2008

The compliance rate of water meters submitted for **type evaluation** has risen in the last ten years. Before the repeatability requirements were added to Handbook 44 in 2003 the percentage of devices passing evaluation was 60%. After this date the percentage rose to 66%, with only one failure for repeatability alone. Of the five meter manufacturers submitting proposals and claiming high failure rates, two have not submitted meters for testing since the introduction of the repeatability requirements.

Compliance of water meters submitted to **county** officials has been comparatively high. In 1997/98 the compliance rate was 90% however in 2000/2001 this dropped to the low 70% presumably because one meter manufacturer was not submitting complete meters; registers only were submitted and county officials installed these into a preexisting body. After the manufacturer was instructed to submit only complete meters compliance gradually improved.

Compliance has been above 90% for five of the last ten years



Type Approval

Before Repeatability Requirements
10 applications, 6 certificates issued Compliance **60 %**
After Repeatability Requirements
9 applications, 6 certificates issued Compliance **66 %**

This does not support the meter manufacturers' claim that they experienced a high failure rate. After the

Letter from Mr. Ed Williams, Director, California Department of Agriculture Division of Measurement Standards, submitted to the 2009 WWMA Annual Meeting (see NCWM 2010 Interim Agenda Item 336-1).

introduction of repeatability requirements compliance actually increased; only one failure was for repeatability alone, the others failed tolerance.

Two of the five meter manufacturers did not submit a meter for testing; they could not have experienced any failure.

County Testing

Five years; 98, 04, 05, 07, and 08 compliance was above **90%**
Three years; 02, 03, and 06 compliance was above **80%**
Only in 01 was compliance in the low **70%**
This does not support the claim of a high rejection rate by county officials

Attachment for S&T Agenda Item 310-4 Remanufactured Devices and Elements
Letter from Mr. Thomas McGee, President PMP Corporation, submitted to the 2010 NCWM Annual Meeting

PMP CORPORATION

Petroleum Meter & Pump

May 4, 2010

Steve Giguere
Maine Department of Agriculture State House Station 28 Augusta, ME 04333

Dear Steve,

The National conference on Weights and Measures has on its agenda for 2010 a voting item which could a dramatic effect on the Remanufacturing Industry and on low volume retail fuel outlets. Item 310-4 (See Supplement I) was proposed at the 2009 WNMA and SWMA Regional Meetings but was originally submitted by the NIST office of Weights and Measures. It was based on an inquirer NIST received from a State Director, asking if the Nonretroactive Requirements apply to Remanufactured Devices. It is stated that the change is needed to clarify the application of intent for the Nonretroactive Clause in Handbook 44, G-A.6.

To say that this change is just a clarification is an understatement It changes the overall interpretation and scope of the Nonretroactive requirement. The change will add requirements to remanufactured devices that were added to the Handbook after the device was originally manufactured. It ultimately could eliminate or severely impact the practice and business of Remanufacturing and of low volume retail fuel outlets.

If you review G-A.6 as it currently reads in the 2010 version of Handbook 44, Nonretroactive Requirements apply to New Devices based on the "Original Manufacturing Date" compared to effective date of a requirement. Adding "Remanufactured" to the requirement will establish a new point in time (Remanufactured Date) to apply requirements. So in short a device originally manufactured in January of 2002 and remanufactured January of 2007 would need to meet all nonretroactive requirements added to the handbook up to and including January of 2007.

A good example of this would be if a Tokheim 1200 series dispenser was removed from the island and remanufactured. Let say the dispenser was disassembled checked for wear and a new mechanical computer and new outer skins were installed. The dispenser was checked for accuracy and everything checked out per handbook 44. Because this dispenser was out of production prior to the adding of the nonretroactive marking requirement specifying that the CC number be clearly marked on the dispenser, it could be rejected by a state and not allowed to be installed. These dispensers are very accurate, and proven to be very reliable and especially suitable for low volume retail outlets in rural areas. There is a vast difference in the cost per gallon for equipment that is passed on to the consumer from a retail location that sells 250,000 gallons per month verses the location that sells 30,000 gallons per month. The same issues apply to scales such as a deli scale that is removed from one grocery store location to the stores shop where it is rebuild and move to another grocery store.

As stated in the discussion of the item NIST wants to make a direct comparison between a new device and a remanufactured device indicating they directly compete with each other. This is true as far as competing in the same market as a whole but not if you factor in technology, features, warranty, etc. Some time back the Remanufactured Task Force recognized that Remanufacturing has been going on for a long time and is just part of the business. The remanufactured devices do not directly compete with new devices but they do fin a void. A smaller low volume operation can buy remanufactured devices at a

reduced price which keeps them competitive with the large volume operations. It provides a means to extend the life of equipment that maybe has gone out of production but is still very accurate and reliable.

NIST has also stated they do not want to reopen the whole remanufactured discussion. However to fully understand the ramification of the change and to determine if the change is even needed, one has to go back and review the current handbook requirements, and definitions for remanufactured devices and repaired devices. Simply said there are very subtle differences between the definitions or repaired and remanufactured. More importantly, the handbook under the nonretroactive requirements already defines application for "used" devices which includes remanufactured devices.

This item should be moved back to an informational item or removed for the agenda. If made informational it would give all of those companies that could be impacted by the change to review and comment on this issue. This is not just a clarification. It is clearly a change in the philosophy of applying Nonretroactive Requirements.

Please feel free to contact me at 1 (800) 243-6628 if you have any questions or need further information.

Sincerely,

Thomas McGee
President

S&T Agenda Item 310-3: Stakeholders Letter from Graffco
Letter from Dan Graff, President, Graffco Inc. submitted to the 2010 NCWM Annual Meeting

July 2, 2010

Tina G. Butcher (NIST Tech Advisor)
NIST, Weights & Measures Division
100 Bureau Drive, MS 2600
Gaithersburg, MD 20899-2600

Ms. Butcher:

We write to you as stakeholders in the community that works to recondition-or, as coined in Handbook 44, "remanufacture" - used gas pumps for sale in the United States. It has come to our attention that a provision currently viewed as a "technical correction" is proposed as a voting item at the National Conference of Weights and Measures in July; the item is 310-4 of the 2010 Publication 15, entitled "Nonretroactive Requirements (Remanufactured Equipment)." This "correction," however, could have a major and lasting impact on the market for reconditioned or remanufactured gas pumps and has not been adequately discussed by the Weights and Measures community or by the remanufacturing community.

This letter is to urge you to support moving the 310-4 G-A6 amendment from "voting" to an "informational item," so that a task force, like the Remanufacturing Task Force formed in the early 2000s, can adequately discuss the ramifications of the change and the resulting impact on the process of reconditioning gas pumps.

S&T Agenda Item 310-3: Stakeholders Letter from Graffco
Letter from Dan Graff, President, Graffco Inc. submitted to the 2010 NCWM Annual Meeting

We realize that there has been continued debate on how exactly to treat reconditioned or remanufactured gas pumps, and the need for conformity throughout the Weights and Measures community. This item, 310-4, however, is likely to exacerbate the problem and lead to further confusion in the remanufacturing community on the appropriate procedure for compliance with Handbook 44. For this reason, both the Northeast Weights and Measures Association and the Central Weights and Measures Association have recommended that the item be moved to "informational" status at the National conference.

For the last decade, "gas pump remanufacturers," equipment distributors, oil companies, and convenience store operators have been reconditioning gas pumps to meet the specifications of the original Certificate of Compliance (CC). The proposal for revised language in 310-4, however, could be interpreted as requiring these reconditioned gas pumps (and possibly even gas pumps repaired on site, but taken off the island) to be treated as if they were newly manufactured gas pumps. This change would drastically increase the costs associated with reconditioning used gas pumps, and potentially ending the practice in the industry, leaving only new gas pumps available in an already depressed market and used pumps sitting as potential hazards in local landfills.

This change would not only harm those that recondition gas pumps, but also the industries that rely on selling used gas pumps, or retailers that seek access to reconditioned pumps as a way to reduce costs in an economically strained market. This letter has been signed by stakeholders with the hope that this issue can be better discussed if there is no change in July. Item 310-4 needs to remain an informational item.

We appreciate all the work that you do on behalf of the Weights and Measures community and look forward to continued discussion on this topic. Please feel free to contact any of us with questions regarding our position on Item 310-4.

Sincerely,

GRAFFCO, INC.
Dan Graff President
13957 Lake Drive Forest Lake,
MN 55025

651-464-1079

S&T Agenda Item 310-3: Stakeholders Letter from Graffco
Letter from Dan Graff, President, Graffco Inc. submitted to the 2010 NCWM Annual Meeting

Letter from Remanufacturing Stakeholders July 2, 2010
Page 2

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ALL-TECH FUEL SYSTEMS, LLC
Jerry Montgomery, Owner/President
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BILL L. DOVER COMPANY, INC.
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Construction Manager
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Attachment for S&T Agenda Item 310-4 Remanufactured Devices and Elements
Letter from Mr. R. Michael Carlson President, Dresser Wayne North America Dresser, Inc., submitted to the 2010 NCWM Annual Meeting

DRESSER Wayne

July 7, 2010
Executive Secretary
National Conference on Weights and Measures
National Institute of Standards and Technology 100 Bureau Drive, Stop 2600
Gaithersburg, MD 20899-2600

ATTN: Specifications and Tolerances Committee

RE: Item 310-4. G-A.6. Nonretroactive Requirements (Remanufactured Equipment)

Dear Mr. Saum and the Specifications and Tolerances Committee:

As one of the leading manufacturers of fuel dispensers in the United States, Dresser Wayne takes great care in providing products in which fuel retailers can place their confidence and can rest assured that their equipment will be safe for and fair to the general public. To that end, we put considerable effort into maintaining Certificates of Conformance for each of our dispensers to ensure that they meet all current NTEP requirements. Dresser Wayne understands that changes to the NTEP standards are not arbitrary: they are put into place to meet the changing needs of the marketplace and to help protect consumers and retailers alike.

Under ordinary circumstances, retailers replace their fuel dispensers with new equipment at the end of the normal lifecycle, a practice that helps ensure that their dispensers always meet the most current standards. However, there is a growing trend to extend that lifecycle by refurbishing or "remanufacturing" the equipment after its removal from the original site, and then placing it back into the stream of commerce without first bringing it into compliance with current NTEP standards. This failure to meet applicable NTEP certification standards increases the chances of errors, misuse, and fraud, and puts consumers as well as station owners at risk.

The purpose of the NTEP standards is to promulgate consistency and fairness in the dispensing of fuel to the public. Dresser Wayne believes that those standards should apply equally to every company selling fuel dispensers, whether the equipment is new, used or remanufactured. The current practice of extending the usable life of fuel dispensers without a system of checks and balances to help ensure that, at the time of sale, such used and remanufactured equipment meets current NTEP standards results in inconsistency in the marketplace, and an unacceptable risk of error. All dispenser suppliers should have an obligation to help keep the public protected, and to see to it that customers at the pump are getting exactly what they pay for.

The consistency and accuracy of fuel-dispensing equipment is an issue of critical and growing importance. For decades the industry has been able to safely and reliably operate within a fueling and payment infrastructure that remained relatively stable. However, the last few years have brought significant changes to the marketplace including:

- **Payment security**. Higher fuel prices and sophisticated identity-theft schemes both have exposed dispensing equipment to increasing threats of fraud - manifested by the theft of fuel as well as customers' personal and financial data. As such, the credit card industry has mandated increasingly rigorous payment-security standards, and dispenser manufacturers have enhanced fuel-meter technology and associated electronics to deter tampering with measurement and calibration.

- **Fuel evolution.** The last few years have brought unprecedented changes in the country's fuel supply based on national energy policy and environmental initiatives. The introduction of ultra-low-sulfur diesel (ULSD) and diesel exhaust fluid (DEF) have taxed the capabilities of dispensers' hydraulic systems. In

Attachment for S&T Agenda Item 310-4 Remanufactured Devices and Elements
Letter from Mr. R. Michael Carlson President, Dresser Wayne North America Dresser, Inc., submitted to the 2010 NCWM Annual Meeting

addition, higher levels of ethanol in today's fuels require specially fabricated seals and components. Manufacturers must adapt quickly and skillfully to these changes, not only to meet environmental standards, but also to maintain the integrity of the metrological function.

- **Communications interface.** Although current dispenser communications are via serial interface, the recent introduction of Ethernet communication to the forecourt portends both the download of dispenser software from remote sources as well as the potential for automatic meter-calibration based on real-time statistical reconciliation. These emerging technological advances may well require updated sealing methods and robust audit requirements achievable only with adherence to the latest industry standards.

It is critical that such developments in a rapidly evolving industry be built upon an infrastructure that does not compromise when it comes to fairness. As such, Dresser Wayne supports maintaining item 301-4 G-A.6 as a voting item at the National Conference of Weights and Measures on July 11-15, 2010. It is in the best interest of the general public, station owners and the fuel-dispensing industry in general.

Sincerely,



R. Michael Carlson
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Dresser, Inc.

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Attachment for S&T Agenda Item 321-1 Check for (Belt) Consistency
Letter from Mr. Bill Ripka, Thermo Fisher Scientific, submitted to the 2010 NCWM Annual Meeting

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SCIENTIFIC

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Memo to:
National Conference on Weights and Measures
Specifications and Tolerances Committee

20 June 2010

A sub-committee of the Belt Conveyor Scale Working Group has held conference calls on over the past several months to discuss NCWM informational item 321-1 regarding the consistency of the conveyor belt.

The existing wording in HB-44 is:

N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. – After a zero load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus (+/- 3d) 3.0 scale divisions from its initial indication during one complete revolution.

The current proposal (321-1) reads:

N.3.1.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. –
During a zero-load test, the total change indicated in the totalizer during one revolution of the belt shall not exceed 0.18% of the load that would be totalized at scale capacity for the duration of the test. The end value of the zero-load test must meet the +/-0.06% requirement of paragraphs N.3.1.2. Initial Stable Zero and N.3.1.3 Test for Zero Stability.

The sub-committee has agreed that the final proposal must include reference to disabling the flow rate filtering (low flow cutoff, dead band, flow rate damping, etc.). The committee also has agreed that the allowable error should be based on the maximum load that can be delivered in one revolution of the belt operated at maximum capacity. The effects of significant variations in the belt carcass could effect the delivered load if the delivered load requires less than complete revolutions of the belt (it is uncommon for a load to be equal to a exact belt revolution or multiples thereof). The committee has also agreed that the allowable error should be expressed in percentage, not in scale divisions. We have also noted that it is not necessary to refer to a different paragraph in the handbook, as each section should be capable of being enforced individually.

In order to determine the current % of belt consistency variance, the team has distributed a brief survey to several manufacturers and scale service companies to obtain data on current installations, both commercial and non-commercial use. Use of current conditions in the majority of installations will be used to establish the final proposed allowable consistency variance.

While not yet fully defined, the committee's version of the revised proposal will be similar to:

N.3.1.4.3. Check for Consistency of the Conveyor Belt Along Its Entire Length. –
Prior to performing a materials test, the consistency of the conveyor belt shall verified as follows:

- **a. Flow rate filtering and no flow cut-off shall be disabled.**
- **b. The belt shall be marked in order to verify one complete revolution.**
- **c. Run the empty belt.**
- **d. The total variance in weight accumulation during one complete revolution of the belt shall not exceed *x*% (tbd) of the load delivered when operated at maximum capacity for one revolution of the belt.**

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(example: If the capacity is 2500 TPH and 1 belt revolution takes = 260 seconds, the load delivered in one revolution at maximum capacity = 180.55 Tons. The total variance of < 0.12% (total +/- accumulation) cannot exceed 0.216 tons.)

Based on the progress of the sub-committee, and the pending receipt of actual field information as it relates to belt consistency, the sub-committee of the National Belt Conveyor Scale Working Group requests the National S&T committee to consider moving the Belt Consistency proposal from informational to developing. The sub-committee expects to have data ready for the fall 2010 regional conferences, or if data is slow in being provided, by the NCWM interim meeting in January, 2011.

Respectfully submitted,

Bill Ripka – sub-committee lead

Sub-Committee Members:
Peter Sirrico – Thayer Scale
Phil Carpentier – PTC Consulting
Al Page – independent
James Hale – Southern Company Services
John Barton – NIST
Rick Harshman – NIST
Jim Dietrich – Kaskaskia Valley Scale

Appendix B

Item 360-1: New NIST Handbook 44 Section 3.39. Hydrogen Gas-Measuring Devices Code
Final

Section 3.39. Hydrogen Gas-Measuring Devices – Tentative Code

This tentative code has only a trial or experimental status and is not intended to be enforced. The requirements are designed for study prior to the development and adoption of a final code. Requirements that apply to wholesale applications are under study and development by the U.S. National Work Group for the Development of Commercial Hydrogen Measurement Standards. Officials wanting to conduct an official examination of a device or system are advised to see paragraph G-A.3. Special and Unclassified Equipment.

(Tentative Code Added 2010)

A. Application

A.1. General. – This code applies to devices that are used for the measurement of hydrogen gas in the vapor state used as a vehicle fuel.

A.2. Exceptions. – This code does not apply to:

(a) Devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.

(b) The wholesale delivery of hydrogen gas.

(c) Devices used for dispensing a hydrogen gas with a hydrogen fuel index lower than 99.97 % and concentrations of specified impurities that exceed level limits.

(d) Systems that measure pressure, volume, and temperature with a calculating device to determine the mass of gas accumulated in or discharged from a tank of known volume.

A.3. Additional Code Requirements. – In addition to the requirements of this code, Hydrogen Gas-Measuring Devices shall meet the requirements of Section 1.10. General Code.

A.4. Type Evaluation. – The National Type Evaluation Program (NTEP) will accept for type evaluation only those devices that comply with all requirements of this code.

S. Specifications

S.1. Indicating and Recording Elements.

S.1.1. Indicating Elements. – A measuring assembly shall include an indicating element that continuously displays measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the device.

S.1.2. Vehicle Fuel Dispensers. – A hydrogen gas dispenser used to fuel vehicles shall be of the computing type and shall indicate the mass, the unit price, and the total price of each delivery.

S.1.3. Units.

S.1.3.1. Units of Measurement. – Deliveries shall be indicated and recorded in kilograms and decimal subdivisions thereof.

S.1.3.2. Numerical Value of Quantity-Value Divisions. – The value of an interval (i.e., increment or scale division) shall be equal to:

~~***(a) 1, 2, or 5; or***~~

(b) a decimal multiple of submultiple of 1, 2, or 5.

Examples: quantity-value divisions may be 10, 20, 50, 100; or 0.01, 0.02, 0.05; or 0.1, 0.2, or 0.5 etc.

S.1.3.3. Maximum Value of Quantity-Value Divisions. – The maximum value of the quantity-value division shall be not greater than 0.5% of the minimum measured quantity.

S.1.3.4. Values Defined. – Indicated values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations thereof. A display of "zero" shall be a zero digit for all displayed digits to the right of the decimal mark and at least one to the left.

S.1.4. Value of Smallest Unit. – The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed the equivalent of:

(a) 0.001 kg on devices with a marked maximum flow rated of 30 kg/min or less; or

(b) 0.01 kg on devices with a marked maximum flow rate of more than 30 kg/min.

S.2. Operating Requirements.

S.2.1. Return to Zero.

(a) The primary indicating and the primary recording elements, if the device is equipped to record, shall be provided with a means for readily returning the indication to zero either automatically or manually.

(b) It shall not be possible to return primary indicating elements, or primary recording elements, beyond the correct zero position.

S.2.2. Indicator Reset Mechanism. – The reset mechanism for the indicating element shall not be operable during a delivery. Once the zeroing operation has begun, it shall not be possible to indicate a value other than the latest measurement, or "zeros" when the zeroing operation has been completed.

S.2.3. Provision for Power Loss.

S.2.3.1. Transaction Information. – In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable for at least 15 minutes at the dispenser or at the console if the console is accessible to the customer.

S.2.3.2. User Information. – The device memory shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.

S.2.4. Display of Unit Price and Product Identity.

S.2.4.1. Unit Price. – A computing or money-operated device shall be able to display on each face the unit price at which the device is set to compute or to dispense.

S.2.4.2. Product Identity. – A device shall be able to conspicuously display on each side the identity of the product being dispensed.

S.2.4.3. Selection of Unit Price. – When a product is offered for sale at more than on unit price through a computing device, the selection of the unit price shall be made prior to delivery using controls on the device or other customer-activated controls. A system shall not permit a change to the unit price during delivery of a product.

S.2.4.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a measuring system shall agree for each transaction.

S.2.5. Money-Value Computations. – A computing device shall compute the total sales price at any single-purchase unit price for which the product being measured is offered for sale at any delivery possible within either the measurement range of the device or the range of the computing elements, whichever is less.

S.2.5.1. Auxiliary Elements. – If a system is equipped with auxiliary indications, all indicated money value and quantity divisions of the auxiliary element shall be identical with those of the primary element.

S.2.5.2. Display of Quantity and Total Price. – When a delivery is completed, the total price and quantity for that transaction shall be displayed on the face of the dispenser for at least 5 minutes or until the next transaction is initiated by using controls on the device or other user-activated controls.

S.2.6. Recorded Representations, Point of Sale Systems. – A printed receipt shall be available through a built-in or separate recording element for transactions conducted with point-or-sale systems or devices activated by debit cards, credit cards, and/or cash. The printed receipt shall contain the following information for products delivered by the dispenser:

(a) the total mass of the delivery;

(b) the unit price;

(c) the total computed price; and

(d) the product identity by name, symbol, abbreviation, or code number.

S.2.7. Indication of Delivery. – The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

S.3. Design of Measuring Elements and Measuring Systems.

S.3.1. Maximum and Minimum Flow-Rates. – The ratio of the maximum to minimum flow-rates specified by the manufacturer for devices measuring gases shall be 10:1 or greater.

S.3.2. Adjustment Means. – An assembly shall be provided with means to change the ratio between the indicated quantity and the quantity of gas measured by the assembly. A bypass on the measuring assembly shall not be used for these means.

S.3.2.1. Discontinuous Adjusting Means. – When the adjusting means changes ratio between the indicated quantity and the quantity of measured gas in a discontinuous manner, the consecutive values of the ratio shall not differ by more than 0.1 %.

S.3.3. Provision for Sealing. – Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment may be made of:

(a) each individual measurement element;

(b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries;

(c) the zero adjustment mechanism; and

(d) any metrological parameter that detrimentally affects the metrological integrity of the device or system.

When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal. Audit trails shall use the format set forth in Table S.3.3. Categories of Device and Methods of Sealing.

Table S.3.3.
Categories of Device and Methods of Sealing

Categories of Device	Method of Sealing
Category 1: No remote configuration capability.	Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.
Category 2: Remote configuration capability, but access is controlled by physical hardware. The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.	The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.
Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password). The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.	An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to 10 times the number of sealable parameters in the device, but not more than 1000 records are required. (**Note:** Does not require 1000 changes to be stored for each parameter.)

S.3.4. Automatic Density Correction.

(a) An automatic means to determine and correct for changes in product density shall be incorporated in any hydrogen gas-measuring system where measurements are affected by changes in the density of the product being measured.

(b) Volume-measuring devices with automatic temperature compensation used to measure hydrogen gas as a vehicle fuel shall be equipped with an automatic means to determine and correct for changes in product density due to changes in the temperature, pressure, and composition of the product.

S.3.5. Pressurizing the Discharge Hose. – The discharge hose for hydrogen gas shall automatically pressurize to a pressure equal to or greater than the receiving vessel prior to the device beginning to register the delivery. The indications shall not advance as a result of the initial pressurization or the purging/bleeding of the discharge hose.

S.3.6. Zero-Set-Back Interlock, Retail Vehicle Fuel Devices.

(a) A device shall be constructed so that:

(1) when the device is shut-off at the end of a delivery an automatic interlock prevents a subsequent delivery until the indicating element and recording elements, if the device is equipped and activated to record, have been returned to their zero positions; and

(2) it shall not be possible to return the discharge nozzle to its start position unless the zero set back interlock is engaged or becomes engaged.

(b) For systems with more than one:

(1) dispenser supplied by a single measuring element, an effective automatic control valve in each dispenser prevents product from being delivered until the indicating elements on that dispenser are in a correct zero position; or

(2) hose supplied by a single measuring element, effective automatic means must be provided to prevent product from being delivered until the indicating element(s) corresponding to each hose are in a correct zero position.

S.4. Discharge Lines and Valves.

S.4.1. Diversion of Measured Product. – No means shall be provided by which any measured product can be diverted from the measuring device.

S.4.2. Directional Flow Valves. – If a reversal of flow could result in errors that exceed the tolerance for the minimum measured quantity, a valve or valves or other effective means, automatic in operation (and equipped with a pressure limiting device, if necessary) to prevent the reversal of flow shall be properly installed in the system. (See N.1. Minimum Measured Quantity)

S.4.3. Other Valves. – Check valves and closing mechanisms that are not used to define the measured quantity shall have relief valves (if necessary) to dissipate any abnormally high pressure that may arise in the measuring assembly.

S.5. Markings. – A measuring system shall be conspicuously, legibly, and indelibly marked with the following information:

(a) pattern approval mark (i.e., type approval number);

(b) name and address of the manufacturer or his trademark and, if required by the weights and measures authority, the manufacturer's identification mark in addition to the trademark;

(c) model designation or product name selected by the manufacturer;

(d) nonrepetitive serial number;

(e) the accuracy class of the device as specified by the manufacturer consistent with Table T.2. Accuracy Classes and Tolerances for Hydrogen-Gas Measuring Devices;

(f) maximum and minimum flow rates in kilograms per unit of time;

(g) maximum working pressure;

(h) applicable range of ambient temperature if other than –10 °C to + 50 °C;

(i) minimum measured quantity; and

(j) product limitations (such as fuel quality), if applicable.

S.5.1. Location of Marking Information; Hydrogen-Fuel Dispensers. – The marking information required in General Code, paragraph G S.1. Identification shall appear as follows:

(a) within 60 cm (24 in) to 150 cm (60 in) from the base of the dispenser;

(b) either internally and/or externally provided the information is permanent and easily read; and accessible for inspection; and
(c) on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).

Note: The use of a dispenser key or tool to access internal marking information is permitted for retail hydrogen-measuring devices.

S.6. Printer. – When an assembly is equipped with means for printing the measured quantity, the printed information must agree with the indications on the dispenser for the transaction and the printed values shall be clearly defined.

S.6.1. Printed Receipt. – Any delivered, printed quantity shall include an identification number, the time and date, and the name of the seller. This information may be printed by the device or pre-printed on the ticket.

S.7. Totalizers for Vehicle Fuel Dispensers. – Vehicle fuel dispensers shall be equipped with a nonresettable totalizer for the quantity delivered through each separate measuring device.

S.8. Minimum Measured Quantity. – The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(a) Measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg.

(b) Measuring systems having a maximum flow rate greater than 4 kg/min but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg.

N. Notes

N.1. Minimum Measured Quantity. – The minimum measured quantity shall be specified by the manufacturer.

N.2. Test Medium. – The device shall be tested with the product commercially measured except that, in a type evaluation examination, hydrogen gas as specified in NIST Handbook 130 shall be used.

Note: Corresponding requirements are under development and this paragraph will be revisited.

N.3. Test Drafts. – The minimum test shall be one test draft at the declared minimum measured quantity and one test draft at approximately ten times the minimum measured quantity or 1 kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed. (See T.3. Repeatability)

The test draft shall be made at flows representative of that during normal delivery. The pressure drop between the dispenser and the proving system shall not be greater than that for normal deliveries. The control of the flow (e.g., pipework or valve(s) size, etc.) shall be such that the flow of the measuring system is maintained within the range specified by the manufacturer.

N.4. Tests.

N.4.1. Master Meter (Transfer) Standard Test. – When comparing a measuring system with a calibrated transfer standard, the minimum test shall be one test draft at the declared minimum measured quantity and one

test draft at approximately ten times the minimum measured quantity or 1 kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed.

N.4.1.1. Verification of Master Metering Systems. – A master metering system used to verify a hydrogen gas-measuring device shall be verified before and after the verification process. A master metering system used to calibrate a hydrogen gas-measuring device shall be verified before starting the calibration and after the calibration process.

N.4.2. Gravimetric Tests. – The weight of the test drafts shall be equal to at least the amount delivered by the device at the declared minimum measured quantity and one test draft at approximately ten times the minimum measured quantity or 1 kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed.

N.4.3. PVT Pressure Volume Temperature Test. – The minimum test with a calibrated volumetric standard shall be one test draft at the declared minimum measured quantity and one test draft at approximately ten times the minimum measured quantity or 1 kg, whichever is greater. More tests may be performed over the range of normal quantities dispensed.

N.5. Minimum Measured Quantity. – The device shall be tested for a delivery equal to the declared minimum measured quantity when the device is likely to be used to make deliveries on the order of the declared minimum measured quantity.

N.6. Testing Procedures.

N.6.1. General. – The device or system shall be tested under normal operating conditions of the dispenser.

The test draft shall be made at flows representative of that during normal delivery. The pressure drop between the dispenser and the proving system shall not be greater than that for normal deliveries. The control of the flow (e.g., pipework or valve(s) size, etc.) shall be such that the flow of the measuring system is maintained within the range specified by the manufacturer.

N.6.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors are reduced to minimize the effect on the results obtained.

N.7. Density. – Temperature and pressure of hydrogen gas shall be measured during the test for the determination of density or volume correction factors when applicable. For the thermophysical properties of hydrogen the following publications shall apply: for density calculations at temperatures above 255 K and pressures up to 120 MPa, a simple relationship may be used that is given in the publication of Lemmon et al., J. Res. NIST, 2008. Calculations for a wider range of conditions and additional thermophysical properties of hydrogen are available free of charge online at the "NIST Chemistry WebBook" http://webbook.nist.gov/chemistry, or available for purchase from NIST as the computer program NIST Standard Reference Database 23 "NIST Reference Fluid Thermodynamic and Transport Properties Database (REFPROP): Version 8.0" http://www.nist.gov/srd/nist23.htm. These calculations are based on the reference Leachman, J.W., Jacobsen, R.T, Lemmon, E.W., and Penoncello, S.G. "Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen" to be published in the Journal of Physical and Chemical Reference Data. More information may be obtained from NIST online at http://www.boulder.nist.gov/div838/Hydrogen/Index.htm.

T. Tolerances

T.1. Tolerances, General.

(a) The tolerances apply equally to errors of underregistration and errors of overregistration.

(b) The tolerances apply to all products at all temperatures measured at any flow rate within the rated measuring range of the device.

T.2. Tolerances. – The tolerances for hydrogen gas measuring devices are listed in Table T.2. Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices. (Proposed tolerance values are based on previous work with compressed gas products and will be confirmed based on performance data evaluated by the U.S. National Work Group.)

Table T.2.
Accuracy Classes and Tolerances for Hydrogen Gas-Measuring Devices

Accuracy Class	Application or Commodity Being Measured	Acceptance Tolerance	Maintenance Tolerance
2.0	Hydrogen gas as a vehicle fuel	1.5 %	2.0 %

T.3. Repeatability. – When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.6.1.1. Repeatability Tests.

T.4. Tolerance Application on Test Using Transfer Standard Test Method. – To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

T.5. Tolerance Application in Type Evaluation Examinations for Devices. – For type evaluation examinations, the tolerance values shall apply under the following conditions:

(a) at any temperature and pressure within the operating range of the device; and

(b) for all quantities greater than the minimum measured quantity.

UR. User Requirements

UR.1. Selection Requirements.

UR.1.1. Computing-Type Device; Retail Dispenser. – A hydrogen gas dispenser used to refuel vehicles shall be of the computing type and shall indicate the mass, the unit price, and the total price of each delivery.

UR.1.2. Discharge Hose-Length. – The length of the discharge hose on a retail fuel dispenser:

(a) shall not exceed 4.6 m (15 ft) unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels;

(b) shall be measured from its housing or outlet of the discharge line to the inlet of the discharge nozzle; and

(c) shall be measured with the hose fully extended if it is coiled or otherwise retained or connected inside a housing.

An unnecessarily remote location of a device shall not be accepted as justification for an abnormally long hose.

UR.1.3. Minimum Measured Quantity.

(a) The minimum measured quantity shall be specified by the manufacturer.

(b) The minimum measured quantity appropriate for a transaction may be specified by the weights and measures authority. A device may have a declared minimum measured quantity smaller than that specified by the weights and measures authority; however, the device must perform within the performance requirements for the declared or specified minimum measured quantity up to deliveries at the maximum measurement range.

(c) The minimum measured quantity shall satisfy the conditions of use of the measuring system as follows:

(1) Measuring systems having a maximum flow rate less than or equal to 4 kg/min shall have a minimum measured quantity not exceeding 0.5 kg.

(2) Measuring systems having a maximum flow rate greater than 4 kg/min, but not greater than 12 kg/min shall have a minimum measured quantity not exceeding 1.0 kg.

UR.2. Installation Requirements.

UR.2.1. Manufacturer's Instructions. – A device shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.

UR.2.2. Discharge Rate. – A device shall be installed so that after initial equalization the actual maximum discharge rate will not exceed the rated maximum discharge rate. Automatic means of flow regulation shall be incorporated in the installation if necessary.

UR.2.3. Low-Flow Cut-Off Valve. – If a measuring system is equipped with a programmable or adjustable "low-flow cut-off" feature:

(a) the low-flow cut-off value shall not be set at flow rates lower than the minimum operating flow rate specified by the manufacturer on the measuring device; and

(b) the system shall be equipped with flow control valves which prevent the flow of product and stop the indicator from registering product flow whenever the product flow rate is less than the low-flow cut-off value.

UR.3. Use of Device.

UR.3.1. Unit Price and Product Identity for Retail Dispensers. – The unit price at which the dispenser is set to compute shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale.

UR.3.2. Vehicle-mounted Measuring Systems Ticket Printer.

UR.3.2.1. Customer Ticket. – Vehicle-mounted measuring systems shall be equipped with a ticket printer which shall be used for all sales where product is delivered through the device. A copy of the ticket issued by the device shall be left with the customer at the time of delivery or as otherwise specified by the customer.

UR.3.2.2. Ticket in Printing Device. – A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

UR.3.3. Printed Ticket. – The total price, the total quantity of the delivery, and the price per unit shall be printed on any ticket issued by a device of the computing type and containing any one of these values.

UR.3.4. Steps After Dispensing. – After delivery to a customer from a retail dispenser:

(a) the device shall be shut-off at the end of a delivery, through an automatic interlock that prevents a subsequent delivery until the indicating elements and recording elements, if the device is equipped and activated to record, have been returned to their zero positions; and

(b) the discharge nozzle shall not be returned to its start position unless the zero set-back interlock is engaged or becomes engaged by the act of disconnecting the nozzle or the act of returning the discharge nozzle.

UR.3.5. Return of Indicating and Recording Elements to Zero. – The primary indicating elements (visual), and the primary recording elements shall be returned to zero immediately before each delivery.

UR.3.6. Return of Product to Storage, Retail Hydrogen Gas Dispensers. – Provisions at the site shall be made for returning product to storage or disposing of the product in a safe and timely manner during or following testing operations. Such provisions may include return lines, or cylinders adequate in size and number to permit this procedure.

UR.3.7. Conversion Factors. – Established correction values (see references in N.7. Density.) shall be used whenever measured hydrogen gas is billed. All sales shall be based on kilograms.

Appendix D. Definitions

The specific code to which the definition applies is shown in [brackets] at the end of the definition. Definitions for the General Code [1.10] apply to all codes in Handbook 44.

A

audit trail. – An electronic count and/or information record of the changes to the values of the calibration or configuration parameters of a device.[1.10, 2.20, 2.21, 2.24, 3.30, 3.37, 3.39, 5.56(a)]

automatic temperature or density compensation. – The use of integrated or ancillary equipment to obtain from the output of a volumetric meter an equivalent mass, or an equivalent liquid volume at the assigned reference temperature below and a pressure of 14.696 lb/in^2 absolute.

Cryogenic liquids	21 °C (70 °F) [3.34]
Hydrocarbon gas vapor	15 °C (60 °F) [3.33]
Hydrogen gas	21 °C (70 °F) [3.39]
Liquid carbon dioxide	21 °C (70 °F) [3.38]
Liquefied petroleum gas (LPG) and Anhydrous ammonia	15 °C (60 °F) [3.32]
Petroleum liquid fuels and lubricants	15 °C (60 °F) [3.30]

C

calibration parameter. – Any adjustable parameter that can affect measurement or performance accuracy and, due to its nature, needs to be updated on an ongoing basis to maintain device accuracy (e.g., span adjustments, linearization factors, and coarse zero adjustments).[2.20, 2.21, 2.24, 3.30, 3.37, 3.39, 5.56(a)]

D

discharge hose. – A flexible hose connected to the discharge outlet of a measuring device or its discharge line.[3.30, 3.31, 3.32, 3.34, 3.37, 3.38, 3.39]

discharge line. – A rigid pipe connected to the outlet of a measuring device.[3.30, 3.31, 3.32, 3.34, 3.37, 3.39]

E

event counter. – A nonresettable counter that increments once each time the mode that permits changes to sealable parameters is entered and one or more changes are made to sealable calibration or configuration parameters of a device.[2.20, 2.21, 3.30, 3.37, 3.39, 5.54, 5.56(a), 5.56(b), 5.57]

event logger. – A form of audit trail containing a series of records where each record contains the number from the event counter corresponding to the change to a sealable parameter, the identification of the parameter that was changed, the time and date when the parameter was changed, and the new value of the parameter.[2.20, 2.21, 3.30, 3.37, 3.39, 5.54, 5.56(a), 5.56(b), 5.57]

I

indicating element. – An element incorporated in a weighing or measuring device by means of which its performance relative to quantity or money value is "read" from the device itself as, for example, an index-and-graduated-scale combination, a weighbeam-and-poise combination, a digital indicator, and the like. (Also see "primary indicating or recording element.")[1.10]

M

minimum measured quantity (MMQ). – The smallest quantity delivered for which the measurement is to within the applicable tolerances for that system.[3.37, 3.39]

N

nonresettable totalizer. – An element interfaced with the measuring or weighing element that indicates the cumulative registration of the measured quantity with no means to return to zero.[3.30, 3.37, 3.39]

P

point-of-sale system. – An assembly of elements including a weighing or measuring element, an indicating element, and a recording element (and may also be equipped with a “scanner”) used to complete a direct sales transaction.[2.20, 3.30, 3.32, 3.37, 3.39]

R

remote configuration capability. – The ability to adjust a weighing or measuring device or change its sealable parameters from or through some other device that is not itself necessary to the operation of the weighing or measuring device or is not a permanent part of that device.[2.20, 2.21, 2.24, 3.30, 3.37, 3.39, 5.56(a)]

retail device. – A measuring device primarily used to measure product for the purpose of sale to the end user.[3.30, 3.32, 3.37, 3.39]

W

wet hose. – A discharge hose intended to be full of product at all times. (See "wet-hose type.")[3.30, 3.31, 3.38, 3.39]

wet-hose type. – A type of device designed to be operated with the discharge hose full of product at all times. (See "wet hose.")[3.30, 3.32, 3.34, 3.37, 3.38, 3.39]

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Appendix C

Item 360-3: Developing Items

In future Committee reports, the Committee plans to include only a brief summary and point of contact for each Developing item in this section and will post any additional details on the item on the Committee's web page on the NCWM web site.

Part 3.30, Liquid-Measuring Devices - Item 1: Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD)

Source: 2009 Carryover Item 330-3. This item originated from WMD and the regional associations and first appeared on the Committee's 2007 agenda.

Purpose: To review and update criteria in the LMD Code related to price posting and computing capability on RMFDs to reflect current market practices.

Item Under Consideration: The Committee was asked to consider a proposal to make modifications to Section 3.30. Liquid-Measuring Devices (LMD) Code to address price posting and computing capability for retail motor-fuel dispensers. Full details of the recommendation are found in the Committee's 2009 Interim and Final Reports. The Committee believes that changes are needed to the LMD Code; however, based on comments received it does not believe these proposed changes adequately address people's concerns.

Key Points:

- Current LMD Code requirements relative to unit price posting and selection and total price computation were developed to address marketing practices in place in the early 1990s; primarily cash/credit/debit forms of payment.

- Marketing practices have changed since the 1990s, and the LMD Code does not adequately address these changes with regard to the display, posting, and selection of unit price information or total price information at various points in a transaction.

- There appears to be general agreement in the Weights and Measures community that changes are needed to the LMD Code in HB 44 to better reflect current market practices.

- Comments indicate the current proposal being considered by the Committee does not adequately address concerns, particularly on the parts of Weights and Measures officials.

- Weights and Measures officials are concerned that customers be given adequate information at all points of the transaction, not just at the end.

- Regional Weights and Measures associations and industry comments indicate support for a work group to further develop this issue.

- The S&T agreed to establish a work group to further develop this issue and present an alternative recommendation for the S&T to consider.

Background/Discussion: In the early 1990s, various sections of the Liquid-Measuring Devices Code in HB 44 (including paragraphs S.1.6.4. Display of Unit Price and Product Identity, S.1.6.5.4. Selection of Unit Price, UR.3.2. Unit Price and Product Identity, and UR.3.3. Computing Device) were modified to address multi-tier pricing applications, such as cash or credit in instances where the same product is offered at different unit prices based on the method of payment or other conditions of the sale. Since that time, marketing practices have evolved to include the addition of new practices, such as frequent shopper discounts and club member discounts. Numerous questions have been posed to WMD and Weights and Measures officials regarding the requirements for posting unit prices,

calculation of total price, customer-operated controls, and other related topics, such as the definitions for associated terminology.

It is clear from these questions that changes are needed to HB 44 to ensure the requirements adequately address current marketplace conditions and practices. WMD has raised this issue with the Committee, and has also discussed a variety of pricing practices with individual state and local Weights and Measures jurisdictions.

The WMD reviewed the existing requirements and their application to current market practices and collected information on a number of scenarios, including the following:

(1) Frequent shopper discounts
(2) Club member discounts
(3) Discount for prepaying cash (to prevent "drive-offs")
(4) Prepay at the cashier for credit sales
(5) Discounts for purchasing store products
(6) Discounts for purchasing a service (e.g., carwash)
(7) Targeted group discounts (e.g., Tuesday – ladies 5 cents off per gallon)
(8) Full service
(9) Self service
(10) Progressive discounts based on volume of motor-fuel purchased
(11) Coupons for discounts on immediate or future purchases
(12) Rebates (e.g., use of oil company credit card)
(13) Day of the week discounts

Note: The conditions under some of these scenarios may not typically fall under the authority of Weights and Measures jurisdictions.

The WMD expressed an interest in receiving input from the Weights and Measures community about the various practices and pricing structures in use, and indicated it welcomed opportunities to discuss this item at regional Weights and Measures associations to ensure the item is adequately addressed.

The regional Weights and Measures associations agreed that changes are needed and encouraged WMD to continue development of the issue. At the 2008 NCWM Interim Meeting, Ohio Weights and Measures submitted a proposal to modify various sections of the LMD Code to the Committee. With a specific proposal to consider, the Committee elevated the item to an Information status for further review and input.

In 2008 and 2009, the Committee heard comments from all of the regional Weights and Measures associations (including the CWMA), industry, and individual NCWM members that, while changes are needed to the LMD Code, the changes proposed through the CWMA do not meet the needs of the marketplace (see the Committee's 2008 and 2009 Final Reports for details of specific concerns). A key concern raised by Weights and Measures officials was the importance for consumers to have full information about the purchase price of the product before they dispense the fuel and to be able to follow all aspects of the transaction.

The CWMA recommended establishment of a small work group to further develop the issue and encouraged consideration of points such as the following:

1. discounts calculated at the pump and others at the counter;
2. level of consumer responsibility;
3. can the dispensers do tier pricing;
4. competitors complaining about non-uniformity of enforcement;
5. discounts should be done electronically; and
6. all is okay as long as the receipt explains the transaction.

NIST WMD agreed to form a small work group to further study this issue and held an initial meeting of interested parties in July 2008. A reduction of staff at NIST prevented subsequent work on this issue. The S&T Committee

continued to hear requests from the regional associations and industry regarding the importance that this work be continued and urging that NIST allocate resources to the project. Mr. John Eichberger, National Association of Convenience Stores, offered to coordinate assistance from some of the association's interested members at the point where work would resume. See the Committee's 2008 and 2009 Final Reports for additional details on this effort.

At its fall 2009 meeting, the CWMA recommended that this remain an Information item and urged resources be committed to its further development. The CWMA members commented that price posting continues to be a problem, noting that the current language in NIST HB 44 does not reflect current market practices and the language needs to be either fixed or removed from the Handbook. The CWMA also requested that the NCWM sponsor a WG to address this issue.

At its fall 2009 meeting, NEWMA agreed that this is a priority item and wants to encourage the formation of a WG as soon as possible. NEWMA further noted comments heard during its meeting:

- As long as terms and conditions are made clear prior to sale, the transaction should be allowed.
- Businesses should purchase the correct equipment (according to HB 44) for their marketing strategy.
- This item needs to move forward as a priority.
- We need to find some remedy for businesses that have older equipment.
- It is very difficult to take a hard line (follow HB 44 exactly) on this item.
- We must enforce equally and provide a level playing field.
- HB 44 is antiquated and should be revised.

At its fall 2009 meeting, the SWMA recommended that NIST WMD resume working on this proposal as soon as resources are available. NIST should include Mr. Eichberger and other sectors that are interested in the work and any stakeholders impacted by proposals to modify the LMD code relative to price posting and computing for RMFDs.

Prior to the 2010 Interim Meeting, NIST reallocated additional resources to work on this issue and announced that Ms. Williams, NIST WMD, would lead the effort to renew the work group. Working in collaboration with the S&T Committee, Ms. Williams held an informal meeting during the 2010 Interim Meeting to allow interested parties to further discuss the issue, share thoughts about next steps, and indicate interest in participating in the work group. That meeting was well attended with 29 NCWM members participating and a number of useful comments were made. Prior to the open hearings, Ms. Williams gave the Committee an overview of the informal meeting and an update on the plan to renew the work group.

At its open hearings, the S&T Committee received positive comments regarding NIST's reallocation of resources to this project and agreed that reviewing and revising current requirements is important. The Committee continues to strongly support the intent of the proposal and recognizes that significant additional development is needed. The Committee believes that this can best be done through an S&T WG, and decided to give this item Developing status until the WG develops a proposal for consideration by the Conference. After collaborating with NCWM Chairman, Randy Jennings, the Committee Chair indicated that the work group should be chaired by an NCWM voting member under the technical direction of NIST. The Committee asks that Ms. Williams collaborate with the Chair regarding possible candidates for the chair based on those who have indicated an interest in serving on the WG. The Committee asks that the WG provide frequent updates on its progress to the Committee and to the regional Weights and Measures associations. The Committee also asks that the WG communicate a work plan and time line after its first official meeting.

Anyone interested in participating in this work group or with questions about this issue is asked to contact NIST WMD Technical Advisor Ms. Juana Williams by e-mail at juana.williams@nist.gov, by telephone at (301) 975-3989, or in writing at NIST 100 Bureau Drive, Stop 2600, Gaithersburg, MD 20899-2600.

The Retail Motor-Fuel Dispenser Price Posting and Computing Capability USNWG wishes to express its thanks to its sponsor the NCWM S&T Committee and also to NCWM members for their contributions to the meeting discussions at the 2010 NCWM Annual Meeting.

The WG offered this abbreviated summary on the direction it will take, based on the task it was given by the S&T Committee and input received at the meeting. The WG is tasked with reviewing the current NIST Handbook 44 Section 3.30 Liquid Measuring Devices Code to determine if the code requirements address rapidly changing practices for marketing retail motor-fuels to the general public. The WG is also tasked with developing proposals for modifying those codes that need changing and preparing them for a review by the S&T Committee.

The WG has laid out several next steps to establish a work plan to achieve this goal:

(1) The WG will work using a teleconference and web conference meeting format to maximize its resources. The WG has a 1.5 hour meeting tentatively scheduled for mid August 2010 to begin its development of the work plan;

(2) The WG will establish a tentative timeline for completing this task and will submit that timeline by e-mail to the S&T Committee for its consideration to determine if that time frame meets with the approval of the Committee;

(3) To better manage this task and ensure input from all groups of stakeholders affected by these marketing practices the Work Group will consist of approximately 12 to 15 individuals who represent at least each of the following organizations/agencies/associations:

CWMA	API
NEWMA	Convenience Store Associations
SWMA	Petroleum Marketers Associations
WWMA	RMFD Manufacturers
Consumer Groups	

The WG is seeking input from any stakeholders that might have been overlooked and should be part of this effort. The Work Group will contact representatives from each group who expressed interest in the work to fill the positions on the WG.

The WG is also seeking additional information to ensure that it does not reinvent code that already works to address marketing practices. Therefore, the WG requests copies of any recent legislation or policies enacted to address these marketing scenarios be forwarded to its Chair by August 31, 2010. The WG wishes to examine various examples of marketing practices to establish some general categories for classifying these marketing practices and analyzing if a practice is adequately addressed by any codes it might develop. The WG will develop a form for stakeholders to provide information on marketing practices they regularly encounter which are either 1) not addressed in the code; 2) result in non-uniform interpretation of the application of code sections; or 3) are difficult to enforce because of conflicting codes that apply to the equipment's design and use.

Part 3.31, Vehicle-Tank Meters - Item 1: T.4. Product Depletion Test

Source: Northeast Weights and Measures Association (NEWMA)

Purpose: Modify the VTM code to base the product depletion test tolerances on the meter's maximum flow rate (a required marking on all meters), rather than the meter size. This will enable more consistent application of the tolerances for older meters, which are not required to be marked with the meter size, and address an unintentional gap which allows an unreasonably large tolerance for smaller meters.

Item Under Consideration: Amend paragraph T.4. as follows:

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed **one-half (0.5 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter. Tolerances for typical meters are** ~~**tolerance**~~ shown in Table T.4. Test drafts shall be of the same size and run at approximately the same flow rate.

[**Note:** The result of the product depletion test may fall outside of the applicable test tolerance as specified in Table 1.]

Table T.4.
Tolerances for Typical Vehicle-Tank Meterson Product Depletion Tests, Except Milk Meters
Refer to T.4. for meters with maximum flow rates not listed.

Meter ~~Size~~ Maximum Flow Rate	Maintenance and Acceptance Tolerances
~~Up to, but not including, 50 mm (2 in)~~ 114 Lpm (30 gpm)	~~1.70 L (104 in^3)[1]~~ 0.57 L (0.15 gal) (34.6 in^3)[1]
~~From 50 mm (2 in) up to, but not including, 75 mm (3 in)~~ 225 Lpm (60 gpm)	~~2.25 L (137 in^3)[1]~~ 1.1 L (0.30 gal) (69.3 in^3)[1]
~~75 mm (3 in) or larger~~ 378 Lpm (100 gpm)	~~3.75 L (229 in^3)[1]~~ 1.9 L (0.5 gal) (115 in^3)[1]
758 Lpm (200 gpm)	3.8 L (1.0 gal) (231 in^3)[1]

[1] Based on a test volume of at least the amount specified in N.3.

(Table Added 2005) **(Amended 201X)**

Alternative language for T.4. with larger tolerance for smaller meters.

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed **one-half (0.5 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated higher than 378 Lpm (100 gpm), or six-tenths (0.6 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated 378 Lpm (100 gpm) or lower. Tolerances for typical meters are** ~~**tolerance**~~ shown in Table T.4. Test drafts shall be of the same size and run at approximately the same flow rate.

[**Note:** The result of the product depletion test may fall outside of the applicable test tolerance as specified in Table 1.]

Table T.4.
Tolerances for Typical Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters
Refer to T.4 for meters with flow rates not listed.

Meter ~~Size~~ Maximum Flow Rate	Maintenance and Acceptance Tolerances
~~Up to, but not including, 50 mm (2 in)~~ 114 Lpm (30 gpm)	~~1.70 L (104 in^3)[1]~~ 0.57 L (0.18 gal) (41.6 in^3)[1]
~~From 50 mm (2 in) up to, but not including, 75 mm (3 in)~~ 225 Lpm (60 gpm)	~~2.25 L (137 in^3)[1]~~ 1.1 L (0.36 gal) (83.2 in^3)[1]
~~75 mm (3 in) or larger~~ 378 Lpm (100 gpm)	~~3.75 L (229 in^3)[1]~~ 1.9 L (0.6 gal) (139 in^3)[1]
758 Lpm (200 gpm)	3.8 L (1.0 gal) (231 in^3)[1]

[1] Based on a test volume of at least the amount specified in N.3.

(Table Added 2005) **(Amended 201X)**

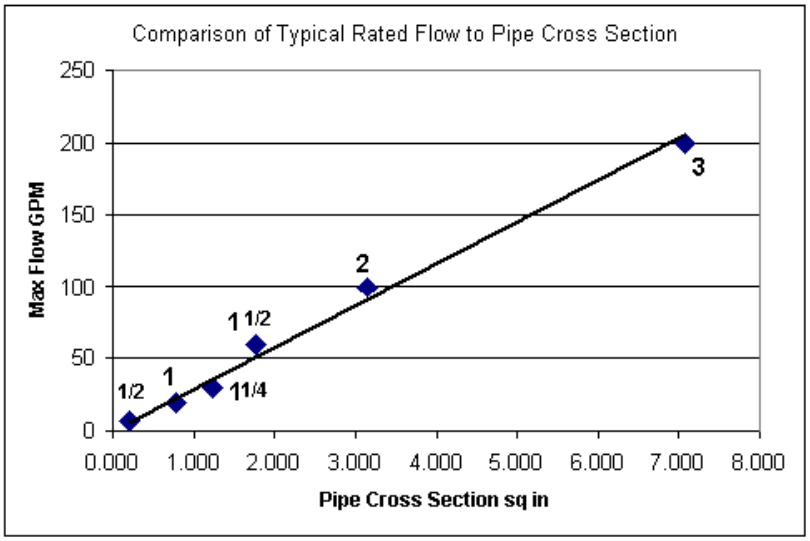
Background/Discussion: This item was submitted to NEWMA at its 2008 Interim Meeting as an alternative to Item 331-1 (S.5.7. Meter Size) in 2008 Publication 16. It would base the tolerances for the product depletion test on a percentage of the maximum flow rate rather than meter size. Justification provided to NEWMA by the submitter is as follows:

> The NCWM S&T Committee received a proposal in 2008 to add new marking requirements to provide inspectors with a basis on which to assess tolerances since the meter size in inches is not currently marked on meters used in VTM systems. This solution would add a new marking requirement non-retroactively, which will not solve the problem until the entire fleet of meters presently in use are replaced with new meters. This could take a very long time, since VTMs can see many years of service. In addition, the compromise made when this item originally passed did not address the possibility that smaller meters, (e.g., down to ¼ in) could be mounted on a vehicle and thus, subject to these tolerances. Allowing the smallest current tolerance (104 in^3) on a ¼ in meter delivering 2 gpm would be 22.5 % relative error for one minute of flow due to air passing through the meter. Even at 20 gpm for a 1 in meter, the relative error only drops to 2.25 %. That seems unconscionable. New York recommends going back to the 0.5 % of 1 minute of flow at the maximum rated flow rate for the meter that was part of the original proposal. The max flow rate must be marked on every meter under current HB 44 requirements, thus, the inspector will have the information necessary to correctly apply the tolerance. It is further recommended that the table provide tolerances for the common meter sizes which will handle most cases encountered in the field (i.e., 1¼-, 1½-, 2- and 3-inch meters with 30, 60, 100 and 200 gpm, respectively).
>
> There may be concern that users will move to larger meter sizes to take advantage of the larger tolerances. It is not thought that this will happen since these systems cannot deliver much over 100 gpm without damaging storage tanks. In fact, most systems we have seen delivering heating oil are actually delivering at less than 80 gpm. If they move to a 200 gpm, 3-inch meter, rated at 40 to 200 gpm, they will then have to meet acceptance tolerances all the way down to 60 gpm which it is not believed that they can do on a consistent basis. We believe the typical 2-inch system will remain the mainstay of the industry.
>
> Graphs of the relationship of typical meter ratings to pipe cross section area show that positive displacement flow rates are clearly a function of pipe size. Any tolerance that does not reflect that relationship is fundamentally flawed in our view. For comparison, we have included a graphic comparison of the proposed tolerances.

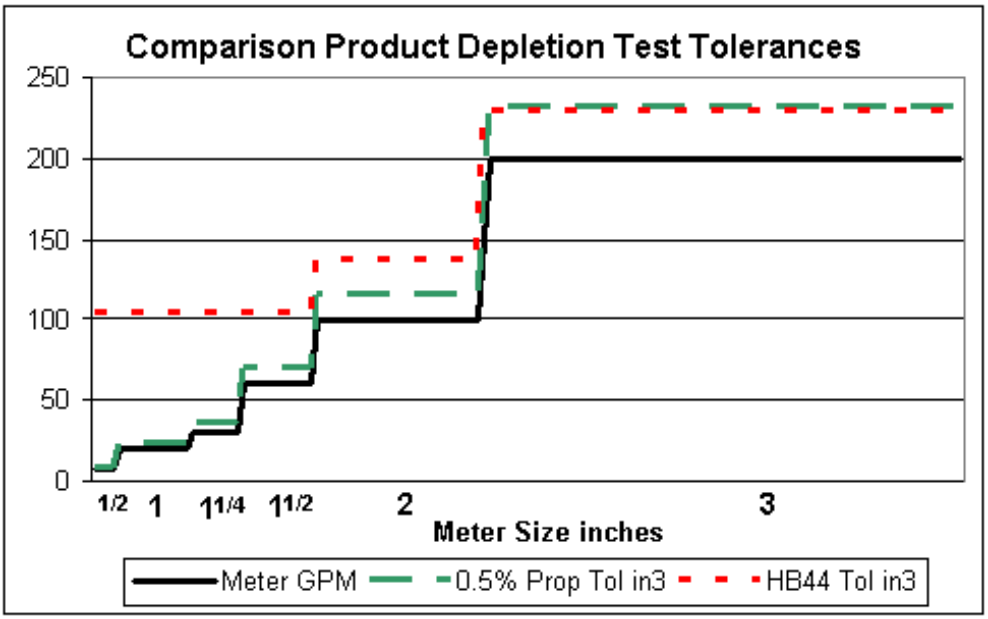
The submitter also noted the following:

> We recognize that the tolerances proposed will reduce the tolerances for meter sizes 2 inch and under. We could support some compromise to recognize diminishing returns on smaller meters, thus allowing a slightly larger tolerance (e.g., 0.6 %) at or below 100 gpm rated flow rate. At 0.6 % for a 2 inch (100 gpm) meter, the tolerance would be 139 in^3, virtually identical to the existing tolerance.

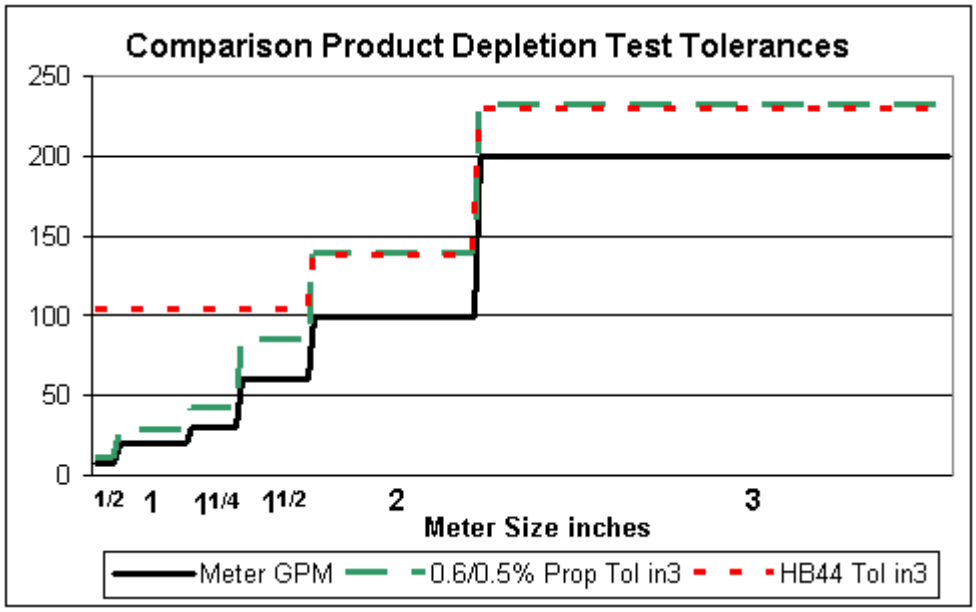
The submitter also provided the following supporting graphics:



Option 1 – 0.5 % across the board:



Option 2 – 0.6 % up to and including 100 gpm and 0.5 % thereafter:



In reviewing this item at its 2008 Interim Meeting, some NEWMA members felt that what is currently in HB 44 is sufficient and did not feel there was a problem determining meter size. Until NEWMA hears further about problems determining meter size from other states, it recommends this be made an Information item.

At the 2010 NCWM Annual Meeting, the Committee heard comments from Mr. Andersen, New York, reiterating NEWMA's request to place this item on the Committee's 2011 Interim Agenda.

The Committee agreed to NEWMA's request and will include this item with the list of carryover items that will be submitted to the fall regional weights and measures association meetings.

Part 4.42, Farm Milk Tanks - Item 1: N.5.1. Verification of Master Metering Systems

Source: Central Weights and Measures Association (CWMA)

Purpose: Eliminate unnecessary verification testing for master meters capable of operating within a prescribed percent of the applicable tolerance.

Item Under Consideration: Amend paragraph N.5.1. as follows:

> **N.5.1. Verification of Master Metering Systems.** – A master metering system used to gauge a milk tank shall be verified before and after the gauging process. A master metering system used to calibrate a milk tank shall be verified before starting the calibration and re-verified every quarter of the tank capacity or every 2000 L (500 gal), whichever is greater. **A master metering system capable of operating within 25 % of the applicable tolerance in T.3. Basic Tolerance Values needs only be verified before and after the gauging process.**
>
> **(Added 201X)**

Background/Discussion: The CWMA received a proposal at its fall 2008 Interim Meeting to modify paragraph N.5.1. Verification of Master Metering Systems in NIST HB 44 Section 4.42. Farm Milk Tanks. USDA provided data suggesting that mass flow meters currently used to test milk tanks would not have to be verified every quarter of the tank capacity, or every 2000 L (500 gal), whichever is greater. The CWMA does not have data that supports that all mass flow meters will perform to the same standard. Based on this information the CWMA

recommends this proposal be made an Information item and is considering the proposal outlined in the recommendation above.

At its fall 2008 meeting, NEWMA recommended this proposal be made an Information item. NEWMA forwarded the following additional justification for the proposed change from Mr. Richard Koeberle, Federal Milk Market Administrator:

> The use of a mass flow meter has eliminated the variations seen in other types of meters used to calibrate or check farm bulk milk tanks. The reverification of the meter at every quarter of tank capacity adds time and potentially introduces errors by requiring the hose or valves to be moved before the tank is totally filled. This proposal originated by Mr. Tom MacNish, from the Cleveland Market Administrator, and was presented to the CWMA in September [2008]. Mass flow meters have been used extensively in their market with excellent results.

Data submitted with this item is posted on the S&T Committee's web page on the Members Only section of the NCWM website at: www.ncwm.net/content/members-only.

At the 2010 NCWM Annual Meeting, the Committee heard comments from Mr. Andersen, New York, reiterating NEWMA's request to place this item on the Committee's 2011 Interim Agenda.

The Committee agreed to NEWMA's request and will include this item with the list of carryover items that will be submitted to the fall regional weights and measures association meetings.

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Report of the Professional Development Committee (PDC)

Ross Andersen, Chairman
New York Weights and Measures
Albany, New York

Reference
Key Number

400 INTRODUCTION

This is the report of the Professional Development Committee (hereinafter referred to as the "Committee" or PDC) for the 95th Annual Meeting of the National Conference on Weights and Measures (NCWM). This report is based on the Interim Report offered in the NCWM Publication 16, testimony heard at public hearings, comments received from the regional weights and measures associations and other parties, the addendum sheets issued at the Annual Meeting, and actions taken by the membership at the voting session of the Annual Meeting. The informational items presented below were adopted as presented when the Committee's report was approved.

Table A identifies the agenda items in the Report by Reference Key Number, Item Title, and Page Number. Item numbers are those assigned in the Interim Meeting agenda. A Voting item is indicated with a "**V**" after the item number. An item marked with an "**I**" after the reference key number is an Information item. An item marked with a "**D**" after the reference key number is a Developing item. The developing designation indicates an item has merit; however, the item was returned to the submitter for further development before any action can be taken at the national level. Table B lists the appendices to the report.

Table A
Index to Reference Key Items

Reference Key Number		Title of Item	Page
400		**INTRODUCTION**	**1**
401		**EDUCATION**	**2**
401-1	I	National Certification Program (NCP)	2
401-2	D	Instructor Improvement	6
401-3	I	Recommended Topics for Conference Training	8
402		**PROGRAM MANAGEMENT**	**9**
402-1	I	Safety Awareness	9
402-2	I	PDC Publication	9

Table B
Appendices

Appendix	Title	Page
A	NCWM National Certification Program, NCWM Curriculum Work Plan – January 2010	A1
B	NCWM National Training Program, Certification Discipline for Retail Motor Fuel Devices (RMFD) Beta Exam – February 2010	B1
C	NCWM National Training Program, Instructions for On-Line Certification Examinations – Beta Exam	C1

Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
No Voting items					

Details of All Items
(In Order by Reference Key Number)

401 EDUCATION

401-1 I National Certification Program (NCP)

Source: Carryover Item 401-1. (This item originated from the Committee and first appeared on its agenda in 2003.) The Committee has combined items previously numbered as 401-1 National Certification Program (NCP), 401-2 Create a Curriculum Plan, and 401-4 Certification into one item covering all aspects of the Certification Program.

Background/Discussion: For complete background information, see the PDC page or the PDC Meeting archives on the NCWM website (www.ncwm.net), or the previous Committee reports available from the National Institute of Standards and Technology (NIST) website (www.nist.gov/pml/wmd/index.cfm).

The Committee set a goal at the 2009 Annual Meeting to conduct an on-line beta test on the retail motor fuel curriculum. The beta test is completed and the results reviewed and analyzed.

Results:

- 63 took exam/43 completed exam/20 timed out and did not receive a score.
- 6 passed with passing set at 85 %.
- 20 would have passed if passing was set at 75 %.
- 27 would have passed if passing was set at 70 %.

What did the results show about the exam process itself?

- The settings of the service caused a large number of people to time out. Each section of the test was timed. Any remaining time from one section could not be added to the next sections, but the instructions did not make that clear to the candidates. In addition, if candidates timed out in the first section, they were not allowed to continue to the other sections. The NCWM staff has corrected this. In the future, if a candidate times out on a section, the candidate will progress to the next section or the test will end. The candidate will receive the score for all questions answered correctly.
- Some candidates had web navigation issues. It was difficult or impossible to use an electronic version of Handbook 44 as a reference while taking the test. Reviewing past answers was cumbersome because the

candidates were required to page back question by question. There is no solution for this as this is the way the testing service operates. Candidates should consider using a hardcopy of Handbook 44 when taking the test.

- The illustration graphic quality needs improvement. Every effort will be made to provide quality graphics in the first case and to improve graphics where test results show that improvements are necessary.

- The grading of short answer questions was very intolerant of variations like capitalization and punctuation. The Committee believes that short answer questions are necessary to test for the ability to apply code requirements. To help in this regard, the Committee is working on improved instruction on how to take the test. A sample test, which will not be timed or graded, may be built into the test itself. The Committee is also looking at using a pull-down help feature on some questions to aid the candidate in properly formatting the answers.

- Some candidates could not see the entire question without scrolling down. Others experienced difficulty seeing the graphics. These problems are related to the candidates' computer settings and can be corrected by changing the screen resolution, or by using the zoom function on the bottom of the Internet browser. The graphics can be seen by adjusting the candidates' browser security settings. The Committee thinks that the sample test can be designed so that the candidate discovers these problems before getting to the real test. The candidate will then have the opportunity to leave the exam and make the needed setting changes or consult with the information technology (IT) department as needed. In addition, a guide to taking the NCWM certification tests could be written addressing frequently asked questions (FAQs) that arise out of taking the tests.

What did the results show about the exam content?

- The Committee analyzed the scoring versus the elapsed time on each section and found that 16 of the 20 people, who timed out on the test, did so on the first section relating to general Handbook 44 questions. Three people timed out in the general liquid measuring section, and only one person timed out on the retail motor fuel device (RMFD) section. The Committee will be adjusting the timing by taking five minutes off the RMFD section, and adding it to the Handbook 44 section. The Committee also expects that timeout problems will decrease as candidates become accustomed to taking tests with timed sections.

- Questions with high error rates and low average times were identified as problem questions. People thought they knew the answers as evidenced by the quickness of their responses, but the error rate indicates that something is potentially wrong with those questions. Questions with high error rates and long response times will also be subject to review to determine whether they exceed the learning objectives.

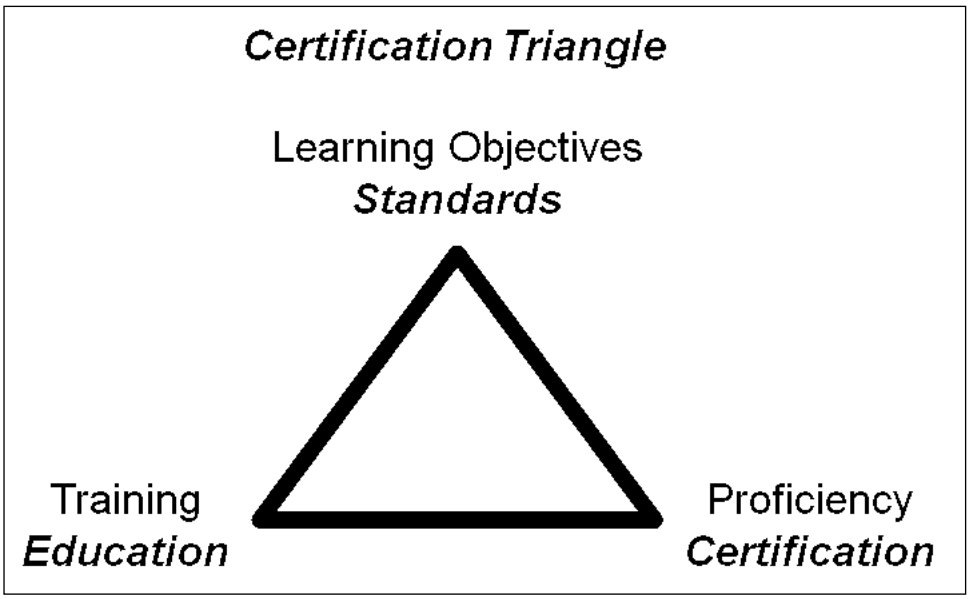
- Ms. Georgia Harris, NIST Weights and Measures Division (WMD), assisted the Committee with information on International Organization for Standardization (ISO) 17204, which is the ISO guide for certification bodies. One component of this guide is analysis of the cut score that defines the passing grade. A wealth of information exists on setting the cut score to define the minimally competent person. The competent group includes individuals at the basic, proficient, and advanced levels. The Committee wants to ensure that the candidate at the bottom of the basically competent group has a reasonable chance of passing the test. Based upon the results of the beta test, the Committee thinks that the cut score for the RMFD test should be set at either 70 % or 75 %.

- Future tests will require similar question evaluation and cut score analyses that will require staff resources to coordinate the review of questions and tests.

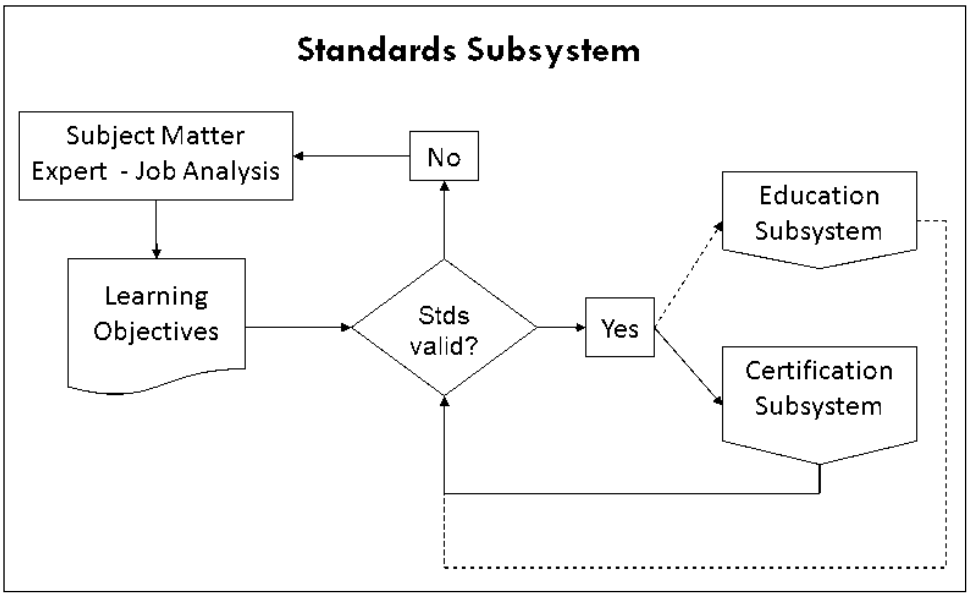
What did the result show about the Committee's plan for certification?

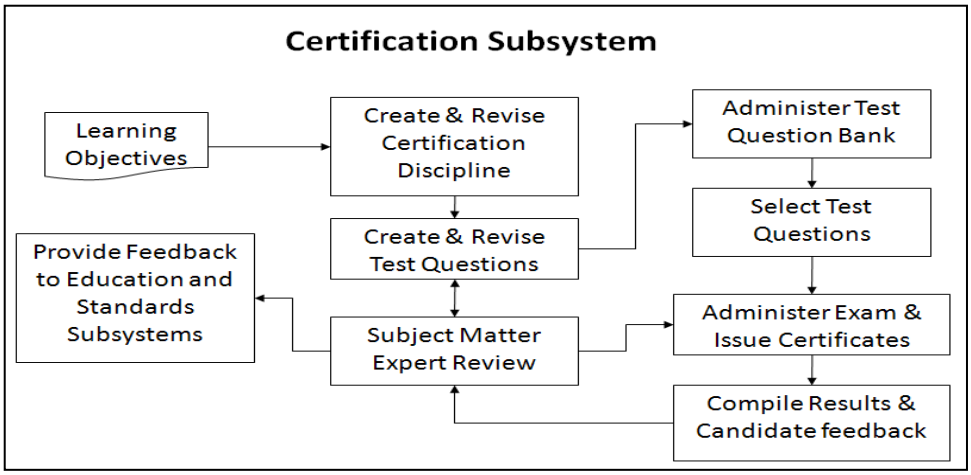
The low passing rate may indicate that the parts of the system were not working together. It is important that users of the NCWM Certification Program understand how the pieces fit together and form a coherent system. To

illustrate the relationships, we can describe the system as a triangle of interdependent parts (see diagram below). The standards come in the form of goals with measureable learning objectives. The education section involves training provided to help the candidate reach the desired level of proficiency for each of the learning objectives. The certification involves an assessment of proficiency that measures whether or not the objectives have been met.



Until now, the Committee has focused attention on the standards and the certification pieces in the triangle, as illustrated in the flowcharts below.





The Committee has described this work in a number of documents available on the PDC pages of the NCWM website:

- the Curriculum Outline, which breaks the profession of Weights and Measures into component parts called curriculum segments;
- the Core Competency Model, which explains how to create the curriculum segments as learning goals with measureable learning objectives or milestones;
- the Curriculum Segments that have been developed; and
- the Certification Disciplines, which identify the areas of certification offered and the Curriculum Segments on which the exam will be based.

Results of the beta test indicate that as the program moves forward, it will be very important that trainers integrate the learning objectives into their materials and design courses in such a way that students will achieve the desired levels of learning. See Item 401-2 Instructor Improvement.

What will happen next?

The PDC will adjust the timing allocation on the test, will review and fix the problem questions, develop the practice test, and set the cut score. The NCWM board will be continuing to develop the infrastructure to manage the Certification Program.

Discussion: Comments were heard from the regulatory sector noting that the average score was 72 %, but the test takers were most likely the cream of the crop of the regulatory agencies. Therefore, the test may not be a basic test even if the bar is lowered to 72 %. Concern was expressed that the cut score not be set so high that the test would not be useful for service agent certification. The necessity of short answer questions on a basic test was questioned. The speaker thought that making sure that the test is really a basic test was more important than rushing the test into production by an August 1, 2010, deadline.

A beta test taker found that the timing element was intimidating, and questioned whether the test itself might be more useful as a learning tool than as a certification tool. He suggested candidates be allowed to take the test together and discuss the questions. The Committee agrees that collaborative work would be an excellent training technique, but certification must be done individually.

An associate member indicated that there is a lot of interest in using the test at the associate level. The speaker echoed the regulatory member's concerns that the quality of the people taking the test was in the upper 20 % and that if service people had taken this test the passing level would have been much lower.

The Committee plans to ask the people who took the beta test to be among the first people to take the official version, so that we can measure improvement in the test.

401-2 D Instructor Improvement

Source: Carryover Item 401-3 (This item originated from the Committee and first appeared on its agenda in 2003.)

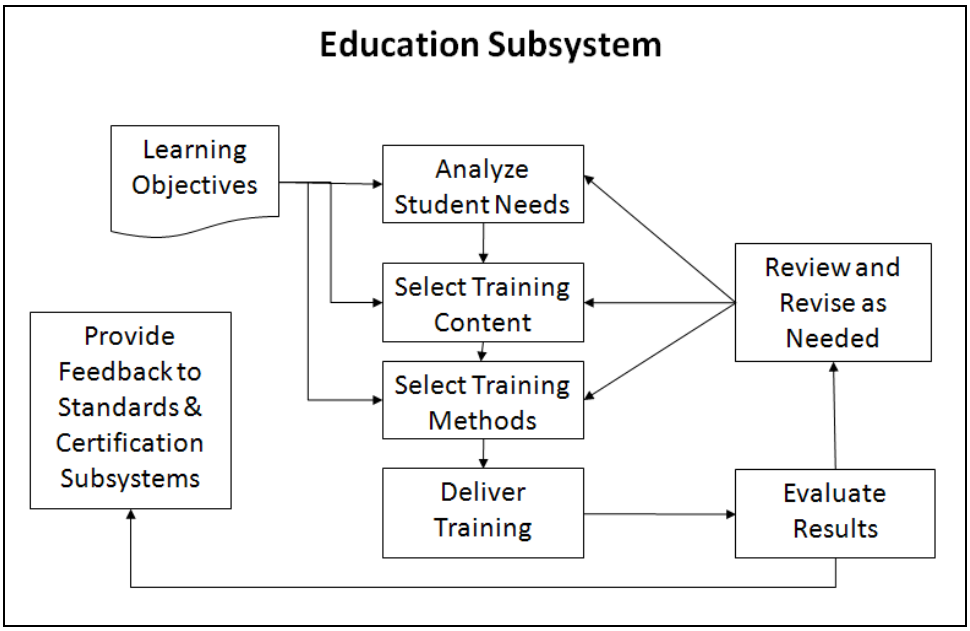
Background/Discussion: The Committee is charged with the coordination of activities to improve the competence of instructors and the uniformity of delivery of the curriculum. For complete background information, see the PDC pages of the NCWM website (www.ncwm.net). After logging in under the members' area, look under the PDC Legacy Documents for the PDC Formal Scope.

Industry has continued to support and sponsor training on their new technology for weighing and measuring devices. NIST has assured the Committee that work will continue towards providing technical training for the trainers. The Committee supports the recommendation from the WWMA to encourage jurisdictions to participate in the NIST, WMD Instructor Training program as those classes become available.

At the NCWM 2009 Interim Meeting, a work group from the NCWM Board of Directores (BOD) provided information to the Committee on initiatives it was considering to use the NCWM website to provide training materials and other trainer aids, such as presentations, videos, etc. The Committee applauds and supports the BOD's efforts. However, the Committee will continue to maintain this item as low priority until other parts of the Certification Program are completed.

At the 2009 Annual Meeting and 2010 Interim Meeting, the Committee reported that no action is being taken on this item while the Committee concentrates on curriculum development and the establishment of the Certification Program.

Prior to the 2010 open hearing, Ms. Harris, NIST WMD, provided the Committee with reference material on teaching methods and assessment of training success. Distilling the essence of these materials, the Committee feels that instructors need training in more than just the technical material; they need training in setting the learning objectives, developing the training materials with those objectives in mind, selecting training methods that incorporate adult learning styles, and evaluating the effectiveness of their training.



The chart below covers three levels of learning objectives and relates them to the training activities most likely to be successful and best methods for assessing the success of the training. The curriculum segments state the learning objectives using verbs similar to those in the bottom row of the table. These drive both the training activities required to promote adult learning and the assessment tools appropriate to measure success at that level.

Assessments	Multiple Choice	Multiple Choice	Practical Examples Short Answer
Training Activities	Lecture Videos Examples	Discussion Review Learner Presentation	Exercises Simulations Demonstrations
Cognitive Levels	**Knowledge**	**Comprehension**	**Application**
	Define Relate List	Restate Discuss Describe Identify	Employ Apply Use Illustrate

The NIST WMD has expressed strong interest in collaborating with the NCWM in efforts to educate instructors in adult learning techniques and relating them to the learning objectives in the NCWM curriculum. The Committee is considering developing another document describing how to translate a curriculum segment into a lesson plan.

The Committee would like to remind everybody designing training materials that the Core Competency Model document is available on the PDC section of the NCWM website. (www.ncwm.net)

Discussion: No comments were received from the floor.

401-3 I Recommended Topics for Conference Training

Source: Carryover Item 401-5 (This item originated from the Committee and first appeared on its agenda in 2003.)

Background/Discussion: The Board has charged the Committee with responsibility for selecting appropriate topics for the technical sessions at future Annual Meetings. The Board asked that the Committee review and prioritize possible presentations and submit those to the Chairman. The Chairman would then work with the NCWM staff to make the arrangements and schedule the sessions.

The Committee continues to carry the following list and recommends these topics for possible training seminars, roundtables, or symposia for presentation at the NCWM meetings:

(a) Marketplace Surveys;

(b) Auditing the Performance of Field Staff (Mr. Will Wotthlie, Maryland, volunteered to lead the session);

(c) Alternative Fuels (Fuel Volatility Issues and Ethanol Blending, and biodiesel blend issues);

(d) Device Inspections Using a Sampling Model;

(e) Emerging Issues;

(f) Ergonomics (including Proper Lifting Techniques, Back and Stress Techniques and Office Ergonomics);

(g) Public Relations, specifically dealing with aggressive/angry people (recommended by the Southern Weights and Measures Association [SWMA]);

(h) General Safety Issues (recommended by the WWMA);

(i) Defensive Driving (recommended by the WWMA);

(j) Administrative Civil Penalty Process (recommended by the WWMA);

(k) Price Verification (recommended by the WWMA);

(l) Customer Service (recommended by the WWMA);

(m) Ethics (recommended by the Central Weights and Measures Association [CWMA]);

(n) Automatic Temperature Compensation (ATC) testing for field inspectors;

(o) Hydrogen Measuring Systems;

(p) Handbook 44 Scale Code Tare Changes;

(q) Wet Tare/U.S. Department of Agriculture (USDA) Issues; and

(r) Moisture Loss.

The Committee asked for suggestions for future training or recommendation on how to prioritize suggestions already on the list. Based on the needs identified in the first two items (401-1 and 401-2), the Committee would like to recommend that the regional associations and the NCWM consider offering training or trainers on how to identify learning objectives, and design training materials that integrate interactive activities and adult learning styles. Ms.

Harris mentioned that NIST has a 1.5 hour course on taking technical material and turning it into a course for adult learners.

Discussion: No comments were received from the floor.

The committee received written comments from Mr. Paul Hoar, AgriFuels LLC, suggesting that the Committee challenge the Associate Membership to provide training materials (videos, operations manuals, etc.) to the Conference for use in developing the skills of the NCWM members and state weights and measures officials.

402 PROGRAM MANAGEMENT

402-1 I Safety Awareness

Source: Carryover Item 402-1 (This item originated from the Committee and first appeared on its agenda in 2003.)

Background/Discussion: In the past, the Committee's responsibility extended to the identification of safety issues in the weights and measures field and included efforts to increase safety awareness. Jurisdictions are encouraged to send their safety reports and issues to their regional safety liaison, who in turn will forward them to the PDC. Below is a list of the Regional Safety Liaisons.

SWMA	Mr. Steve Hadder, Florida Department of Agriculture and Consumer Services
WWMA	Mr. Douglas Deiman, Alaska Division of Measurement Standards/CVE
CWMA	Ms. Julie Quinn, Minnesota Department of Commerce
NEWMA	Mr. Michael Sikula, New York Bureau of Weights and Measures

The Committee will continue to ask the regions to prepare articles for the NCWM newsletter and revised the schedule as follows for future issues. The Committee plans to notify the Regional Safety Coordinators as their assignment date approaches.

Association	Issue	Publication Date	Article Deadline
NEWMA	2010, Issue 3	September	July 15, 2010
SWMA	2011, Issue 1	February	January 15, 2011
WWMA	2011, Issue 2	June	April 15, 2011
CWMA	2011, Issue 3	September	July 15, 2011

All articles should be e-mailed to the NCWM headquarters at info@ncwm.net.

The Committee has not received any reports of safety incidents in the last six months.

Mr. Craig Harris, Ohio, has prepared safety material on handling diesel emission fluid (DEF). Anyone interested in seeing or utilizing this material should contact the Director, Ohio Weights and Measures.

The Committee asks for suggestions on safety articles people would like to see in future newsletters and/or safety issues which must be addressed immediately. They would like to remind regional associations to check the submission deadlines for their upcoming article assignments. Completed articles should be sent to NCWM headquarters by the submission deadline.

Discussion: The Committee was informed that Mr. Douglas Deiman, Alaska, is now the safety liaison for the WWMA.

402-2 I PDC Publication

Background/Discussion: This item originally served to record the development of various documents prepared in pursuit of our training and Certification Programs. These are available on the Member's section of the NCWM

website at www.ncwm.net. At the 2008 Annual Meeting, the Committee indicated its desire to eliminate this item from the agenda. However, in the report from the CWMA PDC, the Committee received a proposal to create a standard like Handbook 130, *Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality,* or Handbook 44, *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices,* to serve as the work product of the Committee. This standard could be reviewed, amended, and adopted by the NCWM to make it a living document. The Committee considered this proposal during discussions held at the 2009 Interim Meetings.

Based on feedback at the 2009 NCWM Interim Meeting, the PDC decided to move forward on the new publication to be titled NCWM Publication XX National Certification Program Guide. This Guide will serve to document the details of the Certification Program.

The Guide will remain under control of the PDC, but will not require a formal NCWM vote to add new sections or revise existing sections. The Committee will add and modify sections continuously to meet its priority objectives with a concerted effort to respond to feedback from program users and the NCWM membership. The three main sections of the Guide would include:

1. Program Administration – combines historical documentation (curriculum outline and work plan, etc.) with administrative procedures on administering exams and records of certifications;

2. Competency Standards – includes the curriculum segments that describe the objectives and measurable competencies that will be used in certification; and

3. Certification Disciplines – includes one document per certification area delineating the standards from the curricula that will be covered in the exam and the weighting of the competencies.

All segments of the PDC Guide will be posted online as they are developed. New pages within the NCWM website will be created for the curriculum disciplines and segments so that interested parties can easily find and utilize this material.

Guidelines for operation of the Certification Program still need developing and will be posted online when they are completed.

As of July 2010, the PDC Guide will remain on the website at this point and not be printed as a separate handbook. The Committee anticipates organizing the material into three sub-pages (Curriculum Development, Training, and Certification) following the triangle model pictured in Item 401-1. We will work with the NCWM staff to establish those pages and keep them updated.

Discussion: No comments were received from the floor.

Mr. Ross Andersen, Chair, New York

Ms. Stacy Carlsen, Marin County, California
Ms. Julie Quinn, Minnesota
Mr. Dale Saunders, Virginia
Mr. Steven Grabski, Walmart

Professional Development Committee

Appendix A

National Conference on Weight and Measures
National Certification Program

NCWM CURRICULUM WORK PLAN

Revised January 2010

Segment/Subject

Level 1/Level 2/Level 3

1. Fundamentals of Weights and Measures
- 1.1. Introduction to Weights and Measures Programs
- 1.2. W&M Laws and Regulations
- 1.3. Field Standards and Test Equipment
- 1.4. State Program Scope and Overview
- 1.5. Enforcement Powers

2. Weights and Measures Administration
- 2.1. Fundamentals of Weights and Measures Administration (Commercial System, Powers and Duties, etc.)
- 2.2. Administration Functions (Personnel, Management, Budget, Safety, etc.)
- 2.3. Legislation and Regulations (Legal Considerations, Interaction with Legislature, Stakeholders, Industry, etc.)
- 2.4. Regulatory Control (Device Inspection, Commodities, Complaints)
- 2.5. Laboratory Metrology Administration (Purpose of Laboratory, Responsibilities of Metrologist, NIST Expectations for Recognition of Laboratory, Quality System, Training Requirements, etc.)
- 2.6. Public Relations and Communications (Publicity, Public Relations, Communications)

3. Laboratory Metrology
- 3.1. NIST Basic Metrology
- 3.2. NIST Intermediate Metrology
- 3.3. NIST Advanced Metrology

4. Device Control Program
- 4.1. Safety Considerations
- 4.2. NIST Handbook 44 – Introduction to Device Control
- 4.3. Weighing Systems, General
  - 4.3.1. Static Electronic Weighing Systems, General
  - 4.3.2. Static Mechanical and Hybrid Weighing Systems, General
  - 4.3.3. Dynamic Weighing Systems, General
  - 4.3.4. Precision Weighing Systems Class I and II
  - 4.3.5. Small Capacity Weighing Systems Class III
  - 4.3.6. Medium Capacity Weighing Systems Class III
  - 4.3.7. Large Capacity Class III and IIIL Weighing Systems (Vehicle and Livestock)
  - 4.3.8. Large Capacity Class III and IIIL Weighing Systems - Advanced
  - 4.3.9. Railroad Track Weighing Systems
  - 4.3.10. In-Motion Railroad Track Weighing Systems

- 4.3.11. Hopper Weighing Systems
- 4.3.12. Automatic Bulk Weighing Systems
- 4.3.13. Automatic Weighing Systems
- 4.3.14. Belt Conveyor Weighing Systems
- 4.3.15. In-Motion Monorail Weighing Systems
- 4.3.16. Point-of-Sale Weighing Systems
- 4.3.17. Other Specialty Weighing Systems

4.4. Dynamic Measuring Systems – General
- 4.4.1. Retail Motor Fuel Dispensers
- 4.4.2. Loading Rack and Other Stationary Metering Systems
- 4.4.3. Loading Rack and Other Stationary Metering Systems – Advanced
- 4.4.4. Vehicle-Tank Meter Systems
- 4.4.5. Vehicle-Tank Meter Systems – Advanced
- 4.4.6. Milk Metering Systems
- 4.4.7. Water Meters
- 4.4.8. LPG/Anhydrous Ammonia Liquid Metering Systems
- 4.4.9. LPG/Anhydrous Ammonia Liquid Metering Systems – Advanced
- 4.4.10. LPG Vapor Meter Systems
- 4.4.11. Mass Flow Metering Systems
- 4.4.12. Other Metering Systems (Cryogenics, Carbon Dioxide, etc.)

4.5. Static Volume Measuring Systems – General
- 4.5.1. Liquid Measures
- 4.5.2. Farm Milk Tanks
- 4.5.3. Dry Measures

4.6. Other Measuring Systems
- 4.6.1. Taximeters and Odometers
- 4.6.2. Wire and Cordage Measuring Systems
- 4.6.3. Linear Measures
- 4.6.4. Timing Devices
- 4.6.5. Weights
- 4.6.6. Multiple Dimension Measuring Systems

4.7. Quality Measuring Systems
- 4.7.1. Grain Moisture Meters
- 4.7.2. NIR Grain Analyzers
- 4.7.3. Carcass Evaluation Systems

5. Market Practices, Laws and Regulations (NIST Handbook 130) and Commodities (NIST Handbook 133)

5.1. Safety Considerations – Market Practices, NIST Handbook 130, NIST Handbook 133

5.2. NIST Handbook 130 – Laws and Regulations
- 5.2.1. NIST Handbook 130 – General Provisions
- 5.2.2. Packaging and Labeling Regulations
- 5.2.3. Method of Sale Regulations
- 5.2.4. Quality of Automotive Fuels and Lubricants
- 5.2.5. Price Verification

5.3. NIST Handbook 133 – Package Net Contents Control
- 5.3.1. Commodities – General
- 5.3.2. Packages Labeled by Weight, Standard, and Random
- 5.3.3. Packages Labeled by Weight, Special Commodities
- 5.3.4. Packages Labeled by Volume (Volumetric and Gravimetric Testing)
- 5.3.5. Packages Labeled by Volume, Special
- 5.3.6. Packages Labeled by Length/Area/Thickness
- 5.3.7. Packages Labeled by Count
- 5.3.8. Other Package Types

5.4. Test Purchases

5.5. E-Commerce

Note: Initial Verification has been intentionally left off this listing and will be addressed later.

Appendix B

National Conference on Weights and Measures
National Training Program

Certification Discipline
for
Retail Motor Fuel Devices (RMFD)
Beta Exam – February 2010

Prepared by the NCWM Professional Development Committee

The NCWM is offering a (beta) certification examination on the subject above. The examination will be taken on-line via the NCWM website. You must register with the NCWM and be granted a user authorization to access the test site. For registration information call the NCWM at (402) 434-4880 or email info@ncwm.net. Be sure to include the exam title in the subject line.

Format and Duration:

The examination will be in three sections with a total of 50 questions and a two hour time limit to complete all three parts. The test will be given in one session and you may not log off and then attempt to return to that exam. You must complete each section before moving to the next section.

The exam is OPEN BOOK, and you may make use of any reference materials, training documents, and procedural guides at your disposal. You are expected to take the examination alone and may not receive assistance from any other person. You will be asked to affirm that at the conclusion of the examination.

Test instructions will be provided on-line. Since the test is electronically graded, the answer must be marked or typed correctly. The test questions will be either multiple choice, fill-in-the-blank, or compliance/citation. For multiple choice questions, you will be asked to pick the best answer from four options. For fill-in-the-blank questions, you must enter the specific answer, typed correctly. For compliance/citation questions, you will be given information describing a situation and asked to assess compliance. Answer yes if the situation complies based on the information provided, otherwise provide the specific citation if the device does not comply. The form of the citation will typically be something like S.X.X. for a specification, T.X.X. for a tolerance, N.X.X. for a note, or UR.X.X. for a user requirement. Typically, you will be directed to the specific Handbook Code so reference to the code designations, such as 1.10. for the General Code, will usually not be necessary.

Subject of Examination:

1. Segment 4.2. Introduction to Device Control – 15 questions
   These questions test for knowledge, understanding, and ability to apply the basic requirements applicable to all weighing and measuring devices. This may include questions on the selection, care and use of standards, the legal basis of NIST Handbook 44, the organization of that handbook, understanding of

Fundamental Considerations, knowledge of systems of measurement units, understanding and application of General Code requirements, and understanding of NTEP and Certificates of Conformance CC).

2. Segment 4.4. Dynamic Measuring Systems – General – 15 questions
   These questions test for knowledge and understanding of the basic technologies used in liquid measuring devices (LMD), understanding of classification of various LMD, ability to operate LMD and interpret indications, understanding and ability to apply code requirements from NIST Handbook 44 LMD Code, and understanding and ability to conduct basic tests of LMD and properly apply tolerances.

3. Segment 4.4.1. Retail Motor Fuel Dispensers (RMFD) – 20 questions
   These questions test for knowledge and understanding of the basic technologies used in RMFD, understanding and ability to apply code requirements from NIST Handbook 44 LMD Code for RMFDs, and understanding and ability to conduct basic tests of RMFDs and properly apply tolerances.

Additional Information:

For more details on the subject matter for this exam, refer to the individual curriculum segments as published on the Certification pages on the NCWM website at www.ncwm.net/certification.

Passing Score and Grading: (not applicable for Beta Exam)

Weights and Measures regulatory officials	85 % (43 or more correct answers)
Service agents	75 % (38 or more correct answers)

You will be given a score for each section and total score immediately after completing the exam (or upon reaching the two-hour time limit). To protect the integrity of the test questions, you will not be advised of the specific questions you answered incorrectly. The PDC Committee will be reviewing incorrect answers in periodic reviews and will adjust scores in select cases, if a question is judged invalid. If your score is affected, you will be notified.

If you wish to challenge any of the questions, there will be a section at the end of the examination where you can offer comments. You may also contact the NCWM PDC through the NCWM staff via the website.

Appendix C

National Conference on Weights and Measures
National Training Program

Instructions for On-Line Certification Examinations – Beta Exam

Prepared by the NCWM Professional Development Committee

Exam Title: 4.4.1 Retail Motor Fuel Devices

Scope of Exam: The exam will consist of three sections comprising 50 test questions as follows:

1. **Segment 4.2. Introduction to Device Control** – 15 questions
   These questions test for knowledge, understanding, and ability to apply the basic requirements applicable to all weighing and measuring devices. This may include questions on the selection, care and use of standards, the legal basis of NIST Handbook 44, the organization of that Handbook, understanding of Fundamental Considerations, knowledge of systems of measurement units, understanding and application of General Code requirements, and understanding of the National Type Evaluation Program (NTEP) and Certificates of Conformance (CC).

2. **Segment 4.4. Dynamic Measuring Systems – General** – 15 questions
   These questions test for knowledge and understanding of the basic technologies used in liquid measuring devices (LMDs), understanding of classification of various LMDs, ability to operate LMDs and interpret indications, understanding and ability to apply code requirements from NIST Handbook 44 Liquid Measuring Device Code, and understanding and ability to conduct basic tests of liquid measuring devices and properly apply tolerances.

3. **Segment 4.4.1. Retail Motor Fuel Dispensers** – 20 questions
   These questions test for knowledge and understanding of the basic technologies used in retail motor fuel devices, understanding and ability to apply code requirements from NIST Handbook 44 Liquid Measuring Device Code for RMFDs, and understanding and ability to conduct basic tests of RMFDs and properly apply tolerances.

Time Limit: You must complete the test in one session limited to two hours from the time the first question screen appears. Each Section also has a time limit and once you complete the last test question in a section, you will not be allowed to go back to any question in that section. Please be sure you have completed and checked each question in the section before answering the last questions. You should plan a dedicated two hour slot and may not log out and back in.

Test Conditions: The exam is OPEN BOOK, and you may make use of any reference materials, training documents, and procedural guides at your disposal. You are expected to take the examination alone and may

not receive assistance from any other person. You will be asked to affirm that at the conclusion of the examination.

Navigation: You may move ahead and back within a test section using the F8 (ahead) key and F7 (back) key. This allows you to skip questions within a section and return to it later. Once you complete a section you will not be able to go back to any question in that section so be sure to answer all questions before leaving a section.

Types of Questions: Since the test is electronically graded, the answer must be marked or typed correctly. The test questions will be either *multiple choice, fill-in-the-blank, or compliance/citation*.

Multiple Choice - You will be asked to pick the best answer from four options. If there is more than one correct answer, you must select the best option.

Fill-in-the-Blank - You must enter the specific answer, typed correctly. When providing numerical answers, you will be informed of the number of decimal places to include in your answer.

Compliance/Citation - You will be given information describing a situation and asked to assess compliance. Answer yes if the situation complies based on the information provided, otherwise provide the specific citation if the device does not comply. DO NOT answer no as it will be scored incorrect. The form of the citation will typically be something like S.X.X. for a specification, T.X.X. for a tolerance, N.X.X. for a note, or UR.X.X. for a user requirement. You will typically be directed to the specific Handbook Code so reference to the code designations such as 1.10 for the General Code will usually not be necessary.

Scoring: You will receive a score for each section and for the total exam. The score for the section will show the number of questions and the number answered correctly. The final score will include the number of questions, the total answered correctly, and the percent correct.

Passing score for Weights and Measures Professionals is 85 % (43 or more correct answers).

Passing score for Service and Repair Technicians is 75 % (38 or more correct answers).

Comments and Challenges: The NCWM PDC encourages you to comment on the test to help us improve our product. If you wish to challenge any of the questions, contact the Committee via the NCWM e-mail at info@ncwm.net, and please include the exam title in the subject line.

Report of the National Type Evaluation Program (NTEP) Committee

Judy Cardin, Chairman
Chief
Wisconsin, Weights and Measures

Reference
Key Number

500 INTRODUCTION

The National Type Evaluation Program (NTEP) Committee (hereinafter referred to as "Committee") submits its report for consideration by the 95th National Conference on Weights and Measures (NCWM). This consists of the Interim Report presented in NCWM Publication 16 as amended in the Addendum Sheets issued during the Annual Meeting that was held July 11 - 15, 2010, in St. Paul, Minnesota. The Committee considered communications received prior to and during the 95th Annual Meeting that are noted in this report.

Table A identifies the agenda items in the report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Committee's Interim Meeting Agenda. A Voting item is indicated with a **"V"** after the item number or, if the item was part of the consent calendar, by the suffix "**VC**." An item marked with an **"I"** after the reference key number is an Information item. An item marked with a **"W"** was Withdrawn by the Committee and generally will be referred to the regional weights and measures associations because it either needs additional development, analysis, and input or does not have sufficient Committee support to bring it before the NCWM. Table B lists the appendices to the report, and Table C provides a summary of the results of the voting on the Committee's items and the report in entirety.

This report contains many recommendations to revise or amend National Conference on Weights and Measures (NCWM) Publication 14, Administrative Procedures, Technical Policy, Checklists, and Test Procedures or other documents. Proposed revisions to the publication(s) are shown in **bold face print** by ~~**striking out**~~ information to be deleted and **<u>underlining</u>** information to be added. Requirements that are proposed to be nonretroactive are printed in *italics*.

Note: The policy of the National Institute of Standards and Technology (NIST) is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Reference Key Number		Title of Item	Page
500		**INTRODUCTION**	1
500-1	I	Mutual Recognition Arrangement (MRA)	3
500-2	I	Mutual Acceptance Arrangement (MAA)	3
500-3	I	NTEP Participating Laboratories and Evaluations Reports	4
500-4	I	NTETC Sector Reports	9
500-5	I	Conformity Assessment Program	10
500-6	I	NTEP Contingency - NCWM NTEP Laboratory	14

Table B
Appendices

Appendix	Title	Page
A	NTETC Grain Analyzer Sector Meeting Summary	A1
B	NTETC Measuring Sector Meeting Summary	B1
C	NTETC Weighing Sector Meeting Summary	C1
D	NTETC Software Sector Meeting Summary	D1
E	NTETC Belt-Conveyor Scale Sector Meeting Summary	E1
F	Industry for a Better NTEP (IBN) Presentation	F1
G	Industry Letters: Verified Conformity Assessment Program (VCAP)	G1
H	Initial Verification Report Form	H1

Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
					No voting items
500 (In its entirety) voice vote	All Yeas	No Nays	All Yeas	No Nays	Passed

Table D
Glossary of Acronyms*

BIML	Bureau of International Legal Metrology	IR	International Recommendation
CD	Committee Draft[1]	MAA	Mutual Acceptance Arrangement
CIML	International Committee of Legal Metrology	OIML	International Organization of Legal Metrology
CPR	Committee on Participation Review	MC	Measurement Canada
DD	Draft Document[2]	R	Recommendation
DR	Draft Recommendation[2]	SC	Subcommittee
DV	Draft Vocabulary[2]	TC	Technical Committee
DoMC	Declarations of Mutual Confidence	UT	Utilizing Participant
IP	Issuing Participant	WD	Working Document[3]

[1] CD: a draft at the stage of development within a technical committee or subcommittee; in this document, successive drafts are numbered 1 CD, 2 CD, etc.

[2] DD, DR, DV: draft documents approved at the level of the technical committee or subcommittee concerned and sent to BIML for approval by CIML.

[3] WD: precedes the development of a CD; in this document, successive drafts are number 1 WD, 2 WD, etc.

* Explanation of acronyms provided by OIML.

Details of All Items
(In Order by Reference Key Number)

500-1 I Mutual Recognition Arrangement (MRA)

Background/Discussion: Both Measurement Canada (MC) and the NTEP labs continue striving to improve the data exchange under the Mutual Recognition Arrangement (MRA). During the 2009 NTEP labs meeting, MC supplied the U.S. NTEP labs with an updated version of an Excel spreadsheet program to standardize the test report forms for weighing devices that fall under the MRA. This updated version of the spreadsheet is now in use for evaluations conducted by the labs. NTEP will continue to review progress and work on improvements during the NTEP lab meetings.

The NTEP Committee was asked to consider expanding the MRA to higher capacity scales. The NTEP weighing labs agreed that expanding the MRA should be considered and MC expressed willingness to consider a proposal from NCWM.

The NTEP Administrator opened communication with MC with a recommendation to expand the MRA to include electronic platform scales up to 14 000 kg (30 000 lb). The current limit is 1000 kg. If the limit was expanded to just platform scales (i.e., not including hoppers, OBWS, IIIL), it appeared the only addition to what is required during an evaluation would be the field permanence test criteria (Pub 14, DES Sections 62.22, 63.7., 64.3., and 64.4.). Upon discussion with MC type evaluation personnel, other issues surfaced: a) MC tests some weighing elements up to 10 000 kg in the lab, applying influence factor requirements (power, temperature, EMI, etc). There is a size limit of 1.6 m x 1.6 m. NTEP has a lab test limit of 1000 kg and some of the chambers will not accommodate the larger weighing elements, and b) MC does not apply the minimum 20 day use limit for field permanence tests for "cost factor" reasons (i.e., they want to avoid a second visit to the site). MC initially had a 20 day use requirement, then did away with the time requirement, now only requiring 300 weighments, and may not want to reinstitute the time requirement for NTEP. Based upon this information, taking the current workload of the weighing labs and current economic conditions into consideration, NTEP does not plan to move forward with the expansion of the MRA to include larger capacity weighing devices at this time.

During the interim meeting, MC updated the Committee on their type approval program. They reported their intentions to sign an International Organization of Legal Metrology (OIML) MAA Declaration of Mutual Confidence (DoMC) for R 76 (Non-Automatic Weighing Instruments). This should have minimal affect on NTEP. They also stated their intent to continue the MRA with the NCWM. The Committee heard requests from U.S. manufacturers to consider expanding the MRA to include Automatic Weighing Systems and Multiple Dimension Measuring Devices.

The MRA is due to be renewed. Both countries have expressed a desire to renew the MRA because of the benefits. The NTEP Committee has met with representatives of MC regarding renewal and possible expansion of the MRA. The Committee plans to complete discussions and have a signed MRA by January 2011.

500-2 I Mutual Acceptance Arrangement (MAA)

Background/Discussion: Information regarding the OIML MAA can be found at www.oiml.org/maa. The NCWM has signed the OIML MAA DoMC for R 60 Load Cells as a utilizing participant.

The OIML technical subcommittee for TC 3/SC 5 "Conformity assessment" is revising the following OIML B documents that are classified as Basic Publications:

- OIML B 3, "OIML Certificate System for Measuring Instruments;" and
- A combined revision of OIML B 10-1, "Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations," and OIML B 10-2, "Checklists for Issuing Authorities and Testing Laboratories carrying out OIML Type Evaluations."

A 2 CD of B 3 and a 1 CD of the combined B 10 revision were distributed to TC 3/SC 5 "Conformity assessment" in December 2009. Comments were requested by April 30, 2010, in advance of a TC 3/SC 5 meeting planned for October 2010.

A meeting of the MAA Committee on Participation Review (CPR) was held in June 2009 in Berne, Switzerland. The NCWM was represented at the CPR meeting by Mr. Jim Truex. Dr. Charles Ehrlich and Mr. John Barton of NIST also attended the meeting as Secretariats of OIML TC 3/SC 5 "Conformity assessment" and TC 9 "Instruments for measuring mass," respectively.

A major discussion topic at the CPR meeting was whether to allow data from manufacturers' test laboratories (obtained under "unsupervised" conditions) as part of the MAA process. While this issue was not resolved at the CPR meeting, a way of possibly moving forward was developed. The CPR members have been queried to better understand the minimum requirements they would have for assessing the impartiality of manufacturers' test labs (MTLs), as well as the minimum requirements that an MTL must meet so that those MTLs that were excluded would not have a basis for complaint. CPR members have also been queried on their view of a possible compromise, where a minimum requirement on "frequency of supervision" of an MTL could be established. Comments from the CPR members were due by February 28, 2010.

Another discussion topic at the CPR meeting was whether to accept laboratories in three countries into the MAA program for OIML R 76 (non-automatic weighing instruments) and OIML R 60 (load cells). These three countries were approved, and this is anticipated to soon lead to a significant increase in the number of OIML MAA Certificates that are issued for these instruments.

During the Annual Meeting, Dr. Ehrlich gave an update of current international activities. Plans to revise the OIML B 3 and B 10 documents are proceeding (the present revision will not incorporate the inclusion of test data from MTLs into B 10, but will keep it in B 3). It has recently been clarified by a TC 3/SC 5 Member who wants to include test data from MTLs into B 10 that the data is not obtained under "unsupervised" conditions, but rather under conditions of "controlled supervision," meaning that, at a minimum, 1) a thorough review of the manufacturer's quality system has been performed; 2) the manufacturer has an independent testing laboratory that reports to the highest management level of the organization; 3) the Issuing Authority must be notified before any type approval tests are begun; 4) the Issuing Authority must be allowed to observe any and all testing on a short-notice basis; 5) the Issuing Authority is entitled to repeat any tests that it deems necessary, either at the manufacturing facility or at its own laboratory, at the manufacturer's expense; plus 6) possibly other requirements. In addition, the Issuing Authority (Issuing Participant) would take all responsibility for any test data it obtained from the manufacturer. It would not be required, however, that the Issuing Authority be present at the MTL for all of the testing. The NCWM has already determined that NTEP will not accept test data from manufacturers unless there is an Issuing Authority representative on-site at the manufacturer's site to supervise 100 % of the testing.

500-3 I NTEP Participating Laboratories and Evaluations Reports

Background: During the 2009 NCWM Annual Meeting, Mr. Truex, NTEP Administrator, updated the Committee on NTEP laboratory and administrative activities.

The NTEP weighing and measuring laboratories held a joint meeting March 31 - April 2, 2009, in Reynoldsburg, Ohio. The NTEP weighing laboratories also met in August 2009, prior to the meeting of the Weighing Sector in Columbus, Ohio. The NTEP measuring laboratories met again in October 2009, prior to the Measuring Sector meeting in Clearwater Beach, Florida.

During the Interim Meeting, NTEP Administrator Mr. Truex, reported that incoming applications remain strong and all labs are busy. He reported there is no backlog concern for measuring devices, but three of the brick and mortar weighing labs still report about a two to three month backlog. However, the number of outstanding applications and evaluations in process is in a downward trend. The Committee noted that NTEP is maintaining a very active business.

2010 NTEP Meetings:

• NTETC Belt-Conveyor Sector	February 24 - 25, 2010	St. Louis, Missouri
• NTETC Software Sector Meeting	March 2 - 3, 2010	Sacramento, California
• NTEP Laboratory Meeting	March 22 - 26, 2010	Sacramento, California
• NTETC Grain Analyzer Sector	August 25 - 26, 2010	Kansas City, Missouri
• NTETC Weighing Sector	August 31 - September 2, 2010	Columbus, Ohio
• NTETC Measuring Sector	October 1 - 2, 2010	Columbia, South Carolina

The Committee discussed the format and need for laboratory statistics that are routinely provided during NCWM Board meetings. The Committee decided to continue receiving updated statistics on a quarterly basis with some minor modifications. They also want statistics to be printed annually in the NTEP Committee addendum sheet.

The Committee plans to conduct a survey of NTEP customers and NTEP laboratories regarding customer service. The Board plans to use the results of the survey to form a continuous improvement plan for NTEP.

The Committee reviewed the following NTEP statistics:

General NTEP Statistics	**2008 - 2009**	**2009 - 2010**	**Grand Total**
	10/01/08 – 9/30/09	10/01/09 – 6/18/10	10/1/00 – 6/18/10
Total Applications Processed	(20) 310	(6) 176	(80) 2559
Applications Completed	336	215	2558
New Certificates Issued	301	197	2316
Active NTEP Certificates			1770

( ) = Reactivations

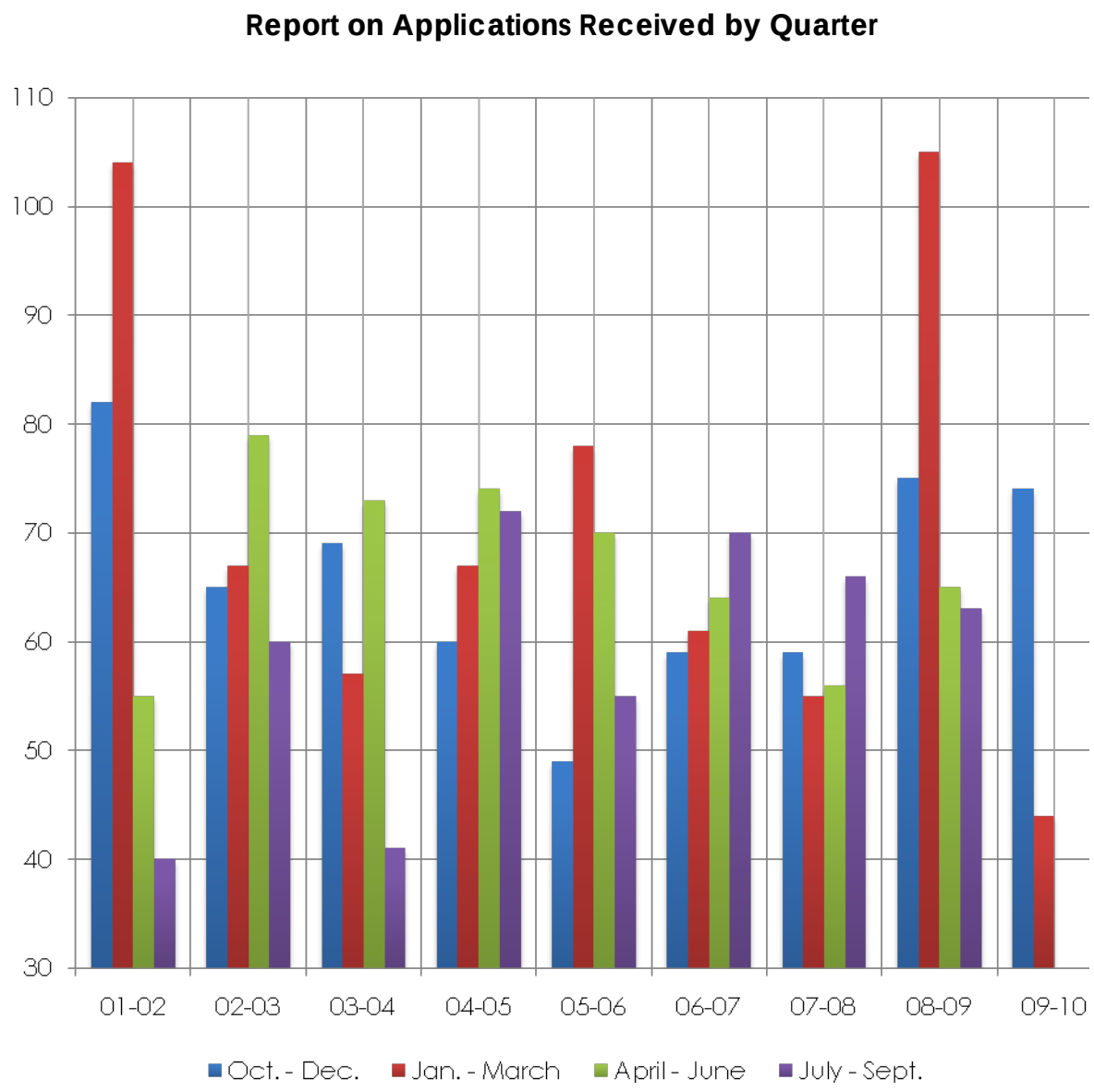
Assignments to Labs per Year	10/1/08 – 9/30/09	10/1/09 – 6/18/10	10/1/00 – 6/18/10
California	(1) 36	(1) 22	(14) 355
Canada	(4) 12	4	(4) 26
GIPSA-DC	0	1	15
GIPSA-KC	10	6	66
Kansas	(2) 14	9	(8) 54
Maryland	(1) 22	(3) 31	(12) 254
Minnesota	(Inactive)	(Inactive)	10
Montana	(Inactive)	(Inactive)	(1) 2
Nebraska	(Inactive)	(Inactive)	(1) 38
New York	(6) 30	5	(15) 157
NIST Force Group	2	(1) 10	(1) 71
North Carolina	(1) 12	(2) 7	(2) 75
Ohio	(8) 58	25	(15) 686
Oregon	(Inactive)	(Inactive)	6
NTEP Staff	(5) 135	58	(8) 734
Applications Not Yet Assigned to a Lab			1

( ) = Reassignments from another lab

Process Statistics	2009 - 2010	2000 - 2010
Average Time to Assign an Evaluation	5 Days	10 Days
Average Time to Complete an Evaluation		150 Days

Evaluations in Progress	3 Months	3-6 Months	6-9 Months	9-12 Months	Over 1 Year	Total
April 2009	58	29	27	17	36	167
June 2009	48	27	17	12	29	133
October 2009	41	33	18	12	33	137
December 2009	45	30	22	12	28	137
March 31, 2010	24	20	18	19	23	104
June 18, 2010	37	12	15	10	26	**100**

In Progress by Lab	3 Months	3-6 Months	6-9 Months	9-12 Months	Over 1 Year	Total
California	8	3	5	2	8	26
Canada	0	1	1	0	0	2
GIPSA-DC	0	0	0	0	0	0
GIPSA-KC	6	0	0	1	2	9
Kansas	2	1	4	1	2	10
Maryland	9	3	1	1	0	14
New York	2	0	1	1	5	9
NIST Force Group	3	3	1	1	1	9
North Carolina	2	0	0	0	0	2
Ohio	4	1	1	3	7	16
NTEP Staff	1	0	1	0	1	3
					Total Pending:	**100**



Applications	01-02	02-03	03-04	04-05	05-06	06-07	07-08	08-09	09-10
Oct – Dec	82	65	69	60	49	59	59	75	74
Jan – Mar	104	67	57	67	78	61	55	105	44
Apr – Jun	55	79	73	74	70	64	56	65	**58
Jul –Sep	40	60	41	72	55	70	66	63	
Total	**281**	**271**	**240**	**273**	**252**	**254**	**236**	**308**	**176**

500-4 I National Type Evaluation Technical Committee (NTETC) Sector Reports

Background/Discussion:

The NTEP Committee is working to correct the Sector report process to ensure the reports are posted for members on the NCWM website prior to the Interim Meeting.

Grain Moisture Meter and NIR Protein Analyzer Sectors: The NTETC Grain Moisture Meter and NIR Protein Analyzer Sectors held a joint meeting in Kansas City, Missouri, August 19 - 20, 2009. A draft of the final summary was provided to the Committee prior to the 2010 NCWM Interim Meeting for review and approval.

The next meeting of the Grain Moisture Meter and NIR Protein Analyzer Sectors is scheduled for August 25 - 26, 2010, in Kansas City, Missouri. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisors:

Ms. Diane Lee
NIST WMD
100 Bureau Drive, Stop 2600
Gaithersburg, MD 20899-2600
Phone: (301) 975-4405
Fax: (301) 975-8091
e-mail: diane.lee@nist.gov

Mr. Jack Barber
J.B. Associates
10349 Old Indian Trail
Glenarm, IL 62536
Phone: (217) 483-4232
e-mail: barber.jw@comcast.net

Measuring Sector: The NTETC Measuring Sector met October 2 - 3, 2009, in Clearwater Beach, Florida. A draft of the final summary was provided to the NTEP Committee prior to the 2010 NCWM Interim Meeting for review and approval.

The next meeting of the Measuring Sector is scheduled for October 1 - 2, 2010, in conjunction with the Southern Weights and Measures Association's 2010 Annual Meeting. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

Ms. Tina Butcher
NIST WMD
100 Bureau Drive, Stop 2600
Gaithersburg, MD 20899-2600
Phone: (301) 975-2196
Fax: (301) 975-8091
e-mail: tbutcher@nist.gov

Software Sector: The NTETC Software Sector met March 11 - 12, 2009, in Reynoldsburg, Ohio. A final draft of the meeting summary was provided to the Committee prior to the 2010 NCWM Interim Meeting for review and approval.

The NTETC Software Sector met March 2 - 3, 2010, in Sacramento, California. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Chairs and NTEP Administrator:

Mr. Jim Pettinato
Sector Chair
FMC Technologies
1602 Wagner Avenue
Erie, PA 16510
Phone: (814) 898-5250
Fax: (814) 899-3414
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Weighing Sector: The NTETC Weighing Sector met August 25 - 27, 2009, in Columbus, Ohio. A final draft of the meeting summary was provided to the Committee prior to the 2010 NCWM Interim Meeting for review and approval.

The next Weighing Sector meeting is scheduled for August 31 - September 2, 2010, in Columbus, Ohio. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

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Belt-Conveyor Scale Sector: The NTETC Belt-Conveyor Scale Sector met February 25 - 26, 2009, in St. Louis, Missouri. A final draft of the meeting summary was provided to the Committee prior to the 2010 NCWM Interim Meeting for review and approval.

The NTETC Belt-Conveyor Scale Sector met February 24 - 25, 2010, in St. Louis, Missouri. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

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The Committee is happy to report that all NTETC Sector reports were available to members at the time Pub 15 was published and is committed to insuring that electronic versions of sector reports are available with Pub 15 in the future.

The NTEP Committee reviewed and approved all 2009 NTETC Sector reports during the Interim Meeting.

500-5 I Conformity Assessment Program

Background/Discussion: The Conformity Assessment Program was established to ensure devices produced after the device has been type evaluated and certified by NTEP continue to meet the same requirements. This program has three major elements: (1) Certificate Review (administrative); (2) Initial Verification (inspection and performance testing); and (3) Verified Conformity Assessment (influence factors). This item is included on the Committee's agenda to provide an update on these elements.

Certificate Review: The question addresses how this would be accomplished given the limited resources of NCWM. It was suggested this item may need to continue on a "back burner" until resources can be clearly identified to proceed with the project in an efficient, thorough, and accurate manner.

During the 92nd NCWM (2007), it was reported that this item continues on the "back burner" until funding can be identified for this project. The NTEP Committee considered the fact that continuing improvement is occurring on Certificates of Conformance (CC) and the improvements are making it easier for inspectors to verify. Therefore, for the time being, the NTEP Committee plans to discontinue reporting on this portion of Conformity Assessment in future NTEP reports.

Current Comment: Certificates are constantly under review by NTEP staff and laboratories. Many active certificates are amended annually because of manufacturer submission for evaluation or issues reported by the states pertaining to information on the certificate. When the devices are re-evaluated and certificates are amended, the information is reviewed and necessary steps are taken to assure compliance and accurate, thorough information is reported on the certificate.

In an effort to keep certificate information up to date, the NTEP Committee offered, during the last CC annual maintenance fee invoice period, an opportunity for active certificate holders to update contact information that is contained in the "Submitted By" on certificates during the payment period with the payment of their annual maintenance fee.

Initial Verification (IV): Work group (WG) chair, Mr. Lou Straub, reported that IV checklists have been developed for small scales, vehicle scales, and retail motor-fuel dispensers. Data has been received from several states on small-capacity price computing scales, and the pilot of Initial Verification for small-capacity scales has been completed. All data has been forwarded to NCWM staff for safekeeping.

The WG asked for direction from the NTEP Committee on how to proceed to the next step. Mr. Straub clarified that not all states or jurisdictions need to participate in submitting information to NCWM on Initial Verification. A subset of states would be sufficient. The NTEP Committee instructed the WG to proceed with development of additional checklists, but there was a sense that the WG was reluctant until they know how states will react and use the developed checklists. The NTEP Committee also noted the need to decide how to process the data generated from Initial Verification. The Committee acknowledges that Verification Conformity Assessment (VCAP) is the priority and thinks IV is a very important element of conformity assessment, but may need to rest until the states are ready to act.

Current Comment: The IV initiative is ongoing. Field enforcement officials perform an initial inspection and test on new installations on a routine basis. The Committee recognized that the states do not want IV reporting to be cumbersome. The NCWM staff has been directed to develop a simple online report form to be used in reporting device deficiencies and non-conformities found in the field. The report form will be reviewed by the NTEP Committee and shared with members.

An Initial Verification report form has been developed. The Committee wanted to have a simple form, perhaps web based for use by the state and local regulators. The form has been approved by the Committee and distributed to the states. A completed form can be submitted via mail, e-mail, fax, or online. The form is attached to this report as Appendix H and is available to regulatory officials who are members of the NCWM online at www.ncwm.net/content/initial_verification_report.

Verified Conformity Assessment Program (VCAP): The NCWM and NTEP have been concerned about production meeting type, protecting the integrity of the NTEP CC since the inception of NTEP. A WG was developed to assist the NCWM with this effort, which has provided feedback and recommendations to the conference. The NCWM Board of Directors thinks it has reached a point that VCAP can be launched. Load cells traceable to NTEP certificates have been selected for the initial effort. All holders of NTEP CCs for load cells have been notified.

The NTEP Committee has been asked to announce which device(s) will be next after load cells. The NTEP Committee wants some additional time to see what issues and concerns come to light with the load cell effort before making a decision.

The NTEP Committee decided to use the current process in Publication 14, Administrative Policy, Section T, "Appeal and Review Process" for all VCAP appeals. To make it clear, the NTEP Committee decided to add a bullet to Pub. 14, Section T to read: "A certificate holder may appeal a certificate made inactive due to non-compliance with VCAP. However, the decision of the Certification Body or VCAP auditor cannot be appealed to the NCWM."

During the 2009 Annual Meeting, a decision was made to keep the established timeline for load cell manufacturers with NTEP certificates, but to delay the timeline by six months for "private label" load cell certificate holders. A new timeline was developed.

The VCAP/Load Cell Project is progressing. The NTEP Administrator attended the fall SMA meeting to explain and update details of the project.

The NCWM Board of Directors reconfirmed its belief that conformity assessment is vital to NTEP's continued success and will be implemented. The NCWM Board recently made decisions that affect Private Label NTEP Load Cell certificate holders and Manufacturers of NTEP Load Cell certificate holders. The Board extended the timeline by six months for both "Manufacturer" and "Private Label" NTEP load cell certificate holders. VCAP Audit Reports for manufacturers with load cell certificates are now due no later than June 30, 2010. VCAP Audit Reports for private label certificate holders are now due no later than November 30, 2010. These decisions finalize the load cell VCAP audit process and timeline. VCAP for load cells will occur according to the final timelines below.

NTEP VCAP Timeline – Load Cell Manufacturer Certificate Holders				
Jul 2008 - ongoing	**Jan 2009 - Jun 2010**	**Jan 2010 - Sep 2010**	**Jul 2010 - May 2011**	**May 2011**
Refine VCAP procedures	LC Manufacturers to put VCAP QM system in place	NTEP to evaluate incoming Certification Body audit reports	NTEP to contact manufacturers not meeting VCAP and encourage compliance	CCs declared inactive if CC holder fails to meet VCAP
Answer incoming questions	Conduct audit by Certified Body		Continue to evaluate incoming audit reports	
Refine/develop appeals process	Submit audit report to NCWM/NTEP			
Notify all CC holders of updated plan, Q&A, etc.				

NTEP VCAP Timeline – Load Cell Private Label Certificate Holders				
Jul 2008 - ongoing	**Jan 2009 - Nov 2010**	Jun 2010 - Mar 2011	**Dec 2010 - May 2011**	**Nov 2011**
Refine VCAP procedures	CC holders to put VCAP QM system in place	NTEP to evaluate incoming Certification Body audit reports	NTEP to contact manufacturers not meeting VCAP and encourage compliance	CCs declared inactive if CC holder fails to meet VCAP
Answer incoming questions	Insure audit by Certified Body		Continue to evaluate incoming audit reports	
Refine/develop appeals process	Submit audit report to NCWM/NTEP			
Notify all CC holders of updated plan, Q&A, etc.				

The NCWM decided to require a systems audit checklist that is to be completed by an outside auditor and submitted to the NCWM per Section 2.5 of the VCAP requirements. A "VCAP Systems Audit Checklist for Manufacturers" and a "VCAP Systems Audit Checklist for Private Label Certificate Holders" have been developed and are available on the NCWM website at www.ncwm.net.

The NTEP Committee has also established a work group to modify VCAP frequently asked questions and other clarifications and a guideline document to assist manufacturers and auditors when completing the checklist and VCAP audit.

Current Comment: During the Interim Meeting, the NTEP Committee heard many comments about VCAP, the direction of VCAP, and other related issues. In addition to the open hearing on agenda Item 500-5, a special two-hour session, moderated by NCWM Chair Mr. Randy Jennings, was held to hear more comments and exchange ideas on the topic.

A newly formed industry group, named Industry for Better NTEP (IBN), presented the Committee with a document containing positions on NTEP, VCAP, and creep requirements for load cells. The entire IBN document can be found in Appendix F of the NTEP Committee Report. Major issues raised by the IBN include:

- NTEP is going in the wrong direction and should pay more attention to the needs of smaller businesses (the little guys).

- The new creep requirement should be applied equally to all. Load cells tested under the old requirements should be retested.

- VCAP is not type evaluation; it is production evaluation and is not necessary. VCAP should immediately be suspended or should go away completely.

- NTEP evaluation of load cells is not necessary and is detrimental to the scale industry. The NTEP evaluation of load cells should be eliminated.

- NTEP should take a hard look at the need for T.N.8. influence factor testing for all types of scales.

- The current VCAP requirement is too costly to manufacturers. It is redundant. The NCWM/NTEP should consider certifying manufacturers to perform type evaluations themselves.

The Committee also received written communications responding to IBN positions. Those communications can be found in Appendix G of the NTEP Committee agenda.

The NTEP Committee appreciates the interest in NTEP, the positions brought forward and the issues raised by the various enforcement officials, manufacturers, organizations, groups and other interested individuals. The Committee responded to many of the issues raised during the open meetings.

- The Committee pointed out that the creep requirement is a Handbook 44 issue, which can be traced back to international requirements and harmonization. The changes to the creep requirements in Handbook 44 were not initiated by NTEP, but NTEP has a responsibility to test for Handbook 44 compliance.

- The Committee answered questions about the evaluation and testing of load cells and clarified a point the non-NTEP cells used in smaller devices are tested, under influence factors, in the laboratory as part of the device under test. They just do not have a separate certificate.

The NTEP Committee discussed the positions presented by the IBN and others that provided input – written and oral. The Committee is committed to the NTEP process and VCAP. The Committee wants the members to understand that NTEP has always been concerned about production devices traceable to an NTEP certificate. The NCWM has long been searching for a method to provide some level of assurance those devices and main elements being produced and used with NTEP certificates, susceptible to influence factors that cannot be verified by field inspectors, meet the applicable requirements of Handbook 44. The Committee and the NCWM Board confirmed the published deadlines for load cells and will move forward with VCAP.

After the Interim Meeting, the NCWM revised requirements for private label CC holder audits and auditors. A new checklist for private label certificate holders was developed and distributed. The requirements for the Certification Body and VCAP auditor were changed to require an "ISO auditor." Clarification was requested to avoid confusion by private label auditors. The Committee plans to add clarification language to the introduction section of the private label checklist to read:

Private label certificate holders are not required to submit devices for testing, on-site or elsewhere. The private label certificate holder is required to verify that the parent certificate holder has

complied with VCAP requirements, has a current VCAP audit certificate, the VCAP certification is traceable back to the parent NTEP certificate and the parent NTEP certificate is active.

The selected Certification Body shall be accredited to the ISO 9001:2000 standard for providing audits and certifications of management systems.

Additionally, the Committee plans to create a new section S.1.d. in NCWM Publication 14, Administrative Policy to distinguish between the requirements for parent NTEP certificate holders (S.1.c.) and private label certificate holders. The requirements in S.1.d. will track the private label checklist requirements; traceability to parent NTEP CC, traceability of the private label cell to a VCAP audit, purchase and sales records, plan to report non-conforming product and non-conforming product in stock, plan to conduct internal audits to verify non-compliance action, and internal audit records. Requirements for the Certification Body and their auditors will also be included.

500-6 I NTEP Contingency – NCWM NTEP Laboratory

Source: NTEP Committee

Purpose: NTEP Contingency, to keep NTEP operating and ensure NTEP services are available at an adequate level. The NTEP Committee wants to ensure there is an appropriate number of laboratories and personnel (evaluators) to maintain viable support for NTEP services, including MRAs, MAAs, and potentially to be an R 76 Issuing Participant.

Item Under Consideration: The NTEP Committee discussed contingency planning for continuity of NTEP operations. With the state of today's economy, what if NTEP lost a lab? How will NTEP maintain workflow? Are there additional states interested in applying to become an NTEP field lab or an NTEP brick-and-mortar lab? The NTEP Committee will continue to discuss these issues during a long-range planning session and welcomes comments from the membership.

Issues under consideration include should the NCWM:

1. Employ NTEP evaluators to conduct testing at manufacturer's facilities?
2. Have evaluators under contract to conduct testing at manufacturer's facilities?
3. Employ NTEP evaluators or have evaluators under contract to assist the state NTEP laboratories?
4. Have a brick and mortar NTEP laboratory and NTEP evaluators?
5. Use a private third party laboratory to conduct NTEP evaluations?

Current Comment: During the Interim Meeting, the Committee heard testimony expressing support and concerns pertaining to the options. Several stated that the Committee should consider adding OIML MAA participation as a Utilizing Participant to the list. Another urged the Committee to continue working on the idea of NCWM NTEP evaluators, an NCWM NTEP lab, and keeping all options open. One member asked the Committee to consider accepting manufacturer compliance data in lieu of hiring NTEP contractors. Another suggestion from the floor was to consider beefing up and utilizing "Initial Verification" as part of the NTEP process. A representative of a state brick and mortar NTEP laboratory asked the Committee to move cautiously forward and not destroy the state NTEP labs. He expressed concern that the establishment of an NCWM/NTEP brick and mortar lab could lead to significant legal complications for the states.

The NTEP Committee wants the membership to know that, at this time, the preferred course of action would be the evaluators under contract option. The Committee recognizes the commitment states with NTEP laboratories have made over the years and would only resort to contingency measures in the event of a severe loss of state lab resources. Labs are handling current demand without a need for contingency measures.

During the Annual Meeting, an industry representative requested the Committee keep a close watch over the status of the laboratories and make NTEP contingency a priority.

Ms. Judy Cardin, Wisconsin, NTEP Committee Chair

Mr. Randy Jennings, Tennessee, NCWM Chair
Mr. Tim Tyson, Kansas
Mr. Mike Sikula, New York
Mr. Kirk Robinson, Washington
NTEP Technical Advisor: Mr. Jim Truex, NTEP Administrator

National Type Evaluation Program Committee

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Appendix A
National Type Evaluation Technical Committee (NTETC)
Grain Analyzer Sector

August 19 - 20, 2009, Kansas City, Missouri
Meeting Summary

Agenda Items

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1. Report on the 2009 NCWM Interim and Annual Meetings

The Interim Meeting of the 94th National Conference on Weights and Measures (NCWM) was held January 11 - 14, 2009, in Daytona Beach, Florida. At that meeting the National Type Evaluation Program (NTEP) Committee accepted the Sector's recommended amendments and changes to the 2008 Edition of NCWM Publication 14. These changes appear in the 2009 Edition of Publication 14. For additional background, refer to *Committee Reports for the* 94th *Annual Meeting*, NCWM Publication 16.

Changes to the Grain Moisture Meter and Near Infrared Grain Analyzers 2009 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
IV. Tolerances for Calibration Performance	Delete the portion of §IV specifying the categories of calibrations to be listed on a Certificate of Conformance (CC).	GMM-6 and GMM-7	08/08 GMM Sector Agenda Item 10
VII.B. Accuracy, Precision, and Reproducibility	Amend to address multi-class type evaluations for TW.	GMM-11 through GMM-15	08/08 GMM Sector Agenda Item 7
VII.C. Tolerances for Test Weight per Bushel Calibration Performance	Amend to limit the moisture content of samples used in evaluating TW performance and to add special considerations for multi-class calibrations.	GMM-15	08/08 GMM Sector Agenda Item 8
Appendix C	Amend to add additional data fields for TW data and to update instructions for submitting data to reflect current practice.	GMM-41	08/08 GMM Sector Agenda Item 9

No Grain Moisture Meter (GMM) or Near Infrared (NIR) Grain Analyzer items appeared in the Specifications and Tolerances (S&T) Committee Interim Report for consideration by the NCWM at the 2009 Annual Meeting held July 12 - 16, 2009, in San Antonio, Texas. Mr. Jim Truex, NTEP Administrator, reported that Annual Meeting attendance was down this year, but that 35 states were represented exceeding the quorum requirements of 27. Other General Code items of interest to the Sector were non-voting items related to software and provisions for sealing electronic adjustable components. [See Sector Agenda Items 4, 4a, 4b, 4c, 4.d, 4.e and 9.]

2. Report on NTEP Type Evaluations and OCP (Phase II) Testing

Ms. Cathy Brenner of the Grain Inspection, Packers and Stockyards Administration (GIPSA), the NTEP Participating Laboratory for Grain Analyzers, briefed the Sector on NTEP Type Evaluation activity. Evaluations are currently underway for three additional devices: one new grain moisture meter with test weight capability; one new grain moisture meter; and one test weight per bushel add-on to a currently approved grain moisture meter. Annual GMM calibration reviews were completed on schedule and updated Certificates of Conformance (CCs) were issued for six device types. She reported that the following five device types are enrolled in the OCP (Phase II) for the 2009 harvest:

[Note: Models listed on a single line are considered to be of the same "type."]

Bruins Instruments	OmegAnalyzerG
DICKEY-john Corporation	GAC2000 NTEP, GAC2100, GAC2100a, GAC2100b
Foss North America	Infratec 1241
Perten Instruments	AM5100
The Steinlite Corporation	SL95

[Note: Foss Infratec 1227 & 1229 dropped out of Phase II – CC expires June 30, 2010.]

3. Review of Ongoing Calibration Program (Phase II) Performance Data

At the Sector's August 2005 meeting, it was agreed that comparative OCP data identifying the Official Meter and listing the average bias for each NTEP meter type should be available for annual review by the Sector. Accordingly, Ms. Brenner, representing GIPSA, the NTEP Participating Laboratory for Grain Analyzers, presented data showing

the performance of NTEP meters compared to the air oven. This data is based on the last three crop years, 2006 - 2008 using calibrations updated for use during the 2009 harvest season.

Four meter types were included in the comparison graphs: DICKEY-john's GAC2100; Foss's Infratec 1241; Foss's Infratec 1229; and Steinlite's SL95. Only the GAC2100 has been identified on the comparisons. It is identified as "Official Meter." The remaining three instruments were randomly assigned numbers 1, 2, and 3.

Ms. Brenner pointed out that data on Perten's AM5100 was not included in the comparisons because it has not been in the program for three full years. It will be included next year. Comparisons of GMMs with less than three years of data against GMMs with the full three years of data are not meaningful, as they may be unduly influenced by a single unusual crop year. Also, to preserve confidentiality, sunflower results were not included because only two meters were approved for sunflowers, one of which was the Official Meter. She noted that labels are missing on the moisture axis of the comparison graph for Hard White Wheat. The moisture intervals and number of samples for Hard White Wheat should be as follows:

8 % to 10 %	43 samples
10 % to 12 %	20 samples
12 % to 14 %	9 samples

[Note: The 2006 - 2008 GMM Phase II comparison graphs were distributed with the August 2009 Grain Analyzer Sector Agenda. They can also be downloaded from the NCWM website using the following link: http://www.ncwm.net/ntep/pdf/09_GMMBiases.pdf.]

Dr. Richard Pierce explained that GIPSA was considering changes in sample collection procedures, this year and in the future, to make moisture data somewhat more representative with respect to both geographical and moisture-range distribution. To illustrate the problem that present procedures have created, he offered an example involving soybean samples. Sample collection assignments are communicated to GIPSA field offices in the spring of each year through a sample collection notice. In the past, GIPSA has requested soybean samples in moisture ranges of 10 % to 13 % and 13 % to 16 %. Within these ranges, they typically receive large quantities of 12 % to 13 % and 13 % to 14 % samples, which results in a huge number of samples in the 12 % to 14 % range. To avoid this unintended consequence, GIPSA intends to request samples in moisture intervals matching those used in reporting Phase II data. They will also try to limit the number of samples that will be analyzed in each 2 % moisture interval.

Dr. Pierce noted that while having too many samples is not a problem for many of the moisture intervals, but GIPSA is trying to scale back so that they don't have more than 25 to 40 samples in a given 2 % interval per year. They will also be attempting to achieve better geographical balance that, as much as reasonably possible, is proportional to crops grown in an area. His message was, "We're not going to analyze every sample we receive."

4. Software Requirements That May Impact Grain Analyzers

Background: In October 2008 the International Committee of Legal Metrology (CIML) approved the new OIML document **D 31** ***General requirements for software-controlled measuring instruments*** that is intended to serve as guidance for software requirements in international recommendations under development by OIML technical committees. **Document D 31** can be downloaded free of charge from:

http://www.oiml.org/publications/D/D031-e08.pdf

In 2005 the NCWM Board of Directors established an NTETC Software Sector. One of the tasks assigned to the Sector was to develop a clear understanding of the use of software in today's weighing and measuring instruments. A good overview of the work of the Software Sector is contained in the Meeting Summary of the Sector's Annual Meeting held March 11 - 12, 2009, in Reynoldsburg, Ohio. The Summary can be downloaded from the NCWM web page:

http://www.ncwm.net/events/pdf/09_Software_Sector_Summary.pdf

Two NTETC Software Sector items have been accepted as Information items by the S&T Committee for inclusion in the Committee Reports for the NCWM 94th Annual Meeting in 2009. Information Items report on subjects and/or actions under consideration by the committee but not proposed for voting. The Committee Reports can be downloaded from the NIST Weights and Measures Division (WMD) web page:

http://ts.nist.gov/WeightsAndMeasures/Publications/upload/11-ST-09-Pub16-FINAL.doc

The two Information items, and several other Software Sector items, are summarized and discussed separately in Agenda Items 4.a, 4.b, 4.c, 4.d, and 4.e. (This information was included to facilitate discussion on the possible impact of these recommendations on GMMs, and ,NIR, Grain Analyzers.)

Discussion: Ms. Cassie Eigenmann, DICKEY-john, encouraged other meter manufacturers to get involved in the Software Sector and to attend their meetings, noting that what gets decided in those meetings can have a big effect on both existing meters and on the design of future meters.

Mr. Jim Truex, NTEP Administrator, explained that much of the work the Software Sector is doing will likely become General Code items that would affect every code in NIST Handbook 44 (HB 44). Fortunately, GMMs and NIR Grain Analyzers have their own specific codes which take precedent over the General Code when there are conflicts/differences. He urged the Sector to pay attention to what is happening so it can anticipate where changes or additions to the specific codes might be required.

4.a Item 310-2: Appendix D – Definition of Electronic Devices, Software-Based and Built-For-Purpose Device

Background: At the Software Sector's October 2007 meeting, it was initially suggested that the term "not-built-for-purpose" be removed from the wording in NIST HB 44 paragraph G-S.1.1., as there is no definition for a not-built-for-purpose device in HB 44. After a lengthy discussion related to the terms "built-for-purpose" and "not-built-for-purpose," the Software Sector agreed these terms were not clear and should be replaced with definitions based on the revision of *OIML R 76 Non-Automatic Weighing Instruments,* Subsections 5.5.1. (Type P) and 5.5.2. (Type U).

At the 2009 NCWM Interim Meeting, the S&T Committee received comments from the Scale Manufacturers Association (SMA) stating that it now opposes this item as there is no technological justification for making a distinction in software-based device types. Other comments were received taking issue with the SMA, position arguing that significant physical differences make the distinction necessary. The Software Sector recommended that this item remain Informational to allow further review. Following is the definition as it appeared the S&T Committee Report for the 94th Annual Meeting:

Electronic devices, software-based. – Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:

(a) Embedded software devices (Type P), aka built-for-purpose. – A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security, and will be called a "P," or

(b) Programmable or loadable metrological software devices (Type U), aka not-built-for-purpose. – A personal computer or other device and/or element with PC components with programmable or loadable metrological software, and will be called "U." A "U" is assumed if the conditions for embedded software devices are not met.

Software-based devices – See Electronic devices, software-based.

At the Software Sector's March 2009 meeting, some discussion on the wording of the definitions resulted in the proposal of a slightly modified version (see below), but no consensus was reached on the language change shown below.

Electronic devices, software-based. Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:

(a) Type 'P' (aka built-for-purpose) software-based electronic devices. – A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security;

(b) Type 'U' (aka not-built-for-purpose) software-based electronic devices. – All metrological software-based devices not meeting the conditions of a Type 'P' device. Example: a personal computer or other device and/or element with PC components with programmable or loadable metrological software.

Software-based devices – See Electronic devices, software-based.

Discussion: The differentiation between software embedded in a built-for-purpose measuring instrument (Type P) and software for measuring instruments using a universal computer (Type U) is well established in the European community. See **WELMEC *Software Guide (Measuring Instruments Directive 2004/22/EC)***. The designations Type P and Type U are also expected to be used in the General Code section of NIST Handbook 44 (HB 44).

Grain Analyzer Sector members were asked for comments on the definition proposed by the Software Sector at their March 2009 meeting. This prompted a lengthy discussion as Sector members tried to grasp the differences between P and U and to understand why it might be important to them. Some questioned, "Does the user care?" It was pointed out that there are security differences and field inspection differences.

When the Sector was asked to express a preference for the definition proposed by the Software Sector at their March 2009 meeting over the definition proposed as Item 310-2 in the S&T Committee Report for the 94th Annual Meeting, additional questions were raised. One member asked if there was anything in either of the two definitions that would cause problems for GMMs or NIR grain analyzers. The Co-Technical Advisor did not believe that there was anything in either of the two definitions themselves that would be troublesome for GMMs or NIR Grain Analyzers. He explained that the reason that this question of definitions had been placed on the Sector's agenda as the first software-related item was due to the following: software items require a thorough knowledge and understanding of what is meant by Type P and Type U. He strongly favored the definition proposed by the Software Sector in March of 2009 because of its clarity and sentence structure.

Mr. Andy Gell, Foss North America, was concerned about the definition for Type U devices (see part b of the definition above) possibly precluding any instrument that consists of a black box that requires a personal computer (PC) to be sitting next to it. In this case, the black box will not function without a PC being connected to it. Proprietary software loaded into a generic PC controls all the functions of the black box and calculates the results which can be displayed on the PC, stored on the PC, and printed on a generic printer attached to the PC. Because the PC was a generic PC capable of functioning as a regular PC, it appeared to the Sector that this would be a Type U device requiring the proprietary software to meet the general code requirements for Type U software. However, the system consisting of PC+software and black box would have to meet the requirements of the appropriate grain analyzer code. The Sector wondered if a single CC could be issued for this system. No decision was reached on this question.

Conclusion: The Sector reached a consensus that, at this point, the Software Sector's March 2009 definition was preferred over the definition that appeared as Item 310-2 in the S&T Committee Report for the 94th Annual Meeting.

Jim Truex, NTEP Administrator, recommended that the Sector's decision be forwarded to the Software Sector and to the S&T Committee.

4.b Item 310-3: G-S.1. Identification. – Software

Background: Beginning at the October 2007 meeting, the Software Sector discussed the value and merits of required markings for software. After several iterations, the Software Sector developed a table to reflect their positions. This table was submitted to NCWM S&T Committee and was assigned Developing status in 2008. However, the Software Sector did not include a recommendation on how to incorporate the proposal into existing G-S.1. and G-S.1.1. language. In particular, WMD was concerned about properly addressing the various existing requirements and multiple non-retroactive dates.

Prior to the NCWM 2009 Interim Meeting, NIST WMD commented on S&T Item 310-3, and presented an alternate proposal with significant modifications, which were included in the Interim Meeting Agenda background for the item (see 2009 Pub 15 for more details). The WMD proposal was subsequently accepted by the S&T Committee as Information Item 310-3 in the Committee Reports for the 94th Annual Meeting of the NCWM. The WMD proposal is reproduced below:

G-S.1. Identification. – For the purposes of identification, all equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect and manufactured on or after January 1, 201X, shall be clearly marked as specified in Table G-S.1. Identification and explained in the accompanying notes in Table G-S.1. Notes:

All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect **and manufactured prior to January 1, 201X**, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model identifier that positively identifies the pattern or design of the device;

(1) The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lowercase.
[Nonretroactive as of January 1, 2003]
(Added 2000) (Amended 2001)

*(c) a nonrepetitive serial number, except for equipment with no moving or electronic component parts and **Type U** **(not-built-for-purpose) software-based** devices;*
[Nonretroactive as of January 1, 1968]
(Amended 2003 **and 201X**)

(1) The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.
[Nonretroactive as of January 1, 1986]

(2) Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).
[Nonretroactive as of January 1, 2001]

*(d) the current software version or revision identifier for **Type U (not-built-for-purpose) software-based** devices;*
[Nonretroactive as of January 1, 2004]
(Added 2003) **(Amended 201X)**

(1) The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.
[Nonretroactive as of January 1, 2007]

(Added 2006)

(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2007]

(Added 2006)

(e) an NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001, 2003~~, and~~, 2006**, and 201X**)

G-S.1.1. Location of Marking Information for Type U (Not-Built-For-Purpose), Software-Based Devices. – *For* ***Type U*** ~~***not built for purpose, software based***~~ *devices* ***manufactured prior to January 1, 201X,*** *either**:***

(a) The required information in G-S.1. Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; or

(b) The Certificate of Conformance (CC) Number shall be:

(1) permanently marked on the device;

(2) continuously displayed; or

(3) accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."

Note: *For (b), clear instructions for accessing the information required in G-S.1.(a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*
[Nonretroactive as of January 1, 2004]
(Added 2003) (Amended 2006 **and 201X**)

Table G-S.1.
Identification for Devices Manufactured on or after January 1, 201X
(For applicable notes, see Table G-S.1. Notes on Identification)

Required Marking	Full Mechanical Devices and Separable Mechanical Elements	Type P Electronic Devices and Separable Elements	Type U Electronic Devices and Separable Elements
Name, initials, or trademark of the manufacturer or CC holder	Hard-Marked	Hard-Marked or Continuously Displayed	Hard-Marked, Continuously Displayed, or Via Menu (display) or Print Option (8)
Model identification information that positively identifies the pattern or design of the device (1)	Hard-Marked	Hard-Marked or Continuously Displayed	Hard-Marked, Continuously Displayed, or Via Menu (display) or Print Option (8)
Non-repetitive serial number (2)	Hard-Marked	Hard-Marked or Continuously Displayed	Not Acceptable
Software version or revision (3)	Not Applicable	Hard Marked (5), Continuously Displayed, or by Command (operator action) (6)	Continuously Displayed or Via Menu (display) or Print Option (8)
Certificate of Conformance number or corresponding CC Addendum (4)	Hard-Marked	Hard-Marked or Continuously Displayed	Hard-Marked (7) or Continuously Displayed

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Added 201X)

Table G-S.1.
Notes on Identification for Devices Manufactured on or after January 1, 201X

1. **The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word.**
   - **The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).**
   - **The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lowercase.**

2. **Except for equipment with no moving or electronic parts, the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.**
   - **Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).**

3. **Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be dedicated to the metrologically significant portion.**
   - **The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.**
   - **Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number."**
   - **Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number."**
   - **The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).**

4. **An NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval."**
   - **These terms may be followed by the word "Number" or an abbreviation of that word.**
   - **The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).**

5. **If the manufacturer declares that the primary sensing element "software" is integral, has no end user interface and no print capability, the version/revision shall be hard-marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).**

6. **Information on how to obtain the Version/Revision shall be included on the NTEP CC.**

7. **Hard-marking of the CC Number is permitted if no means of displaying this information is available.**

8. **Information on how to obtain the name, initials, or trademark of the manufacturer or CC holder, model designation, and software version/revision information shall be included on the NTEP CC.**

(Added 201X)

At the Software Sector's March 2009 meeting, several members were of the opinion that the perceived scope of their original proposal had been extended by the modifications proposed by WMD and had actually made the Sector's intent less clear. The Sector Chairman proposed revisiting the current text of G-S.1. to determine exactly what changes would be required to reflect the Sector's position. It was also noted that there was some validity to the SMA argument that there is no justification for differentiation of marking requirements based on device type P or U. After additional lengthy discussions, the following modified versions of G-S.1./G-S.1.1 were drafted. Although the Sector believed that a table was now unnecessary, they also suggested what the table should look like if one was

desired. They also pointed out that the second table of notes, as proposed by WMD, was now redundant as the notes were incorporated in their suggested table.

The Software Sector's March 2009 proposal is shown below:

G-S.1. Identification. – All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect **and manufactured after January 1, 201X**, shall be clearly and permanently marked for the purposes of identification with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model identifier that positively identifies the pattern or design of the device;

(1) The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lower case.
[Nonretroactive as of January 1, 2003]
(Added 2000) (Amended 2001)

*(c) a nonrepetitive serial number, except for equipment with no moving or electronic component parts and **software that is not part of a Type P (built-for-purpose) device**;*
[Nonretroactive as of January 1, 1968]
(Amended 2003 **and 201X**)

(1) The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.
[Nonretroactive as of January 1, 1986]

(2) Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).
[Nonretroactive as of January 1, 2001]

*(d) the current software version or revision identifier for software-based **electronic** devices;*
[Nonretroactive as of January 1, 2004]
(Added 2003)**(Amended 201X)**

(1) The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.
[Nonretroactive as of January 1, 2007]
(Added 2006)

(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2007]
(Added 2006)

(e) an NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word

"Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Amended 1985, 1991, 1999, 2000, 2001, 2003, and 2006)

***G-S.1.1. Method of Marking Information for all Software-Based Devices**. – For devices **manufactured after January 1, 201X,** either:*

(a) The required information in G-S.1 Identification. shall be permanently marked or continuously displayed on the device; or

(b) The Certificate of Conformance (CC) Number shall be:

(1) permanently marked on the device;

(2) continuously displayed; or

(3) accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."

***Note:** For (b), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*

[Nonretroactive as of January 1, 2004]

(Added 2003) (Amended 2006 **and 201X**)

Table G-S.1. Identification for Devices Manufactured on or after January 1, 201X		
Required Marking	**Full Mechanical Devices and Separable Mechanical Elements**	**Electronic Devices, Software Based**
Manufacturer or CC holder ID	**Hard-Marked**	**Hard-Marked, Continuously Displayed, Via Menu (display) or by command (operator action)**
Model identification	**Hard-Marked**	**Hard-Marked, Continuously Displayed, Via Menu (display) or by command (operator action)**
Serial number	**Hard-Marked**	**Hard-Marked, Continuously Displayed[1]**
Metrologically Significant Software version	**Not Applicable**	**Continuously Displayed, Via Menu (display) or by command (operator action)[2]**
Certificate of Conformance number	**Hard-Marked**	**Hard-Marked, Continuously Displayed, Via Menu (display) or by command (operator action)[3]**

[1]Type 'U' devices need not have a non-repetitive serial number.

[2]If the manufacturer declares that the primary sensing element "software" is integral, has no end user interface and no print capability, the version/revision shall be hard-marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).

[3]If the Certificate of Conformance number is to be displayed via menu and/or submenu, the means of access must be easily recognizable. In addition, instructions on how to obtain the remaining required information not hard-marked or continuously displayed shall be included on the NTEP CC.

Discussion/Conclusion: All GMMs and NIR Grain Analyzers currently holding active CCs are of Type P. For these devices it would appear that the requirement for marking the Software Version/Revision of the metrologically significant portion would be the only change required to comply with the proposed marking for Type P devices.

The Grain Analyzer Sector's Co-Technical Advisor suggested that the Software Sector's March 2009 proposal does not address the WMD's concerns regarding addressing various existing requirements and multiple non-retroactive dates. In the Software Sector's proposal, both ***G-S.1. Identification*** and ***G-S.1.1. Method of Marking Information for all Software-Based Devices*** include a statement indicating that the following subparagraphs apply to equipment **"manufactured after January 1, 201X"** implying that G-S.1. and G-S.1.1 do NOT apply to equipment manufactured prior to that date. However, the subparagraphs indicate added, amended, and non-retroactive dates ranging from 1968 to 2007. The Software Sector's proposal is unclear as to which, if any paragraphs/subparagraphs apply to equipment manufactured prior to 201X. The NIST WMD proposal clearly indicates which requirements are applicable to devices manufactured before January 1, 201X, and which are applicable to devices manufactured after January 1, 201X.

The Sector was in general agreement that the NIST WMD proposal was less confusing from an enforcement point of view.

4.c Identification of Certified Software

Background: The Software Sector's work on this item originated as an attempt to answer the question, "How does the field inspector know that the software running in the device is the same software that was evaluated and approved by the lab." The Software Sector is developing language to be added to HB 44 that will include requirements similar to those developed by OIML. The initial draft of the Software Sector's proposed language (for G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices) is shown below:

> **Identification of Certified Software:**
>
> **Software-based electronic devices shall be designed such that the metrologically significant software is clearly identified. The identification of the software shall be inextricably linked to the software itself.**
> - **Unique identifier must be displayable/printable on command or during operation, etc. (marking req't in addition)**
> - **At a minimum, a version/revision indication (1.02.09, rev 3.0 a, etc). Could also consist of/contain checksum, etc (crc32, for example)**

Discussion: All GMMs and NIR Grain Analyzers currently holding active CCs are of Type P. The metrologically significant, or legally relevant, software elements of these devices can be classified as either "Fixed" or "Other" as shown below:

Fixed:
- Main program
- Associated subroutines
- Type specific parameter tables (set by the manufacturer)

Other:
- Device specific parameter tables (set by the manufacturer or a competent service representative)
- Site specific parameter tables (set by user and verified by field inspection)
- Individual Grain Calibrations (periodically changed, frequently by user; verified by field inspection.)

In order for software to have a unique identifier that is "inextricably linked to the software itself" the software must be Fixed so that any change made after certification is reflected by a change in the unique identifier. Alternate methods may have to be found to identify the versions of the software elements classified as Other.

For Grain calibrations, the requirements for version identification are specified in existing HB 44 code. Grain calibrations are individually identified and are required to be self-checking against data corruption or alteration (see **HB 44, §5.56.(a)** paragraphs **S.2.4.1. Calibration Version and S.2.4.2. Calibration Corruption** and **HB 44, §5.57.** paragraphs **S.2.5.2. Calibration Version** and **S.2.5.3. Calibration Corruption**)

Site specific parameters and device specific parameter tables (e.g., any tables or parameters residing in software to normalize the response of like instruments) currently are not required to be identified by version, but existing code requires these to be secured by a physical seal or an audit trail.

Dr. Richard Pierce, GIPSA (the NTEP Participating Laboratory for Grain Analyzers), wondered if there might be a problem with the way GMM CCs have been handled in the past. The example he cited was related to GMMs that also have test weight per bushel (TW) capability. Such devices have an extra sensor to determine if there is adequate sample in the hopper for a TW measurement. Presently, a GMM without TW capability and the same model with TW capability are both covered under the same CC. In some cases, they have the same instrument identifier. If they should happen to use two different software versions with different identifiers, it could be very difficult if all the different options have to be tracked. Many different CCs might be required for the same basic instrument.

The Sector Co-Technical Advisor did not think that separate CCs would be required. If the software had different identifiers, they could all be listed on the same CC with a description of which one was applicable to the basic instrument and which one was applicable to the version with TW capability.

Mr. Jim Truex, NTEP Administrator, reported that this was already being done on CCs for point of sale systems. NCR offers multiple software versions on the same device.

Dr. Charles Hurburgh, Iowa State University, remarked that device specific and site specific parameters for NIR Analyzers will become much more complicated than slope and bias. Eight to ten different algorithms, some very complex and some with virtual coefficients, are now available to adjust one instrument to match another. He was of the opinion that getting locked in as to what is Fixed could create problems. When asked if all the algorithms would behave the same over the operating temperature range his reply was, "Absolutely not!" It was pointed out that each algorithm would have to be evaluated separately to convince the NTEP lab that these device specific algorithms do not affect the operating characteristics of the device (temperature range, etc.).

It was later proposed that if these algorithms were calibration specific and the manufacturer could demonstrate that they would be invoked/applied only to non-NTEP grains or non-NTEP constituents, they would not have to be evaluated.

When the discussion returned to the subject of alternate ways to handle device specific parameters, Dr. Pierce suggested that if you standardize an instrument at the factory and have Device Specific adjustments (as opposed to type specific adjustments), a checksum could be used to protect those specific adjustments against corruption in the same manner that grain calibrations are protected. Although individual instruments would all have different standardizing packages, as long as those do not change, unless service is performed) the need to assign a version to those adjustments seems unnecessary.

Mr. Ole Rasmussen proposed defining actual code as the actual compiled machine code that is changed by re-compiling source code. Then, what is actual code can be separated from those parameters that are tracked by audit trail, parameters which could be user definable or service changeable. Code is not re-compiled when simply making an adjustment to that device.

Expanding on Dr. Pierce and Mr. Rasmussen's suggestions, the Sector Technical Advisor outlined how these parameters might be protected. Put service/standardization parameters in a module/table/file that contains all the adjustment parameters plus a stored checksum for that instrument's unique set of parameter values. At instrument start-up, the main program calculates a checksum based on that unique set of parameter values and compares it with the stored checksum. If they do not match, the instrument cannot proceed further and it displays an error code/message. To save audit trail memory space, he proposed that the individual corrupted parameter values not be logged in the audit trail. It would be sufficient to log only the error or error code for the type of error (e.g., corrupted standardization parameters).

The discussion moved to what the software identification might look like and how changes might be tracked.

Several members suggested that the software version might look like:

3.yy.xx where 3 is the version that was originally evaluated, yy are metrologically significant changes that are compatible with older instruments running other 3.yy.xx versions, and xx can be any sequentially issued change that does not need new approval, a non-metrologically significant change. Typically, yy versions do not require re-testing, but will require notifying the NTEP lab. A revised CC may or may not be required.

4.yy.xx where 4 is incompatible with older versions of the instruments in the field and cannot be used in instruments of that type manufactured prior to a given serial number or manufacturing date. A revised or new CC will be required. If a revised CC is issued, the revised CC must list the various older revisions and the range of serial numbers on which they can be used.

Mr. Jim Truex remarked on the importance of software having to be identified and that the identification is going to have to be available to the inspector.

The discussion shifted to what "inextricably linked" means; how much security is required to guarantee that the displayed software identification number has the actual approved software behind it? Is it sufficient to embed the version number in the fixed portion of the code (before it is compiled) and to include in the code a routine for displaying that number upon command, or must the version number be scrambled or otherwise hashed before being embedded in the fixed portion of the code? These questions were not answered.

Dr. Pierce commented that he does not see GIPSA with a software engineer in the NTEP lab examining the software, or the NTEP lab sending the device elsewhere for the software to be examined.

Mr. Truex replied, "We're not going to have software engineers, but we will be requesting information from manufacturers about their software." (See the following agenda item.)

4.d Software Protection/Security

Background: The Software Sector derived a trial Publication 14 checklist based on the OIML checklist to verify that the software adequately protected against fraudulent modification as well as accidental or unintentional changes. The checklist has been distributed to current NTEP labs for use on a trial basis for new type approval applications.

Devices with embedded software TYPE P (aka built-for-purpose)			
	Declaration of the manufacturer that the software is used in a fixed hardware and software environment, and		Yes☐ No ☐ N/A ☐
	cannot be modified or uploaded by any means after securing/verification		Yes☐ No ☐ N/A ☐
	Note: *It is acceptable to break the "seal" and load new software, audit trail is also a sufficient seal.*		
	The software documentation contains:		
		description of the (all) metrologically significant functions OIML states that there shall be no undocumented functions	Yes☐ No ☐ N/A ☐
		description of the securing means (evidence of an intervention)	Yes☐ No ☐ N/A ☐
		software identification	Yes☐ No ☐ N/A ☐
		description how to check the actual software identification	Yes☐ No ☐ N/A ☐
	The software identification is:		
		clearly assigned to the metrologically significant software and functions	Yes☐ No ☐ N/A ☐
		provided by the device as documented	Yes☐ No ☐ N/A ☐
Personal computers, instruments with PC components, and other instruments, devices, modules, and elements with programmable or loadable metrologically significant software TYPE U (aka not built-for-purpose)			
	The *metrologically significant* software is:		
		documented with all relevant (see below for list of documents) information	Yes☐ No ☐ N/A ☐
		protected against accidental or intentional changes	Yes☐ No ☐ N/A ☐
	Evidence of intervention (such as, changes, uploads, circumvention) is available until the next verification/inspection (e.g., physical seal, Checksum, CRC, audit trail, etc. means of security)		Yes☐ No ☐ N/A ☐

Software with closed shell (no access to the operating system and/or programs possible for the user)			
	Check whether there is a complete set of commands (e.g., function keys or commands via external interfaces) supplied and accompanied by short descriptions		Yes☐ No ☐ N/A ☐
	Check whether the manufacturer has submitted a written declaration of the completeness of the set of commands		Yes☐ No ☐ N/A ☐
Operating system and/or program(s) accessible for the user:			
	Check whether a checksum or equivalent signature is generated over the machine code of the metrologically significant software (program module(s) subject to legal control W&M jurisdiction and type-specific parameters)		Yes☐ No ☐ N/A ☐
	Check whether the metrologically significant software will detect and act upon any unauthorized alteration of the metrologically significant software using simple software tools (e.g., text editor)		Yes☐ No ☐ N/A ☐
Software interface(s)			
	Verify the manufacturer has documented:		
		the program modules of the metrologically significant software are defined and separated	Yes☐ No ☐ N/A ☐
		the protective software interface itself is part of the metrologically significant software	Yes☐ No ☐ N/A ☐
		the *functions* of the metrologically significant software that can be accessed via the protective software interface	Yes☐ No ☐ N/A ☐
		the *parameters* that may be exchanged via the protective software interface are defined	Yes☐ No ☐ N/A ☐
		the description of the functions and parameters are conclusive and complete	Yes☐ No ☐ N/A ☐
		there are software interface instructions for the third party (external) application programmer	Yes☐ No ☐ N/A ☐

Discussion: It was pointed out that the draft checklist should have been distributed to manufacturers rather than NTEP labs. The checklist relates to information that the manufacturer might be asked to submit to the NTEP lab with a new application for evaluation. Grain Analyzer Sector members were asked to see what might be involved in supplying the requested information. There was no further discussion of this item.

4.e Software Maintenance and Reconfiguration

Background: The Software Sector has followed the lead of OIML in defining two procedures used to check software updates for authenticity and integrity and has agreed upon the following language:

> **Verified Update:** A verified update is the process of installing new software where the security is broken and the device must be re-verified. Checking for authenticity and integrity is the responsibility of the owner/user.
>
> **Traced Update:** A traced update is the process of installing new software where the software is automatically checked for authenticity and integrity, and the update is recorded in a software update log or audit trail.

The Software Sector has worked on language for defining the requirements for a traced update. Their draft specifies, "For a traced update, an event logger is required . . .." The draft goes on to say that the use of a Category 3 audit trail is acceptable for the software update logger. The requirements the Software Sector has proposed for Category 3 audit trails are quite similar to the requirements for Category 3 audit trails in the GMM and NIR sections of HB 44 and Publication 14.

The Software Sector also proposed the addition of new text to the General Code section of HB 44:

> **G-S.9. Metrologically Significant Software Updates. –** The updating of metrologically significant software shall be considered a sealable event. Metrologically significant software that does not conform to the approved type is not allowed for use.

The NTEP Administrator was of the opinion that the proposed G-S.9. was unnecessary, because G-S.8. already requires that any changes that affect metrological function are sealable. The Software Sector felt that the explicit language proposed for G-S.9. is clearer than any implied requirement in G-S.8. The Software Sector decided to ask for clarification/interpretation from the S&T Committee.

Discussion: OIML D 31:2008 (E) includes flow charts illustrating the implementation of traced and verified updates (reproduced at the end of this agenda item). The Sector questioned the need for a definition of traced update. The traced update was probably intended to cover cases in Europe where the National Body controls a network of devices and wants to update all the devices simultaneously from a central location. Denmark and France do this with NIR Grain Analyzers. It is unlikely that a traced update would be used in the United States for Gain Analyzers that fall under state W&M jurisdiction. Verification would still be required by state inspectors.

Mr. Ole Rasmussen, Foss North America, commented on the OIML diagram for traced update, comparing it to the situation where a device in the field has calibrations and much of the device's specific information on a memory stick. It is possible to go to the company's website, download all the necessary new calibrations and information on the memory stick, and plug it back into the device. The downloaded information is serial number specific for that device. The user license is checked, and all the information is checked for integrity and authenticity. Because there is no person at place to verify it he believed that this is essentially a traced update.

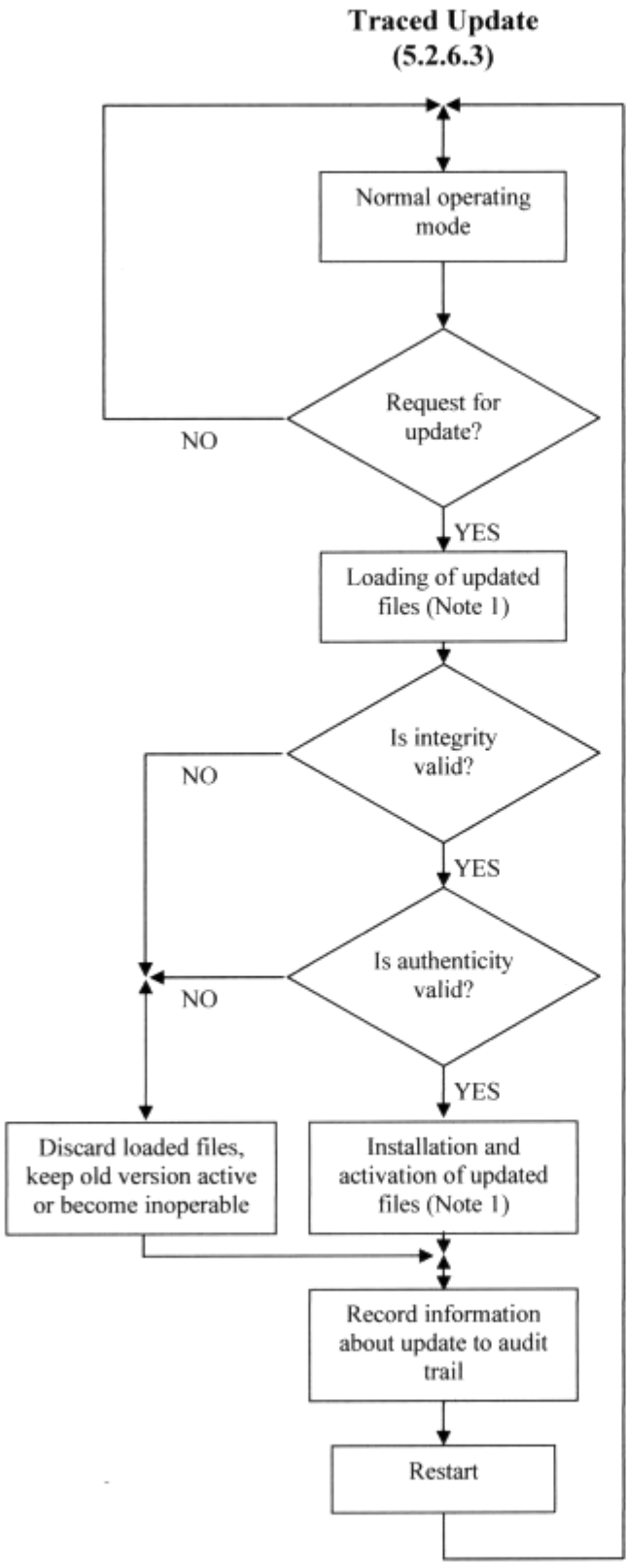
When asked whether information about the update was recorded to the audit trail, Mr. Rasmussen explained that it depended on how that was defined. The information is all on the server. That could be called an audit trail; it just does not reside on the device.

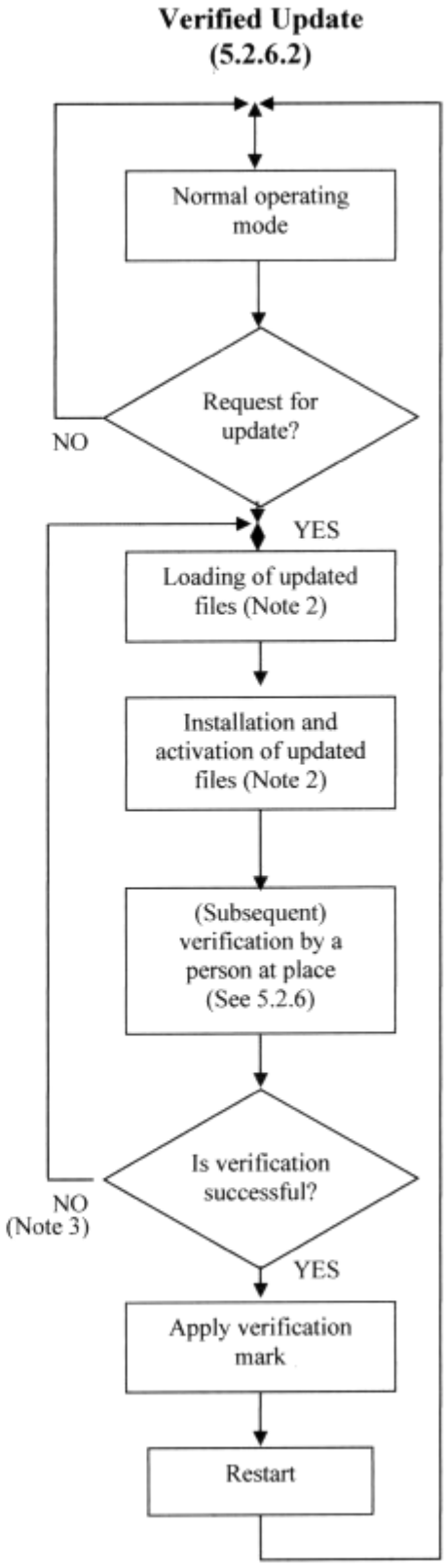
The Sector Co-Technical Advisor maintained that this example involves a Type P device, and that this update falls under the category of a verified update the same as if software was being downloaded (whether over a high-speed data link, a thumb drive, or from a local or remote PC, etc.), and, therefore, would have to meet the security requirements for a Type P device. It would be up to the local authority to verify that the downloaded version of software agrees with what's on the CC.

Dr. Pierce added that in this case, the user has no control over the process as he is simply moving the memory stick from the computer to the instrument. This says,in essence, that the manufacturer is installing the updates.

Verification is defined as a procedure, other than type approval, that includes the examination and marking and/or issuing of a verification certificate that ascertains and confirms that the measuring instrument complies with the statutory requirements. This means that the local authority (the state) confirms that the device meets the applicable requirements of HB44 and conforms to the CC.

In the OIML flow chart for verified update, the three boxes titled: "(Subsequent) verification by a person at place"; "Is verification successful?"; and "Apply verification mark" are decisions/operations that would be made by state W&M personnel.


Traced Update
(5.2.6.3)
Normal operating mode
Request for update?
NO
YES
Loading of updated files (Note 1)
Is integrity valid?
NO
YES
Is authenticity valid?
NO
YES
Discard loaded files, keep old version active or become inoperable
Installation and activation of updated files (Note 1)
Record information about update to audit trail
Restart


Verified Update
(5.2.6.2)
Normal operating mode
Request for update?
NO
YES
Loading of updated files (Note 2)
Installation and activation of updated files (Note 2)
(Subsequent) verification by a person at place (See 5.2.6)
Is verification successful?
NO
(Note 3)
YES
Apply verification mark
Restart

Software Update Procedure – from OIML D 31:2008 (E)

Notes:

(1) In the case of a Traced Update updating is separated into two steps: "loading" and "installing/activating." This implies that the software is temporarily stored after loading without being activated because it must be possible to discard the loaded software and revert to the old version, if the checks fail.

(2) In the case of a Verified Update, the software may also be loaded and temporarily stored before installation but, depending on the technical solution, loading and installation may also be accomplished in one step.

(3) Here, only failure of the verification due to the software update is considered. Failure due to other reasons does not require re-loading and re-installing of the software symbolized by the NO-branch.

5. Report on New GIPSA/NIST Interagency Agreement for 2010 – 2014

The present five year Interagency Agreement that provides funding for the Grain Moisture Meter On-going Calibration Program (OCP) expires at the end of the Federal Government's Fiscal Year 2009 (September 30, 2009). Under the proposed terms of the new agreement NIST and GIPSA each contribute one-third the cost of the program subject to an annual maximum of $30,000 each. The balance of costs is borne by manufacturers and is dependent on the number of meter models in the NTEP pool according to a fee schedule (see table below). Ms. Diane Lee, NIST/WMD, reported that NIST's legal office has been reviewing the Interagency Agreement. She anticipated receiving their approval by early 2010 after which the Agreement would be forwarded to GIPSA for the appropriate signatures.

Dr. Rich Pierce, GIPSA, indicated that the fee schedule remains as shown in the table below. It appears that five meters will be in the plan at a cost to each manufacturer of $6000 per meter type, per year. If another meter type increases the number of meters to six, the cost to each manufacturer will increase to $8750 per meter type per year.

Explanation of columns in the Fee Schedule table:

Column	**Explanation (or formula for calculating)**
(1) Total Meters	The number of meter types (including the Official GIPSA meter) that will share in the NTEP calibration costs.
(2) Total Meters in NTEP Pool	The number of meter types other than the Official meter that will share in the NTEP calibration costs.
(3) Cost per Pool Meter	The cost associated with each pool meter in the program.
(4) Total Program Cost	A per meter type cost of $22,500 times the number of NTEP "pool" meters.
(5) NIST Contribution	One-third the total program cost up to a maximum of $30,000.
(6) GIPSA Contribution	One-third the total program cost up to a maximum of $30,000.
(7) Manufacturers Contributions (total funding from manufacturers)	Total Program Cost minus NIST Contribution minus GIPSA Contribution.
(8) Cost per Meter Type	Manufacturers' Contributions divided by Total Meters (including the Official meter).

Proposed NTEP On-going Calibration Program Fee Schedule For Year 2010 to 2014							
(1) TotalMeters (includingofficial meter)	(2) Meters In NTEP Pool	(3) Cost Per Pool Meter	(4) TotalProgram Cost	Funding Contribution From Participants			
				(5) NIST	(6) GIPSA	(7) Mfg's (total funding from mfg's)	(8) Cost Per Meter Type
2	1	22,500	22,500	7,500	7,500	7,500	3,750
3	2	22,500	45,000	15,000	15,000	15,000	5,000
4	3	22,500	67,500	22,500	22,500	22,500	5,625
5	4	22,500	90,000	30,000	30,000	30,000	6,000
6	5	22,500	112,500	30,000	30,000	52,500	8,750
7	6	22,500	135,000	30,000	30,000	75,000	10,715
8	7	22,500	157,500	30,000	30,000	97,500	12,185
9	8	22,500	180,000	30,000	30,000	120,000	13,335

6. Report on OIML TC 17/SC 1 R 59 "Moisture Meters for Cereal Grains and Oilseeds"

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 1. In October 2008, the Secretariat of TC 17/SC 1 was jointly allocated to China and the United States. The Co-Secretariats (China and the United States) are working closely with an IWG to revise OIML R 59 "Moisture meters for cereal grains and oilseeds." The 5 CD of **OIML R 59**, revised to comply with OIML's Guide ***Format for OIML Recommendations*** and to incorporate tests for the recommended disturbances of **OIML D 11** ***General Requirements for Electronic Measuring Instruments***, was distributed to the U.S. National Working Group (USNWG) in March 2009 with a request for comments by May 21, 2009. The changes to R 59 5 CD are summarized below:

- Extensive reformatting to comply with OIML's Guide ***Format for OIML Recommendations***, OIML B 6-2, ***Directives for Technical Work*** – *Part 2*, and the April 2008 OIML Secretariat training.
- Changes to address the comments received to 4 CD.
- Changes to the MPE tables.
- Added requirements for software.
- Added OIML D11 tests.
- Added test report section - B.
- Added new Section 3, Description of instruments.
- Added definitions.
- Revised the bibliography section.
- Explanatory notes includes a history of the TC 17/SC 1 meetings and committee draft revisions.
- Added cross reference table of OIML R 59 5 CD and OIML ***Directives for Technical Work***
- Added cross reference table of OIML R 59 5 CD and OIML D 11

Discussion: Ms. Diane Lee, NIST/WMD, reported that she had received approximately 170 comments from 10 countries. The next version, R 59 CD 6, will be sent out for a vote. She asked the Sector to discuss the OIML D 11 tests that are included in R 59, and if some of the tests are not appropriate for moisture meters, provide technical reason as to why they should not be included. She explained that this may be the last opportunity to provide comments, because the next step for this draft recommendation will be voting for its acceptance as an approved OIML Recommendation. Special attention should be paid to the .disturbance tests from OIML D 11.

The following table lists the tests in question and shows where their test procedures are located in 5 CD of R 59.

Immunity tests of IEC 61326 and/or Recommended Disturbances in OIML D 11	**Test Procedure Section (As appropriate, severity levels are included in test procedures, Annex A)**
Sand and Dust	A.4.1
Short time power reduction	A.4.2
Bursts	A.4.3
Radiated radiofrequency, electromagnetic susceptibility	A.4.4
Conducted radiofrequency fields	A.4.5
Electrostatic discharges	A.4.6
Mechanical shock	A.4.7

Ms. Cassie Eigenmann, DICKEY-john Corporation, expressed concern over the inclusion of the sand and dust test. She was of the opinion that grain moisture meters (GMMs) are not located in areas subject to the sand and dust concentrations that they would be exposed to under the conditions described in D 11, citing paragraph **8.2.4 Sand and Dust** from OIML D 11:

> This test is mainly applicable for instruments or parts of instruments typically being used in dusty warehouses and in the building industry (for instance production of concrete) or, in some climatic regions, in the open air. Therefore, it is advised to prescribe test 10.5 in the relevant Recommendation only for those measuring instruments that can be expected to be typically used under sandy/dusty conditions (refer to 4.4).
>
> (Note: **D 11 4.4** shown below for reference)
> **4.4** Some of the tests described in this Document may be relevant only for specific kinds of instruments. Therefore, a test should be included for a particular kind of instrument only if that instrument is likely to be significantly influenced by the test, under the instrument's specified operating conditions.

The Sector's Co-Technical Advisor noted that D 11 gives only a vague description of how the test is to be performed: A brief description of the test in D 11 Section 10.5 states:

> The test consists of exposure to cyclic temperature variation between 30 °C and 65 °C, maintaining the following conditions:
>
> - Relative humidity: less than 25 %
> - Air velocity: 3 m/s
> - Particle concentration: 5 g/m^3
> - Composition of the particles: as specified in 3.2.1 of IEC 60512-11-8 [17]

He questioned the severity of the test with regard to the concentration of 5 grams per cubic meter.

Mr. Dave Krejci, Grain Elevator & Processing Society (GEAPS), remarked that 5 grams per cubic meter seems excessively dusty, and that he couldn't imagine people operating a meter in those conditions without wearing a respirator. Table Z-1, Limits for Air Contaminants, in OSHA Regulation 29CFR1910-1000 originally set grain dust

limits of no more than 10 milligrams per cubic meter for wheat, barley, and oats grain dust and 15 milligrams per cubic meter for other grains. Those limits were set aside by a court challenge, because they were based on limits established by the American Conference of Governmental Industrial Hygienists (ACGIH) without sufficient scientific basis. Table Z-1 in the current issue of 29CFR1910-1000 lists a limit of 10 milligrams per cubic meter for particulates not otherwise regulated (PNOR). Grain dust falls under that category. He believed that an argument could be made that people operating GMMs are not wearing respirators so the instruments are not being exposed to dust concentrations anywhere near 5 grams per cubic meter.

In addition, he pointed out that if a GMM was expected to operate in an atmosphere of 5 grams per cubic meter, it would be required to have a dust-tight or weather-tight enclosure. There is nothing in R 59 requiring a dust-tight or weather-tight enclosure, so it seems illogical to require a sand and dust test. In the United States, if a GMM was being operated in the sand and dust environment tested for, it would be a violation of the electrical codes for hazardous locations unless the enclosure was a NEMA9 or the GMM was intrinsically safe (which they are not).

One Sector member asked if a case could be made for retaining the sand and dust test on the basis of accelerated testing for an operating environment with a low level of dust (below 10 mg/m^3) that is allowed to accumulate over a long period of time. Sector members were quick to respond that there are user requirements that specify that instruments are to be maintained in good working condition, so there should be no large accumulation. Others also pointed out that user manuals typically specify the installation conditions such as, "Avoid a hazardous (classified) location as defined in Article 500 of the NFPA Handbook of the National Electrical Code," and "Choose a clean environment …"

The Sector agreed that A.4.1 sand and dust should be removed from R59.

Dr. Rich Pierce, GIPSA (the NTEP Participating Laboratory for Grain Analyzers), took issue with the D 11 tests as they had been incorporated in R 59 5 CD. It was his opinion that they are too vague, and do not give sufficient details (e.g., what grains are to be used, how many drops, initial conditions, whether the instrument was turned on or turned off, etc.) When D11 tests are incorporated in specific Recommendations, these additional details have to be specified. This detail is needed to assure that when a device is tested in country "B it's done the same way it was done in country "A."

The Co-technical Advisor called the Sector's attention to several other shortcomings to 5 CD:

> **A.4.4 Radiated radio-frequency electromagnetic fields** – R 59 should also specify wiring to and from the GMM from any and all ports. The paragraph:
>
> The equipment under test is subjected to 20 discrete frequency bands of electromagnetic radiation in the frequency range 26 MHz to 1000 MHz, at a field strength of either 10 V/m (for electromagnetic environment E1) or 10 V/m (for electromagnetic environment E2) appears to be in conflict with the previously described tests.
>
> **A.4.5 Conducted radio-frequency fields** – This item is missing from Annex B. R 59 should also specify wiring to and from the GMM for any and all ports.
>
> Need to add:
> The difference between the intrinsic error and the error (of indication) measured while the EUT is subjected to conducted radio-frequency fields, at the same reference conditions, shall not exceed the maximum permissible error in the specified operating range (or significant faults are detected and acted upon by means of a checking facility).
>
> **A.4.7 Mechanical shock** – This item is missing from Annex B.
>
> Need to add:
> The difference between the intrinsic error and the error (of indication) measured after the EUT is subjected to mechanical shock, at the same reference conditions, shall not exceed the maximum

permissible error in the specified operating range (or significant faults are detected and acted upon by means of a checking facility).

Conclusions/Summary: The Sector agreed that A.4.1 sand and dust should be removed from R 59. The sand and dust concentration specified for that test far exceeds the acceptable level of particulate concentration for human health unless an approved respirator (or OSHA approved dust mask) is worn, and it is known that GMM operators do not wear respirators. [References: Table Z-1 Limits for Air Contaminants for PNOR in OSHA Regulation 29CFR1910-1000.]

The Sector is also concerned that the present wording of the new tests in Annex A is too vague. They are not detailed enough to specify which grains are to be used. Is it necessary to use all grains for this test? Can a single grain be used? Can another grain be substituted? From what moisture range should the test samples be selected? Do you drop the sample one time through the instrument or multiple times? If multiple times, can you average the results? If you have to repeat the tests under several different conditions (as at maybe 20 or more different frequencies), is the same grain sample going to be used for each frequency? By the time D 11 requirements come into a Recommendation, the test procedures should be very specific.

The corrections/additions to **A.4.4**, **A.4.5**, and **A.4.7** detailed above, should be incorporated. **Annex B** should be edited to include references to A.4.5 and A.4.7.

The Sector is of the opinion that CD 5 as it exists today is not ready for a final vote.

7. Report on OIML TC17/SC8 Draft IR "Protein Measuring Instruments for Cereal Grain"

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 8. A new subcommittee has been formed to study the issues and write a working draft document "Measuring instruments for protein determination in grains." Australia is the Secretariat for this new subcommittee. A TC 17/SC 8 meeting was hosted by NIST in September 2007 to discuss the 2 CD. Discussions on 2 CD dealt mostly with maximum permissible errors (MPEs) and harmonization of the TC 17/SC 8 Recommendation for protein with the TC 17/SC 1 Recommendation for moisture.

Discussion: Ms. Diane Lee reported that she had not received an updated draft Protein Recommendation from Australian Secretariat, Dr. Grahame Harvey, so she was not sure what the status is concerning the Protein Recommendation. It has been difficult to follow the version and revisions to the protein document because the United States has not received regular updates or lists of comments to the revisions.

Dr. Pierce commented that at the conclusion of the joint meeting of SC 1 and SC 8 in October 2007, the two respective documents were closely aligned. However, the 5 CD of R 59 does not look anything like the version of R 59 that came out of the meeting in October 2007. He speculated that SC 8 was waiting to see what SC 1 comes up with before they come out with another draft.

8. Air-Oven Collaborative Study

Background: NIST-WMD's laboratory measurement traceability program requires that laboratories participate in interlaboratory and other collaborative experiments. A structured collaborative air oven study was last conducted following the 2000 harvest. Results of that study were reported at the Sector's August 2001 meeting. At its August 2008 meeting, the Sector agreed that a collaborative study was long overdue. It was also noted that such a study addresses the measurement traceability requirements of ISO 17025 *General requirements for the competence of testing and calibration laboratories*. Mr. Karl Cunningham, Illinois, subsequently agreed that the State of Illinois Moisture Meter Laboratory would serve as the pivot laboratory.

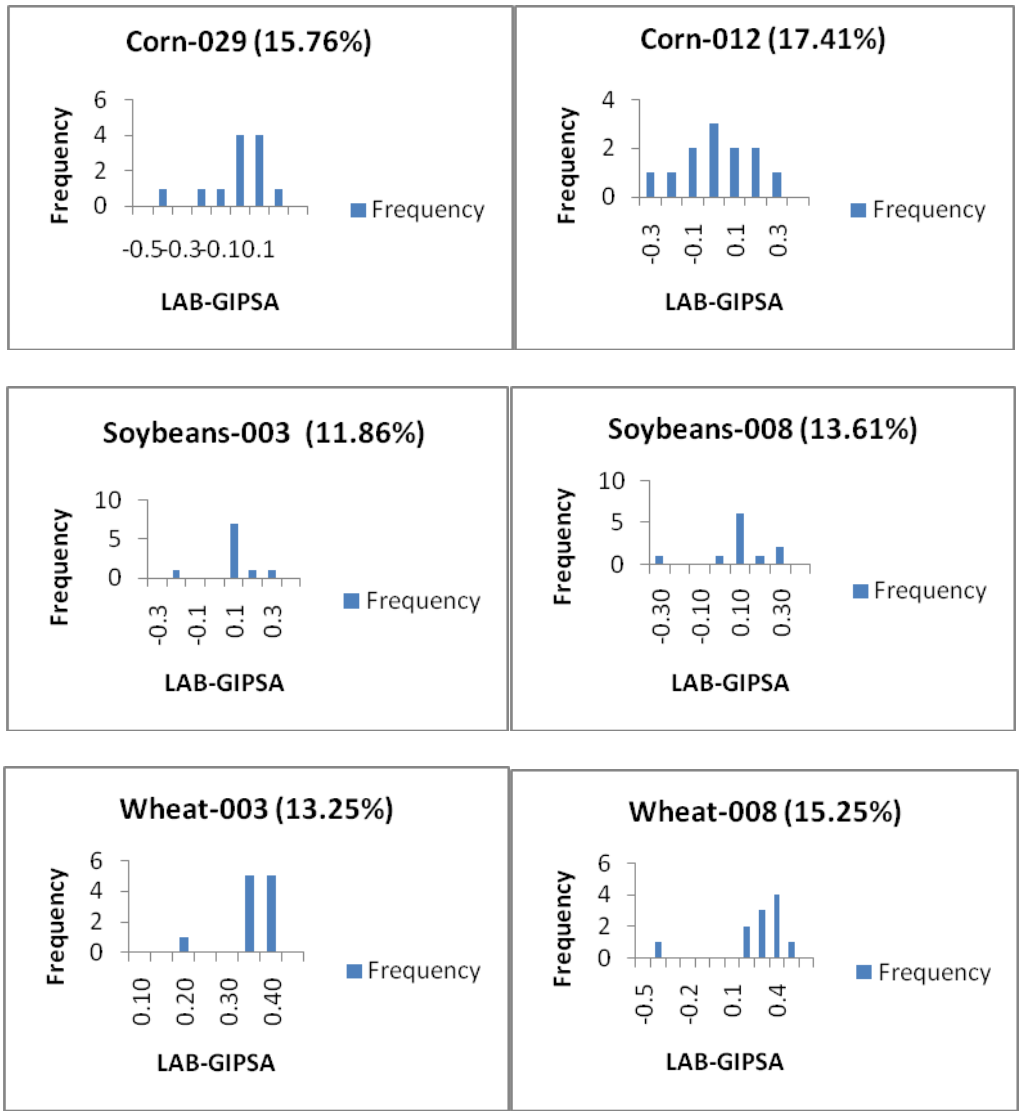
Discussion: Mr. Karl Cunningham reported that 14 laboratories participated in this study. Participants included: USDA/GIPSA (as reference laboratory), Arkansas, Colorado, Illinois, Iowa, Maryland, Mississippi, Missouri, North Carolina, South Carolina, Wisconsin (corn only), Wyoming, and DICKEY-john. Perten was sent samples but did

not return results. With the exception of one or two outliers, results were fairly good. The histograms below show the distribution of lab error (participant lab result minus reference lab result) for each of the grain samples. A more detailed analysis of results will be distributed at a later date.

The Sector agreed that when detailed results are distributed, participants should not be identified by name (except for USDA/GIPSA.) Individual participants will be told which laboratory number they were assigned (e.g., you are lab #4.)

In response to the question if a collaborative air oven study was something that should be scheduled to happen on a regular basis, Mr. Cunningham suggested that every two years might be appropriate.

Dr. Hurburgh, Iowa State University, urged the representatives from the American Oil Chemists Society (AOCS) to prepare a proposal so that the collaborative study could be conducted on an on-going basis rather than on an ad hoc basis. He cautioned that the proposal would have to include corn and wheat, as well as soybeans.



9. Item 310-1: G-S.8. Provision for Sealing Electronic Adjustable Components, G-S.8.1. Access to Calibration and Configuration Adjustments, and G-S.8.2. Automatic or Semi-automatic Calibration Mechanism

Background: At its 2007 Annual Meeting, the SWMA received a proposal to add requirements to G-S.8. to assure that a device could not be sealed in the configuration mode and continue to operate normally. Such a condition could facilitate fraud. The proposal, as submitted, required that a device continuously indicate when access to the set-up mode was not disabled.

At the 2008 Interim Meeting, the S&T Committee reviewed comments received during the open hearing and discussed alternate proposals provided by WMD and SMA. At the 2008 Annual Meeting, the WMD suggested that the S&T Committee amend the recommendation to address some of the concerns noted by the CWMA, NTEP participating laboratories, and WMD since the 2008 Interim Meeting.

During the open hearings at the 2009 Interim Meeting, WMD stated that it had received comments questioning how the application of a physical seal, as recommended by the manufacturer and listed on the CC, ensures that the calibration and configuration modes are disabled. What does that presence of the physical seal, pressure sensitive or lock and wire, due to the device that disables the calibration and configuration modes?

The S&T Committee agreed with the comments that the proposal ***is not ready*** to become a Voting item and suggested that further development to the proposal addresses the following concerns:

1. Avoid language that allows the indication of usable metrological values while in the adjustment mode for devices that do not have an event logger.

2. Recognize that more than one method of sealing is acceptable on a single device, such as using a lock and wire seal, for the mechanical adjustments and an audit trail for electronic adjustments.

3. Recognize that other codes in HB 44 do not have language for device categories and corresponding methods of sealing.

4. Require an obvious indication when a device is being adjusted if it is provided with a physical security seal.

5. Clarify that the application of a physical security seal to a specially designed and sealable plate or cover that disables external access to the configuration and adjustment mode is not the only method to seal adjustable components.

Consequently, the S&T Committee recommended that this item remain Informational.

After the 2009 Interim Meeting, the NIST Technical Advisor developed the following language for further development by the regional weights and measures associations, NTETC sectors, and other interested parties with the intent that a revised proposal can be forwarded to the S&T Committee for consideration at the 2010 NCWM Interim Meeting.

> ***G-S.8. Provision for Sealing Electronic Adjustable Components.*** *– A device shall be designed with provision(s) for****:*** ~~***applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.***~~
>
> ***(a) applying a physical security seal that must be broken, or***

(b) using other approved means of providing security (e.g., data change audit trail available at the time of inspection)

before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.
[Nonretroactive as of January 1, 1990]

(Amended 201X)

A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.

(Added 1985) (Amended 1989 and 1993)

G-S.8.1. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. **- (Unchanged)**

G-S.8.2. Multiple Sealing Methods. – Weighing and measuring devices may be approved for use with multiple methods for sealing adjustable components such as physical seals for calibration adjustment (e.g., load cells, meters, etc.) and event counters or event logger for the configuration parameters (e.g., capacity, interval size, octane blend settings, etc.).
[Nonretroactive as of January 1, 201X]

(Added 201X)

G S.8.3. Adjustment Mode Indications. – During the calibration and configuration adjustment mode, the device shall:

(a) Not provide metrological indications that can be interpreted, or transmitted into memory, or printed while it is in the calibration and/or configuration adjustment mode as a correct measurement value, or

(b) Clearly and continuously indicate that it is in the calibration and/or configuration adjustment mode, and record such message if capable of printing in this mode.

Nonretroactive as of January 1, 201X)

(Added 201X)

Discussion: The proposed changes to **G-S.8.** and the proposed language of **G-S.8.2.** do not appear to affect the provisions for sealing GMMs and NIR Grain Analyzers (see **HB 44, Section 5.56.(a)**, paragraph **S.2.5. Provision for Sealing** and **HB 44 Section 5.57**., paragraph **S.2.6. Provision for Sealing.)** The requirements of **G-S.8.3.**, however, may affect some instruments. This proposal stipulates that during any adjustment mode, the device must either not provide any metrological result that could be interpreted as a correct measurement, or must clearly and continuously indicate that it is in the adjustment mode.

In response to a request for feedback from manufacturers on the proposed changes and additions to **G-S.8.3**, Mr. Sean Bauer, Steinlite, described how the SL95 seals a switch that gives access to "adjustment mode". A wire seal must be broken to slide the switch to "adjustment mode" position. The device cannot be re-sealed without returning the switch to normal "operate" position. In "operate" position, the user cannot access "adjustment mode". Mr. Truex, NTEP Administrator, offered the opinion that this sort of arrangement sounded as if it would meet the requirements of option (a) of the proposal. He mentioned that some devices display CAL OPEN or CON OPEN continuously whenever the device is in adjustment mode to comply with option (b) of the proposal.

During a discussion of **G-S.8. Provision for Sealing Electronic Adjustable Components**, and use of a data change audit trail as a method of sealing, there was some concern that the two Grain Analyzer chapters of Publication 14 might contain wording that allows certain manufacturer/service company adjustments to be excluded from the audit trail. A cursory examination of Pub 14 did not reveal any obvious exclusions.

The Co-technical Advisor suggested that the GMM and NIR grain analyzer code of HB44 appears to cover the proposed changes to **G-S.8., G-S.8.2**, however, **Table S.2.5. Categories of Device and Methods of Sealing** in the GMM code may require some minor changes to expand the meaning of remote configuration capability to include the ability of the device to accept a new memory chip or to accept new parameters from anything plugged into a universal serial bus (USB) port or other port.

[Note the following definitions from **Appendix B - Philosophy for Sealing** in the GMM Chapter of Publication 14.]

> **Remote configuration capability.**
> The ability to adjust a weighing or measuring device or change its sealable parameters from or through some other device that is not itself necessary to the operation of the weighing or measuring device or is not a permanent part of that device.
>
> **Remote device.**
> A device that (1) is not required for the measurement operation of the primary device or computing the transaction information in one or more of the available operating modes for commercial measurements or (2) is not a permanent part of the primary device. In the context of this paper, a remote device has the ability to adjust another device or change its sealable configurable parameters.

The Sector decided to make this a carryover item for the next meeting so it could be studied in more depth.

9.5 Properly Standardized Reference Meters

[Submitted by Mr. Karl Cunningham, Illinois Department of Agriculture; received after the formal Agenda was published.]

The State of Illinois is requesting a definition for properly standardized reference meter and what the requirements are to qualify a meter as such. As with all standards there must be traceability. What criteria must these reference meters" meet? Also, for non-NTEP meters the testing procedure allows for air-oven testing to be performed, not meter to like-meter testing. What suggestions does the sector have on traceability of grain standards?

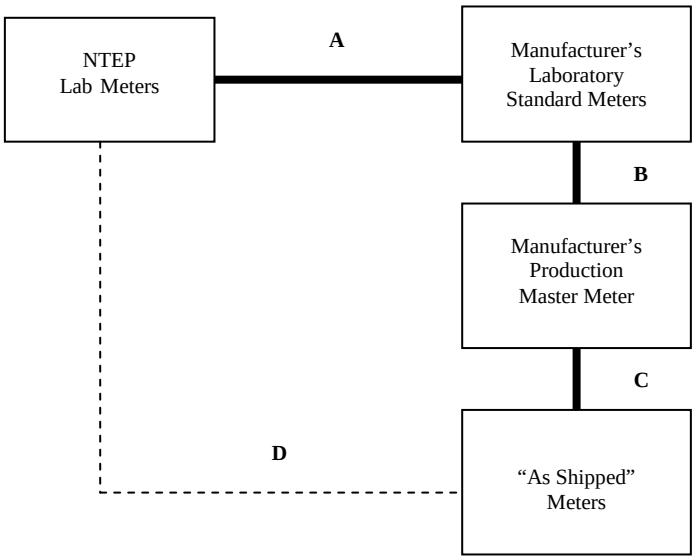
Background and Discussion:
[Note: The Illinois Bureau of Weights and Measures licenses companies and individuals who sell, install, or repair commercially used weighing and measuring devices through the Registered Serviceperson Program. Before becoming licensed, servicepersons are examined on their proficiency and understanding of applicable regulations. Licenses must be renewed annually. A registered serviceperson in good standing may place a commercially used device into service and the device may be used in trade or commerce until a state test is performed. Anyone who sells, installs, services, reconditions, or repairs a commercially used weighing or measuring device must be registered with the Illinois Department of Agriculture. On the bureau's list of Registered Repair Companies, eight are classified as registered to service moisture meters. Two of these companies carry the note "Sell only." Whenever a GMM has been serviced **or has had updated grain calibrations installed**, the meter must be "returned to service" by a registered serviceperson before it can be used. It is still subject to later inspection by Illinois Weights and Measures personnel.]

This item originated because the State of Illinois is concerned that some of its Registered Service Companies do not have the required procedures or equipment to comply with Handbook 44 test requirements when placing meters back into service.

For NTEP meters HB 44 permits meter to like-meter testing using "properly standardized reference meters …." Mr. Cunningham asked, "What is the definition of a properly standardized reference meter? How are they maintaining these standardized reference meters to know that they are operating properly and accurately?"

He was referred to **Section VI. Standardization of Instruments** in the GMM chapter of Publication 14 that shows the relationship and maximum permissible errors between the NTEP Lab meters, Manufacturer's Laboratory Standard Meters, Manufacturer's Production Master Meter, and "As Shipped" meters. It was explained that a

properly standardized reference meter for a Service Company should have the same traceability to the NTEP Lab Meters as the Manufacturer's Production Master Meter has.



Ms. Eigenmann explained how DICKEY-john checks and maintains the traceability required by Publication 14. DICKEY-john has three Laboratory Standard Meters that never leave the moisture laboratory. In the factory they have production line standards corresponding to the "Manufacturer's Production Master Meter shown in the above diagram. Once a month the production line standards are brought into the laboratory and checked against the three lab instruments. Six drops of grain are run though each of the four meters. This is done in a sequence that minimizes the effect of any moisture loss in the grain being used. Averages and standard deviations are calculated, and several other comparison tests are performed. The mean moisture difference between the Laboratory Standard Meters and a Production Line Standard (path B in the diagram) must not exceed 0.08 % moisture. Similarly, remote service locations bring their working standards to the DICKEY-john moisture laboratory once a year for the same kind of checks that are given to production line standards.

It was pointed out that there was no way to standardize a non-NTEP meter to the NTEP Laboratory Standard Meters. This is why HB44 requires that grain samples with air-oven moisture values be used for testing non-NTEP meters. Mr. Cunningham was concerned that there were service agencies and manufacturer's dealers who were placing non-NTEP meters into service without using air-oven samples. He thought that this was going to be another issue for these service companies, because they were going to be required to have air-oven capability or to show how they can obtain air-oven samples for putting non-NTEP meters back into service.

Mr. Tom Runyon, Seedburo Equipment Company, expressed the opinion that it is not reasonable to expect some dealers working out of their home, especially those not doing any repair work, to have air-oven capabilities rather they only need a set of air-oven samples. Dr. Hurburgh suggested that Illinois could offer a service supplying state certified air-oven samples for use by a registered service company to verify that a meter meets the accuracy requirements of HB 44 when it places a meter back into service. The State could require the service company to use a monitor meter and maintain a log of initial moisture and results of periodic monitor meter checks, just as Illinois inspectors do.

10. Time and Place for Next Meeting

The next meeting is tentatively planned for Wednesday, August 25 and Thursday, August 26, 2010, at the Chase Suites by Woodfin at Kansas City International Airport in Kansas City, Missouri. Sector members are asked to hold these days open pending determination of agenda items, exact meeting times, and meeting duration. Final meeting details will be announced by early June 2010.

If you would like to submit an agenda item for the 2010 meeting, please contact any of the following persons by June 1, 2010.

Mr. Jim Truex, NTEP Administrator, jim.truex@ncwm.net
Ms. G. Diane Lee, NIST Technical Advisor, diane.lee@nist.gov
Mr. Jack Barber, Technical Advisor, barber.jw@comcast.net

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Appendix B

National Type Evaluation Technical Committee (NTETC)
Measuring Sector

October 2 - 3, 2009, Clearwater, Florida
Annual Meeting Summary

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National Type Evaluation Technical Committee (NTEC)
Measuring Sector Annual Meeting
Meeting Summary

October 2 - 3, 2009
Clearwater, Florida

Chairman, Mr. Mike Keilty, Endress and Hauser, opened the meeting by welcoming participants and asking for introductions. Mr. Keilty also described the purpose of the Measuring Sector (hereafter referred to as the "Sector") and others contributed insights on how the Sector interacts with other committees in the National Conference on Weights and Measures (NCWM). Mr. Keilty also described procedures for commenting on issues during the meeting and indicated that, should an item be presented for an official "vote" during the meeting, only those listed on the "voting members" list provided by the NCWM will be recognized.

Accompanying this summary as "Appendix A" is a list of "Action Items" agreed to at the meeting.

Carry-over Items:

1. Table of Key Characteristics of Products in Product Families for Meters Table

Source: Carryover Item – 2007 and 2008 Measuring Sector Agenda

Purpose: For the past several years, the Sector has been working to revise the "Product Family" tables in NCWM Publication 14 (Pub 14) with the goal of clarifying the tests to be conducted and products to be referenced on an NTEP Certificate of Conformance (CC) based on NTEP testing. This item is included on the agenda to allow for review of a recent revision to the tables and to determine what additional work is needed.

Background: At its 2006 Annual Meeting, the Sector established a small work group (WG) tasked with developing proposed changes to the Product Families for Meters table in NCWM Pub 14 to help improve consistent application and ease of use of the table. In 2007, the Sector heard a progress report from the WG and considered a number of proposed revisions (see the 2007 meeting summary for details). The WG also noted additional work was needed to list the various liquids, describing their viscosity, specific gravity, and conductance.

At its 2008 meeting, the Sector was asked to consider another proposal from the WG, consisting of (1) a proposed table listing product families/groups along with typical product names and corresponding viscosities and specific gravities; and (2) a proposed revision to the product families table outlining test requirements for different meter types within each product family. The Sector also discussed the categorization of liquid CO_2 and the inclusion of milk and dairy products under separate agenda items.

After considerable review and discussion and on-screen editing of proposed variations of the table, the Sector reached a consensus on the format of the table, agreeing to divide the information into three tables: Table C.1. Tests to be Conducted (identifying tests to be conducted); Table C.2. Product Family Table (outlining product families broken down by meter technology and referencing tests from Table C.1.); and Table C.3. Typical Product Family Characteristics (listing typical products in each product family and the viscosity and specific gravity of each). At the end of the meeting, there was general agreement that the proposed revisions represent major improvements, while acknowledging that additional work was needed (see 2008 Sector Summary for additional details).

At the conclusion of the 2008 meeting, the Sector once again agreed that a consensus had been reached on the general revisions to the format, but that additional content changes are needed. Based on a reluctance to wait an additional year to implement the corrections already agreed upon, Sector members present agreed that additional revisions should be made and the Sector balloted. Following the 2008 meeting, Mr. Keilty prepared and distributed a ballot. The results of the vote indicated a lack of consensus for the additional changes proposed.

Recommendation: Based upon comments received as a result of the ballot and additional research on product characteristics, Sector Chairman Mr. Keilty developed a revised version of Policy C. Product Families for Meters (including revisions to the three "product family" tables) for consideration by the Sector in September 2009. This version was distributed as an attachment to the 2009 Sector Agenda (see Appendix B) and Sector members were asked to review the draft and consider it for inclusion in the 2010 edition of NCWM Pub 14.

Discussion: At the 2009 Sector Meeting, Mr. Keilty reviewed the history of the item and then described key features of the most recent version Policy C. Product Families for Meters that was included with the 2009 Agenda. Mr. Keilty noted that:

(1) Table C.1. (Tests to be Conducted) tests are identical to the current Pub 14;
(2) Table C.3. (Typical Product Family Characteristics) is an extraction of the products and their characteristics;
(3) There were some items that need to be addressed. For example, the Sector agreed to add "juices and beverages" to the table last year, but this didn't show up in Pub 14.
(4) In Table C.3., there was originally a question about the abbreviations for centipoises and the abbreviation now appears as "cP" with P capitalized because it is an abbreviation of a proper name.
(5) The breakout of the terms in the remainder of Table C.3. were taken from current version of Pub 14.
(6) References are closer to branded chemical names.
(7) Additional data in the agrichemicals area that people provided to Mr. Keilty are included.
(8) Additional information is still needed in defining "crop chemicals."
(9) Additional items need to be corrected, such as the addition of the "juices and beverages" categories.

Mr. Keilty suggested that the Sector begin its discussion of this item by first focusing on the format of the proposed table and then discussing its contents. Many positive comments were made regarding the format. Some questioned how to handle products that are not presently referenced in the table. Mr. Steve Patoray, Consultants on Certification, questioned the use of the term "normal liquids," noting its meaning is not clear.

Some questioned why different metering technologies are treated differently. For example, "normal liquids" for mass flow meters encompasses a much wider range of products than do other technologies. Mr. Keilty and Mr. Will Wotthlie, Maryland Weights and Measures, pointed out that for technologies new to the type evaluation program, more testing is required until data and NTEP experience with the technology illustrates expected performance for given product groupings. For example, when NTEP first began testing with turbine meters, the number of tests and flow rates were greater than for other technologies, which were more familiar to the NTEP program. As experience with turbine meters increased, NTEP broadened the coverage that could be obtained with a given test. An additional reason for the variation in how meter technologies are addressed in the table relates to how a given meter technology is affected by product characteristics. For example, changes in viscosity may affect one meter technology more than another meter technology. Others reiterated that the goal in establishing the "product family" table(s) was to minimize the amount of testing required by identifying groups of products which would give similar test results. For example, testing with one or two products from the group would illustrate performance similar to what would be expected for other products in the group.

Mr. Rich Miller, FMC Technologies, commented that the basic format and approach used in the table seems to have originated with PD meters; the Sector is trying to fit other meter technologies into the same format without acknowledging that some of the criteria do not make sense for those technologies. He further commented that meter technology should not matter; the criteria should be based on performance and the criteria should be applied equally across all meter technologies. Mr. Rich Tucker, RL Tucker Consulting, observed that the "normal liquids" seem to be causing some confusion for people, noting that the term only appears to be significant for mass flow meters and perhaps clarifying that term might eliminate some of the concerns. He also observed that the current criteria have been in Pub 14 for years; the current effort is to attempt to make the table more manageable and, if there are concerns about the criteria, perhaps this needs to be worked on and brought back as a separate proposal. Sector Technical Advisor, Ms. Butcher (NIST Weights and Measures Division) noted that, since the format seems acceptable to many, footnotes regarding the application of the term "normal liquids" might be used as an interim measure to allow the current criteria to be more easily applied, and alternative proposals could be developed as a separate effort to address concerns about inconsistencies found in other sections of the current criteria. The Sector discussed the use of the term "normal liquids" at greater length without coming to any resolution on how to address its use.

In the course of discussing the criteria and format of the tables, several people suggested that a better approach might be to separate the tables by technology. Mr. Patoray and Mr. Henry Oppermann (Weights and Measures Consulting) both offered to develop alternative formats and presented them to the Sector on the second day of the meeting. Mr. Keilty and Ms. Butcher agreed to make modifications to the three proposed tables in an attempt to clarify the use of current terminology.

On October 3, Mr. Patoray and Mr. Oppermann each presented alternative versions of the table which they had developed for two different metering technologies. The Sector reviewed the alternative prepared by Mr. Patoray and the alternative prepared by Mr. Oppermann as well as modifications to the existing proposal prepared by Mr. Keilty and Ms. Butcher.

Comments indicated that most prefer the approach in which technologies are addressed in separate tables, though Mr. Miller expressed disappointment that technologies are broken into separate tables and treated differently. Mr. Mr. Wotthlie noted that the version prepared by Mr. Oppermann appears to be the easiest to use, also noting that the ascending order of the product by specific property values is more relevant to the metrologically significant factors. Participants noted that additional work is needed to further develop an alternative table that combines or includes this approach and format, and a small work group was formed for this purpose as described in the "Decision" below.

Decision: Of three alternative versions of the table presented to the Sector during its 2009 meeting, the approach in which technologies are addressed in separate tables was viewed as a more appropriate approach.

[Technical Advisor's Note: An example of this format is illustrated in Appendix C in a draft prepared by Mr. Oppermann and further revised and reformatted by Mr. Keilty. This work is still in progress and the draft in this appendix is provided only to illustrate the general format agreed upon.]

Mr. Keilty will continue to shepherd this work, coordinating with those who have expressed interest in this issue and welcoming additional input from other Sector members. Work will be done to integrate the separated technology proposal with that presented at the 2009 Sector meeting. This newly edited version will be circulated among Measuring Sector members and discussed with those members who are able to attend the January 2010 NCWM Interim Meeting. Based on any comments received, additional revisions may be made prior to presenting a revised draft to the Sector at the 2010 Sector meeting. The goal is to develop a version for inclusion in NCWM Pub 14 in which it is easy to understand which tests and procedures must be followed for type evaluation testing.

2. NTEP Checklist for Hydrocarbon Gas Vapor Meters in Sub-metering Applications

Source: NTEP Director

Purpose: California Division of Measurement Standards (CA DMS), working with members of industry, has updated a draft checklist for hydrocarbon gas vapor meters in sub-metering applications. This item is included on the Sector agenda to allow for an update on this work and to discuss further action required by the Sector.

Background: At its 2006 meeting, the Sector was asked by the NTEP Committee to consider and develop a checklist for residential hydrocarbon gas vapor meters. These devices will most likely be used for sub-metering. At that meeting, the Sector heard that several states had recently contacted NTEP regarding these devices. California already has type evaluation and certification of these devices in their state. The Sector was asked to review the procedures used by California (which were included as Appendix D of the 2006 meeting agenda) and rework them into a format acceptable for NCWM Pub 14. The Sector agreed at that time that the best approach for developing a Pub 14 checklist for Liquid Petroleum Gas (LPG) vapor meters would be the utilization of a WG made up of technical experts and other interested parties. Mr. Dan Reiswig (CA DMS), was to provide a list of vapor meter manufacturers to be contacted for participation in the WG.

At its 2007 meeting, the Sector reviewed a draft presented by the California NTEP laboratory and agreed that the California NTEP laboratory and the NTEP director would continue to develop this checklist for presentation and discussion at the next Sector meeting.

At its 2008 meeting, the Sector, at the suggestion of the NTEP Measuring Laboratories, raised the question of whether or not there is interest in developing this checklist, particularly given the small number submitted for evaluation in the past and the availability of California's certificate as an alternative. Since the bulk of work remaining was in the reformatting of the checklist, the Sector agreed that the CA NTEP Laboratory will work to reformat the checklist into a Pub 14 format. Norman Ingram (CA Division of Measurement Standards, NTEP Laboratory) agreed to coordinate with Mr. Maurice Van Puten (meter manufacturer) and Jim Truex to work on this issue between now and the next Sector meeting.

A copy of a revised draft checklist was distributed to the Sector prior to its 2009 Meeting; a copy of the draft checklist is included in Appendix D to this summary. At its 2009 meeting, the Sector revisited the need to include a checklist for these devices in Pub 14. Mr. Oppermann, who noted he had experience testing these devices prior to his career at NIST, questioned the need for a separate checklist. Others questioned where they would fall in the product family table and what test criteria would apply. Mr. Reiswig noted that the meters recently tested are of a different technology than previously encountered. Mr. Keilty asked the Sector to consider the general question of whether or not the checklist is complete and ready to move forward and whether or not the checklist references anything that isn't currently referenced in NIST Handbook 44.

Decision: While some Sector members present at the meeting have tested these devices, there were no manufacturers of these devices present at the Sector meeting. The Sector heard no specific comments on the checklist and, hearing no real opposition, decided to forward the checklist to the NTEP Committee for their consideration.

The Sector agreed that Ms. Tina Butcher, NIST Technical Advisor, would forward the HydroCarbon (HC) Vapor Meter Checklist developed by CA to the NTEP Committee by November 1, 2009, for their consideration for inclusion in NCWM Pub 14.

3. Testing Meters Made of Different Materials

Source: California NTEP Laboratory – Carryover from 2007 Measuring Sector Agenda

Purpose: For the past several years, the Sector has been discussing the issue of how to assess variations in meter materials in conjunction with type evaluation testing. A key point of contention in these discussions revolves around changes to meter materials from that used in the meter evaluated during type evaluation. The NTEP laboratories would like more definitive criteria to help them assess when changes to meter materials are metrologically significant to the extent that additional testing should be required in order for the new material to be covered on the NTEP CC. Meter manufacturers generally believe that changes in materials should be left to the judgment of the manufacturer since they must ensure continued meter performance for their customers and, as the designers of the meter, they well understand and take into consideration product and environmental applications and adjust materials accordingly to meet the needs of the end application. The issue is further complicated by the lack of definitive criteria that would guide the NTEP laboratories in making a decision about which meter materials should be selected for testing to be representative of a range of materials. This item is a continuation of past discussions by the Sector on this issue.

Background: The Sector reviewed this issue at its 2007 and 2008 meetings, but was unable to reach a consensus on the item. The Meter Manufacturers Association had also prepared a white paper in which they noted that it is the manufacturer's responsibility to ensure that a meter meets type, noting the long history of meter compliance and also that NIST Handbook 44 is not intended to differentiate between measurement technologies, only the intended application. They also pointed out questions to be answered in order to make an informed decision on this issue include: (1) Is there a real world problem that requires a solution by inclusion of a new section in NCWM Pub 14 specifically aimed at materials?; and (2) Is there an inequity in the market or facilitation of fraud?

At its 2008 meeting, the Sector had extensive discussion over specific examples of meter sizes, product applications, and component materials. There were clearly divided opinions regarding how these combinations should be addressed. Manufacturers generally seemed to feel that component materials relative to the intended meter

application are a design issue and should be left to the manufacturer to address, particularly since they will ultimately be responsible for ensuring that the meters work accurately and their customers are satisfied. Some NTEP laboratory representatives were comfortable with the idea of allowing the marketplace to take care of this issue, whereas others were not, particularly citing their feeling of responsibility in attesting to the accuracy of what is listed on a CC. However, it was clear that all laboratories felt the need for additional guidance in how to handle variations with regard to the amount of testing required and on how to handle listing materials information on the CC to ensure consistency among all of the laboratories.

The Sector was unable to reach any consensus on this issue; however, the Sector acknowledged that the issue is not going to be eliminated from the Sector's agenda. Criteria (whatever that may be) regarding how to address materials must be included in Pub 14, and guidance needs to be given to the NTEP Laboratories to ensure this issue is consistently addressed for all evaluations.

Recommendation: The Sector was asked to reconsider this issue and attempt to reach a resolution. The original proposal first considered at the Sector's 2006 meeting is included for reference along with an excerpt of the discussion from the Sector's 2008 discussion of this item.

Original Proposal from 2006 Sector Meeting:

The following proposal was offered as a possible solution. The Sector reviewed the proposal for possible forwarding to the NTEP Committee for inclusion in Publication 14.

Proposal: Add a new Section F. to the Publication 14 Technical Policy as follows and renumber subsequent sections:

U. Meters Made of Different Materials within the Same Family

When multiple meters made of different materials within a meter family are submitted for evaluation all meters will be tested with at least one product from each product family to be included on the CC and at least one meter will be tested with the range of products required in the Product Family Table for the meter type (e.g., positive displacement, turbine, mass meter, etc.) submitted for evaluation.

Excerpt from Item 3 of the 2008 Measuring Sector Final Meeting Summary:

Discussion: Steve Patoray described (from his perspective as past NTEP Director) the scenario discussed at the 2006 and 2007 Sector meetings. He noted that materials used in devices are considered metrologically significant for weighing applications and questions were raised about whether or not materials are metrologically significant for metering applications. Some had suggested that using criteria similar to that used by Underwriters Laboratories might be considered. He indicated that many were uncomfortable with the concept of defining a "worst case" scenario for particular materials. He further noted that the question was raised of where to stop in the examination of device components: the body of the meter, or the seals, or other location? Manufacturers indicate that these questions are all part of the design process and inherent with assembling a device intended for a given application. Steve concluded his overview by noting that a key question is whether or not additional testing is needed based on variations in the materials used in the metering system and further commented that it is not likely that a field official will be able to determine these differences by visual examination. The inspector just needs to have confidence that the meter they are examining is covered by the CC. An overriding concern of NTEP is to ensure that the evaluation is fair and that the requirements are being applied consistently to all manufacturers. At present, NTEP has no guidance on how to handle these different scenarios.

Allen Katalinic (NC) commented that while changes to significant components of a meter will make a difference, there are many parts in a meter where changes will not have any metrological impact. Mike Frailer (MD) noted that a key difficulty on the part of the evaluator is in assessing how to consistently assess whether a given change is metrologically significant, and Jim Truex (NCWM NTEP Director) noted that this depends on how one defines "metrologically significant." Paul Glowacki (Murray Equipment) commented that Jim's point touches on the basic issue, which is how to define what changes can be made without reevaluation. A manufacturer may be confident that a change in material will not affect a meter's performance; however, an evaluator may not agree and may

require re-evaluation. There have to be some guidelines because, at present, Paul feels as if every CC is a negotiation and what is applied to one company may be different than what is applied to another company. Tina Butcher (NIST WMD) commented that the technical policies in Publication 14 strive to minimize the amount of testing required for a manufacturer to list the maximum number of devices on a CC. She stated that, for the NTEP laboratories, key questions are: (1) whether the laboratories and NTEP management have adequate information to enable them to assess when additional testing is needed in order to list particular variations on the CC, and (2) how they can make that assessment consistently from manufacturer to manufacturer and from laboratory to laboratory. NTEP has developed experience with some basic types of changes to devices through trial and error and in consulting with manufacturers; the laboratories are asking for specific guidelines with regard to materials variation. Mike Keilty noted that manufacturers submit a sample(s) of a device in good faith and expect a rigorous evaluation; however, manufacturers are concerned that the amount of testing not be expanded beyond what is economically feasible.

Relaying discussions from the NTEP laboratory meeting prior to the Sector meeting, Jim Truex commented that the laboratories also have a dilemma in assessing how to avoid "horror stories" such as experiences with E85 while establishing reasonable guidelines. Jerry Butler (NC) also noted that, while many manufacturers such as those who have long participated in NTEP Sector meetings and evaluations are conscientious and laboratories may trust their judgment, laboratories are seeing an influx of equipment from sources (sometimes off shore) with which they have had little experience and whose manufacturers sometimes have little if any experience with legal metrology requirements, let alone U.S. requirements. This concern was echoed by other laboratories who also noted confidence in manufacturers participating in this discussion, but recognized that policies must be in place to ensure fair treatment. Several manufacturers commented that the industry will take care of substandard products produced by competitors by bringing such instances to NTEP's attention; reputable manufacturers cannot afford to allow substandard products to undercut the market when they themselves are expending the resources needed to comply.

The Sector also had some discussions about replacement parts and how these affect metrological integrity, with some members noting that field officials are unable to determine when non-metrologically equivalent or inferior components are used by visual examination. Several members commented that this is not something that can be prevented by increased evaluation at the type evaluation level, but is rather addressed by performance testing in initial and subsequent verification. In addition, the manufacturer is equally concerned about unauthorized substitutions since this can affect the reputation of their product. In that same vein, a manufacturer would not make a change in materials unless he is confident that the change would not affect the performance of the device in his customer's application. Rodney Cooper (Actaris) pointed out that reputable manufacturers police themselves to ensure their customer's continued confidence. Norm Ingram (CA) pointed out that manufacturers have designed these products and know from experience what will work, so perhaps the best approach is to allow them to make these changes and allow the marketplace to take care of itself. Norm did note, however, as did Dan Reiswig (CA), that even if the issue is tabled, the laboratories still need guidance on how to consistently approach proposed changes with regard to issuing CCs.

Dmitri Karimov (Liquid Controls) and others pointed out that NTEP has largely relied on the integrity of the manufacturer in reporting changes to devices and that, in many cases, NTEP or a field official would never be able to tell the difference. For example, if a rotor is changed, there is no reasonable way that weights and measures officials can determine that the clearances are different. In addition, NTEP has also relied primarily on the manufacturer to provide guidance on when a particular change is metrologically significant. With regard to material, the manufacturer's concern is in making sure that the materials are compatible with the product being measured in the application. Sector Chairman Mike Keilty (Endress and Hauser) questioned how conformity assessment might factor into this issue and contribute to resolving some of these questions.

Rich Tucker (RL Tucker Consulting) echoed an earlier comment by Norm Ingram, noting that most manufacturers change materials because of the products with which the meter will be used. When a manufacturer finds through experience that a particular change creates problems, manufacturers make adjustments accordingly to ensure continued performance. Rich even noted there were instances when NTEP passed a material in an evaluation and that material later proved to be problematic. The majority of the time materials issues will resolve themselves and most of the testing requirements imposed by the product families table are going to address any question about materials.

The Sector also discussed numerous examples of specific materials and their effect on metering of different product types; however, these discussions provided no insight on how to best address the materials issue. Steve Patoray reminded the Sector that its purpose is to advise the NTEP administrator, and Publication 14 will only be changed if the NTEP Committee agrees with the Sector's recommendations.

Will Wotthlie (MD) commented that the laboratories are putting their reputation on the line by issuing a CC and saying that it covers everything listed on the CC; the laboratories want to have confidence that the devices will work and field officials are, in turn, relying on that assurance. Will also questioned why NTEP is needed if the feeling is that everything in the field will take care of itself. Mike Keilty noted that a balance needs to be achieved between a system that can be practically executed and one that will still provide confidence; manufacturers are concerned about expanding testing beyond what is economically feasible.

Will Wotthlie suggested that an alternative is for the labs to simply list what is tested on the CC under the testing conditions section; however, some manufacturers indicated they want to continue to list materials of construction on the CC under the "Standard Features and Options" section. Jim Truex noted that a CC is not meant to be a marketing tool. Tina Butcher commented that, in its early days, NTEP decided that only metrologically significant things should be listed on the CC. If this position is to be maintained, then the Sector needs to decide whether or not to include the metals on the CC if all options are covered. If the Sector concludes that the material is not significant, then perhaps a statement needs to be included in Publication 14 to that effect. She also reminded the Sector that the laboratories are not only trying to assess whether or not a new variation in material can be covered on the CC, but also how to determine which of two meters to select for testing when they are made of different materials.

Some members, including NTEP laboratory representatives as well as manufacturers, stated that if the materials feature or attribute is not metrologically significant, it doesn't belong on the CC; the information can be listed in the test conditions, but not on the front of the CC under the "Standard Features and Options." Dmitri Karimov questioned why the information would be listed in the test conditions if it isn't metrologically significant. Others noted that this record of the test conditions may eliminate the need for additional testing should policies change at a later date. Jim Truex also pointed out that if the information is to be listed on the front of the CC, it will be necessary for the laboratory to determine the "worst case" scenario with regard to materials.

At present there is a great variation among existing CCs with regard to how materials are referenced. Steve Patoray noted that there are differences in how manufacturers request this information be reflected on their CCs; some want various model numbers listed, including different materials. Some believe that the only thing that should be listed on the CC is the product application for which the meter is approved, not the materials. Jerry Butler (NC) questioned why the manufacturers want to list all of these different products on the CC, commenting that it is up to the manufacturer and the customer to make sure the meter is right for the application. He further noted it would be helpful to have materials construction identified through the model designation.

Questions were raised by the manufacturers and laboratories about how CCs will be handled until the Sector can reach an agreement with regard to testing requirements for materials variations. Jim Truex reiterated that the purpose of a CC is not a marketing tool. Jim indicated that, as NTEP Director, he is not comfortable with listing all these different features unless the laboratory has tested them. Without taking a position on whether or not "materials" are considered a metrologically significant feature, Jim indicated that, for consistency purposes, NTEP will not list materials in the standard features and options; however, the information will be listed in the test conditions for the meter(s) tested during the NTEP evaluation(s). He noted this will be an administrative decision to ensure consistency. In response to a question about whether eliminating the reference to materials of construction in the "standard features and options" section would affect existing CCs that presently list this information, Jim stated that no changes would be made until the CC is being revised for other reasons.

After extensive debate on the first day of the meeting without resolution, the Sector returned to the discussion the following day with little additional progress. At that point, Mike Keilty noted that there are manufacturers who have product materials listed on their CCs and those who do not have the materials listed. He commented that, in establishing guidelines, the Sector has tended to draw a broad brush across metering technologies and, in many instances, treated them as the same even though people know they are not made the same way. Manufacturers generally make the materials of the meter to be compatible with the product to be measured and manufacturers

may take different approaches in ensuring this compatibility. Andre Noel (Neptune) pointed out that some meters are made of different materials for different product applications, and the change in product necessitates an additional evaluation. Andre noted that a manufacturer can't make a meter out of bronze, for example, and use it to meter a caustic material because it will fail. Manufacturers take the product application and other application details into account when designing and choosing a meter for a given application and will relay this information to the customer with regard to where the meter can be used. Andre further noted that this becomes a question of liability for the manufacturer since the customer will hold the manufacturer accountable. Some members also made note that the materials may be more significant for some meter technologies than for others.

The NTEP laboratories are asking for guidance to ensure consistency, but the Sector seems to be at an impasse with regard to how to provide that guidance. The Sector was not able to agree upon and general guidance that would assist the laboratories in understanding material construction and its impact on device performance. The laboratories need to be comfortable that the testing they have conducted supports the variations listed on the CC. Dennis Beattie (Measurement Canada) observed that the issue seems to focus on the question of how the materials affect the definition of what constitutes a "family" of devices. He also pointed out in response to an example of a manufacturer choosing a lighter material for a vehicle-mounted than a stationary application that some materials such as aluminum respond differently to changes in temperature.

Discussion: At its 2009 Meeting, the Sector once again spent considerable time discussing this issue.

Mr. Dmitri Karimov (Liquid Controls) advised that a number of manufacturers present, met separately just prior to the second day of the Sector meeting to discuss this issue. He reported that most manufacturers felt that the issue should be dropped from the Sector's agenda.

Mr. Reiswig (CA) and Mr. Wotthlie (MD) commented that, if the item is dropped, then this would mean that the NTEP laboratories would test what is submitted and list the material on the NTEP Certificate under the test conditions. Mr. Miller, (FMC) clarified that listing the material on the NTEP CC was not the intent of the manufacturers' position. He stated that materials of construction should not be considered a metrological issue. He noted that the premise of the manufacturers' arguments in past discussions of this issue is that, if the meter is misapplied in the application, then the customer is going to come back to the manufacturer to resolve the problem. The manufacturers should be looked to as the experts since they are the designers of the meters and understand what must be done to ensure continued compliance in different applications. He also questioned whether the meter would pass the NTEP test to begin with if the materials weren't suitable for the application.

Mr. Jerry Butler (NC), pointed out that failures from improper material selection do not always arise in the limited space of time involved in an NTEP test. As stated by NTEP laboratories and others in previous discussions of this issue, Mr. Butler reminded the audience that NTEP evaluations include meters manufactured by companies who are not as conscientious as the manufacturers present at this meeting and who are not familiar with the process and requirements for legal-for-trade applications. It is largely with these manufacturers that the concerns lie and weights and measures officials rely on the NTEP laboratories for the credibility of the NTEP CCs. Mr. Rodney Cooper (Actaris) stated that the manufacturers believe that this should be up to the manufacturers to control. The Sector had similar discussions about companies that "clone" meters covered by existing NTEP CCs, but that don't use the same (appropriate) materials. Mr. Gordon Johnson (Gilbarco) noted that if manufacturers are competing with clones, they will go out of business.

Mr. Miller reiterated that a key point with this issue is that this is really a question of a misapplication of the meter. If the meter with the right materials is not selected for the application, then problems can arise. For example, if a meter with carbon steel bearings is selected to measure water and the meter eventually failed, it was a misapplication of the meter. It is not the meter design itself that is a problem, but rather the selection of the meter materials for that product application.

Mr. Patoray Consultants on Certification), pointed out that meter failure can also arise from other factors such as other influences or components in the system. Manufacturers will work to resolve the problem, but the problem is not always the meter or its materials. He reminded the Sector that this entire issue was raised because some manufacturers were advising NTEP of materials changes and were subjected to additional NTEP testing. Others made materials changes, but did not notify NTEP of the changes and were not subjected to additional NTEP testing.

This inconsistency led to the inclusion of this issue on the agenda. He also noted that the CCs should reflect a clear definition of type and that differences should be noted in some manner on the CC such as in the model designation.

Mr. Mike Frailer (MD) reiterated that the NTEP laboratories are looking for additional guidance to assist them in determining when a change is metrologically significant and would, therefore, require additional testing. Mr. Wotthlie pointed out that, if this item is dropped from the agenda entirely, the labs will revert to their previous approach of conducting additional testing when a materials change is made; this is not something that is desirable for the manufacturers.

Ms. Butcher (NIST) questioned whether, if the materials are changed based on the product application, wouldn't the NTEP laboratories have done testing with different materials when the tests were done for the different product applications. Couldn't this tie to the product family table? The manufacturers present indicated that testing of different materials by virtue of testing different product applications would generally be the case. Mr. Patoray noted that this is also a reason that there is concern about the product family table; that the current table was developed for a specific technology, positive displacement meters. Mr. Reiswig (CA) observed that he doesn't oppose changes to the product family table, particularly if it would help provide uniform information about the effect of material changes.

Mr. Wotthlie (MD) pointed out that the product family tables were actually further broken down several years ago based on an effort led by Ms. Charlene Numrych (LC) and involving other manufacturers. With regard to the materials issue, we can't seem to get all manufacturers to agree that materials are metrologically significant. Mr. Paul Glowacki (Murray Equipment) noted that the manufacturers were asked to identify what guidelines and criteria they could accept; however, the manufacturers may be going too far in one direction for the regulators' comfort. He noted that the manufacturers want clarity and also discussion about what defines "metrologically significant" rather than focusing only what is metrologically significant with regard to product families and materials.

Sector Chairman, Mr. Keilty (Endress and Hauser), questioned whether this issue should be dropped since it has been on the agenda for an extended period of time without resolution and no data has been provided to move the issue in any direction. Mr. Miller, (FMC), indicated that they are willing to provide data, but noted that eliminating product subcategories in the product family tables might eliminate some of the issues related to materials.

After discussing this issue at great length and examining various aspects of the points raised earlier in this discussion, the Sector concluded that this issue will not reach resolution by continuing to discuss it at the Sector meetings alone. They agreed that it would be better to form a small work group of interested parties who can focus their attention on trying to come up with a solution to this issue using the expertise available within the various metering technologies. Mr. Oppermann (Weights and Measures Consulting) pointed out that this topic is related to the product family topic in Agenda Item 1. The two topics should be discussed together since both are focused on trying to identify and define what constitutes metrologically significant factors.

Decision: The Sector agreed to form a work group, the "Metrologically Significant Characteristics of Technologies Work Group," to arrive at a uniform, appropriate, and clear approach for initial, subsequent, and additional tests for the performance of a device technology. The following people agreed to serve on the work group:

Chair:	Mr. Rodney Cooper
Co-Chair:	Mr. Rich Miller
Work Group Members:	Mr. Marc Buttler
	Mr. Paul Glowacki
	Mr. Mike Guidry
	Mr. Gordon Johnson
	Mr. Dmitri Karimov
	Mr. Henry Oppermann
	Mr. Steve Patoray
	Mr. Dan Reiswig

The work group was tasked to:

(1) Create a short list of features/options affecting the metrological characteristics of each device technology by December 15, 2009;
(2) Prepare a one-page analysis that briefly documents and provides the rationale for including each metrological characteristic in the list (referenced in task 1) by December 15, 2009;
(3) Review the first draft list of significant constituents and condense that list to only relevant characteristics;
(4) Prepare a final list for a work group meeting during the NCWM Interim Meeting by January 15, 2010.

Should revisions be needed prior to presenting an updated draft of Policy C. to the general Sector membership, the WG could potentially meet again at the July 2010 NCWM Annual Meeting in addition to completing additional work through electronic communication in the interim period.

4. Add Testing Criteria to NTEP Policy U "Evaluating electronic indicators submitted separate from a measuring element"

Source: California NTEP Lab

Purpose: Since 2007, work has been underway to develop a checklist to evaluate electronic indicators submitted separate from a measuring element. This item is included on the Sector agenda to allow for an update on this work and to discuss further action required by the Sector.

Background: At its 2007 meeting, the Sector heard that Section U of the NTEP Policy in NCWM Pub 14 allows for testing an indicator separate from a measuring element. However, specific test criteria had not been developed for this section. The Sector heard a recommendation to develop and add specific criteria for testing an indicator separate from a measuring element to this section. The California NTEP Laboratory recommended using Canada's test criteria as a guideline for developing the tests outlined in 2007 Sector Agenda Appendices A, B, and C.

The Sector agreed the California NTEP laboratory should lead a WG to develop a specific test procedure and ready the document for review at the 2008 Sector meeting. Members of the WG selected at the 2007 meeting were Mr. Dave Rajala (Veeder-Root Company), Mr. Miller (FMC Technologies), Mr. Maurice Forkert (Tuthill Transfer Systems), Mr. Karimov (Liquid Controls), Mr. Cooper (Actaris Neptune), and Mr. Ralph Richter (NIST WMD).

At the 2008 Sector meeting, Mr. Reiswig (CA DMS) reported that he had developed and circulated an initial draft of criteria for separate indicators and a lot of additional input was provided by manufacturers and Measurement Canada were significant contributors to the development of the draft (See the 2008 Sector Meeting Summary for details). Sector Chairman Mr. Keilty asked for a renewed commitment from the WG volunteers and asked if others were interested in participating. The WG made plans for additional meetings to further develop the draft.

A copy of the draft criteria to date was included as an attachment to the Sector's 2009 meeting agenda and appears as Appendix E to this summary.

Discussion: At the 2009 Sector meeting, Mr. Reiswig provided an update to the Sector on progress to develop criteria for separate electronic indicators. He reported that the draft checklist provided to the Sector follows the general format of Pub 14 and the main test procedures are at the end of the document. The procedure specifies tests for applying specific pulses over a range of temperatures and the procedure allows the laboratories to simulate the effects of changes in temperature. Mr. Reiswag noted that he has worked with Measurement Canada's type evaluation laboratory and has completely revised the document from the previous versions based on the collaborations with Canada. The current draft should be viewed as a starting point for the NTEP procedure.

Since the Canadian procedure and test criteria are well developed for testing indicators separately, some questioned the needed to undertake a major project to develop criteria for NTEP testing, suggesting that an agreement to accept Canadian test data be pursued instead. Others noted that the turnaround time for Canadian tests are about six to seven months and the NTEP process is much faster, so pursuing NTEP testing would be beneficial. The Sector discussed how arrangements between NTEP and Measurement Canada for accepting test data are designed to work.

Mr. Patoray, (Consultants on Certification and former NTEP Director) provided information and an explanation on how such arrangements generally work. In the case of a "one-way" agreement, where the Canadian test criteria are more stringent, testing is performed to the more stringent requirements and then the test data is forwarded to NTEP.

Questions were raised about the readiness of the checklist for inclusion in NCWM Pub 14. The Sector agreed that some additional work is needed and suggested that a small work group be formed to further develop the checklist. One additional question to consider is whether or not the checklist would apply to indicators across all technologies and applications.

Decision: The Sector agreed to the following.

- A small work group comprised of the following individuals is to further review and discuss the checklist.

Work Group Members:	Mr. Rodney Cooper (Actaris)
	Mr. Maurice Forkert (Tuthill Transfer Systems)
	Mr. Dmitri Karimov (Liquid Controls)
	Mr. Rich Miller (FMC Technologies)
	Mr. Dave Rajala (Veeder-Root)
	Mr. Ralph Richter (NIST WMD)
Checklist Developer:	Mr. Dan Reiswig (California)

- The work group will provide input to Mr. Reiswig (CA) at least one month prior to the March 2010 NTEP Laboratory Meeting. Mr. Reiswig will provide this input to the Measuring Laboratories. One additional question to consider is whether or not the checklist would apply to indicators across all technologies and in all applications.

- Following the March 2010 NTEP Laboratory meeting, Mr. Reiswig will modify the draft checklist based on feedback from the NTEP Measuring Labs.

- Mr. Reiswig will provide a copy of the draft checklist to the NIST Technical Advisor by the end of August 2010 to allow for distribution to the Sector one month prior to the Fall 2010 Sector Meeting.

- Following the fall 2010 Sector meeting, Mr. Reiswig will work with Sector Technical Advisor Ms. Butcher (NIST) to update the draft checklist to reflect the comments from the Sector.

- Assuming the checklist requires no further modification or review by the Sector, Ms. Butcher will submit the checklist to the NTEP Committee to consider for inclusion in the 2011 version of NCWM Pub 14.

New Items:

5. Policy C - Product Family Table – Change in Upper Limit for Oxygenated Blends – Note 4

Source: Mr. Johnson, Gilbarco, Inc.

Purpose: Underwriters Laboratories (UL) has modified the upper limit for oxygenates in oxygenated fuel blends specified in its standard UL87A Edition 5. A proposal has been submitted by the Sector to change a reference in the "Product Family" tables to correspond with the revised UL upper limit. This item is included on the Sector agenda to allow input and discussion by the Sector on the proposed change.

Background: Mr. Johnson (Gilbarco, Inc.) submitted information to the Sector regarding changes to the upper limit specified by UL on oxygenates in oxygenated fuel blends and proposed changes to NCWM Pub 14 to reflect those changes. Mr. Johnson noted that UL recently issued UL87A Edition 5. This standard details the tests and

specifications needed to list dispensers for Ethanol and Ethanol blends. The 5th edition specifies three major gasoline fuel categories:

(a) Gasoline for Use as Automotive Spark-Ignition Engine Fuel, ANSI/ASTM D4806 (Up to E10) (Current)
(b) Gasoline/ethanol blends with nominal ethanol concentrations up to 25 % ethanol (E25) (NEW)
(c) Gasoline/ethanol blends with nominal ethanol concentrations above 25 % (E85) (Current)

When the EPA set the new ethanol limits, "standard gasoline" will include more ethanol. This affects all gasoline motor fuel dispensers currently in use. Typically the need to re-calibrate a dispenser's meter is seen when adding ethanol to the motor fuel. The ethanol acts as a solvent washing away gasoline varnish and the meter may shift its calibration point.

The following additional information regarding the fifth issue of UL's Outline Subject 87A is provided for the Sector's reference:

UL SUBJECT 87A
OUTLINE OF INVESTIGATION FOR POWER-OPERATED DISPENSING DEVICES FOR GASOLINE AND GASOLINE/ETHANOL BLENDS WITH NOMINAL ETHANOL CONCENTRATIONS UP TO 85 PERCENT (E0 – E85)
Issue Number: 5 AUGUST 10, 2009

Summary of Topics

This Fifth issue of Outline Subject 87A contains requirements pertaining to a new rating option. This new option will include an E25 rating along with the original E85 rating. This addition will allow for products to carry the lower rating when they are not intended for use with higher blends of gasoline/ethanol. New requirements have been added for blending options in dispensers. This required a new test, the Blending Cycling Test, which addresses the cycling of ethanol blends inherent in this type of use. Various editorial changes have also been included to address testing with one sample rather than two when evaluating for the E25 rating and other editorial changes have been made for clarification.

The Sector was asked to review NCWM Pub 14, Technical Policy C. Product Families for Meters, Note 4 in the product families table, which currently states:

"Gasoline includes oxygenated fuel blends with up to 15 % oxygenate"

(Note: This footnote appears in Table C.2. Product Family Test Table in the revised version of the Tables currently under consideration by the Sector in Agenda Item 1.)

The Sector was asked to consider changing the oxygenated fuel blends from 15 % to 25 %. The new note 4 would read:

"Gasoline includes oxygenated fuel blends with up to 25 % oxygenate"

Discussion: At the 2009 Sector meeting, Mr. Johnson (Gilbarco) outlined the history of this issue, noting that UL has made several significant changes to UL 87 (to include an alternative fuel standard) as a result of a push by EPA to coincide with a federal mandate to increase the levels of ethanol in vehicle fuel. The old standard for gasoline (15 % oxygenate) was revised this year to specify a 10 % limit. Mr. Johnson noted that the old standard of 15 % was not selected based on any equipment data. UL also revised the standard to create a third category which allows up to a 25 % blend. Mr. Johnson stated that his company is currently is recertifying its dispensers up to E85, 10 %, and 15 % and will mark the dispensers as such. He expressed concern regarding what will happen to existing dispensers when used for deliveries of 25 %. Previously, UL put out a statement that it was up to the local fire marshal accept the electrical system for use with 15 %. There is a program to buy back some 30-year old equipment. Some dispensers that are currently in use (standard pumps) were never UL rated or weights and measures approved for E85. Mr. Johnson stated that ethanol tends to wash out the sediment resulting in the dispenser giving away some product. He proposed changing the current reference in Pub 14 from 15 % standard to

25 %, noting that he has no data to illustrate the impact of the change. He indicated that both Gilbarco and Wayne are completing tests for E85, but no tests have been conducted for 25 %. There is not enough ethanol in production at the moment and he foresees a gradual increase in the amount of 25 % fuels. He is concerned that the limits will go above 15 % and if weights and measures apply the 15 % limit currently referenced in NTEP CCs, then all dispensers will be tagged and place out of service.

In its discussion of this issue prior to the 2009 Sector meeting, the NTEP Measuring Laboratories took the position that it is acceptable for a device to be used with product up to 15 % oxygenate with testing of only gasoline; however, for blends above this percent, the device must be retested with the higher percentage blends. Mr. Wotthlie (MD) noted concerns on the part of the labs that there is no data available to illustrate the impact on the dispenser's performance of the higher blends. Mr. Butler (NC) also commented that some in the room believe that higher blends should be considered an alcohol and that alcohol and gasoline are treated differently in the current product tables. Several lab representatives also commented that, if a supporting statement can be obtained from UL, EPA, and other relevant bodies to say there will not be a problem with the existing dispensers, they might be able to accept the 25 % limit.

Decision: After discussing this issue, the Sector was unable to reach agreement on the propose change. The Sector expressed its appreciation to Mr. Johnson for information regarding recent changes to the upper limit that Underwriters Laboratories (UL) has specified for levels of oxygenates in oxygenated fuel blends. The Sector agreed that this should remain an information item on the Sector's agenda.

6. Electronic Linearization for Positive Displacement Meters

Source: Mr. Maurice Forkert, Tuthill Transfer Systems

Purpose: The Sector received a proposal to establish more definitive criteria for electronic linearization internal to positive displacement meters. This item is included on the Sector's agenda to allow for review and discussion of proposed criteria.

Background/Recommendation: Mr. Forkert (Tuthill Transfer Systems) submitted a request for the Sector to consider adding criteria to NCWM Pub 14 for electronic linearization internal to positive displacement meters, noting that there is apparently no regulation for this feature. Mr. Forkert suggested considering Measurement Canada's "Approval Procedure for Linearization Functions Incorporated in Measuring Systems" (Document Number VO-AP-037) as the basis for the criteria, provided there is no objection by Measurement Canada or copyright violation by doing so.

A copy of Mr. Forkert's letter proposing this addition along with the Measurement Canada document was included as an attachment to the Sector's 2009 Agenda and is included in Appendix F to this Summary.

Mr. Forkert suggested the following revisions to the Measurement Canada document:

- **Section 1.2. Scope**

  Add paragraph to the "Scope" of the document as shown below. This paragraph would bring electronic output PD meters, turbine meters, etc. that do not have a shaft output on equal requirements as other meters that currently incorporate electronics in the measuring device.

  1.2 Scope

  This procedure applies to pulse processing electronic devices incorporating the linearization of the pulse per unit volume versus pulse frequency. This includes all flow computers, electronic registers, correction devices and supporting software external to the measuring device. The tests verify the proper functioning and accuracy of the linearization schemes.

For processing electronic devices incorporating the linearization of the pulse per unit that is within the measuring device, the results of the device accuracy and endurance tests will verify the complete measuring device capabilities. The linearization electronics of the measuring device must be protected from tampering and fraud utilizing a physical seal. No separate tests on parts of the measuring device are required.

- **2.1. Equipment Requirements.**

  This section needs to be reviewed by the work group developing criteria for electronics. When Tuthill tested their linearization board in Canada, they had problems because their Dual Channel Pulser "off" position of the pulse did not go close enough to zero volts. Tuthill furnished a dual channel pulser that goes down to within 0.2 volts in the "off" part of the pulse and then the Measurement Canada counters worked fine.

- **Section 2.5.1. and 2.5.3.**
  The word "devices" should be "EUT."

- **Section 2.6.2.1. and 2.6.2.3.**
  Do not limit "meter Factors" to 4 or 5 points. See proposed revisions to 2.6.2.5. below as a method to test all points for which the device is capable.

- **Section 2.6.2.5.**
  Delete runs number 2 through number 5 and replace with:

  2. Select frequencies that result in flow rates that lie between each pair of points programmed in Section 2.6.2.3. Test at each frequency.

  Change Run number 6 to number 3.

- **Factor Limit**
  The limit of 3 to 5 factors should be changed to cover any number of factors.

Discussion: Mr. Forkert explained that his company had introduced a meter into the market with a linearization board and was advised by the weights and measures authority that there were no regulations to address that component. He recommended including the feature as allowable in the register and to not require a separate evaluation of this component. He explained that the part could not be removed or modified without breaking a seal. He also requested that the e-linearization feature be considered as part of the meter just as the pulse output component is looked at as part of the meter.

Mr. Oppermann (Weights and Measures Consulting) commented that industry wants to be able to use e-linearization as a means to improve the performance of a meter and noted that this has been done for years with scales and load cells. Provided the performance is within acceptable levels, it should not matter how this is accomplished.

In discussing this issue, reference was made to NCWM Pub 14 Policy G. Range of Data Points, which addresses the use of "multi-point calibration." This policy specifies that "multi-point calibration" must be "blind and integral" which, according to the policy, is intended to mean it is programmed during the manufacture of the device and is not accessible in the field. The policy also prohibits multi-point calibration from being used as a means to establish the minimum turn down ratios of 5:1 or 10:1; however, it does allow the feature to be used to extend the measuring range beyond the minimum ratios. In discussing how this policy is to be applied in conjunction with Mr. Forkert's example, there were questions regarding the use of the term "blind and integral." Several members noted that a better definition of the term is needed in order to ensure consistent understanding of the term and its use in the application of requirements.

Mr. Forkert noted a distinction in his scenario is that they want the e-linearization feature to be considered a part of the meter, much as one would consider other components of the device. Understanding that the e-linearization feature is used to individually program each meter at the factory, some NTEP laboratory representatives expressed

concerns about the possibility of interchanging parts in the field and the impact on meter performance and questioned what means would be provided to deter field replacements. Some manufacturers noted that this should be viewed no differently than replacing other metrologically significant parts in the field; for example, meters are not shipped back to the factory for replacement of a rotor and replacement of the e-linearization board should be viewed in the same light. It is up to the user/installer to ensure continued compliance with accuracy and other requirements.

There were also questions during the discussion regarding whether or not the e-linearization feature should be listed as a feature on the CC. Some pointed out that other device types use metrologically significant components that can be replaced in the field when problems are encountered. Repairs, adjustments, or changes to these features are generally obvious or detectable. Mr. Patoray, (Consultants on Certification) gave several examples of weighing device applications such as load cells (which are not repairable in the field), junction boxes (which can be protected by a security seal), and electronic boards (which are completely replaced when they fail).

The Sector discussed developing language to clarify the application of Policy G., but was unable to reach a conclusion at the meeting. While they did not identify a specific alternative, there was general agreement that the electronic linearization that is programmed during the manufacture of a device should not be readily accessible in the field without breaking an approved seal. The NTEP Labs expressed concern regarding the unique nature of the programming and how interchange of the e-linearization board would be controlled in the field. The Sector agreed that this issue requires additional work that would best be accomplished by a small work group.

Decision: The Sector agreed that a small work group comprised of the following individuals be established to further develop this issue for the Sector's review.

Chairman:	Mr. Steve Patoray
Work Group Members:	Mr. Maurice Forkert
	Mr. Mike Frailer
	Mr. Mike Guidry
	Mr. Dmitri Karimov
	Mr. Rich Miller
	Mr. Ken Smith

The WG was tasked with the following:

1) Clarify Policy G. Range of Data Points by bouncing ideas off of Mike Frailer for:
   a. Defining what is meant by multi-point calibration shall be "blind and integral" to the measuring element.
   b. Clarifying what is meant by multi-point calibration shall be not "accessible" in the field.

2) Develop Language in Policy G. Range of Data Points to Allow for Uniform Interpretation and Application of the Criteria by the United States and Canadian Stakeholders by February 2010, including
   a. Where necessary to clarify the intent of the criteria:
      i. Modify Language
      ii. Define Terminology

3) Review and Discuss Modifications to Policy G. at the March 2010 NTEP Measuring Lab Meeting

7. Next Meeting

Source: NTETC Measuring Sector

Background/Discussion: The Sector was asked to develop a proposed date and location for the next meeting. The Sector agreed that holding the meeting in conjunction with the SWMA is still acceptable.

Decision: The Sector agreed to recommend to the NTEP Committee that the next Sector meeting be held in conjunction with the 2010 Southern Weights and Measure Association meeting, which is tentatively scheduled to be held in South Carolina. The NCWM is asked to communicate with the SWMA regarding its past difficulties booking lodgings for the Sector meetings and ask for assistance to prevent these difficulties in the future.

Additional Items as Time Allows:

The NCWM S&T Committee would appreciate input from the Measuring Sector on the following measuring-related issues on its agenda. If time permits, the Measuring Sector was asked for comments on these issues. In the interest of brevity, the narrative for each item was abbreviated. Full descriptions of the items can be found in the S&T Committee's 2009 Interim Report and 2010 Interim Agenda.

8. G-S.1. Marking (Software)

Source: NCWM S&T Committee

Purpose: This item is included on the Sector's agenda to allow for the Sector to review proposed changes to NIST Handbook 44 General Code paragraph G-S.1. Identification and provide comments to assist the NCWM S&T Committee in its deliberations on these proposals.

Background: The S&T Committee is considering changes to NIST Handbook 44 General Code paragraph G-S.1. Identification to better address software-based systems. The Committee has considered multiple proposals under this item.

Recommendation: A copy of the most recent proposal to modify G-S.1. was included in the 2009 Sector Agenda (see also the 2009 Final S&T Report). The Sector was asked to provide input to the S&T Committee on this issue.

Discussion: During the 2009 Sector meeting, Mr. Patoray, (Consultants on Certification) noted that an updated version of the proposal from the Software Sector is now available. In the more recent version, software-based devices must have a version number for both built-for-purpose and not-built-for purpose devices. The version number can be included in a "look-up" menu. A serial number could be required for a built-for-purpose device. Additional work is being done on definitions and the Sector is encountering a significant amount of opposition from the general weighing industry whose members hold a large number of CCs.

Mr. Wotthlie (MD) made comment that the previous version of the proposal (prior to the one with the most recent modifications) was reasonable. The latest changes by the Software Sector include requirements for hard marking which do not seem reasonable.

Decision: While the Sector briefly discussed this item, it did not have comments to offer the S&T Committee.

9. G-S.8.1. Access to Calibration and Configuration Adjustments, Proposed Changes to Language

Source: NCWM S&T Committee

Purpose: This item is included on the Sector's agenda to allow for the Sector to review proposed changes to NIST Handbook 44 General Code paragraph G-S.8. Sealing and associated paragraphs and provide comments to assist the NCWM S&T Committee in its deliberations on these proposals.

Background: The S&T Committee has considered multiple proposals to modify and expand NIST Handbook 44 General Code paragraph G-S.8. Provision for Sealing Electronic Adjustable Components and associated subparagraph G-S.8.1. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. The Committee agreed that if a device designed for commercial applications is capable of being "sealed" while leaving

available either external or remote access to the calibration or configuration mode, it is clearly in violation of the current G-S.8. Provision for Sealing Electronic Adjustable Components and General Code paragraph G-S.2. Facilitation of Fraud and, therefore, no change to the existing language is needed. However, because of the ongoing disagreement on the interpretation of G-S.8. among the NTEP laboratories, the Committee agreed to make changes to the proposal based on the concerns raised during multiple open hearings.

Although multiple iterations of proposed language have been submitted, reviewed, and discussed, at the 2009 NCWM Interim Meeting, the Committee concluded that the item is not ready for a vote. However, the Committee decided to maintain the item on its agenda in anticipation that language would be developed by the 2010 Interim Meeting.

During the 2009 NCWM Annual Meeting, the S&T Committee received comments during the open hearing that no action may be needed and that the existing language in HB 44 is sufficient. Additional comments indicated that other proposals are overly complex. Oregon and Maryland believe that amended requirements for sealing are needed by the NTEP labs and field officials in order to consistently interpret and apply sealing requirements.

The Committee believes that all parties agree with the intent of the proposal. Both the WMD and SMA proposals include language that restates the existing language in G-S.8., but is essentially reformatted for clarification. Additionally, both proposals include new requirements for providing indications when a device is in adjustment mode. WMD proposed further language to address devices that may have more that one method of sealing.

Recommendation: Proposals considered by the Committee were included in the 2009 Sector agenda (and are also available as part of the S&T Committee's 2009 Interim and Final Reports). The Sector was asked for technical input on this issue that could be provided to the S&T Committee to help them in their assessment of the proposed changes.

Discussion: The Sector briefly discussed this issue, giving examples of how the requirements in paragraph G-S.8. have been applied to measuring devices. Mr. Patoray, (Consultants on Certification) noted that some weighing devices could be left in the calibration mode even though a physical security seal has been affixed and he further commented that the term "effective" has been questioned in discussions on this issue.

Most Sector members agreed that the Sector and NTEP measuring labs have consistently understood and applied the criteria in paragraph G-S.8. Mr. Wotthlie observed that, if the Sector sends a statement to the S&T Committee, it should say measuring devices either cannot function in the calibration or configuration mode or it should not be possible to seal the device while in that mode. Mr. Wotthlie gave the example of the mechanical temperature compensators that must be deactivated in order to reapply a security seal; this is considered an acceptable means of security and it complies with paragraph G-S.8. He also noted that the measuring laboratories have been consistently applying this requirement. Mr. Wotthlie noted that clarification is needed so the weighing labs are consistent in applying these requirements. Even though paragraph G-S.8. is relatively clear, he would suggest only changing a few words for clarification.

Decision: The Sector reviewed the proposed changes to General Code paragraph G-S.8.1. currently under consideration by the NCWM S&T Committee. The Sector agreed that measuring devices with NTEP CCs have been evaluated to either:

(1) not function in the calibration or configuration mode;
(2) not be sealed in the calibration or configuration mode; or
(3) clearly indicate the device is in the calibration or configuration mode.

The Sector agreed that these options reflect the intent of General Code paragraph G-S.8. and, because the intent of the paragraph is understood and appropriately applied by the measuring community, the Sector recommends that no changes be proposed to General Code paragraph G-S.8.

10. Temperature Compensation for Liquid Measuring Devices Code

Source: NCWM S&T Committee

Purpose: This item is included on the Sector's agenda to allow for the Sector to review proposed changes to the NIST Handbook 44 Liquid Measuring Devices Code to address temperature compensation for retail motor-fuel devices and to provide comments to assist the NCWM S&T Committee in its deliberations on these proposals.

Background: The NCWM S&T Committee is considering a proposal to modify Section 3.30. Liquid-Measuring Devices (LMD) Code by modifying paragraphs S.2.6., S.2.7.1., S.2.7.3., N.4.1.1.(a) and (b), N.5., UR.3.6.1.1., and UR.3.6.1.2., to add new paragraphs S.1.6.8., S.2.7.2., S.4.3., UR.3.6.1.3., and UR.3.6.4., and to renumber other existing paragraphs as appropriate to recognize temperature compensation for retail devices.

Based on comments heard from the floor at the 2009 NCWM Annual Meeting, the S&T Committee acknowledged that additional work may be needed to specific sections of the proposed changes to the code. Points raised and discussed by the Committee include the following:

- There was a question of whether to reference "15 °C" or "15.56 °C." The Committee agreed that industry practice has been to use "15 °C" and that this is the reference used internationally; consequently, they believe it should be kept as "15 °C." This is also supported by the L&R Committee's 2009 Interim Report which references a statement by the Meter Manufacturers' Association indicating that 15 °C is used internationally and industry would likely follow that convention should SI units be used.
- Clarification is needed for the differences between wholesale devices and systems. In question were paragraph S.1.6.8. Representations from Devices with Temperature Compensation and paragraph S.2.7.2. Display of Temperature.
- Clarification is needed for how S.2.7.2. applies to electronic registers that can only indicate in terms of compensated quantities when the compensator is activated; the compensator would need to be activated and an additional run completed in order to view an uncompensated reading.
- Review the use of the term "invoice" and consider if the term is well understood for retail transactions which have typically used terminology such as "printed receipt" or recorded representation.
- Review the language in the VTM code under Item 331-2 and consider where changes might be needed to ensure consistency for the conditions and period of use for this feature.

The Committee decided to keep the status of this item as an "Information" item and acknowledges that some jurisdictions are already facing the imminent possibility of temperature-compensated retail motor-fuel equipment in their jurisdictions. The Committee believes that these standards are necessary whether or not the issue of a model method sale regulation is adopted in NIST Handbook 130 since weights and measures jurisdictions may decide to permit this equipment based upon their individual State laws or regulations.

Recommendation: Proposed changes to the Liquid-Measuring Devices Code currently under consideration by the NCWM S&T Committee were included in the 2009 Sector agenda (and are also available as part of the S&T Committee's 2009 Interim and Final Reports). At its 2009 meeting, the Sector was asked for technical input on this issue that could be provided to the S&T Committee to help them in their assessment of the proposed changes.

Discussion: Mr. Karimov (Liquid Controls) noted that he questioned how paragraph S.2.7.3. would apply with regard to the simultaneous display of net and gross volumes, particularly for equipment that delivers multiple product types and product types under both compensated and uncompensated conditions. Other Sector members agreed that paragraph S.2.7.3. as modified would not require simultaneous display of net and gross volume. The Sector agreed that the gross and net volumes should not be required to be simultaneously displayed.

Mr. Wotthlie encouraged manufacturers to carefully review the proposed changes to ensure that the changes would not negatively affect their equipment. By identifying changes early in the process, this can avoid having to revisit the requirements after they have already been adopted in Handbook 44.

The Sector also had a great deal of discussion on proposed paragraph UR.3.6.1.1. Use of Automatic Temperature Compensation regarding temperature compensator and nontemperature compensated meters where the delivery is temperature compensated. Mr. Wotthlie (MD) suggested that a search needs to be done for the terms "retail" and "wholesale" to ensure that they have been inserted or deleted as appropriate to reflect the expanded application. A related question was raised by Mr. Oppermann (Weights and Measures Consulting) regarding how revised paragraph UR.3.6.1.3. Recorded Representations (Invoices, Receipts, and Bills of Lading) (formerly numbered UR.3.6.1.2.) was intended to apply in applications where the sale is to the end user.

Decision: The Sector discussed the proposed changes to the LMD Code to recognize temperature compensation for retail motor-fuel devices, particularly paragraph UR.3.6.1.1. Use of Automatic Temperature Compensation; however, it had no specific comments to forward to the S&T Committee.

11. T.2.1. Tolerances – Vehicle-Tank Meters (VTMs)

Source: NCWM S&T Committee

Purpose: This item is included on the Sector's agenda to allow for the Sector to review proposed changes to the tolerances in NIST Handbook 44 Vehicle Tank Meters Code paragraph T.2.1. Automatic Temperature-Compensating Systems devices and to provide comments to assist the NCWM S&T Committee in its deliberations on these proposals.

Background: The S&T Committee continues to consider the following proposed changes to decrease the ATC tolerances on VTMs.

> **T.2.1. Automatic Temperature-Compensating Systems.** The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:
>
> (a) **~~0.4~~0.2 %** for mechanical automatic temperature-compensating systems; and
>
> (b) **~~0.2~~0.1 %** for electronic automatic temperature-compensating systems.
>
> The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.
>
> **(Amended 201X)**

The Committee requested data (in addition to that provided by the submitter) to be submitted in either support or opposition to the proposed changes. At the 2009 Annual Meeting, the Committee reported that it received additional VTM test data from the State of Maine. This data supports the proposed change to the tolerances; the change would not impact the compliance rate for the devices included in these tests. The Committee noted that to date it has received only data in support of the proposed change.

The Committee heard opposition from the Meter Manufacturers Association and received a letter from David Rajala (Veeder-Root) expressing similar concerns over the proposed change to the tolerances. Both expressed concerns over the test procedures and test equipment that might be used by some jurisdictions, noting that, should non-NIST traceable thermometers or improper test procedures be used, the proposed tolerances would be too small.

Recommendation: The Committee asks for additional input from the Measuring Sector regarding these proposed changes. Data in support or opposition of the changes would be appreciated.

Decision: Time did not permit the Sector to discuss these proposed changes. Consequently, the Sector took no position on this proposal.

12. Water Meters – Test Draft Sizes, Repeatability Tests, and Tolerance Values

Source: NCWM S&T Committee

Purpose: This item is included on the Sector's agenda to allow for the Sector to review proposed changes to the NIST Handbook 44 Water Meters Code for test draft sizes, repeatability test criteria, and tolerances values and to provide comments to assist the NCWM S&T Committee in its deliberations on these proposals.

Background: The S&T Committee has reviewed multiple proposals to modify the test procedures and tolerances associated with testing water meters under NIST Handbook 44 Section 3.36. Water Meters Code. These proposals were included on the Committee's 2009 agenda under Information Item 336-3 N.3. Test Drafts and N.4. Testing Procedures and Developing Item. The water meter manufacturers who submitted the proposed changes have expressed concerns that the test draft sizes for some tests are not adequate and may result in erroneous test results. These manufacturers are also proposing that the test procedures and draft sizes be aligned with the standards of the American Water Works Association (AWWA).

At the 2009 NCWM Annual Meeting, the S&T Committee reported receiving additional data from the water meter manufacturers; a comparison of current H44 requirements, AWWA standards, and the proposed changes; comments from NIST WMD; and excerpts from corresponding international standards.

The above information as well as correspondence between the water meter manufacturers and the S&T Committee is available upon request from the Sector technical advisor and S&T Committee technical advisor, Ms. Butcher.

The Committee recently received eight additional alternate proposals from five water meter manufacturers. These proposals are being discussed between the five manufacturers, the State of California Division of Measurement Standards (represented on the S&T Committee by Ms. Kristin Macey), and several California counties (including 2010 S&T Committee Chairman, Mr. Brett Saum, San Luis Obispo County, CA). The S&T Committee anticipates receiving an update of these eight revisions from the fall regional weights and measures associations.

Recommendation: The Sector was asked to provide any comments regarding this issue to the S&T Committee.

Decision: Time did not permit the Sector to discuss these proposed changes. Consequently, the Sector took no position on this proposal.

13. Draft Code Section 3.3X. Hydrogen Gas-Measuring Devices

Source: NCWM S&T Committee

Purpose: This item is included on the Sector's agenda to allow for the Sector to review a draft code being proposed for inclusion in NIST Handbook 44 to address commercial hydrogen gas-measuring devices and to provide comments to assist the NCWM S&T Committee in its deliberations on these proposals.

Background: The NCWM S&T Committee's Agenda added a new item to its Developing Item in 2008 to recognize work being done to develop a code for commercial hydrogen gas-measuring devices by the U.S. National Work Group (USNWG) for the Development of Commercial Hydrogen Measurement Standards. The WG, which presently includes weights and measures officials, manufacturers and users of hydrogen measuring devices, and federal agency representatives, continues to look for input and participation from the weights and measures community in the development of the code and associated test procedures. The most current version of the draft code can be found on NIST WMD's home page at http://ts.nist.gov/WeightsAndMeasures/Developing-Commercial-Hydrogen-Measurement-Standards.cfm. This web page is a resource for the U.S. weights and measures and hydrogen community regarding the latest information and status of ongoing work to develop uniform and appropriate legal metrology standards for commercial hydrogen measurements.

At its August 2009 meeting, the USNWG on Hydrogen agreed that the code is ready to propose for adoption as a tentative code, with the caveat that some additional verification needs to be completed over the coming months to validate the proposed tolerances and test notes.

Recommendation: This item was included on the Sector's agenda to make the Sector aware of the work and to encourage input and participation from Sector members. A copy of the most recent draft code was provided to the Sector for reference.

Decision: Time did not permit the Sector to discuss these proposed changes. Consequently, the Sector took no action on this item. This item was included on the Sector's agenda to make the Sector aware of the work and to encourage input and participation from Sector members.

Appendix A
NTETC Measuring Sector (MS)
Action List – October 2009

	Responsible Party	Task	Details	Deadline
1	Mike Keilty working with interested Sector members	Refine the example for a "separated technology" proposal and circulate it for review.	<Integrate the separated technology proposal with that presented at the 2009 Sector meeting. <Circulate the newly edited version among Measuring Sector members.	December 15, 2009, to complete a revised example of Policy C.
		Discuss revisions with interested Sector members.	<Discuss revision with members who are able to attend the January 2010 NCWM Interim Meeting. <Solicit additional comments via electronic communication	January 2010 Interim Meeting
		Make additional revisions and present draft to the Sector for review and approval.	<Make any additional revisions as needed. <Distribute revised version to Sector.	2010 Sector Meeting
3	Metrologically Significant Characteristics of Technologies Work Group (WG) Chair: Rodney Cooper Co-Chair: Rich Miller Work Group: Marc Buttler Paul Glowacki Mike Guidry Gordon Johnson Dmitri Karimov Henry Oppermann Steve Patoray Dan Reiswig	Form new MS Metrologically Significant Characteristics of Technologies Work Group to arrive at a uniform, appropriate, and clear approach for initial, subsequent, and additional tests for the performance of a device technology	<Create a Short List features/options affecting the metrological characteristics of each device technology <Provide a 1-page analysis that briefly documents and provides the rationale for including each metrological characteristic in the list <WG reviews First Draft List of significant constituents and condenses to only relevant characteristics[1] <WG prepares Final List for its January 2010 NCWM Meeting[2]	[1]December 15, 2009, to complete the First Draft List that is ready for the WG's Review [2]January 15, 2010, for the Final List for the WG's First Meeting
3	Mike Keilty Tina Butcher	Coordinate with NCWM to enable Metrologically Significant Characteristics of Technologies Work	<Contact NTEP Admin Director (Don Onwiler) for meeting approvals	October 15, 2009

Appendix A
NTETC Measuring Sector (MS)
Action List – October 2009

	Responsible Party	Task	Details	Deadline
		Group to meet briefly at the: (1) January 2010 NCWM Meeting and (2) July 2010 NCWM Meeting		
2	Tina Butcher	Forward HydroCarbon (HC) Vapor Meter Checklist developed by CADMS for consideration of the NTEP CMTE	<Add HC Vapor Meter Checklist to NCWM Pub 14 <NOTE Input is needed on HC Vapor Meter Checklist from HC Vapor Meter OEMs	November 1, 2009
4A	Test Criteria for an Electronic Indicator Submitted Separately from a Measuring Element for NTEP Evaluation Work Group: Rodney Cooper Maurice Forkert Dmitri Karimov Rich Miller Dave Rajala Ralph Richter	WG Provides Input on the Checklist developed by CADMS	<WG Provides Input to Dan Reiswig 1 month prior to March 2010 NTEP Lab Meeting	February 2010
4B	Checklist Developer: Dan Reiswig	Modify the Checklist for Discussion at the March 2010 NTEP Lab Meeting	<Dan Reiswig Modifies Draft Checklist based on Input of the WG	March 2010
4C	Checklist Developer: Dan Reiswig	MS Labs Discuss and Make Necessary Modification at the March 2010 NTEP Lab Meeting	<Dan Reiswig Modifies Draft Checklist based on Labs' Input from the March 2010 NTEP Lab Meeting	Late August 2010 Final Draft Checklist Distributed 1 month prior to the Fall 2010 MS Meeting
4D	Dan Reiswig/Tina Butcher	Finalize the Checklist for the 2011 NCWM Pub 14	<Dan Reiswig works with Technical Advisor to incorporate input from Fall 2010 Sector meeting. <If further Sector review is not required, Technical Advisor submits draft to the NTEP Committee to consider for 2011 Pub 14.	November 1, 2010, MS Submits Final Checklist for consideration of the NTEP CMTE to include in the 2011 NCWM Pub 14
6A	Maurice Forkert	Clarify Policy G. Range of	Bounce ideas off of	

Appendix A
NTETC Measuring Sector (MS)
Action List – October 2009

	Responsible Party	Task	Details	Deadline
	Mike Frailer Mike Guidry Dmitri Karimov Rich Miller Lead: Steve Patoray Ken Smith	Data Points	Mike Frailer for: (1) Defining what is meant by multi-point calibration shall be "blind and integral" to the measuring element (2) Clarifying what is meant by multi-point calibration shall be not "accessible" in the field	
6B	Maurice Forkert Mike Frailer Mike Guidry Dmitri Karimov Rich Miller Lead: Steve Patoray Ken Smith	Develop Language in Policy G. Range of Data Points to Allow for Uniform Interpretation and Application of the Criteria by the U.S. and Canadian Stakeholders	<In Policy G, where necessary to clarify the intent of the criteria: (1) Modify Language (2) Define Terminology <Review and Discuss Modifications to Policy G. at the March 2010 Lab Mtg	February 2010
9	Tina Butcher	Forward the MS Position on the Proposal to Modify HB44 General Code G-S.8 to the 2010 NCWM S&T CMTE	<Measuring Devices with CCs have been evaluated to either: (1) not function in the calibration or configuration mode (2) not be sealed in the calibration or configuration mode or (3) clearly indicate the device is in the calibration or configuration mode <MS recommends no changes to paragraph G-S.8 since the intent is understood and appropriately applied by MS members	November 1, 2009

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Appendix B

Proposed Revisions to Policy C – Product Family Table, prepared by Mike Keilty, Attachment to 2009 Agenda (Agenda Item 1)

C. Product Families for Meters

When submitting a meter for evaluation, the manufacturer must specify the product family and critical parameters for which the meter is being submitted.

The product family and the specific product subgroup covered by the Certificate are to be identified on Page 1 of the Certificate of Conformance. More detailed information, including the typical product types found in the subgroup, is to be included in the application section of the Certificate.

Table C.1. Tests to be Conducted
Test A – Products must be individually tested and noted on the Certificate of Conformance.
Test B - To obtain coverage for a range of products within a family: Test with one product having a low specific gravity; test with a second product having a high specific gravity. The Certificate of Conformance will cover all products in the product family within the specific gravity range tested.
Test C - To obtain coverage for a range of products within a family: Test with one product having a low viscosity; test with a second product having a high viscosity. The Certificate of Conformance will cover all products in the product family within the viscosity range tested.
Test D – To obtain coverage for a product family: Test with one product in the product family. The Certificate of Conformance will cover all products in the family.
Test E – To obtain coverage for a range of products within a family: Test with one product having a low kinematic viscosity; test with a second product having a high kinematic viscosity. The Certificate of Conformance will note coverage for all products in the family within the kinematic viscosity range tested.
Test F – To obtain coverage for a range of products within a family: Test with one product having a specified conductivity. The Certificate of Conformance will note coverage for all products in both of the families with conductivity equal to or above the conductivity of the tested liquid.

Table C.2. Product Family Test Table			
Mass Meter Product Family & Test Requirements	**Magnetic Flow Meter Product Family & Test Requirements**	**Positive Displacement Flow Meter Product Family & Test Requirements**	**Turbine Flow Meter Product Family & Test Requirements**
Test B Normal Liquids Includes the following for Mass Flow Meters: Fuels, Lubricants, Industrial and Food Grade Liquid Oils, Solvents General, Solvents Chlorinated, Pure Alcohols & Glycols, Water (De-mineralized &	**Test F** Fuels, Lubricants, Industrial and Food Grade Liquid Oils, Solvents General, Solvents Chlorinated, Pure Alcohols & Glycols, Water (De-mineralized & de-ionized), Heated Products (above 50 °C)*	**Test C** Fuels, Lubricants, Industrial and Food Grade Liquid Oils	**Test E** Fuels, Lubricants, Industrial and Food Grade Liquid Oils
		Test C Solvents General	**Test E** Solvents General
		Test C Solvents Chlorinated	**Test A** Solvents Chlorinated
		Test C Alcohols, Glycols, & Water Mixes Thereof	**Test E** Alcohols, Glycols, & Water Mixes Thereof

Table C.2. Product Family Test Table

Mass Meter Product Family & Test Requirements	Magnetic Flow Meter Product Family & Test Requirements	Positive Displacement Flow Meter Product Family & Test Requirements	Turbine Flow Meter Product Family & Test Requirements
de-ionized), Heated Products (above 50 °C)* Water (Tap, Potable & Nonpotable), Water Mixes of Alcohols & Glycols, Juices, Beverages, Clear Liquid and Suspensions Fertilizers, Crop Chemicals, Liquid Feeds, Chemicals	**Test D** Water (Tap, Potable & Nonpotable), Water Mixes of Alcohols & Glycols, Juices, Beverages, Clear Liquid and Suspensions Fertilizers, Crop Chemicals, Liquid Feeds, Chemicals		
		Test D Water	**Test D** Water
		Test C Clear Liquid Fertilizers	**Test A** Clear Liquid Fertilizers
		Test C Crop Chemicals *(Type A)*	**Test A** Crop Chemicals *(Type A)*
		Test C Crop Chemicals *(Type B)*	**Test A** Crop Chemicals *(Type B)*
		Test C Flowables	**Test A** Flowables
		Test C Crop Chemicals *(Type C)*	**Test A** Crop Chemicals *(Type C)*
		Test C Crop Chemicals *(Type D)*	**Test A** Crop Chemicals *(Type D)*
		Test C Suspension Fertilizers	**Test A** Suspension Fertilizers
		Test C Liquid Feeds	**Test A** Liquid Feeds
		Test C Chemicals	**Test A** Chemicals
Test B Heated Products (above 50 °C)	*See above	**Test C** Heated Products (above 50 °C)	**Test A** Heated Products (above 50 °C)
Test D Compressed Liquids	Not Applicable (conductivity too low)	**Test C** Fuels and Refrigerants	**Test E** Fuels and Refrigerants
		Test C NH_3	**Test A** NH_3
Test D Compressed Gases	*Note: CNG is only included in Section 3.37 Mass Flow Meters of Handbook 44*		*CNG*

Table C.2. Product Family Test Table			
Mass Meter Product Family & Test Requirements	**Magnetic Flow Meter Product Family & Test Requirements**	**Positive Displacement Flow Meter Product Family & Test Requirements**	**Turbine Flow Meter Product Family & Test Requirements**
Test D Cryogenic Liquids and Liquefied Natural Gas	Not Applicable (conductivity too low)	**Test A** Cryogenic Liquids and Liquefied Natural Gas –	**Test D** Cryogenic Liquids and Liquefied Natural Gas –

[1]*Note: The Typical Products listed in this table are not limiting or all-inclusive; there may be other products and product trade names, which fall into a product family. Water and a product such as stoddard solvent or mineral spirits may be used as test products in the fuels, lubricants, industrial, and food- grade liquid oils product family.*

[2] The specific gravity of a liquid is the ratio of its density to that of water at standard conditions, usually 4 °C (or 40 °F) and 1 atm. The density of water at standard conditions is approximately 1000 kg/m3 (or 998 kg/m3)

[3] Diesel fuel blends (biodiesel) with up to 20 % vegetable or animal fat/oil.

[4] Gasoline includes oxygenated fuel blends with up to 15 % oxygenate.

$$\text{Centistokes} = \frac{\text{Centipoise}}{\text{Specific Gravity}}$$

[5] Kinematic viscosity is measured in centistokes.

Source for some of the viscosity value information is in the Industry Canada - Measurement Canada "Liquid Products Group, Bulletin V-16-E (rev. 1), August 3, 1999."

Table C.3. Typical Product Family Characteristics			
Product Families	**Typical Products**	**Reference Viscosity* (60 °F) Centipoise (cP)**	**Reference Specific Gravity* (60 °F)**
Normal Liquids Fuels, Lubricants, Industrial and Food Grade Liquid Oils	Diesel Fuel	10	0.72
	Gasoline	0.28	0.72
	Fuel Oil (#1, #2, #3, #4)	8 to 88	0.9
	Kerosene	1.94	0.75
	Light Oil	13.47	0.86
	Spindle Oil		
	Lubricating Oils	20 to 1000	0.80 to 0.90
	SAE Grades	192 to 3626	0.9
	Bunker Oil	11,200	0.99
	6 Oil (#5, #6)	66-13,000	0.9
	Crude Oil	3-1783	0.79 to 0.97
	Asphalt	100 to 5000	
	Vegetable Oil	133	0.92
	Biodiesel above B20	10.12	0.86
	Avgas	1.5 to 6	
	Jet A	1.5 to 6	
	Jet A-1	1.36	0.76
	Jet B	1.5 to 6	
	JP4	1.02	0.76
	JP5	1.94	0.76
	JP7 JP8	1.82	0.76
	Cooking Oils	9.93	0.92
	Sunflower Oil	90.1	0.93
	Soy Oil	90.6	0.93
	Peanut Oil	11 to 110	0.9 to 1.0
	Olive Oil	116.8	0.92
	Corn Oil	4.0	0.91
Normal Liquids Solvents General	Acetates	0.44	0.93
	Acetone	0.34	0.8
	Ethylacetate	1.36	0.96
	Hexane	0.34	0.66
	MEK	0.45	0.81
	Toluene	0.62	0.87
	Xylene	0.86	0.89
Normal Liquids Solvents Chlorinated	Carbon Tetra-Chloride	0.99	1.6
	Methylene-Chloride	0.46	1.34
	Perchloro-Ethylene	1	1.6
	Trichloro-Ethylene	0.6	1.47
Normal Liquids Alcohols, Glycols & Water Mixes thereof	Ethanol	1.29	0.79
	Methanol	0.64	0.80
	Butanol	3.34	0.81
	Isopropyl	2.78	0.79
	Isobutyl	4.54	0.81
	Ethylene glycol	25.5	1.19
	Propylene glycol	54	1.04

Product Families	Typical Products	Reference Viscosity* (60 °F) Centipoise (cP)	Reference Specific Gravity* (60 °F)
Normal Liquids Water	Tap Water	1.0	1.0
	Deionized	1.0	1.0
	Demineralized	1.0	1.0
	Potable	1.0	1.0
	Nonpotable	1.0	1.0
	Juices	1.0	1.0
	Beverages	1.0	1.0
	Milk	1.0	1.0
Normal Liquids Fertilizers	Clear Liquid Fertilizers	31 to 110	1.17 to 1.44
	Nitrogen Solution	31 to 110	1.17 to 1.44
	28%, 30% or 32%	31 to 110	1.28 to 1.32
	20% Aqua-Ammonia	1.1 to 1.3	0.89
	Urea	1.0	1.89
	Ammonia Nitrate	11.22	1.16 to 1.37
	N-P-K solutions		1.2 to 1.4
	10-34-0	48	1.39
	9-18-9		1.32
Normal Liquids Crop Chemicals *(Type A)*	Herbicides	4 to 400	0.7 to 1.2
	Round-up		
	Touchdown		
	Banvel		
	Treflan		
	Paraquat		
	Prowl		
Normal Liquids Crop Chemicals *(Type B)*	Fungicides	0.7 to 100	0.7 to 1.2
	Insecticides		
	Adjuvants		
	Fumigants		
Normal Liquids Flowables	Dual	20 to 900	1 to 1.2
	Bicep		
	Marksman		
	Broadstrike		
	Doubleplay		
	Topnotch		
	Guardsman		
	Harness		
Normal Liquids Crop Chemicals *(Type C)*	Fungicides	20 to 900	1 to 1.2
Normal Liquids Crop Chemicals *(Type D)*	Micronutrients	20 to 1000	0.9 to 1.65
Normal Liquids Suspension Fertilizers	3-10-30	100 to 1000	0.9 to 1.65
	4-4-27	20 to 215	0.9 to 1.65
Normal Liquids Liquid Feeds	Liquid Molasses	8640	1.25
	Molasses plus Phos Acid and/or Urea (Treacle)	2882	1.1 to 1.3
Normal Liquids Chemicals	Sulfuric Acid	1.49	1.83
	Hydrochloric Acid	0.80 to 1. 0	1.1
	Phosphoric Acid	161	1.87

Product Families	**Typical Products**	**Reference Viscosity* (60 °F) Centipoise (cP)**	**Reference Specific Gravity* (60 °F)**
Heated Products	Bunker C	11,200	1.99
	Asphalt	100 to 5000	
Compressed Liquids Fuels and Refrigerants NH_3	LPG		
	Propane	0.098	0.504
	Butane	0.19	0.595
	Ethane		
	Freon 11	0.313	1.49
	Freon 12	0.359	1.33
	Freon 22	1.99	1.37
	Anhydrous Ammonia	0.188	0.61
Compressed Gases	Compressed Natural Gas (CNG)		0.6 to 0.8 (1=Air)
Cryogenic Liquids and Liquefied Natural Gas	Liquefied Oxygen	0.038	0.66
	Nitrogen	1.07	0.31
	Liquefied Natural Gas		

*Reference fluid properties are not all inclusive and are representative examples only.

Appendix C

Proposed Revisions to NCWM Publication 14, Policy C, Product Families for Meters – By Henry Oppermann and Mike Keilty Following October 2009 Sector Meeting

C. Product Families for Meters

When submitting a meter for evaluation, the manufacturer must specify the product family and critical parameters for which the meter is being submitted.

The product family and the specific product subgroup covered by the Certificate are to be identified on Page 1 of the Certificate of Conformance. More detailed information, including the typical product types found in the subgroup, is to be included in the application section of the Certificate.

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
Test B: To cover a range of the following products, test with one product having a low specific gravity and test with a second product having a high specific gravity. The Certificate of Conformance will cover **all products in all product categories listed in the table** within the specific gravity range tested.			Test F – To cover a range of the following products, test with one product having a specified conductivity. The Certificate of Conformance will cover all products in both of the families with conductivity equal to or above the conductivity of the tested liquid.		Test C - To cover a range of products **within each product category**, test with one product having a low viscosity and test with a second product having a high viscosity **within each category**. The Certificate of Conformance will cover **all products in the product category** within the viscosity range tested.		Test E – To cover a range of products **within each product category**, test with one product having a low kinematic viscosity and test with a second product having a high kinematic viscosity **within each category**. The Certificate of Conformance will cover **all products in the product category** within the kinematic viscosity range tested.	
Typical Products	**Specific Gravity* (60 °F)**	**Product Category**	**Typical Products**	**Product Category**	**Product Category:** Fuels, Lubricants, Industrial and Food Grade Liquid Oils (FL&O)		**Product Category:** Fuels, Lubricants, Industrial and Food Grade Liquid Oils (FL&O)	
Asphalt		FL&O	Gasoline	FL&O	**Typical Products**	**Reference Viscosity* (60 F)**	**Typical Products**	**Reference Viscosity* (60 °F)**
Asphalt		Heated	JP4	FL&O		**Centipoise (cP)**		**Centipoise (cP)**
Avgas		FL&O	Jet A-1	FL&O	Gasoline	0.28	Gasoline	0.28
Jet A		FL&O	JP7 & JP8	FL&O	JP4	1.02	JP4	1.02
Jet B		FL&O	Kerosene	FL&O	Jet A-1	1.36	Jet A-1	1.36
Spindle Oil		FL&O	JP5	FL&O	JP7 & JP8	1.82	JP7 & JP8	1.82
Adjuvants	0.7 to 1.2	CC	Corn Oil	FL&O	Kerosene	1.94	Kerosene	1.94
Banvel	0.7 to 1.2	CC	Cooking Oils	FL&O	JP5	1.94	JP5	1.94

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
Fumigants	0.7 to 1.2	CC	Diesel Fuel	FL&O	Corn Oil	4	Corn Oil	4
Fungicides	0.7 to 1.2	CC	Biodiesel above B20	FL&O	Cooking Oils	9.93	Cooking Oils	9.93
Herbicides	0.7 to 1.2	CC	Light Oil	FL&O	Diesel Fuel	10	Diesel Fuel	10
Insecticides	0.7 to 1.2	CC	Sunflower Oil	FL&O	Biodiesel above B20	10.12	Biodiesel above B20	10.12
Paraquat	0.7 to 1.2	CC	Soy Oil	FL&O	Light Oil	13.47	Light Oil	13.47
Prowl	0.7 to 1.2	CC	Olive Oil	FL&O	Sunflower Oil	90.1	Sunflower Oil	90.1
Round-up	0.7 to 1.2	CC	Vegetable Oil	FL&O	Soy Oil	90.6	Soy Oil	90.6
Touchdown	0.7 to 1.2	CC	Bunker Oil	FL&O	Olive Oil	116.8	Olive Oil	116.8
Treflan	0.7 to 1.2	CC	Avgas	FL&O	Vegetable Oil	133	Vegetable Oil	133
Ammonia Nitrate	1.16 to 1.37	Fert	Jet A	FL&O	Bunker Oil	11,200	Bunker Oil	11,200
Crude Oil	0.79 to 0.97	FL&O	Jet B	FL&O	Avgas	1.5 to 6	Avgas	1.5 to 6
Lubricating Oils	0.80 to 0.90	FL&O	Asphalt	FL&O	Jet A	1.5 to 6	Jet A	1.5 to 6
Peanut Oil	0.9 to 1.0	FL&O	Peanut Oil	FL&O	Jet B	1.5 to 6	Jet B	1.5 to 6
Hexane	0.66	Sol Gen	SAE Grades	FL&O	Asphalt	100 to 5000	Asphalt	100 to 5000
Diesel Fuel	0.72	FL&O	Lubricating Oils	FL&O	Peanut Oil	11 to 110	Peanut Oil	11 to 110
Gasoline	0.72	FL&O	Crude Oil	FL&O	SAE Grades	192 to 3626	SAE Grades	192 to 3626
Kerosene	0.75	FL&O	6 Oil (#5, #6)	FL&O	Lubricating Oils	20 to 1000	Lubricating Oils	20 to 1000
Jet A-1	0.76	FL&O	Fuel Oil (#1, #2, #3, #4)	FL&O	Crude Oil	3 to 1783	Crude Oil	3 to 1783
JP4	0.76	FL&O	Spindle Oil	FL&O	6 Oil (#5, #6)	66 to 13,000	6 Oil (#5, #6)	66 to 13,000
JP5	0.76	FL&O	Acetone	Sol Gen	Fuel Oil (#1, #2, #3, #4)	8 to 88	Fuel Oil (#1, #2, #3, #4)	8 to 88
JP7 JP8	0.76	FL&O	Hexane	Sol Gen	Spindle Oil		Spindle Oil	
Ethanol	0.79	Alc Gly	Acetates	Sol Gen	**Product Category:** Solvents General (Sol Gen)		**Product Category:** Solvents General (Sol Gen)	
Isopropyl	0.79	Alc Gly	MEK	Sol Gen	**Typical Products**	**Reference Viscosity* (60 °F)**	**Typical Products**	**Reference Viscosity* (60 °F)**
Acetone	0.8	Sol Gen	Toluene	Sol Gen		**Centipoise (cP)**		**Centipoise (cP)**
Methanol	0.80	Alc Gly	Xylene	Sol Gen	Acetone	0.34	Acetone	0.34
Butanol	0.81	Alc Gly	Ethylacetate	Sol Gen	Hexane	0.34	Hexane	0.34

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
Isobutyl	0.81	Alc Gly	Methylene-Chloride	Sol Chl	Acetates	0.44	Acetates	0.44
MEK	0.81	Sol Gen	Trichloro-Ethylene	Sol Chl	MEK	0.45	MEK	0.45
Biodiesel above B20	0.86	FL&O	Carbon Tetra-Chloride	Sol Chl	Toluene	0.62	Toluene	0.62
Light Oil	0.86	FL&O	Perchloro-Ethylene	Sol Chl	Xylene	0.86	Xylene	0.86
Toluene	0.87	Sol Gen	Methanol	Alc Gly	Ethylacetate	1.36	Ethylacetate	1.36
20 % Aqua-Ammonia	0.89	Fert	Ethanol	Alc Gly	**Product Category:** Solvents Chlorinated (Sol Chl)		**Product Category:** Alcohols, Glycols & Water Mixes Thereof (Alc Gly)	
Xylene	0.89	Sol Gen	Isopropyl	Alc Gly	**Typical Products**	**Reference Viscosity* (60 F) Centipoise (cP)**	**Typical Products**	**Reference Viscosity* (60 F) Centipoise (cP)**
6 Oil (#5, #6)	0.9	FL&O	Butanol	Alc Gly				
Fuel Oil (#1, #2, #3, #4)	0.9	FL&O	Isobutyl	Alc Gly	Methylene-Chloride	0.46	Methanol	0.64
SAE Grades	0.9	FL&O	Ethylene glycol	Alc Gly	Trichloro-Ethylene	0.6	Ethanol	1.29
Corn Oil	0.91	FL&O	Propylene glycol	Alc Gly	Carbon Tetra-Chloride	0.99	Isopropyl	2.78
Cooking Oils	0.92	FL&O	Demineralized	Water	Perchloro-Ethylene	1	Butanol	3.34
Olive Oil	0.92	FL&O	Deionized	Water	**Product Category:** Alcohols, Glycols & Water Mixes Thereof (Alc Gly)		Isobutyl	4.54
Vegetable Oil	0.92	FL&O	Asphalt	Heated	**Typical Products**	**Reference Viscosity* (60 °F) Centipoise (cP)**	Ethylene glycol	25.5
Acetates	0.93	Sol Gen	Bunker C	Heated			Propylene glycol	54
Soy Oil	0.93	FL&O	Test D – To obtain coverage for a product category: Test with one product in the product category. The Certificate of Conformance will cover all products in the category.		Methanol	0.64	Compressed liquids: Fuels and Refrigerants, NH_3	
							Typical Products	**Reference Viscosity* (60 °F) Centipoise (cP)**
Sunflower Oil	0.93	FL&O			Ethanol	1.29	Propane	0.098
							Anhydrous Ammonia	0.188
Ethylacetate	0.96	Sol Gen			Isopropyl	2.78	Butane	0.19
Bunker Oil	0.99	FL&O			Butanol	3.34	Freon 11	0.313

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
Beverages	1.0	Water	Tap water	Water	Isobutyl	4.54	Freon 12	0.359
Deionized	1.0	Water	Potable	Water	Ethylene glycol	25.5	Freon 22	1.99
Demineralized	1.0	Water	Nonpotable	Water	Propylene glycol	54	Ethane	
Juices	1.0	Water	Juices	Water	**Product Category:** Clear Liquid Fertilizers (Liq Fert)		Test A – The following products must be individually tested and noted on the Certificate of Conformance.	
Milk	1.0	Water	Beverages	Water	**Typical Products**	**Reference Viscosity* (60 °F)**		
Nonpotable	1.0	Water	Water mixes of alcohols & glycols	Alc Gly		**Centipoise (cP)**	**Typical Products**	**Product Category**
Potable	1.0	Water	Urea	Fert	Urea	1	Methylene-Chloride	Sol Chl
Tap Water	1.0	Water	Ammonia Nitrate	Fert	Ammonia Nitrate	11.22	Trichloro-Ethylene	Sol Chl
Propylene glycol	1.04	Alc Gly	10-34-0	Fert	10-34-0	48	Carbon Tetra-Chloride	Sol Chl
Hydrochloric Acid	1.1	Chem	20 % Aqua-Ammonia	Fert	20 % Aqua-Ammonia	1.1 to 1.3	Perchloro-Ethylene	Sol Chl
Ethylene glycol	1.19	Alc Gly	Chlear Liquid Fert	Fert	Chlear Liquid Fert	31 to 110	Urea	Liq Fert
Liquid Molasses	1.25	Liq Feed	Nitrogen Solution	Fert	Nitrogen Solution	31 to 110	Ammonia Nitrate	Liq Fert
9-18-9	1.32	Fert	28 %, 30 % or 32 %	Fert	28 %, 30 % or 32 %	31 to 110	10-34-0	Liq Fert
Methylene-Chloride	1.34	Sol Chl	N-P-K solutions	Fert	N-P-K solutions		20% Aqua-Ammonia	Liq Fert
10-34-0	1.39	Fert	9-18-0	Fert	9-18-0		Chlear Liquid Fert	Liq Fert
Trichloro-Ethylene	1.47	Sol Chl	4-4-27	Sus Fert	**Product Category:** Suspension Fertilizers (Sus Fert)		Nitrogen Solution	Liq Fert
Carbon Tetra-Chloride	1.6	Sol Chl	3-10-30	Sus Fert	**Typical Products**	**Reference Viscosity* (60 °F)**	28 %, 30 % or 32 %	Liq Fert
Perchloro-Ethylene	1.6	Sol Chl	Molasses plus Phos Acid and/or Urea (TreaChle)	Liq Feed		**Centipoise (cP)**	N-P-K solutions	Liq Fert
Sulfuric Acid	1.83	Chem	Liquid Molasses	Liq Feed	4-4-27	20 to 215	9-18-0	Liq Fert
Phosphoric	1.87	Chem	Sulfuric Acid	Chem	3-10-30	100 to 1000	4-4-27	Sus Fert

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
Acid								
Urea	1.89	Fert	Phosphoric Acid	Chem	**Product Category:** Liquid Feeds (Liq Feed)		3-10-30	Sus Fert
Bunker C	1.99	Heated	Hydrochloric Acid	Chem	**Typical Products**	**Reference Viscosity* (60 °F)**	Molasses plus Phos Acid and/or Urea (TreaChle)	Liq Feed
Fungicides	1 to 1.2	CC	Herbicides	CC-A		**Centipoise (cP)**	Liquid Molasses	Liq Feed
Micronutrients	1 to 1.2	CC	Round-up	CC-A	Molasses plus Phos Acid and/or Urea (TreaChle)	2882	Asphalt	Heated
Molasses plus Phos Acid and/or Urea (TreaChle)	1.1 to 1.3	Liq Feed	Touchdown	CC-A	Liquid Molasses	8640	Bunker C	Heated
3-10-30	0.9 to 1.65	Liq Fert	Banvel	CC-A	**Product Category:** Heated Products (Heated)		Sulfuric Acid	Chem
4-4-27	0.9 to 1.65	Liq Fert	Treflan	CC-A	**Typical Products**	**Reference Viscosity* (60 °F)**	Phosphoric Acid	Chem
Micronutrients	0.9 to 1.65	Liq Fert	Paraquat	CC-A		**Centipoise (cP)**	Hydrochloric Acid	Chem
28%, 30% or 32%	1.28 to 1.32	Fert	Prowl	CC-A	Asphalt	100 to 5000	Herbicides	CC-A
N-P-K solutions	1.2 – 1.4	Fert	Herbicides	CC-A	Bunker C	11,200	Round-up	CC-A
Chlear Liquid Fert	1.17 to 1.44	Fert	Fungicides	CC-B	**Product Category:** Chemicals (Chem)		Touchdown	CC-A
Nitrogen Solution	1.17 to 1.44	Fert	Insecticides	CC-B	**Typical Products**	**Reference Viscosity* (60 °F)**	Treflan	CC-A
Test D – To obtain coverage for each of the following product categories, test with one product in **each** product category. The Certificate of Conformance will cover all of the products in **the** product category in which a product was tested.			Adjuvants	CC-B			Banvel	CC-A
			Fumigants	CC-B	Sulfuric Acid	1.49	Paraquat	CC-A
			Fungicides	CC-C	Phosphoric Acid	161	Prowl	CC-A
Product Category	**Typical Products**	**Specific Gravity***	Micronutrients	CC-D	Hydrochloric Acid	0.80 to 1. 0	Herbicides	CC-A

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
		(60 F)						
Comp gas	Compressed Natural Gas (CNG)	0.6 to 0.8 (1=Air)			**Product Category:** Crop Chemicals (Type A) (CC-A)		Fungicides	CC-B
					Typical Products	**Reference Viscosity* (60 °F)**	Insecticides	CC-B
Comp liq	Anhydrous Ammonia	0.61				**Centipoise (cP)**	Adjuvants	CC-B
Comp liq	Butane	0.595			Herbicides	4 to 400	Fumigants	CC-B
Comp liq	Ethane				Round-up	4 to 400	Fungicides	CC-C
Comp liq	Freon 11	1.49			Touchdown	4 to 400	Micronutrients	CC-D
Comp liq	Freon 12	1.33			Banvel	4 to 400	Dual	Flow
Comp liq	Freon 22	1.37			Treflan	4 to 400	Bicep	Flow
					Paraquat	4 to 400	Marksman	Flow
Comp liq	Propane	0.504			Prowl	4 to 400	Broadstrike	Flow
					Product Category: Crop Chemicals (Type B) (CC-B)		Doubleplay	Flow
Cryo LNG	Liquefied Natural Gas				**Typical Products**	**Reference Viscosity* (60 °F)**	Topnotch	Flow
Cryo LNG	Liquefied Oxygen	0.66				**Centipoise (cP)**	Guardsman	Flow
Cryo LNG	Nitrogen	0.31			Fungicides	0.7 to 100	Harness	Flow
					Insecticides	0.7 to 100	NH_3	
					Adjuvants	0.7 to 100	Test D – To obtain coverage for a product category: Test with one product in the product category. The Certificate of Conformance will cover all products in the category.	
					Fumigants	0.7 to 100		
					Product Category: Crop Chemicals (Type C) (CC-C)			
					Typical Products	**Reference Viscosity* (60 °F)**	Tap Water	Water
						Centipoise (cP)	Deionized	Water
					Fungicides	20 to 900	Demineralized	Water
					Product Category: Crop Chemicals (Type D) (CC-D)		Potable	Water

Mass Meter Product Category & Test Requirements			**Magnetic Flow Meter Product Category & Test Requirements**		**Positive Displacement Flow Meter Product Category & Test Requirements**		**Turbine Flow Meter Product Category & Test Requirements**	
					Typical Products	**Reference Viscosity* (60 °F)**	Nonpotable	Water
						Centipoise (cP)	Juices	Water
					Micronutrients	20 to 1000	Beverages	Water
					Product Category: Flowables (Flow)		Milk	Water
					Typical Products	**Reference Viscosity* (60 °F)**	Liquefied Oxygen	Cryo LNG
						Centipoise (cP)	Nitrogen	Cryo LNG
					Dual	20 to 900	Liquefied Natural Gas	Cryo LNG
					Bicep	20 to 900		
					Marksman	20 to 900		
					Broadstrike	20 to 900		
					Doubleplay	20 to 900		
					Topnotch	20 to 900		
					Guardsman	20 to 900		
					Harness	20 to 900		
					Product Category: Compressed Liquids: Fuels and Refrigerants (Comp liq)			
					Typical Products	**Reference Viscosity* (60 °F)**		
						Centipoise (cP)		
					Propane	0.098		
					Anhydrous Ammonia	0.188		
					Butane	0.19		
					Freon 11	0.313		
					Freon 12	0.359		
					Freon 22	1.99		
					Ethane			

Mass Meter Product Category & Test Requirements			Magnetic Flow Meter Product Category & Test Requirements		Positive Displacement Flow Meter Product Category & Test Requirements		Turbine Flow Meter Product Category & Test Requirements	
					Test D – To obtain coverage for a product category: Test with one product in the product category. The Certificate of Conformance will cover all products in the category.			
					Product Category: All Water (Water)			
					Typical Products	**Reference Viscosity* (60 °F)**		
						Centipoise (cP)		
					Tap Water	1.0		
					Deionized	1.0		
					Demineralized	1.0		
					Potable	1.0		
					Nonpotable	1.0		
					Juices	1.0		
					Beverages	1.0		
					Milk	1.0		
					Test A – The following products must be individually tested and noted on the Certificate of Conformance.			
					Product Category: Cryogenic Liquids and Liquefied Natural Gas (Cryo LNG)			
					Typical Products	**Reference Viscosity* (60 °F)**		
						Centipoise (cP)		
					Liquefied Oxygen	0.038		
					Nitrogen	1.07		
					Liquefied Natural Gas			

Product Family Table – Category Abbreviations	
Abbreviation	**Product Categories**
FL&O	Fuels, Lubricants, Industrial and Food Grade Liquid Oils
Solv Gen	Solvents General
Solv Cl	Solvents Chlorinated
Alc Gly	Alcohols, Glycols & Water Mixes thereof
Water	Water
Fert	Fertilizers
CC-A	Crop Chemicals *(Type A)*
CC-B	Crop Chemicals *(Type B)*
CC-C	Crop Chemicals *(Type C)*
CC-D	Crop Chemicals *(Type D)*
Flow	Flowables
Sus Fert	Suspension Fertilizers
Liq Feed	Liquid Feeds
Chem	Chemicals
Heated	Heated Products
Comp liq	Compressed Liquids: Fuels and Refrigerants NH_3
Comp gas	Compressed Gases
Cryo LNG	Cryogenic Liquids and Liquefied Natural Gas

[1]*Note: The Typical Products listed in this table are not limiting or all-inclusive; there may be other products and product trade names, which fall into a product family. Water and a product such as stoddard solvent or mineral spirits may be used as test products in the fuels, lubricants, industrial, and food- grade liquid oils product family.*

[2] The specific gravity of a liquid is the ratio of its density to that of water at standard conditions, usually 4 °C (or 40 °F) and 1 atm. The density of water at standard conditions is approximately 1000 kg/m^3 (or 998 kg/m^3)

[3] Diesel fuel blends (biodiesel) with up to 20 % vegetable or animal fat/oil.

[4] Gasoline includes oxygenated fuel blends with up to 15 % oxygenate.

$$\text{Centistokes} = \frac{\text{Centipoise}}{\text{Specific Gravity}}$$

[5] Kinematic viscosity is measured in centistokes.

Source for some of the viscosity value information is in the Industry Canada - Measurement Canada "Liquid Products Group, Bulletin V-16-E (rev. 1), August 3, 1999."

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Appendix D

Draft Hydrocarbon Gas Vapor-Measuring Devices Checklist

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Measuring Devices

Hydrocarbon Gas-Vapor Measuring Devices

Technical Policy • Checklists • Test Procedures

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Hydrocarbon Gas-Vapor Measuring Devices

Hydrocarbon Gas-Vapor Measuring Devices Checklist and Test Procedures

Introduction

The checklist is designed so that the user can determine and record in a logical sequence the conformance of the device with the elements of the checklist. The user should make copies of the checklist to serve as worksheets and preserve the original for reference. Unless specifically requested to do so, the applicant is not required to submit a completed checklist to NTEP prior to the evaluation; however, the applicant is urged to carefully review the checklist prior to submission to ensure that the device meets the requirements of the checklist. In most cases, the results of evaluation for each element can be recorded by checking the appropriate response. In some cases, the user is required to record values, results, or comments. In those cases, space is provided; examples are:

1. **Yes** ☐ **No** ☐ **N/A** ☐

2. ☐ EXTERNAL ☐ INTERNAL ☐ N/A

3. Comments:

This checklist is a guide for conducting prototype examinations to determine compliance with the requirements of NIST Handbook 44. These criteria shall apply only to type evaluation examinations, not on a retroactive basis to devices that are currently in service. The General Code requirements apply to all classes of devices. The specific code requirements supersede General Code requirements in all cases of conflict.

I. General

Code Reference: G-S.1. Identification

Virtually all weighing and measuring equipment must be clearly and permanently marked with the manufacturer's name or trademark, model designation, and serial number. Dispensers, consoles, cash registers interfaced with dispensers, retrofit computing registers, and customer card-activated terminals must all have these markings. As a practical matter, some equipment does not need a serial number. "Satellite" modules in a modular system (e.g., keyboard module and cash drawer) need not have serial numbers because they do not have any "intelligence."
A serial number is required in the following circumstances:

Separate Device: A device is capable of operating as a weighing or measuring device without being interfaced with or connected to other components.

Separate Main Element: Primary indicating elements must be marked. The device is a major element in the weighing or measuring system. That is, it is metrologically significant to the operation and/or performance of the system and interfaces with different compatible main elements. Examples: Indicating elements, weighing elements, meter registers, meter measuring elements (vehicle tank meters and loading rack meters).

Component: The device is a component in a system, may be used in different models of devices, and is sufficiently complex to warrant a separate evaluation and a separate CC (e.g., load cells and vapor recovery nozzles). Such a device may or may not be placed into an enclosure with other components of the system. When installed in an enclosure, the complete device must be marked with a serial number, and the one serial number will suffice for the entire collection of components. If it is not placed in an enclosure with other components, the component must be marked with a serial number.

Equipment must be marked on a surface that is an integral part of the device, and the marking must be visible after installation. If the required information is not positioned in a visible location after installation, a duplicate, permanent identification badge must be located in a visible location. A removable cover is an acceptable location for the required information only if a permanent ID badge is located elsewhere on the device.

The information may be on a metal or plastic plate that is attached with pop rivets, adhesive, or other means, but may not be fastened by removable bolts or screws. A foil or vinyl badge may be used provided that the badge can survive wear and tear, remains legible, and is difficult to remove. The printing on a foil badge must be easily readable and not easily obliterated by rubbing with a relatively soft object (e.g., the wood of a pencil)

Location of the information:

1. Identification

All equipment shall be clearly and permanently marked on an exterior visible surface after installation. It must contain the following information (prefix lettering may be initial capitals, all capitals, or all lower case):

Code Reference: G-S.1.

1.1. Name, initials, or trademark of the manufacturer. Yes☐ No ☐ N/A ☐

1.2. A model designation that positively identifies the pattern or design. The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, at a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod.". Yes☐ No ☐ N/A ☐

1.3. Except for not built-for-purpose, software-based devices, a nonrepetitive serial number. The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). Yes☐ No ☐ N/A ☐

1.4. For not built-for-purpose, software-based devices the current software version or revison designation. The version or revision identifier shall be prefaced by the word "Version" or "Revision" as appropriate and either word may be followed by the word "Number." The abbreviations for the word “Version” shall, as a minimum, begin with the letter "V". The abbreviation for the word “Number” shall, as a minimum, begin with the letter "N" (e.g., No or No.). Yes☐ No ☐ N/A ☐

Code Reference: G-S.1. (e).

1.5. The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have a CC. The number shall be prefaced by the terms "NTEP CC", "CC", or "Approval". These terms may be followed by the word "Number" or an abbreviation for the Word "Number". The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.). Yes☐ No ☐ N/A ☐

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC Number is not part of an identification plate, then note its intended location below and how it will be applied.

Location of CC Number if not located with the identification:

Code Reference: G-S.1.1. Location of Marking Information for Not Built-for-Purpose Devices, Software-Based

1.6. For not built-for-purpose, software-based devices the following shall apply:

1.6.1. The required information in G-S.1 Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; or Yes☐ No ☐ N/A ☐

1.6.2. The Certificate of Conformance (CC) Number shall be: Yes☐ No ☐ N/A ☐

- permanently marked on the device; or
- continuously displayed; or
- accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."

Note: For (1.6.2.), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.

1.7. The identification badge must be visible after installation. Yes☐ No ☐ N/A ☐

1.8. The identification badge must be permanent. Yes☐ No ☐ N/A ☐

Code Reference: S.4.1. Marking Requirements – Limitation of Use

1.9 If a device is intended to measure accurately only products having particular properties, or to measure accurately only under specific installation or operating conditions, or to measure accurately when used in conjunction with specific accessory equipment, these limitations shall be clearly and permanently marked on the device. Yes☐ No ☐ N/A ☐

Code Reference: S.4.2. Marking Requirements -Discharge Rate

1.10. A volume-measuring device shall be marked to show it's rated gas capacity in cubic meters or cubic feet per hour. Yes☐ No ☐ N/A ☐

Code Reference: S.4.3. Temperature Compensation

1.11. If a device is equipped with a temperature compensator, this shall be marked on the badge or immediately adjacent to the badge and on the register. Yes☐ No ☐ N/A ☐

Code Reference: S.4.4. Badge

1.12. A badge affixed in a prominent position on the front of the device shall show the manufacturer's name, serial number and model number of the device, and capacity rate of the device for the particular products that it was designed to meter as recommended by the manufacturer. Yes☐ No ☐ N/A ☐

Code Reference: G-S.2. Facilitation of Fraud

This applies to all metering systems, including dispensers controlled from a remote location and vehicle tank meters. An exception is permitted if the unit price can be changed at a dispenser only through the use of a key to gain access to the unit price mechanism, e.g., mechanical computing registers. Such action would be obvious to a consumer and would inhibit changing the unit price during a delivery.

1.13. All equipment and all mechanisms, software, and devices attached to or used in conjunction therewith shall be so designed, constructed, assembled, and installed for use such that they do not facilitate the perpetration of fraud. Yes☐ No ☐ N/A ☐

Code Reference: G-S.3. Permanence

Equipment shall be of such materials, design, and construction that, under normal service conditions:

1.14. Accuracy will be maintained. Yes☐ No ☐ N/A ☐

1.15. Operating parts will continue to function as intended, Yes☐ No ☐ N/A ☐

1.16. Adjustments will remain reasonably permanent. Yes☐ No ☐ N/A ☐

Code Reference: G-S.4. Interchange or Reversal of Parts

If a metering system has parts that may be interchanged or reversed in normal field assembly, the system shall either be constructed so that reversal will not affect the accuracy of the system or the parts must be marked to indicate their proper position. For most metering devices, this applies only to the reversal of connectors of cables to peripheral devices.

If a metering system has any parts that may be interchanged or reversed in normal field assembly, the parts must either be:

1.17. Constructed so that reversal will not affect performance, Yes☐ No ☐ N/A ☐

1.18. Marked or keyed to indicate the proper position. Yes☐ No ☐ N/A ☐

2. Graduations, Indications, and Recorded Representations

Several general requirements facilitate the reading and interpretation of displayed and recorded values. Each display for quantity must be appropriate in design and have sufficient capacity for particular applications to be suitable for the application. Metering devices must be capable of indicating the maximum quantity that can normally be expected in a particular application.

Code Reference: S.1.1. Primary Elements

2.1. **General.** -A device shall be equipped with a primary indicating element and may also be equipped with a primary recording element. Yes☐ No ☐ N/A ☐

2.2. **Units.** - A volume-measuring device shall indicate, and record if equipped to record, its deliveries in terms of cubic meters or cubic feet, or multiple or decimal subdivisions of cubic meters or cubic feet. Yes☐ No ☐ N/A ☐

Code Reference: S.1.1.3. Value of the Smallest Unit – Volume Measuring Devices

2.3. The value of the smallest unit of indicated delivery, and recorded delivery if the device is equipped to record, shall not exceed:

2.3.1. (a) 1 m^3 (1 000 dm^3) (100 ft^3) when the maximum rated gas capacity is less than 100 m^3/h (10 000 ft^3/h); Yes☐ No ☐ N/A ☐

2.3.2. (b) 10 m^3 (1 000 ft^3) when the maximum rated gas capacity is 280 m^3/h (10 000 ft^3/h) up to but not including 1 700 m^3/h (60 000 ft^3/h); Yes☐ No ☐ N/A ☐

2.3.3. (c) 100 m^3 (10 000 ft^3) when the maximum rated gas capacity is 1 700 m^3/h (60 000 ft^3/h) or more. Yes☐ No ☐ N/A ☐

Code Reference: S.1.1.4.

2.4. Primary indicating and recording elements shall advance digitally or continuously and be susceptible to advancement only by the mechanical operation of the device. Yes☐ No ☐ N/A ☐

Code Reference: S.1.1.5. Proving Indicator

2.5. Devices rated less than 280 m^3/h (10 000 ft^3/h) gas capacity shall be equipped with a proving indicator measuring 0.025, 0.05, 0.1, 0.2, or 0.25 m^3 per revolution (1, 2, 5, or 10 ft^3 per revolution) for testing the meter. Devices with larger capacities shall be equipped as follows: Yes☐ No ☐ N/A ☐

2.5.1. (a) Devices rated 280 m^3 (10 000 ft^3) up to but not including 1 700 m^3/h (60 000 ft^3/h) gas capacity shall be equipped with a proving indicator measuring not greater than 1 m^3 (100 ft^3) per revolution. Yes☐ No ☐ N/A ☐

2.5.2. (b) Devices rated 1 700 m^3/h (60 000 ft^3/h) gas capacity or more shall be equipped with a proving indicator measuring not more than 10 m^3 (1 000 ft^3) per revolution. Yes☐ No ☐ N/A ☐

2.5.3. The test circle of the proving indicator shall be divided into 10 equal parts. Additional subdivisions of one or more of such equal parts may be made. Yes☐ No ☐ N/A ☐

Code Reference: S.1.2. Graduations

2.6. **Length.** - Graduations shall be so varied in length that they may be conveniently read. Yes☐ No ☐ N/A ☐

2.7. **Width.** - In any series of graduations, the width of a graduation shall in no case be greater than the width of the minimum clear interval between graduations, and in no case should it exceed 1.0 mm (0.04 in) for indicating elements and 0.5 mm (0.02 in) for proving circles. Yes☐ No ☐ N/A ☐

Code Reference: S.1.2.3. Clear Interval Between Graduations

2.8. The clear interval shall be not less than 1.0 mm (0.04 in). If the graduations are not parallel, the measurement shall be made: Yes☐ No ☐ N/A ☐

2.8.1. (a) along the line of relative movement between the graduations at the end of the indicator, **Yes☐ No ☐ N/A ☐**

or

2.8.2. (b) if the indicator is continuous, at the point of widest separation of the graduations. **Yes☐ No ☐ N/A ☐**

Code Reference S.1.3. Indicators

2.9. **Symmetry.** - The index of an indicator shall be symmetrical with respect to the graduations, at least throughout that portion of its length associated with the graduations. Yes☐ No ☐ N/A ☐

2.10. **Length.** - The index of an indicator shall reach to the finest graduations with which it is used. Yes☐ No ☐ N/A ☐

Code Reference: S.1.3.3. Indicator Width

2.11. The width of the index of an indicator in relation to the series of graduations with which it is used shall be not greater than:

2.11.1. (a) the width of the widest graduation, and Yes☐ No ☐ N/A ☐

2.11.2. (b) the width of the minimum clear interval between graduations. Yes☐ No ☐ N/A ☐

2.11.3. When the index of an indicator extends along the entire length of a graduation, that portion of the index of the indicator that may be brought into coincidence with the graduation shall be of the same width throughout the length of the index that coincides with the graduation Yes☐ No ☐ N/A ☐

2.12 **Clearance.** - The clearance between the index of an indicator and the graduations shall in no case be more than 1.5 mm (0.06 in). Yes☐ No ☐ N/A ☐

2.13. **Parallax.** - Parallax effects shall be reduced to the practicable minimum. Yes☐ No ☐ N/A ☐

3. Code Reference: S.2. Design of Measuring Elements

Code Reference: S.2.1. Pressure Regulation

3.1. Except when measured as a retail motor fuel, the vapor should be measured at a normal gauge pressure (psig) of:

3.1.1. (a) 2 740 Pa ± 685 Pa [11 in of water column (0.40 psig) ± 2.75 in of water column (0.10 psig)] for liquefied petroleum gas vapor; or Yes☐ No ☐ N/A ☐

3.1.2. (b) 1 744 Pa ± 436 Pa [7 in of water column (0.25 psig) ± 1.75 in of water column (0.06 psig)] for natural and manufactured gas. Yes☐ No ☐ N/A ☐

When vapor is measured at a pressure other than what is specified above for the specific product, a volume multiplier shall be applied within the meter or to the billing invoice based on the following equation:
Where

VPM = Volume pressure multiplier
AAP = Assumed atmospheric pressure in psia
GP = Gauge pressure in pascal or psig
NGP = Normal gauge pressure in pascal or psig

The assumed atmospheric pressure is to be taken from HB 44 Sec 3.33. Tables 2 and 2M .

3.1.3. When liquefied petroleum gas vapor is measured at a pressure of 6 900 Pa (1 psig) or more, the delivery pressure shall be maintained within ± 1 725 Pa (± 0.25 psig). Yes☐ No ☐ N/A ☐

3.1.4. Pressure variations due to regulator lock off shall not increase the operating pressure by more than 25%. Yes☐ No ☐ N/A ☐

3.2. **Provision for Sealing.** - Adequate provision shall be made for applying security seals in such a manner that no adjustment may be made of any measurement element. Yes☐ No ☐ N/A ☐

3.3. **Maintenance of Vapor State.** - A device shall be so designed and installed that the product being measured will remain in a vapor state during passage through the meter. Yes☐ No ☐ N/A ☐

3.4. **Automatic Temperature Compensation.** - A device may be equipped with an adjustable automatic means for adjusting the indication and registration of the measured volume of vapor to the volume at 15 °C (60 °F). Yes☐ No ☐ N/A ☐

4. Design of Discharge Lines

Code Reference S.3.

4.1 **Diversion of Measured Vapor.** - No means shall be provided by which any measured vapor can be diverted from the measuring chamber of the meter or the discharge line therefrom. Yes☐ No ☐ N/A ☐

5. Repeatability of Indications

Code Reference: G-S.5.4.

The quantity measured by a device shall be repeatable within tolerance for the same indication. One condition that may create a problem is that the value of the quantity division may be large relative to the tolerance. A delivery must be within tolerance wherever the delivery is stopped within the nominal indication of the test draft. Meters that may be at the tolerance limit may be out of tolerance at an extreme limit of the nominal quantity indication.

5.1. When a digital indicator is tested, the delivered quantity shall be within tolerance at any point within the quantity-value division for the test draft. Yes☐ No ☐ N/A ☐

The following philosophy and list of sealable parameters applies to provision for sealing all liquid/vapor-measuring devices.

An electronic data audit trail is a means of allowing a weights and measures inspector to review how many times any electronic adjustment, which affects the accuracy of a weight, or volume measurement has been changed. The information contained in the audit trail shall consist of a cumulative and non-destructible number (even if a power failure occurs) which increments each time any of the adjustments required to be sealed have been changed. The electronic data audit trail information shall be capable of being recalled by the official on the main display of the device.

As a minimum, devices which use an audit trail to provide security for sealable parameters shall satisfy the following criteria and shall use the format set forth in Appendix A of the checklist for Liquid-Measuring Devices.

Philosophy for Sealing
Typical Features to be Sealed

Principles for Determining Features to be Sealed

The need to seal some features depends upon:

- The ease with which the feature or the selection of the feature can be used to facilitate fraud; and
- The likelihood that the use of the feature will result in fraud not being detected.

Features or functions which the operator routinely uses as part of device operation, such as setting the unit prices on dispensers and maintaining unit prices in price look-up codes stored in memory, are not sealable parameters and shall not be sealed.

If a parameter (or set of parameters) selection would result in performance that would be obviously in error, such as the selection of parameters for different countries, then it is not necessary to seal the selection of these features.

If individual device characteristics are selectable from a "menu" or a series of programming steps, then access to the "programming mode" must be sealable. (Note: If an audit trail is the only means of security, then the audit trail shall update only after at least one sealable parameter has been changed; simply accessing the sealable parameters via a menu shall not update the audit trail.)

If a physical act, such as cutting a wire is required to change a parameter setting and physically repairing the cut is required to reactivate the parameter, then this physical repair process would be considered an acceptable way to select parameters without requiring a physical seal or an audit trail.

Typical Features and Parameters to be Sealed

The following provides examples of configuration and calibration parameters that are to be sealed. The examples are provided for guidance and are not intended to cover all possible parameters.

Calibration Parameters: Calibration parameters are those parameters whose values are expected to change as a result of accuracy adjustments. Examples include the following.

1. Measuring element adjustments where linearity corrections are used, e.g., flow rate 1 and meter factor 1, flow rate 2 and meter factor 2, etc.
2. Mass flow meter adjustments for zero adjustments (not simply setting the display to zero) and span settings.

Configuration Parameters: Configuration parameters are those parameters whose values are expected to be entered only once and not changed after all initial installation settings are made. Examples include the following.

1. Octane or other blend setting ratios (optional in Canada at this time)
2. Temperature, pressure, density, and other sensor settings for zero, span, and offset values
3. Measurement units (in Canada, only if not displayed or printed on the primary register)
4. Temperature compensation table, liquid coefficient of expansion, or compressibility factors or tables
5. Liquid density setting (in Canada, only if not displayed or printed on the primary register) and allowable liquid density input range
6. Vapor pressures of liquids if used in calculations to establish the quantity
7. Meter or sensor temperature compensation factors
8. False or missing pulse limits for dual pulse systems (Canada only)
9. On/off status of automatic temperature, pressure, or density correction
10. Automatic or manual data input for sensors
11. Dual pulse checking feature status on or off
12. Flow control settings (optional in Canada)
13. Filtering constants

Hydrocarbon Gas-Vapor Measuring Device Features and Parameters	
Typical Features or Parameters to be Sealed	**Typical Features or Parameters Not Required to be Sealed**
Measuring element adjustment (both mechanical and electronic)	Analog-to-digital converters
Linearity correction values	Quantity division value (display resolution)
Measurement units (e.g., cubic feet to cubic meters)	Double pulse counting
~~Octane blend setting for retail motor-fuel dispensers~~	Communications
Any tables or settings accessed by the software or manually entered to establish the quantity (e.g., specific gravity, pressure, etc.)	
Density ranges	
Pulsers	
Signal pick-up (magnetic or reluctance)	
Temperature probes and temperature offsets in software	
Pressure and density sensors and transducers	
Flow control settings, e.g., flow rates for slow-flow start, quantity for slow-flow start and stop	
Temperature compensating systems (on/off)	
Differential pressure valves	
As a point of clarification, the flow control settings referenced above are those controls typically incorporated into the installations of large-capacity meters (wholesale meters). The reference does not include the point at which retail motor-fuel dispensers slow product flow during a prepaid transaction to enable the dispenser to stop at the preset amount.	

Note: The above examples of adjustments, parameters, and features to be sealed are to be considered "typical" or "normal." This list may not be all inclusive. Some parameters other than those listed, which affect the metrological performance of the device, must be sealed. If listed parameters or other parameters, which may affect the metrological function of the device, are not sealed, the manufacturer must demonstrate that all settings comply with the most stringent requirements for the application of the device (i.e., the parameter does not affect compliance with Handbook 44).

(Section 3.33. of Handbook 44, Code for Hydrocarbon Gas Vapor-Measuring Devices, does not include specific design criteria for electronic audit trails. Based upon G-A.3., Special and Unclassified Equipment, and G-S.8., Provisions for Sealing Electronic Adjustable Components, Table S.2.2.of the Liquid-Measuring Devices Code, Categories of Device and Methods of Sealing, will be applied to the type evaluation of cryogenic devices until specific design criteria are added to Section 3.33. of Handbook 44 for the design of audit trails installed in Hydrocarbon Gas Vapor-measuring devices.)

Category 1 Devices (Devices with No Remote Configuration Capability):

- The device is sealed with a physical seal or it has an audit trail with two event counters (one for calibration, the second for configuration). Yes☐ No☐ N/A☐
- A physical seal must be applied without exposing electronics. Yes☐ No☐ N/A☐
- Event counters are non-resettable and have a capacity of at least 000 to 999. Yes☐ No☐ N/A☐
- Event counters increment appropriately. Yes☐ No☐ N/A☐
- The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power. Yes☐ No☐ N/A☐
- Accessing the audit trail information for review shall be separate from the calibration mode. Yes☐ No☐ N/A☐
- Accessing the audit trail information must not affect the normal operation of the device. Yes☐ No☐ N/A☐
- Accessing the audit trail information shall not require removal of any additional parts other than normal requirements to inspect the integrity of a physical security seal. (e.g., a key to open a locked panel may be required). Yes☐ No☐ N/A☐

Category 2 Devices (Devices with Remote Configuration Capability but Controlled by Hardware):

- The physical hardware enabling access for remote communication must be on- site. Yes☐ No☐ N/A☐
- The physical hardware must be sealable with a security seal or Yes☐ No☐ N/A☐
- The device must be equipped with at least two event counters: one for calibration, the second for configuration parameters Yes☐ No☐ N/A☐
  - calibration parameters event counter
  - configuration parameters event counter
- Adequate provision must be made to apply a physical seal without exposing electronics. Yes☐ No☐ N/A☐
- Event counters are non-resettable and have a capacity of at least 000 to 999. Yes☐ No☐ N/A☐
- Event counters increment appropriately. Yes☐ No☐ N/A☐
- Event counters may be located either: Yes☐ No☐ N/A☐
  - at the individual measuring device or
  - at the system controller
- If the counters are located at the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device. Yes☐ No☐ N/A☐
- An adequate number (see table below) of event counters must be available to monitor the calibration and configuration parameters of each individual device. Yes☐ No☐ N/A☐
- The device must either: Yes☐ No☐ N/A☐
  -clearly indicate when it is in the remote configuration mode or
  -the device shall not operate while in the remote configuration mode.
- If capable of printing in the calibration mode, it must print a message that it is in the calibration mode. Yes☐ No☐ N/A☐
- The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power. Yes☐ No☐ N/A☐
- The audit trail information must be readily accessible and easily read. Yes☐ No☐ N/A☐

Minimum Number of Counters Required		
	Minimum Counters Required for Devices Equipped with Event Counters	**Minimum Event Counter(s) at System Controller**
Only one type of parameter accessible (calibration or configuration)	One (1) event counter	One (1) event counter for each separately controlled device, or one (1) event counter, if changes are made simultaneously.
Both calibration and configuration parameters accessible	Two (2) event counters	Two (2) event counters for each separately controlled device, or two (2) or more event counters if changes are made to all controlled devices simultaneously.

Category 3 Devices (Devices with Unlimited Remote Configuration Capability):

Category 3 devices have virtually unlimited access to sealable parameters or access is controlled though a password.

- For devices manufactured after January 1, 2001, the device must either: Yes☐ No☐ N/A☐
  - Clearly indicate when it is in the remote configuration mode, or
  - The device shall not operate while in the remote configuration mode
- The device is equipped with an event logger Yes☐ No☐ N/A☐
- The event logger automatically retains the identification of the parameter changed, the date and time of the change, and the new value of the parameter. Yes☐ No☐ N/A☐
- Event counters are nonresettable and have a capacity of at least 000 to 999. Yes☐ No☐ N/A☐
- The system is designed to attach a printer, which can print the contents of the audit trail. Yes☐ No☐ N/A☐
- The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power. Yes☐ No☐ N/A☐
- The event logger must have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. Yes☐ No☐ N/A☐
- The event logger drops the oldest event when the memory capacity is full and a new entry is saved. Yes☐ No☐ N/A☐
- Describe the method used to seal the device or access the audit trail information.

Code Reference: G-UR.1.1. Suitability of Equipment

A device must be properly designed and have sufficient capacity to be suitable to use in a particular application. A device must measure the appropriate characteristics of a commodity to accurately determine the quantity, have the necessary components (e.g. vapor eliminator) to eliminate factors that may cause measurement errors during normal use, have sufficient capacity to indicate the quantity measured and the associated total price if it is a computing device. The meter must have the proper flow rate capacity to operate over the actual flow rates for the application, and the device must have a quantity division appropriate for the application. Some specific requirements for device characteristics are given in the specific codes for particular devices.

2.25. The equipment is suitable for its intended application. Yes☐ No ☐ N/A ☐

Code Reference: G-UR.1.2. Environment

2.26. Equipment shall be suitable for use in the environment in which it will be used. Suitability with respect to environment includes the effects of wind, weather, temperature variations, and radio frequency interference. A device must work and remain accurate under its actual conditions of use. Yes☐ No ☐ N/A ☐

Code Reference: G-UR.3.3. Position of Equipment

Paragraph G-UR.3.3. requires that the primary indicating element be visible from a reasonable customer position. Many electronic vehicle-mounted metering/controlling systems on which transaction information is displayed are mounted inside the cab of the delivery vehicle. This location is not considered visible from a reasonable customer position. Some systems provide a remote customer display as a standard feature and some do not. The application section of any Certificate of Conformance issued to a vehicle-mounted metering/controlling system must limit the system to installations where a customer indicator is provided and located in a reasonable customer position (e.g., at the meter on the rear of the vehicle).

A. Field Evaluation and Permanence Test for Hydrocarbon Gas Vapor Meters

The following tests are to be run on vapor meter as part of the permanence test:

1. Three tests at the maximum discharge rate.

2. Three slow-flow tests. (Refer to slow-flow tests below)

3. One low-flame test. (Refer to low-flame test below)

Only one meter will be required for the initial test, after which the meter must have air or product passed through it as part of the permanence test. The amount of air or product shall be at least the maximum flow rate times 1000. California weights and measures performs this test in approximately 60 days. Although it is longer than the usual 30-day test, this is considered appropriate because these meters are usually tested only every ten years.

Following the period of use, the tests listed above are to be repeated. All results within the range of flow rates to be included on the certificate of conformance must be within the applicable tolerances. Extended flow range testing performed at the manufacturer's discretion may be included on the certificate of conformance provided the results are within the acceptable tolerances.

B. Test Medium – The device shall be tested with air or the product to be measured.

C. Temperature and Volume Change - Care should be exercised to reduce to a minimum any volume changes. The temperature of the air, bell-prover oil, and the meters under test should be within 1 °C (2 °F) of one another. The devices should remain in the proving room for at least 16 hours before starting any proving operations to allow the device temperature to approximate the temperature of the proving device.

D. Test Drafts - Except for low-flame tests, test drafts shall be at least equal to one complete revolution of the largest capacity proving indicator, and shall in no case be less than 0.05 m^3 or 2 ft^3. All flow rates shall be controlled by suitable outlet orifices.

E. Test Procedures - If a device is equipped with an automatic temperature compensator, the proving device reading shall be corrected to 15 °C (60 °F), using an approved table.

F. Normal Tests - The normal test of a device shall be made at a rate not to exceed the capacity rate given on the badge of the meter.

G. Automatic Temperature Compensation - If a device is equipped with an automatic temperature compensator, the quantity of the test draft indication of the standard shall be corrected to 15°C (60 °F).

H. Repeatability Tests – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as temperature pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

I. Special Tests - "Special" tests shall be made to develop the operating characteristics of a device, and any special elements and accessories attached to or associated with the device. Any test except as set forth in N.4.1. shall be considered a special test.

J. Slow Test. - The device shall be tested at a rate not less than 20 percent of the marked capacity rate, or (at the check rate) not less than the minimum flow rate if marked on the device, whichever is less.

K. Low-Flame Test. - The device shall be tested at an extremely low-flow rate as given in HB 44 Sec 3.33.Table 1. The test shall consist of passing air at a pressure of 375 Pa (1.5 in water column) through the meter for not less than 60 minutes. The meter shall continue to advance at the conclusion of the test period.

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Appendix E

Checklist for Testing Electronic Digital Indicators with Simulated Pulses

This checklist is used for Technical Policy **U. Evaluating electronic digital indicators submitted separate from a measuring element.**

Code Reference: G-S.1. Identification

All equipment shall be clearly and permanently marked on an exterior visible surface after installation. It must contain the following information (prefix lettering may be initial capitals, all capitals, or all lower case):

1.1. Name, initials, or trademark of the manufacturer. **Yes ☐ No ☐ N/A ☐**

1.2. A model designation that positively identifies the pattern or design. The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, at a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod.". **Yes ☐ No ☐ N/A ☐**

1.3. Except for not built-for-purpose, software-based devices, a nonrepetitive serial number. The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). **Yes ☐ No ☐ N/A ☐**

1.4. For not built-for-purpose, software-based devices the current software version or revision designation. The version or revision identifier shall be prefaced by the word "Version" or "Revision" as appropriate and either word may be followed by the word "Number." The abbreviations for the word “Version” shall, as a minimum, begin with the letter "V". The abbreviation for the word “Number” shall, as a minimum, begin with the letter "N" (e.g., No or No.). **Yes ☐ No ☐ N/A ☐**

Code Reference G-S.1. (e).

1.5. The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have a CC. The number shall be prefaced by the terms "NTEP CC", "CC", or "Approval". These terms may be followed by the word "Number" or an abbreviation for the Word "Number". The abbreviation shall as a minimum begin with the letter "N" (e.g., No or No.). **Yes ☐ No ☐ N/A ☐**

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC Number is not part of an identification plate, then note its intended location below and how it will be applied.

Location of CC Number if not located with the identification:

_____

_____

Code Reference: G-S.1.1. Location of Marking Information for Not Built-for-Purpose, Software-Based Devices Not Built-for-Purpose Devices, Software-Based

1.6. For not built-for-purpose, software-based devices the following shall apply:

1.6.1. The required information in G-S.1 Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; or

1.6.2. The Certificate of Conformance (CC) Number shall be:

- permanently marked on the device; or
- continuously displayed; or
- accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."

Note: For (1.6.2.), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.

1.7. The identification badge must be visible after installation. **Yes ☐ No ☐ N/A ☐**

1.8. The identification badge must be permanent. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.2. Facilitation of Fraud

This applies to all metering system indicators installed at a fixed location or vehicle tank meter applications and controlled remotely or within the device itself.
This requirement addresses the process of changing the unit price or unit prices set in a metering system.

1.9. The system shall prevent a change of unit price during a delivery. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.3. Permanence

Equipment shall be of such materials, design, and construction that, under normal service conditions:

1.10. Accuracy will be maintained. **Yes ☐ No ☐ N/A ☐**

1.11. Operating parts will continue to function as intended, **Yes ☐ No ☐ N/A ☐**

1.12. Adjustments will remain reasonably permanent. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.4. Interchange or Reversal of Parts

If a metering system has parts that may be interchanged or reversed in normal field assembly, the system shall either be constructed so that reversal will not affect the accuracy of the system or the parts must be marked to indicate their proper position. For most metering devices, this applies only to the reversal of connectors of cables to peripheral devices.

If a metering system has any parts that may be interchanged or reversed in normal field assembly, the parts must either be:

1.13. Constructed so that reversal will not affect performance, **Yes ☐ No ☐ N/A ☐**

1.14. Marked or keyed to indicate their proper positions. **Yes ☐ No ☐ N/A ☐**

2. Indications, and Recorded Representations

Code Reference: G-S.5.1. Indicating and Recording Elements

Several general requirements facilitate the reading and interpretation of displayed values. Each display for quantity or total price must be appropriate in design and have sufficient capacity for particular applications to be suitable for the application. Metering devices must be capable of indicating the maximum quantity and money values that can normally be expected in a particular application.

2.1. **Minimum quantity value indications.**

2.1.1. Display is capable of 1.0 **Yes ☐ No ☐ N/A ☐**

2.1.2. Display is capable of 01 **Yes ☐ No ☐ N/A ☐**

2.1.3. Display is capable of 0.01 **Yes ☐ No ☐ N/A ☐**

2.1.4. Display is capable of 0.001 **Yes ☐ No ☐ N/A ☐**

2.1.5. Display is capable of other (fill in blank): **Yes ☐ No ☐ N/A ☐**

2.2. **Money value display**

	2.2.1.	Money value is properly displayed	**Yes ☐ No ☐ N/A ☐**
3.2.	**The indications must be clear, definite, and accurate.**		
	2.2.1.	Values must be clear, definite, and accurate	**Yes ☐ No ☐ N/A ☐**
	2.2.2.	Unit of measure is programmable Gallon, Liter, Pound	**Yes ☐ No ☐ N/A ☐**
	2.2.2.	Unit of measure is applied by permanent marking on indicator housing	**Yes ☐ No ☐ N/A ☐**
2.3.	The indications must be easily read under normal operating conditions.		**Yes ☐ No ☐ N/A ☐**
2.4.	Symbols for decimal points shall clearly identify the decimal position. (Generally acceptable symbols are dots, small commas, or x.)		**Yes ☐ No ☐ N/A ☐**
2.5.	**The zero indication must consist of at least the following minimum indications as appropriate:**		
	2.5.1.	One digit to the left and all digits to the right of a decimal point.	**Yes ☐ No ☐ N/A ☐**
	2.5.2.	If a decimal point is not used, at least one active decade must be displayed.	**Yes ☐ No ☐ N/A ☐**
2.6.	Totalizer values must be accurate to the nearest minimum interval with decimal points displayed or subordinate digits adequately differentiated from others, if applicable.		**Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.2.2. Digital Indication and Representation

Basic operating requirements for devices:

2.7.	All digital values of like value in a system shall agree with one another.	**Yes ☐ No ☐ N/A ☐**
2.8.	A digital value coincides with its associated analog value to the nearest minimum graduation.	**Yes ☐ No ☐ N/A ☐**
2.9.	Digital values shall round off to the nearest minimum unit that can be indicated or recorded.	**Yes ☐ No ☐ N/A ☐**
2.10.	When a digital zero display is provided, the zero indication shall consist of at least one digit to the left and all digits to the right of the decimal point.	**Yes ☐ No ☐ N/A ☐**

Agreement of indications shall be checked for several deliveries. The totalizer shall be checked for accuracy and agreement with individual deliveries and with other totalizers in the system.

2.11.	All digital values of like value in a system agree with one another.	**Yes ☐ No ☐ N/A ☐**
2.12.	Digital values coincide with associated analog values to the nearest minimum graduation. We do not request to test a digital indicator with an analog register. This sounds like a field enforcement test?	**Yes ☐ No ☐ N/A ☐**
2.13.	Digital values "round off" to the nearest minimum unit that can be indicated or recorded.	**Yes ☐ No ☐ N/A ☐**
2.14.	The device totalizer shall agree with the total of the individual deliveries and with other totalizers in the system.	**Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.2.3. Size and Character

Digits used for comparable values must be uniform in size and character, but subordinate values may be displayed in different and less prominent digits than more significant values. The latter more likely occurs on analog devices. In digital indications, the digits are usually of uniform size throughout a particular display. The size of digits may differ for different quantities, for example, the quantity and unit price digits may be smaller than the total price digits.

2.15.		**Yes ☐ No ☐ N/A ☐**
2.16.	Indications and recorded representations shall be appropriately portrayed or designated.	**Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.2.4. Values Defined

2.17. Values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations, which are uniformly placed so that they do not interfere with the accuracy of the reading. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.2.5. Permanence

2.18. Indications, or recorded representations and their defining figures, words, and symbols shall be of such character that they will not tend to easily become obliterated or illegible. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.3., G-S.5.3.1. Values of Graduated Intervals or Increments

2.19. Digital indications and recorded representations shall be uniform in size, character, and value throughout any series. Quantity values shall be defined by the specific unit of measure in use. **Yes ☐ No ☐ N/A ☐**

2.20. Indications shall be uniform throughout any series. **Yes ☐ No ☐ N/A ☐**

2.21. Quantity values shall be identified by the unit of measure. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.4. Repeatability of Indications

The quantity measured by a device shall be repeatable within tolerance for the same indication. One condition that may create a problem is that the value of the quantity division may be large relative to the tolerance. A delivery must be within tolerance wherever the delivery is stopped within the nominal indication of the test draft. Meters that may be at the tolerance limit may be out of tolerance at an extreme limit of the nominal quantity indication.

2.22. When a digital indicator is tested, the delivered quantity shall be within tolerance at any point within the quantity-value division for the test draft. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.6. Recorded Representations

2.23. All recorded values shall be digital. (See also G-UR.3.3.) **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.5.7. Magnified ~~Graduations and~~ Indications

2.24. Magnified indications shall conform to all requirements for ~~graduations and~~ indications. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.6. Marking, Operational Controls, Indications, and Features

All operational controls, indications, and features shall be clearly and definitely identified. Nonfunctional keys and annunciators shall not be marked because their marking implies that the key or annunciator is functional and should be inspected or tested by the enforcement official. Keys and operator controls that are visible to a customer in a direct sale transaction shall be marked with words or symbols to the extent that they can be understood by the customer and aid in understanding the transaction. Keys that are visible only to the console operator need to be marked only to the extent that a trained operator can understand the function of each key.

2.25. All operational controls, indications, and features including switches, lights, displays, and push buttons shall be clearly and definitely identified. **Yes ☐ No ☐ N/A ☐**

2.26. All dual function (multi-function) keys or controls shall be marked to clearly identify all functions. **Yes ☐ No ☐ N/A ☐**

2.27. Non-functional controls and annunciators shall not be marked. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.7. Lettering, Readability

2.28. Required markings and instructions shall be permanent and easily read. **Yes ☐ No ☐ N/A ☐**

Code Reference: G-S.8. Sealing Electronic Adjustable Components, and Provision for Sealing of Adjustable Components or Audit Trial

2.29. Electronic adjustable components that affect the performance of a device shall provide for an approved means of security (e.g. data change audit trail) or for physically applying a security seal. These components include the following: (1) mechanical adjustment mechanism for meters, (2) the electronic calibration factor and automatic temperature compensator for electronic meter registers, (3) selection of pressure for density correction capability and correction values, and (4) pulser setting and gallon/liter conversion switches when they may accidentally or intentionally be used to perpetrate fraud. **Yes □ No □ N/A □**

The following philosophy and list of sealable parameters applies to provision for sealing all liquid-measuring devices.

An electronic data audit trail is a means of allowing a weights and measures inspector to review how many times any electronic adjustment, which affects the accuracy of a volume measurement has been changed. The information contained in the audit trail shall consist of a cumulative and non-destructible number (even if a power failure occurs) which increments each time any of the adjustments required to be sealed have been changed. The electronic data audit trail information shall be capable of being recalled by the official on the main display of the device.

As a minimum, devices which use an audit trail to provide security for sealable parameters shall satisfy the following criteria and shall use the format set forth in Appendix A of the checklist for Liquid-Measuring Devices.

Philosophy for Sealing

Typical Features to be Sealed

Principles for Determining Features to be Sealed

The need to seal some features depends upon:

- The ease with which the feature or the selection of the feature can be used to facilitate fraud; and
- The likelihood that the use of the feature will result in fraud not being detected.

Features or functions which the operator routinely uses as part of device operation, such as setting the unit prices on dispensers and maintaining unit prices in price look-up codes stored in memory, are not sealable parameters and shall not be sealed.

If a parameter (or set of parameters) selection would result in performance that would be obviously in error, such as the selection of parameters for different countries, then it is not necessary to seal the selection of these features.

If individual device characteristics are selectable from a "menu" or a series of programming steps, then access to the "programming mode" must be sealable. (Note: If an audit trail is the only means of security, then the audit trail shall update only after at least one sealable parameter has been changed; simply accessing the sealable parameters via a menu shall not update the audit trail.)

If a physical act, such as cutting a wire is required to change a parameter setting and physically repairing the cut is required to reactivate the parameter, then this physical repair process would be considered an acceptable way to select parameters without requiring a physical seal or an audit trail.

Typical Features and Parameters to be Sealed

The following provides examples of configuration and calibration parameters that are to be sealed. The examples are provided for guidance and are not intended to cover all possible parameters.

Calibration Parameters: Calibration parameters are those parameters whose values are expected to change as a result of accuracy adjustments. Examples include the following.

1. Measuring element adjustments where linearity corrections are used, e.g., flow rate 1 and meter factor 1, flow rate 2 and meter factor 2, etc.
2. Mass flow meter adjustments for zero adjustments (not simply setting the display to zero) and span settings.

Configuration Parameters: Configuration parameters are those parameters whose values are expected to be entered only once and not changed after all initial installation settings are made. Examples include the following.

1. Octane or other blend setting ratios (optional in Canada at this time)
2. Temperature, pressure, density, and other sensor settings for zero, span, and offset values
3. Measurement units (in Canada, only if not displayed or printed on the primary register)
4. Temperature compensation table, liquid coefficient of expansion, or compressibility factors or tables
5. Liquid density setting (in Canada, only if not displayed or printed on the primary register) and allowable liquid density input range
6. Vapor pressures of liquids if used in calculations to establish the quantity
7. Meter or sensor temperature compensation factors
8. False or missing pulse limits for dual pulse systems (Canada only)
9. On/off status of automatic temperature, pressure, or density correction
10. Automatic or manual data input for sensors
11. Dual pulse checking feature status on or off
12. Flow control settings (optional in Canada)
13. Filtering constants

Liquid-Measuring Device Features and Parameters	
Typical Features or Parameters to be Sealed	**Typical Features or Parameters Not Required to be Sealed**
Measuring element adjustment (both mechanical and electronic)	Analog-to-digital converters
Linearity correction values	Quantity division value (display resolution)
Measurement units (e.g., gallons to liters)	Double pulse counting
Octane blend setting for retail motor-fuel dispensers	Communications
Any tables or settings accessed by the software or manually entered to establish the quantity (e.g., specific gravity, pressure, etc.)	
Density ranges	
Pulsers	
Signal pick-up (magnetic or reluctance)	
Temperature probes and temperature offsets in software	
Pressure and density sensors and transducers	
Flow control settings, e.g., flow rates for slow-flow start, quantity for slow-flow start and stop	
Temperature compensating systems (on/off)	
Differential pressure valves	
As a point of clarification, the flow control settings referenced above are those controls typically incorporated into the installations of large-capacity meters (wholesale meters). The reference does not include the point at which retail motor-fuel dispensers slow product flow during a prepaid transaction to enable the dispenser to stop at the preset amount.	

Note: The above examples of adjustments, parameters, and features to be sealed are to be considered "typical" or "normal." This list may not be all inclusive. Some parameters other than those listed, which affect the metrological performance of the device, must be sealed. If listed parameters or other parameters, which may affect the metrological function of the device, are not sealed, the manufacturer must demonstrate that all settings comply with the most stringent requirements for the application of the device (i.e., the parameter does not affect compliance with Handbook 44).

Category 1 Devices (Devices with No Remote Configuration Capability):

- The device is sealed with a physical seal or it has an audit trail with two event counters (one for calibration, the second for configuration). **Yes ☐ No ☐ N/A ☐**
- A physical seal must be applied without exposing electronics. **Yes ☐ No ☐ N/A ☐**
- Event counters are non-resettable and have a capacity of at least 000 to 999. **Yes ☐ No ☐ N/A ☐**
- Event counters increment appropriately. **Yes ☐ No ☐ N/A ☐**

- The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power. **Yes ☐ No ☐ N/A ☐**
- Accessing the audit trail information for review shall be separate from the calibration mode. **Yes ☐ No ☐ N/A ☐**
- Accessing the audit trail information must not affect the normal operation of the device. **Yes ☐ No ☐ N/A ☐**
- Accessing the audit trail information shall not require removal of any additional parts other than normal requirements to inspect the integrity of a physical security seal. (e.g., a key to open a locked panel may be required). **Yes ☐ No ☐ N/A ☐**

Category 2 Devices (Devices with Remote Configuration Capability but Controlled by Hardware):

- The physical hardware enabling access for remote communication must be on-site. **Yes ☐ No ☐ N/A ☐**
- The physical hardware must be sealable with a security seal or **Yes ☐ No ☐ N/A ☐**
- The device must be equipped with at least two event counters: one for calibration, the second for configuration parameters
  - calibration parameters event counter
  - configuration parameters event counter

  Yes ☐ No ☐ N/A ☐
- Adequate provision must be made to apply a physical seal without exposing electronics. **Yes ☐ No ☐ N/A ☐**
- Event counters are non-resettable and have a capacity of at least 000 to 999. **Yes ☐ No ☐ N/A ☐**
- Event counters increment appropriately. **Yes ☐ No ☐ N/A ☐**
- Event counters may be located either:
  - at the individual measuring device or
  - at the system controller

  Yes ☐ No ☐ N/A ☐
- If the counters are located at the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device. **Yes ☐ No ☐ N/A ☐**
- An adequate number (see table below) of event counters must be available to monitor the calibration and configuration parameters of each individual device. **Yes ☐ No ☐ N/A ☐**
- The device must either:
  -clearly indicate when it is in the remote configuration mode or
  -the device shall not operate while in the remote configuration mode.

  Yes ☐ No ☐ N/A ☐
- If capable of printing in the calibration mode, it must print a message that it is in the calibration mode. **Yes ☐ No ☐ N/A ☐**
- The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power. **Yes ☐ No ☐ N/A ☐**
- The audit trail information must be readily accessible and easily read. **Yes ☐ No ☐ N/A ☐**

Minimum Number of Counters Required		
	Minimum Counters Required for Devices Equipped with Event Counters	**Minimum Event Counter(s) at System Controller**
Only one type of parameter accessible (calibration or configuration)	One (1) event counter	One (1) event counter for each separately controlled device, or one (1) event counter, if changes are made simultaneously.

Minimum Number of Counters Required		
	Minimum Counters Required for Devices Equipped with Event Counters	**Minimum Event Counter(s) at System Controller**
Both calibration and configuration parameters accessible	Two (2) event counters	Two (2) event counters for each separately controlled device, or two (2) or more event counters if changes are made to all controlled devices simultaneously.

Category 3 Devices (Devices with Unlimited Remote Configuration Capability):

Category 3 devices have virtually unlimited access to sealable parameters or access is controlled though a password.

- For devices manufactured after January 1, 2001, the device must either: **Yes ☐ No ☐ N/A ☐**
  - Clearly indicate when it is in the remote configuration mode, or
  - The device shall not operate while in the remote configuration mode
- The device is equipped with an event logger **Yes ☐ No ☐ N/A ☐**
- The event logger automatically retains the identification of the parameter changed, the date and time of the change, and the new value of the parameter. **Yes ☐ No ☐ N/A ☐**
- Event counters are nonresettable and have a capacity of at least 000 to 999. **Yes ☐ No ☐ N/A ☐**
- The system is designed to attach a printer, which can print the contents of the audit trail. **Yes ☐ No ☐ N/A ☐**
- The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power. **Yes ☐ No ☐ N/A ☐**
- The event logger must have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. **Yes ☐ No ☐ N/A ☐**
- The event logger drops the oldest event when the memory capacity is full and a new entry is saved. **Yes ☐ No ☐ N/A ☐**
- Describe the method used to seal the device or access the audit trail information.

_____

_____

Code Reference: G-UR.1.1. Suitability of Equipment

A device must be properly designed and have sufficient capacity to be suitable to use in a particular application. A device must measure the appropriate characteristics of a commodity to accurately determine the quantity, have the necessary components (e.g. vapor eliminator) to eliminate factors that may cause measurement errors during normal use, have sufficient capacity to indicate the quantity measured and the associated total price if it is a computing device. The meter must have the proper flow rate capacity to operate over the actual flow rates for the application, and the device must have a quantity division appropriate for the application. Some specific requirements for device characteristics are given in the specific codes for particular devices.

2.24. The equipment is suitable for its intended application. **Yes ☐ No ☐ N/A ☐**

2.25. Equipment shall be suitable for use in the environment in which it will be used. Suitability with respect to environment includes the effects of wind, weather, temperature variations, and radio frequency interference. A device must work and remain accurate under its actual conditions of use. **Yes ☐ No ☐ N/A ☐**

2.26. **Simulator tests: All tests shall have a minimum of 10,000 pulses applied to the device for each test. Test with a minimum of two API/Density settings.**

Product:		**Meter Factor:**	**K Factor:**	
1	Test at a temperature between 55 – 65 degrees F at the manufactures rated maximum frequency/pulse rate.	API Gravity: Temperature:		**Yes ☐ No ☐ N/A ☐**
2	Test at a temperature between 55 – 65 degrees F at manufactures rated minimum frequency/pulse rate.	API Gravity: Temperature:		**Yes ☐ No ☐ N/A ☐**
3	Test at a temperature below 35 degrees F at manufactures rated maximum frequency/pulse rate.	API Gravity: Temperature:		**Yes ☐ No ☐ N/A ☐**
4	Test at a temperature below 35 degrees F at manufactures rated minimum frequency/pulse rate.	API Gravity: Temperature:		**Yes ☐ No ☐ N/A ☐**
5	Test at a temperature above 100 degrees F at manufactures rated maximum frequency/pulse rate.	API Gravity: Temperature:		**Yes ☐ No ☐ N/A ☐**
6	Test at a temperature above 100 degrees F at manufactures rated minimum frequency/pulse rate.	API Gravity: Temperature:		**Yes ☐ No ☐ N/A ☐**
7	Test at a temperature between 55 – 65 degrees F at the manufactures rated maximum frequency/pulse rate.	API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
8	Test at a temperature between 55 – 65 degrees F at manufactures rated minimum frequency/pulse rate.	API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
9	Test at a temperature below 35 degrees F at manufactures rated maximum frequency/pulse rate.	API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
10	Test at a temperature below 35 degrees F at manufactures rated minimum frequency/pulse rate.	API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
11	Test at a temperature above 100 degrees F at manufactures rated maximum frequency/pulse rate.	API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
12	Test at a temperature above 100 degrees F at manufactures rated minimum frequency/pulse rate.	API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
13		API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**
14		API Gravity/Density: Temperature:		**Yes ☐ No ☐ N/A ☐**

Appendix F

Proposed Criteria for Electronic Linearization

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August 27, 2009

Mrs. Tina Butcher
NIST, Weights & Measures Div
100 Bureau Drive, MS 2600
Gaithersburg, MD 20899

Subject: Agenda Item

I used the Canadian Document VO-AP-037, Version 00.02 on Linearization Functions Incorporated in Measuring Instruments as the basis for this item. I did not find any copyright so I hope this is legal. If not, please delete.

I added a paragraph to the Scope. This paragraph would bring electronic output PD meters, turbine meters, etc that do not have a shaft output on equal requirements as other meters that currently incorporate electronics in the measuring device.

1.2 Scope

This procedure applies to pulse processing electronic devices incorporating the linearization of the pulse per unit volume versus pulse frequency. This includes all flow computers, electronic registers, correction devices and supporting software external to the measuring device. The tests verify the proper functioning and accuracy of the linearization schemes.

For pulse processing electronic devices incorporating the linearization of the pulse per unit that is within the measuring device, the results of the device accuracy and endurance tests will verify the complete measuring device capabilities. The linearization electronics of the measuring device must be protected from tampering and fraud utilizing a physical seal. No separate tests on parts of the measuring device are required.

2.1 Equipment Requirements

This needs to be reviewed by the electronic group. When we tested our linearization board in Canada, we had problems because their Duel Channel Pulser off position of the pulse did not go close enough to zero volts. We furnished them a duel channel pulser that goes down to within 0.2 volts in the off part of the pulse and then their counters worked fine.

2.5.1 and 2.5.3

The word "devices" should be "EUT"

2.6.2.1 and 2.6.2.3

Do not limit "meter Factors" to 4 or 5 points. See revised 2.6.2.5 as a method to test all points the device is capable of.

2.6.2.5

Delete Runs #2 through #5 and replace with:

2. Select frequencies that results in flow rates that lie between each pair of points programmed in 2.6.2.3. Test at each frequency.

Change Run number 6 to number 3.

One other area that I would support a change is the limit of 3 to 5 factors. The regulation should be written to cover any number of factors.



Maurice Forkert
Compliance and
Design Engineer

Measurement Canada / Mesurer Canada	Approval and Calibration Services Laboratory Technical Manual

APPROVAL PROCEDURE

FOR

LINEARIZATION FUNCTIONS INCORPORATED IN MEASURING INSTRUMENTS

DOCUMENT NUMBER
VO-AP-037

VERSION: 00.02

Filename: VO-AP-037-V00.02 - Linearization functions in Measuring Instruments.wpd

Document Title: LINEARIZATION FUNCTIONS INCORPORATED IN MEASURING INSTRUMENTS Document number: VO-AP-037	Version No.: 00.02	Page 3 of 19

RECORD OF CHANGE

Version	Date	Description
00.01	2005.11.30	Original Release
00.02	2005.12.08	Correct errors, make small improvements to document Add section for Step type linearization scheme.

Document Title: LINEARIZATION FUNCTIONS INCORPORATED IN MEASURING INSTRUMENTS Document number: VO-AP-037	Version No.: 00.02	Page 4 of 19

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Document Title: LINEARIZATION FUNCTIONS INCORPORATED IN MEASURING INSTRUMENTS Document number: VO-AP-037	Version No.: 00.02	Page 5 of 19

1.0 INTRODUCTION

1.1 Purpose

This approval procedure (AP) describes the process to evaluate the linearization functions incorporated in electronic measuring devices in order to determine compliance with applicable requirements, as provided in the *Weights and Measures Act and Regulations.*

1.2 Scope

This procedure applies to pulse processing electronic devices incorporating the linearization of the pulse per unit volume factor versus pulse frequency. This includes all flow computers, electronic registers, correction devices and supporting software external to the device. The tests verify the proper functioning and accuracy of the linearization schemes .

SEE ADDED PARAGRAPH

1.3 Applicable Documents

Document Number	Document Title
	Weights and Measures Act and Regulations Sections SVM-1
GN-LP-003	Vocabulary of Technical and Metrological Terms

1.4 Abbreviations and Symbols

N/A	

2.0 PROCEDURE

2.1 Equipment Requirements

2.1.1 Standards

Standard Number	Description / Performance Requirements
N/A	

2.1.2 Other Equipment

Equipment Description	Performance Requirements
Pulse Generator	The maximum frequency must be greater than the maximum input frequency of the electronic device under test. Variable output voltage of 5V with a frequency output of ±0.1% or better.
Universal Counter	The maximum frequency must be greater than the maximum rated input frequency of the electronic device under test.
Dual Channel Pulser	Dual channel, variable phase shift (0°, 90°, 120°, 180°), variable output voltage (5V, 12V, 24V)

2.2 Software Requirements

Software Name	Description / Performance Requirements
Microsoft Excel ASL_Linearization.xls	Accepts 4 or 5 values for the meter factor (MF) or the K factor versus flow rates, as provided by the manufacturer. During test runs, the correct factor is calculated by interpolating in between flow rates and used to measure the device's accuracy.

2.3 Environmental Requirements

Temperature	N/A
Humidity	N/A
Pressure	N/A

2.4 Safety Requirements

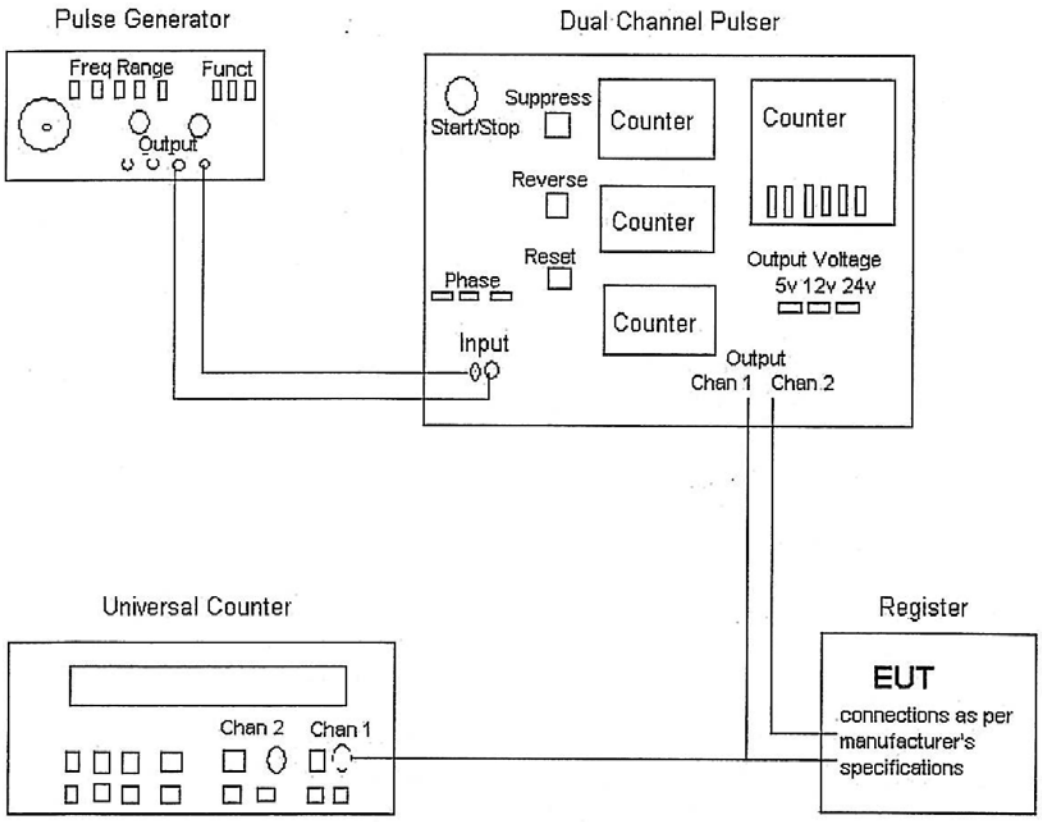
Kindly refer to the applicable Measurement Canada Health and Safety documentation.

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2.5 Set-up

Kindly refer to the block diagram below for details of equipment setup and connections.

Linearization test Set-up



2.5.1 Connect the Output of the Pulse Generator to the Input of the Dual Channel Pulser, making sure to connect the positive terminals together and the negative (ground) terminals together. Select a "square wave" function and a frequency in between the maximum and minimum range of the device. ? EUT

2.5.2 On the Dual Channel Pulser select the appropriate phase shift (90°, 120° or 180°) and voltage output for the device (5V, 12V or 24V). Connect the Output of Channel 1 of the Pulser to both the Input Channel 1 of the Universal Counter and to the Input of the device as specified by the manufacturer. EUT

2.5.3 Connect the Output of Channel 2 of the Dual Channel Pulser to the Input of the device, as specified by the manufacturer. EUT

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2.6 Instructions

2.6.1 Familiarize yourself with the device's measurement adjustment scheme. Applying codes supplied by the manufacturer, program various meter factors or K factors to determine functionality of the adjustment feature. Use Appendix A, section 3.1 to determine the type of linearization applied and to verify that the adjustment complies with established regulations.

2.6.2 Devices using step type linearization scheme

2.6.2.1 In a step type adjustment scheme, a single correction factor is applied over each specific range of flow rates. For this simple and common approach, the correction factors (up to 5) and the corresponding range of flow rates are programmed to the device, as specified by the manufacturer. The calculated corrected meter factor (MF) or corrected K factor remains constant over the specified range of flow rates and only steps to a new value when the flow rate lies within a different range.

2.6.2.2 Determine the minimum and maximum input frequencies, and the maximum flow rate (Q_{max}) for the device under test. These values are required to establish test points across the full operating range of the linearization feature.

2.6.2.3 Confirm the number of meter factors allowed, as specified by the manufacturer (usually 4 or 5). Divide the maximum flow rate by the number of meter factors permitted and program the values below into the device. Take care to program the values in ascending order of flow rates, starting from the minimum value, unless otherwise specified by the manufacturer.

Note: Depending on the design of the device either the error factors, the meter factors or the K factors may be specified and programmed. Select the appropriate column from the tables below to program the device accordingly.

a) If 4 meter factors are permitted:

Test points	(% Qmax) (%)	Error factor (%)	Meter factor	K factor (Pulses/L)
1	25	0.05	0.99950	0.99950 x Base K
2	50	0.24	0.99760	0.99760 x Base K
3	75	0.00	1.00000	1.00000 x Base K
4	100	-0.24	1.00240	1.00240 x Base K

b) If 5 meter factors are permitted:

Test points	(% Qmax) (%)	Error factor (%)	Meter factor	K factor (Pulses/L)
1	20	0.05	0.99950	0.99950 x Base K
2	40	0.24	0.99760	0.99760 x Base K
3	60	0.00	1.00000	1.00000 x Base K

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4	80	-0.24	1.00240	1.00240 x Base K
5	100	0.00	1.00000	1.00000 x Base K

2.6.2.4 The minimum number of pulses required to achieve an error resolution of 0.01% is 10,000. All test runs performed must include at least this number of pulses.

2.6.2.5 Using the test sheet in Appendix B, perform test runs on the device at the recommended flow rates below, ensuring to input at least the minimum number of pulses at each different rate. Select frequencies that will result in flow rates that fall in between the set points for the meter factors entered in section 2.6.2.3. As a minimum, run tests as follows:

Run	Comments
1	Select a frequency that results in a flow rate below the first point programmed in 2.6.2.3
2	Select a frequency that results in a flow rate that lies between the first and second points programmed in 2.6.2.3
3	Select a frequency that results in a flow rate that lies between the second and third points programmed in 2.6.2.3
4	Select a frequency that results in a flow rate that lies between the third and forth points programmed in 2.6.2.3 (if a minimum of 4 factors are used)
5	Select a frequency that results in a flow rate that lies between the forth and fifth points programmed in 2.6.2.3 (if a minimum of 5 factors are used)
6	Select a frequency that results in a flow rate that lies above the last point programmed in 2.6.2.3

2.6.3 Devices using linear interpolation linearization scheme

2.6.3.1 In this scheme, referred to as "linear interpolation" (sometimes also referred to as "point-to-point linearization"), separate and discreet straight lines of the form $Y = mX + b$ are drawn between adjacent predetermined calibration values. The"Y" values (either corrected meter factors (MF) or corrected K factors) are calculated relative to the pulse frequency rate "X". These values are used to correct the raw meter pulse signal and provide an estimate of the true value of flow.

2.6.3.2 Same as 2.6.2.2.

2.6.3.3 Same as 2.6.2.3.

2.6.3.4 Same as 2.6.2.4

2.6.3.5 Same as 2.6.2.5

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2.6.4 Devices using curve fitting of the form $Y = a + b(1/X) + cX + d(X^2) + e(X^3)$

2.6.4.1 The third method employs the reduction of calibration data, (meter factor or K factor "Y" vs flow rate "X"), using a preselected modelling equation. One model commonly chosen is a 4th order equation in the form of $Y = a + b(1/X) + c(X) + d(X^2) + e(X^3)$. The data manipulation is usually performed using software external to the flow computer or correction device, and results in a series of coefficients (a, b, c, d, e, etc.) and an estimate of the uncertainty of the curve fit. The equation coefficients are then programmed into the correction device or flow computer. The calculated corrections are then used by the flow computer or correction device to correct the "raw meter pulse signal" and provide an estimate of the true value of flow.

2.6.4.2 Assuming that the model is a 4th order equation, program the following coefficients into the correction device for evaluation purposes:

Coefficient	Value
a	6.5072493
b	-62.267514
c	-0.13650801
d	0.00085092719
e	-5.105311×10^{-7}

2.6.4.3 Using the test sheet in Appendix B, perform test runs on the device at the recommended flow rates below, ensuring to input at least the minimum number of pulses at each different rate. Select frequencies that will result in flow rates that span the full range of the device's capabilities.. As a minimum, run tests as follows:

Run	% Q_{max}	Comments
1	10	Select a frequency that results in a flow rate that lies between 0% and 20% of the maximum.
2	30	Select a frequency that results in a flow rate that lies between 20% and 40%. maximum.
3	50	Select a frequency that results in a flow rate that lies between 40% and 60% maximum.
4	70	Select a frequency that results in a flow rate that lies between 60% and 80% maximum.
5	90	Select a frequency that results in a flow rate that lies between 80% and 100% maximum.
6	110	Select a frequency that results in a flow rate that lies above 100% of the specified maximum.

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2.7 Calculations

2.7.1 Calculations of K factor or Meter Factor (MF) for a step type linearization method

2.7.1.1 To calculate the K factor or MF during test runs, record the flow rate. From the step graph of the K factor (Y) versus flow rate (X) programmed to the device, move along the X axis to the recorded flow rate. Read the corresponding K factor (Y value)

2.7.1.2 Sample calculation for step type linearization method

Assume that a device can accept 4 K factors that are programmed as per the table presented in section 2.6.2.3(a). Then for any flow rates in between 25% Q_{max} and 50% Q_{max} the K factor is 0.99950 x Base K factor. Also for any flow rates above 100% Qmax the K factor is 1.00240 x Base K factor.

2.7.2 Calculations of K factor or Meter Factor (MF) for the linear interpolation linearization method

2.7.2.1 With this type of linearization scheme, the error factors are calculated by interpolating in between two set data points. To calculate the K factor or MF during test runs, record the flow rate. From the linear graph of the K factor (Y) versus flow rate (X) programmed to the device, move along the X axis to the recorded flow rate. Read the corresponding K factor (Y value), which can be calculated as follows:

$$Y = Y_1 + \frac{(X - X_1)}{(X_2 - X_1)} \times (Y_2 - Y_1)$$

where Y_2 = K factor of next highest set point
X_2 = Flow rate of next highest set point
Y_1 = K factor of next lowest set point
X_1 = Flow rate of next lowest set point
Y = K factor to be calculated
X = Flow rate of current test

2.7.2.2 Sample calculation for linear interpolation type linearization method

Assume that a device can accept 5 MFs that are programmed as per the table presented in section 2.6.2.3(b). Then for a flow rate of 30% Q_{max} the MF is 0.99855, calculated as follows:

$$Y = 0.9995 + \frac{(30 - 20)}{(40 - 20)} \times (0.9976 - 0.9995) = 0.99855$$

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2.7.3 Calculations of K factor or Meter Factor (MF) for the curve fitting linearization method

2.7.3.1 With the curve fitting scheme, the error factors are calculated using coefficients for a polynomial specified by the manufacturer, usually of the form of $Y = a + b(1/X) + c(X) + d(X^2) + e(X^3)$. To calculate the K factor or MF during test runs, record the flow rate. From the polynomial graph of the K factor (Y) versus flow rate (X) programmed to the device, move along the X axis to the recorded flow rate. Read the corresponding K factor (Y value), which can also be calculated by substituting the flow rate (X value) into the specified curve.

2.7.3.2 Sample calculation for curve fitting type linearization method

If the coefficients in section 2.6.4.2 above are programmed into the device, then the expected theoretical values for the correction factor and the volume at the flow rates below are:

Test points	Flow rate (L/min)	Expected Meter factor	Expected K factor (Pulses/L)	Expected Volume (L)
1	20	1.00000	1.00000 x Base K	Pulse count ÷ (1.00000 x Base K)
2	50	0.50000	0.50000 x Base K	Pulse count ÷ (0.50000 x Base K)
3	90	0.05000	0.05000 x Base K	Pulse count ÷ (0.05000 x Base K)
4	130	1.54126	1.54126 x Base K	Pulse count ÷ (1.54126 x Base K)
5	180	6.18250	6.18250 x Base K	Pulse count ÷ (6.18250 x Base K)
6	110	13.64210	13.6421 x Base K	Pulse count ÷ (13.6421 x Base K)

Note: For other flow rates calculate the expected correction factor using the recommended coefficients in section 2.6.4.2.

2.7.4 Linearization Error Calculations

2.7.4.1 Regardless of the correction scheme used to determine a true volume, the linearization error is a function of the volume indicated by the device ($V_{indicated}$) and the expected theoretical volume ($V_{expected}$) calculated as follows.

$$\text{Linearization Error (\%)} = \frac{V_{indicated} - V_{expected}}{V_{expected}} \times 100$$

where

$$V_{expected} = \frac{\text{Pulse count}}{\text{Calculated Linearizing K factor}}$$ if the K factor is programmed

or

$$V_{expected} = \frac{\text{Pulse count x Calculated Linearizing Mf}}{\text{Base K factor}}$$ if Meter Factor is programmed

2.8 Pass/Fail Criteria

Description	Criteria	Reference	Pass–Fail
General Requirements	Kindly refer to Appendix 3.1 "General Requirements Checklist - Linearization function".	SVM-1	
Linearization Error	Must not exceed ±0.02%	???	

Note: The Linearization spreadsheet **ASL_Linearization.xls** is available to help interpolate meter factors and calculate the percentage errors automatically. Kindly use the spreadsheet in conjunction with the test sheet presented in Appendix B to assist you in the evaluation.

3.0 APPENDICES, WORK SHEETS AND TABLES

3.1 Appendix A: General Requirements Checklist - Linearization function

			Comments
1)	Linearization function characteristics: a) Type of function: G Step G Linear G Function Desc:_____ G Other Decs:_____ b) Number of programmable points:____ Resolution:_____ c) Adjustment variable: G K factor or G Meter factor d) Sampling frequency:_____		
2)	Is the means of adjustment used for processing pulses in order to vary measurement results sealable and located so as to be inaccessible without the removal of a portion of the exterior housing? SVM1-8	G N/A G NC G C	
3)	If the means of adjustment is accessible without the removal of the exterior housing, then:		
	a) Is the adjustment range less than ± 2% of the volume of liquid delivered? SVM1-9(a)	G N/A G NC G C	
	b) Is the adjustment range sealable? SVM1-9(b)	G N/A G NC G C	
	c) Is the means of adjustment adjustable while the device is operating? SVM1-9(c)	G N/A G NC G C	

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General Requirements Checklist - Linearization function (continued)

			Comments
4)	If the means of adjustment automatically selects a predetermined correction factor that corresponds to the flow rate in order to linearize the meter accuracy curve, then:		
a)	Is the adjustment range less than ± 0.25% between adjacent factors? SVM1-10(a)	G N/A G NC G C	
b)	Are the correction factors readily verifiable either by means of display or printing of the factors, or by other means? SVM1-10(b)	G N/A G NC G C	

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3.2 Appendix B

Linearization function test sheet

	A	B	C	D	E	F	G
Run	Pulses	Frequency (Pulses/Sec)	Expected Flow rate [(60 * B) / D] (L/min)	Expected K Factor [Interpolated] (Pulses/L)	Expected Volume [A / D] (L)	Indicated Volume [Device] (L)	% Error [((F-E) / E) * 100)] (%)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

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Operator: _____ **Device:** _____

Appendix G

National Conference on Weights and Measures / National Type Evaluation Program

Measuring Sector Final Attendee List

October 2-3, 2009 / Clearwater Beach, Florida

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National Conference on Weights and Measures / National Type Evaluation Program

Measuring Sector Final Attendee List

October 2-3, 2009 / Clearwater Beach, Florida

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Appendix C

National Type Evaluation Technical Committee
Weighing Sector

August 25-27, 2009, Columbus, Ohio
Meeting Summary

Load Cell Items **C2**

1. Load Cell Creep Recovery C2
   - 1 (a). Load Cell Creep Recovery (Recommended Changes to Publication 14 Based on Actions at the 2009 NCWM Annual Meeting) C2
   - 1 (b). Load Cell Creep Recovery (Editorial Suggestions) C3

Carry-over Items: **C3**

2. Recommended Changes to Publication 14 Based on Actions at the 2009 NCWM Annual Meeting C3
3. In-Motion Railway Track Scales - Definition. C3
4. Pub 14 Technical Policy - Hopper Scale Design Parameters C4
5. Pub 14 Section 69. - Railway Track Scales C5
6. Correction to Scale Tickets C6
7. Update - Minimum Size of Weight and Units Proposals C7
8. Update - Automatic Zero-Setting Proposal C8
9. Update - New and Amended HB 44 Tare Proposals C10

New Items: **C11**

10. Pub 14 - Maximum Platform Width Parameter Sections 8.1., 8.2., and 8.3. ..... C11
11. Pub 14 - Minimum Platform Area (Section Lengths) Parameter Sections 8.1., 8.2., and 8.3 ..... C13
12. Auxiliary Reading Means when $e \neq d$. C13
13. Method of Sealing – G-S.8. Provisions for Sealing Adjustable Components C16
14. Publication 14 – Editorial Suggestions C17
    - 14 (a). Publication 14 DES Section 58. ..... C17
    - 14 (b). Publication 14 DES Section 40. ..... C17
    - 14 (c). Publication 14 DES Section 43. ..... C17
    - 14 (d). Publication 14 DES Section 15.1. ..... C17
    - 14 (e). Publication 14 FT Table 1. ..... C17
    - 14 (f). Publication 14 FT Section I-10. ..... C17
15. Delete DES Section 66 (c). C17
16. Creep Recovery for Complete Scales. C18

Next Sector Meeting: **C20**

Appendix A - Recommendations for Amendments to Publication 14 ..... C21
- Agenda Item 1.(a). C21
- Agenda Item 1.(b) C21
- Agenda Item 4. ..... C22
- Agenda Item 5. ..... C23
- Agenda Item 6. ..... C27
- Agenda Item 9. ..... C28
- Agenda Item 10. ..... C28
- Agenda Item 11. ..... C28
- Agenda Item 14 (a). C28
- Agenda Item 14 (b) C29
- Agenda Item 14 (d) C29
- Agenda Item 14 (e). C30

Agenda Item 14 (f). C30
Appendix B - 2009 NTETC Weighing Sector Attendees (to be included in the Sector report) C31

Glossary of Acronyms			
AWS	Automatic Weighing Systems	NTETC	National Type Evaluation Technical Committee
CC	NTEP Certificate of Conformance	OIML	International Organization of Legal Metrology
CIM	Coupled-in-Motion (Railway Track Scales)	S&T	NCWM Specifications and Tolerances Committee
CLC	Concentrated Load Capacity	SWMA	Southern Weights and Measures Association
EPO	Examination Procedure Outline	W/LRE	Weighing/Load-receiving Element
GIPSA	Grain Inspection Packers and Stockyards Administration	WG	Work Group
NCWM	National Conference on Weights and Measures	WMD	NIST Weights and Measures Division
NIST	National Institute of Standards and Technology	WWMA	Western Weights and Measures Association
NTEP	National Type Evaluation Program	WS	NTETC Weighing Sector
Unless Otherwise Stated: - "Handbook 44" (HB 44) means the 2009 Edition of NIST Handbook 44, "Specifications Tolerances, and Other Technical Requirements for Weighing and Measuring Devices." - "Handbook 130" (HB 130) means the 2009 Edition of NIST Handbook 130, "Uniform Laws and Regulations in the areas of legal metrology and fuel quality." - "Publication 14" (Pub. 14) means the 2009 Edition of NCWM Publication 14 - Weighing Devices - Technical Policy - Checklists - Test Procedures.			
Note: NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.			

Load Cell Items

1. Load Cell Creep Recovery

1 (a). Load Cell Creep Recovery (Recommended Changes to Publication 14 Based on Actions at the 2009 NCWM Annual Meeting)

Source: Mr. Steve Cook, NIST Technical Advisor

Background: See the Final Report of the 2009 NCWM S&T Committee (Agenda Item 320-2 for additional background information to amend HB 44 Scales Code paragraph T.N.4.6. Time Dependence (Creep) for Load Cells during Type Evaluation. During the 2009 Annual Meeting, the S&T Committee adopted a proposal to amend HB 44 Scales Code paragraph T.N.4.7. to relax creep recovery tolerances on Class III load cells with more the 4000 division (n_{max} > 4000).

At the 2009 Annual Meeting of the NTETC-WS, the NIST Technical Advisor recommended amendments to Publication 14 – Force Transducers Section: FT Section II-9 as follows for consideration by the WS.

Discussion/Conclusion: The WS reviewed the language adopted by the NCWM and agreed with the NIST Technical Advisor recommendation to amend Publication 14 FT Section 9. This recommendation can be found in Appendix A, Agenda Item 1.(a).

1 (b). Load Cell Creep Recovery (Editorial Suggestions)

Source: Mr. Stephen Patoray, Consultants on Certification

Background: Mr. Patoray noted that the subject of Creep Recovery in Section 12 was inadvertently omitted in previous editions of Publication 14 and proposed a recommendation to amend Publication 14 – Force Transducers Section: FT Section M-12 – Summary Table and Table 6.

Discussion/Conclusion: The WS reviewed and agreed with the recommendation to amend Publication 14 FT Section 12 and Table 6. The WS added additional language to the proposed subsection 12 (f) to include the reference to the times specified for the initial reading in FT Table 5. This recommendation can be found in Appendix A, Agenda Item 1.(b).

Carry-over Items:

2. Recommended Changes to Publication 14 Based on Actions at the 2009 NCWM Annual Meeting

Source: The NIST Technical Advisor, Steve Cook, has provided the Sector with specific recommendations for incorporating test procedures and checklist language based upon actions of the 2009 Annual Meeting of the 94th NCWM. The Sector was asked to briefly discuss each item and, if appropriate, provide general input on the technical aspects of the issues.

Background: See the Final Report of the 2009 NCWM S&T Committee Agenda Item 310-4 for the adopted language and additional background information on the item to amend HB 44 General Code paragraph G-N.3. Verification of Testing Standards. The NCWM agreed to add a new test note and add General Code paragraph G-N.3. and deleted similar language in the 2.2X series of weighing device codes.

Discussion/Conclusion: The WS reviewed the language adopted by the NCWM and agreed with the NIST Technical Advisor recommendation that no further action by the Sector is required since the new paragraph is nearly identical to the 2009 Scales Code paragraph N.2. Verification of Standards, which has not been referenced in NCWM Publication 14.

3. In-Motion Railway Track Scales - Definition.

Source: 2008 NTETC Weighing Sector Meeting Summary – Agenda Item 3

Background: During the 2003 discussion of Agenda Item 3 – the WS reviewed the following proposed definitions for "in-motion weighing device."

1. In-motion weighing device: A complete weighing system, separable indicating element, or controller that follows a predetermined program of automatic processes for objects while in motion without the intervention of an operator on the load-receptor of a complete weighing device or separable weighing/load-receiving element. (*Source: OIML R51 for automatic weighing instruments*)

2. In-motion weighing device: An instrument capable of weighing objects in motion without the intervention of an operator and follow a predetermined program of automatic process characteristics of the instrument. The instrument can be a complete weighing system, a separable controller or a separable weighing/load-receiving element. (*Source: Mettler/Toledo*)

The WS recommended that the versions be presented to the representative of the railroad weighing industry attending the fall meeting of AREMA Committee 34 and the SMA and that this item be placed on the WS's 2009 agenda.

During its Fall 2008 meeting, some members of AREMA Committee 34 reviewed the proposed definitions for Publication 14 and stated no preference for either recommendation. This item was also discussed by the SMA at their fall 2008 meeting where Mr. Darrell Flocken reported on discussions at the NTETC Weighing Sector meeting and that feedback on the In-Motion Railway Track Scales item is being requested. Any suggestions and comments were to be submitted to Mr. Flocken or Mr. Steve Cook by August 2009.

Discussion: The NIST Technical Advisor asked the WS to review the two proposed definitions in the background information from the 2008 NTETC Weighing Sector Summary and recommend which version should be added to Publication 14 DES Section 68.

The WS discussed the word "object" in the proposed language and was concerned that it would include all types of in-motion devices. This item started out for railway track scales and weighing modules that weigh in-motion, where the weighing modules were evaluated statically and if the modules could be used in dynamic weighing applications. Mr. Steve Beitzel of Systems Associates and Chairman of AREMA Committee 34, proposed amending the Mettler-Toledo language to limit the scope of the definition to railcars and delete the added language that described the characteristics of a controller. A couple of the members of the WS asked if the definition is still needed and questioned whether the definition will add value if it is added to Publication 14. The WS agreed that there is little added benefit to add the definition.

Discussion/Conclusion: The Sector concluded that the definition is not required as it adds no benefit to NCWM Publication 14 - DES Section 68.

4. Pub 14 Technical Policy - Hopper Scale Design Parameters

Source: 2008 WS Agenda Item 7

- 2008 WS Summary - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/13-NTEP-AppC-Pub16-FINAL.doc

Background: See the 2008 NTETC Weighing Sector Meeting Summary Agenda Item 7 for additional background information. During the 2008 WS meeting, the NTEP Director reported that there has been little agreement on what constitutes a different type, or what can be considered as a variation of the design, and how many certificates are required. The WS recommended that this item be carried over for the 2009 NTEP lab and NTETC WS meetings to allow for additional work and development of a proposal. The NIST Technical Advisor stated that the NTEP labs did not discuss this item at its 2009 Spring Meeting.

Discussion: The WS reviewed the background information from the 2007 and 2008 WS summaries. The WS also discussed the following issues regarding the existing technical policy in Publication 14 DES Section A.6.1 and A.6.2:

1. What are the allowable variations in the number of load supports for cylindrical and rectangular hopper/tank scales?
2. What are the allowable variations in the design and location of the load supports (hanging, compression, load supports attached to the upper, mid, or lower portion of the hopper or tank)?
3. Should volume of the tank be considered as a parameter along with capacity?
4. Depending on the answers to the above questions, can different "types" be included on one CC?

Mr. Flocken, Mettler-Toledo and Sector Chairman, discussed the history of this item, and asked what parameters define the type. Mr. Patoray, Consultants on Certifications, added that Publication 14 lists the types that had to be tested, but does not include all that could go on a CC. The WS continued to discuss the various parameters and topics including:

Parameter/Topics	Comment
Number of hopper/tank supports.	- If 3 are adequate, then more should be allowed.
Number of load cell.	- If 3 are adequate, then more should be allowed. - Maximum number limited by v_{min}.
Location of hopper/tank supports.	- Supported from the top of tank. - Supports located between top and bottom of tank. - Supported from bottom of tank. - Supported on corners of a weighbridge.
Variations in the shapes of the hopper/tanks.	- Cylindrical. - Square. - Rectangular. - Combination of above.
Past allowed variations in the dimensions of lever systems.	- Some pre-NTEP CCs were issued for a large range of capacities and dimensions based on state approvals and past performance.
Structural integrity of the tank/hopper.	- Deflection of tank/hopper may have impact on the way the load is applied to the load cells. - However, this could be deducted in the proper application and amount of test load.
Application of test weights.	- Safety issue. - Could also cause unwanted deflection in the hopper/tank that is not representative of deflection during normal weighing.
Uncertainty in test methods.	- Excessive number on drafts during a strain test increases uncertainty beyond ⅓ acceptance tolerance.
Include material tests (for automatic systems).	- Has merit since it better simulates actual use with associate equipment (e.g., dust suppression, gates, etc.). - Study may be needed to discover if this is necessary, considering the cost involved with modifying conveyor systems to pre- or post-weigh material.

Mr. Todd Lucas, Ohio NTEP Lab, suggested that a WG be assembled to address the above items. A vote was taken to determine if the WS should establish a hopper scale WG. The result of the vote indicated that there was little support to establish the WG (2 in favor and 6 opposed).

However, the WS did agree that additional guidance is needed in Publication 14 technical policies that address the number of supports that can be allowed based on an evaluation. Several sector members stated that increasing the number of load supports beyond what was tested during type evaluations would strengthen the support structure. Conversely, decreasing the number of supports may weaken the design of the support structure and that additional testing should be required to amend a hopper scale CC to include "type" variations with fewer supports. Mr. Patoray recommended that changes should be allowed retroactively to amend existing active CCs since there are no proposed changes to the current type evaluation test procedures.

Conclusion: The WS agreed to recommend changes to Publication 14 DES Section B.6 (Certificate of Conformance Parameters) for hopper scales by adding "a CC shall apply to all models having number of load supports equal to or greater than the number of supports in the device submitted for evaluation." This recommendation can be found in Appendix A - Agenda Item 4.

The WS also agreed that existing active CCs can be amended to coincide with the proposed changes since there is no difference in test procedures based on the number of load supports. The WS added that other proposals to amend Publication 14 hopper scale technical policies based should be addressed by the WS as separate agenda items.

5. Pub 14 Section 69. - Railway Track Scales

Source: Weighing Sector Carryover Agenda Item 3 (2007) and Item 10 (2008)

- (2007) - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/11-NTEP-AppC-Weighing-08-Annual-FINAL.doc
- (2008) - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/13-NTEP-AppC-Pub16-FINAL.doc

Background: 2008 Weighing Sector Carryover Item 10.

During the 2007 meeting of the Weighing Sector, the WS agreed there is a loophole in the existing policies for RR track scales with a capacity greater than 200 000 lb. The SMA and AREMA Committee 34 volunteered to work on the testing requirements for vehicle and railway track scales with capacities greater than 200 000 lb and provide to the NTEP Director and NIST Technical Advisor an update on developing a proposal for consideration by the Weighing Sector prior to the 2008 NCWM Interim Meeting.

AREMA Committee 34 Adhoc Subcommittee submitted proposed changes to Publication 69. However, the SMA was not able to address this item during their November meeting and therefore this item will be carried over to the 2008 meeting of the Weighing Sector.

At its September 2008 meeting, the WS recommended that this item be carried over until the 2009 meeting of the Sector to await final approval by AREMA Committee 34.

At its October 2008 meeting, the Chairman of Committee 34 stated that Committee 34 could not further develop this item without specific input from the Weighing Sector. Permission to reprint sections of the 2009 AAR Handbook was granted to NTEP.

Recommendation/Conclusion: The language appears to be acceptable to AREMA Committee 34 and has not yet been reviewed by the SMA. The WS reviewed the testing requirements proposed by AREMA Committee 34 and recommends adding the proposed language as amended by the WS.

This recommendation can be found in Appendix A - Agenda Item 5.

6. Correction to Scale Tickets

Source*:* 2008 WS Item 12 - Maryland NTEP Lab

- 2008 WS Summary - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/13-NTEP-AppC-Pub16-FINAL.doc

Background: This item was provided as an update to the 2008 Weighing Sector Carryover Item 12.

At its 2008 NTEP Participating Laboratory meeting, the NTEP labs discussed a proposal from the Maryland NTEP lab to amend Section 35., which is for weigh-in/weigh-out applications.

The proposal recommended amending DES Section 35. to specify the requirements for devices that print scale tickets with corrected weight information. Several of the labs believed that the subject may be more appropriate for Section 13. Recorded Representations and limited to indirect sale applications.

The WS reviewed the item that was submitted to the NTEP labs. There were concerns that the proposal is intended to address the application described in Scales Code UR.3.9. However, other members of the WS supported the intent for weigh-in/weigh-out vehicle scales applications. The WS agreed that clarification of erroneous tickets is needed; however it could not come to a conclusion since the WS did not have a developed recommendation to review. There were also discussions about the appropriate location for the requirements. For example, Section 35. applied to weigh-in/weigh-out applications where the publication states that manual weight entries are not permitted. The WS recommended that a specific recommendation be developed for this item and carried over until the 2009 meeting of the Weighing Sector. At its 2009 Spring Meeting, the NTEP labs did not discuss this item.

Discussion: The NIST Technical Advisor reported that he has not received an update on the development of this item. WS Chairman, Mr. Flocken provided additional background information.

Mr. Ken Jones, California NTEP Lab, stated that the traditional method of correcting tickets in California is typically handled outside the weighing system by the CA Weighmaster Laws and Regulations. The first ticket is: 1) voided by handwriting or printing "VOID" across the ticket; 2) retained for auditing purposes; and 3) a second ticket is manually created with the words "corrected ticket" with a note referencing the original voided ticket.

Mr. Patoray stated that entering manual weights to correct erroneous tickets in the normal weighing mode of operations is impractical for many truck scale (direct sales to the customer) applications since manual weights can only be entered with the scale at zero according to DES Section 17.2. He added that the user is no longer conducting a weigh-in/weigh-out transaction to correct a weigh-in/weigh-out ticket and that corrected tickets may be generated in a different mode of operation.

Mr. Bill Fishman, New York NTEP Lab, expressed his concern that some systems simply use a different program to issue a corrected ticket and the potential for fraud. Mr. Jim Truex responded that Scales Code paragraph "UR.3.9. Use of Manual Weight Entries" still applies to the user and suggested that it may be appropriate to add language to DES section "35. Weigh-In/Weigh-Out Systems" using language from DES section 36.9.7 ("Manual gross weight entries are permitted to correct tickets issued in error provided the following conditions are met:"). Other WS members suggested that a reference to DES Section 17 Manual Weight Entries be added to DES Section.

Conclusion: The WS agreed that a footnote should be added to DES Section 35, referring to DES Section 17 Manual Weight Entries. This recommendation can be found in Appendix A, Agenda Item 6.

7. Update - Minimum Size of Weight and Units Proposals

Source: 2008 Weighing Sector Item 6

- 2009 S&T Committee Interim Report - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/11-ST-09-Pub16-FINAL.doc
- 2008 WS Summary - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/13-NTEP-AppC-Pub16-FINAL.doc

Background: See the 2009 NCWM Specifications and Tolerance Committee Annual Report Developing Item Part 2, Item 1 "S.1.4.6. Height., Definition of Minimum Reading Distance, UR.2.10. Primary Indicating Elements Provided by the User and Definition of Primary Indications," and the 2006 Weighing Sector Summary Item 6 for additional background information.

At its 2008 meeting, the Weighing Sector voted on whether to forward the 2008 NTEP labs' proposal to the S&T Committee. Seven members voted in favor and nine members voted against forwarding the NTEP lab alternate proposal to the S&T Committee. The results of the vote indicated that there is no consensus between the NTEP labs and device manufacturers. The Sector also recommended that the discussion and conclusion be forwarded to the WWMA and NCWM S&T Committees. The Technical Advisor reported that the regional weights and measures associations recommended that this item be withdrawn from the S&T Committee's Developing agenda based on the comments from the 2008 Weighing Sector and the SMA.

Discussion/Conclusion: Mr. Fishman believes that the problem still exists and that evaluators will have to make their best judgment. Mr. Flocken reminded the WS that the OIML R 76 9.5 mm requirement applies to both buyer and seller displays for scales up to 100 kg and that the main objection to the proposal was the requirement that it applies to all applicable devices manufactured after the effective date and that changing production would be cost prohibitive to amend NTEP and other approvals (e.g., FCC, UL, etc.).

The WS believes that no progress can be made on this item and this item be withdrawn from the WS agenda.

8. Update - Automatic Zero-Setting Proposal

Source: 2008 WS Agenda Item 17.

- 2008 WS Summary - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/13-NTEP-AppC-Pub16-FINAL.doc

Background: This item is provided as an update to the 2008 Weighing Sector Carryover Item 17.

During its 2008 meeting, WS discussed the comments that an increasing number of scales submitted for NTEP evaluations include an automatic zero-setting feature, which is not addressed in HB 44. It has been noted that many devices are built for a global marketplace and that the operation of this automatic zero-setting device may be functional on the device when installed in the United States. Currently, HB 44 does not define this function. NCWM Pub 14 has no test to determine if the device submitted for evaluation has such a function, or if it is sealable. The automatic zero-setting mechanism on a scanner/scale submitted to NTEP could be enabled and disabled by means of a bar code read by the scanner.

In the past, several of the NTEP labs, when asked about this feature, have indicated that since it does not meet the definition of automatic zero-tracking mechanism, it is not allowed. Additionally, the WS agreed that HB 44 does not clearly state that this function is not allowed, which may lead to inconsistent interpretations of Section 2.20. Scales paragraphs S.1.1.(c) (Zero Indication – ". . . return to a continuous zero indication") and S.1.1.1.(b) (Digital Indicating Elements – *"a device shall either automatically maintain a "center-of-zero" condition. . . ."* could be interpreted to allow the automatic zero-setting device as described in OIML R 76. That may not be a universal interpretation.

In 2008, the WS concluded that:

1. There is a problem that needs to be solved, based on the current information or lack of information in HB 44.
2. There are no technical reasons why the automatic zero-setting feature, as described in OIML R 76, should not be included in NIST Handbook 44.
3. The feature may not be suitable for all applications (e.g., balancing off a stable partial load) if the feature can function with both positive and negative weight indications.
4. Language will need to be developed for NCWM Publication 14 to either test for the correct function of automatic zero-setting or test to determine that the device does not have automatic zero-setting and it is a sealable parameter.

The WS established a small work group (Mr. Scott Davidson, Mr. Scott Henry, Mr. Steve Cook, and Mr. Patoray) to develop a proposal to be submitted to the NCWM S&T Committee and make a recommendation addressing the suitability of scales with the capability to automatically set a positive weight indication to zero. Additionally, the WS agreed to review the language developed by the work group to confirm its support of the proposed language. (Mr. Lucas and Mr. Truex also contributed to the discussions and subsequent proposal.)

The WG did not have sufficient time to both develop the proposal and ballot the WS prior to the November 1, 2008, cutoff date for submitting new items to the Committee. Therefore, the group agreed to submit the proposal to the Committee and ballot the WS members. The results of the ballot and all comments were summarized and forwarded to the Committee prior to the 2009 NCWM Interim Meeting. Eight WS members responded to the ballot of which six voted in favor of the proposed language. It should be noted that two of the affirmative votes stated that their vote was provisional provided the reference to the 4 % of scale capacity limitation is removed from the proposal. Two members opposed that item, stating that the language should not be rushed through the S&T Committee and that the feature should operate with either negative or positive weight indications.

The NIST technical advisor forwarded the ballot results and comments to the S&T Committee for its consideration at the 2009 NCWM Interim Meeting.

Discussion: The NIST Technical Advisor provided the WS with an update on the status and additional discussions on this item since the 2009 Interim Meeting, and can be reviewed in the 2009 NCWM Annual Report as S&T Committee Item 320-3. The NIST Technical Advisor suggested that the WS develop a consensus position on this item and forward its conclusion to the S&T Committee. The WS discussed the following possible positions to forward to the S&T Committee:

1. Allow feature to operate only when below zero with capacity limit (as shown in 2009 NCWM Annual Report Committee Recommendation).
2. Consider the Spring 2009 SMA position to allow the feature to operate in either direction with no capacity limit.
3. Consider HB 44 language to prohibit the feature.
4. No changes to HB 44.

The NIST Technical Advisor also developed language for Publication14 for additional development that:

1. Defines the feature.
2. Tests that could be used to detect the feature.
3. Procedures or actions if the feature is encountered (e.g., "feature shall be disabled for commercial applications and the switch that enables or disables the feature can not be changed without breaking a security seal or other means of providing security").
4. Amend Pub 14 by adding "automatic zero-setting mechanism" to the Table of Scale Features and Parameters as a sealable parameter.

Representatives from Measurement Canada stated that Canada allows the feature for direct sale and that it only automatically rezeros the scale when indicating negative gross weigh values. Mr. Flocken asked if the WS should consider making a recommendation to the S&T Committee to consider differences in operations for direct versus indirect sale applications. Mr. Nigel Mills and Mr. Paul Lewis supported the fourth option and added that existing Scales Code paragraph UR.4.1. Balance condition is sufficient. Mr. Richard Harshman stated his support for the third option.

Mr. Flocken commented that one justification for the feature citing actual examples where coupons are scanned and placed one at a time on a scanner/scale resulting in the individual coupons be zero off using the automatic zero-tracking feature. All the coupons would then be removed from the scale in one action placing a scale in a below zero condition beyond the zero-tracking range. Without the automatic zero-setting feature, the store will be giving away product until the operator takes deliberate action to rezero that scale. Mr. Henry from NCR was unable to attend the meeting. However, he did provide the following in an email that was presented to the WS supporting that the item with OIML language.

> August 5, 2009
>
> Hi All,
>
> Although I will not be able to attend the upcoming Weighing Sector Meeting, I would like to provide some input to the AZSM issue.
> As for bench counter scales I foresee problems allowing for Zeroing (outside of normal Zero Tracking Range) in the positive direction.
>
> Here is a prime example:
>
> Cashier leaves pen on scale top plate... (AZSM) scale zeros the weight of the pen... cashier places item to be weighed on scale top plate then realizes that the pen is on the top plate and removes the pen.... now the item will be short weighed.
>
> This is one of many examples, cashiers are always using the scale top plate as desk space (typically due to limited counter space).
>
> Items typically left on scale for an extended period of time include coupons, money, sales adds, PLU sheets, and even shelf items (either not wanted by customer or waiting to be bagged).

> Given the numerous chances that the POSITIVE side AZSM would have to zero unintentional items left on the scale would lead to numerous errors.
>
> NCR would like to use the AZSM as stated in OIML 4.5.6:
> Operate only when the equilibrium is stable and the indication has remained stable below zero for at least 5 seconds.
>
> If the positive direction of AZSM can be harmlessly used by other classes of scales then maybe the Weighing Sector can propose adding AZSM Negative only for Bench Counter Scales and in both directions for other classes of scales.
>
> Please keep me in the loop and Best Regards,
>
> Scott Henry
> Compliance Engineering (W&M)
> NCR Corporation
> phone:770-623-7543
> scott.henry@ncr.com | www.ncr.com

The NIST Technical Advisor suggested a compromise position to limit the feature to point-of-sale systems interfaced with scales.

Mr. Truex added that there are already devices that are tagged for this feature. Mr. Patoray believes that doing nothing according to the fourth option would but may present enforcement problems due to the inconsistent interpretations when citing HB 44 paragraph G-S.2. Facilitation of Fraud. He added that most scales are designed for the international marketplace with features that can be enabled or disabled. In this option, there is very little in HB 44 to guide field officials.

Mr. Flocken and Mr. Patoray stated the incident that prompted the issue before the WS. A field official was performing an inspection on a point-of-sale scanner/scale. A test weight was place and left undisturbed on the scale for 20 seconds when the inspector noticed that the scale automatically reset to rezeroed. Further investigation indicated that the weight display would automatically rezero with either positive or negative weight indication. Additionally, configuration of the feature could be changed by passing a specific barcode across the scanner portion of the scanner/scale without breaking a security seal or updating audit trail information. Additionally, this created competitive disadvantage to at least one other manufacturer that was told that the feature was not allowed.

Additional comments addressed properly trained operators, potential benefits or harm to the buyer and seller, minimum positive weight indications, negative net weight indication, and confusion regarding the differences between automatic zero-tracking and automatic zero-setting.

Conclusion: The Sector discussed this in great detail and reached a consensus among the attendees that this feature does not have any value and at times will facilitate inaccurate weight determinations either agains the buyer or seller. The NIST Technical Advisor will forward the sector discussions (above) to the S&T Committee.

9. Update - New and Amended HB 44 Tare Proposals

Source: 2008 WS Agenda Item 5.

Background: This item is provided as an update to the 2008 Weighing Sector Carryover Item 5.

See the 2009 Interim Report of the 2009 NCWM S&T Committee agenda Item 320-1 and the Final Summary for the 2008 Meeting of the Weighing Sector Agenda Item 5 for additional background information.

- 2009 Interim Report - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/11-ST-09-Pub16-FINAL.doc.
- 2008 WS Summary - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/13-NTEP-AppC-Pub16-FINAL.doc

Discussion: The NIST Technical Advisor provided the WS with following update on the status and additional discussions on this item since the 2009 Interim Meeting. This information can be found in the 2009 Annual Report of the 94th NCWM S&T Committee Final Report.

The NIST Technical Advisor also reported that the S&T Committee asked the WS for its position on the remaining informational agenda items for the Scales and Automatic Weighing Systems codes on Tare.

Mr. Steve Cook, NIST Technical Advisor, believes that much of the background information reviewed and developed by the Tare Work Group is not easily accessible by NTEP evaluators and NTEP applicants. As a result of the SMA comments that the proposals for HB 44 are adequately verified during type evaluation. Steve requested that the WS or Tare Work Group review the information developed during this discussion on tare and determine if any evaluation criteria or technical policies can be recommended for Publication 14. For example, the sections on "Tare" could be grouped together and the 1980 NCWM S&T discussion on "Tare" could be updated and included as an appendix in Publication 14 (similar DES Section 73 – Appendix for the Audit Trail).

The WS also reviewed Publication 14 list of acceptable indications and recorded representations to verify that "PT" is an acceptable abbreviation for keyboard and stored tare.

Conclusions:

1. **The WS agreed that there may be some merit to Mr. Cook's recommendation to include language from the 1980 NCWM S&T discussion on "Tare" and recommended that a developed recommendation be submitted to the next meeting of the WS in 2010.**

2. **The WS also agreed that the remaining Informational tare items should be withdrawn from the S&T Committee Agenda.**

3. **The Sector also agreed to include the PT for preset tares since PT has been accepted by some of the NTEP labs. This recommendation can be found in Appendix A - Agenda Item 9.**

New Items:

10. Pub 14 - Maximum Platform Width Parameter Sections 8.1., 8.2., and 8.3.

Source: Mr. Stephen Langford, Cardinal Scale Mfg Co.

Background: Current NTEP policy as described in Publication 14, sections 8.1, 8.2, and 8.3 regarding acceptable range of platform widths on vehicle scales to be included on the CC is apparently unclear and may not be uniformly applied.

- Part c of 8.1 states that widths up to 120 % of the device evaluated can be listed on the CC for vehicle scales up to 200 000 pounds of capacity. [3]
- Part c of 8.2 states that widths no greater than that of the device evaluated can be listed on the CC for vehicle scales with capacities greater than 200 000 pounds. [3]
- Part e of 8.3.2 for modular vehicle scales states that widths up to 120 % of the device evaluated can be listed on the CC regardless of scale capacity. [5]

[3&5] For scales with widths greater than 12 feet, this policy on range of widths may not be applied retroactively. Additional testing is required for devices with widths greater than 12 feet. Test procedures for scales wider than 12 feet will be addressed by NTEP management and the NTEP laboratories on a case-by-case basis.

Currently, it appears that the CC lists only the width of the device evaluated for modular vehicle scales of widths of 14 feet or more. Evaluations of 10 ft wide models allow 120 % or 12 feet-wide models to be listed on the NTEP CC. This practice is not in compliance with the current NTEP policy as written and needs to be clarified.

The submitter recommends amending section 8.2 part c of Publication 14 to read;

c. **widths ~~no greater than~~ up to 120 %** of the **width of the** platform tested;[3]

The submitter also included the following justification:

The following table summarizes the current restrictions on the maximum platform width that can be placed on the NTEP CC and highlights the difference criteria in 8.2.c for width parameters to be included on the CC.

Section	Device Type	CC Platform Width
8.1.c	Vehicle, Railway, Combination Vehicle/Railway and others over 30 000 and up to and including 200 000 lb	Up to 120 % of the width of the platform tested
8.2.c	Vehicle, Railway, Combination Vehicle/Railway and others greater than 200 000 lb[3]	No greater than the width of the platform tested
8.3.2.e	Modular Load-Cell Vehicle, Livestock or Railroad Track Scales[5]	Up to 120 % of the width of the platform tested

In each section, the "12 feet" footnote adds the following information:

For scales with widths greater than 12 feet;

1. the policies on range of widths may not be applied retroactively,
2. additional testing is required, and
3. NTEP management and the NTEP laboratories will address the test procedures on a case-by-case basis.

Based on this information, it is permissible to apply the 120 % (width) multiplier to modular scales (in 8.3.2.c) and to other vehicle scales of not more than 200 000 pounds in capacity (in 8.1.c). There is no reason known to exclude vehicle scales of more than 200 000 pounds in capacity from being allowed to have widths up to 120 percent of the width of the device evaluated. Therefore, part c of section 8.2 should be revised to reflect the same limits on platform width as listed in section 8.1.

There seems to be reluctance on the part of some examiners to allow platform widths of 120 % of the platform width of the device evaluated for widths greater than 12 feet. This practice is against existing NTEP policy. The test protocol is the same for scales with platform widths greater than 12 feet and includes applying loads both down both sides of the platform and in the center. Because the test protocol used in the examination of platforms of more than 12 feet in width is the same regardless of whether the platform is 14, 15, or 16 feet in width, the existing policy is correct. The WS is urged to endorse the practice of allowing up to 120 % of the width of the device evaluated for both modular and non-modular vehicle scales as is currently described in Publication 14.

For example, a 14-foot wide scale could be submitted and certified with the test procedures in DES Section 66 for extra wide and double wide vehicles scales (i.e., extra tests along the sides of the scale, etc.). Mr. Langford states that a 17-foot wide scale could be included on the CC without additional testing. (120 % * 14 = 16.8 and rounded to 17) since the "additional testing" was conducted and verified on the 14-foot wide scale. This should also apply to scales greater than 200 000 lb in DES Section 8.2.c.

Discussion: The WS reviewed and discussed the proposal and background information. Mr. Lou Straub asked if this proposed technical policy change be allowed retroactively on active CCs for devices that were tested with the wide test procedures. Mr. Langford believes that this should be allowed retroactively since the testing for scales wider that 12 feet is more stringent since it includes applying test load between pairs of load supports and other locations that simulate actual usage for both highway and extra wide vehicles. Mr. Truex expressed concerns about deflections of the load-receiving element when the widths of the platform load bearing points are changed. Mr. Flocken replied that manufacturers typically (proportionally) increase the distance between the load supports for wider scales and believes that the existing 20 % allowable width increase for scales 12 foot wide or less adequately limits increasing the width of scales greater than 12 feet. For example, a 14 foot wide scale submitted and tested for evaluation under the criteria in DES 66 b or 66 c may have additional widths listed on the CC up to and including 17 foot without additional testing.

There was support from the other manufactures attending the WS meeting and no additional comments from the NTEP labs. Note that there was no recommendation to change the footnote statement that test procedures for scales wider than 12 feet will be addressed by NTEP management and the NTEP laboratories on a case-by-case basis.

Conclusion: The Sector agreed to amend the criteria in DES Technical Policy 8.2.c[3] to be consistent with 8.3.2.e[5]. This recommendation can be found in Appendix A, Agenda Item 10.

11. Pub 14 - Minimum Platform Area (Section Lengths) Parameter Sections 8.1., 8.2., and 8.3.

Source: Mr. Ed Luthey, Brechbuhler Scales

Background: Brechbuler Scales is questioning why the minimum platform area on a vehicle scale is limited to 50 % of the device that was tested. For example, a 70' x 10', 3-section vehicle scale was evaluated and passes type evaluation. The CC would then list the minimum platform size as 350 ft^2 or list the minimum L x W scales that would comply with the Pub 14 criteria. Under the Pub 14 language, the applicant would have to submit a smaller second scale if they wanted 10' x 10', 2-section scale listed on the CC.

The submitter of the item believes that there is no technical justification for the limitation. Brechbuhler Scales submitted a proposal to eliminate the 50 % minimum platform area restriction as shown in the recommendation below:

8.1. Additional criteria for vehicle scales, railway track scales, combination vehicle/railway track scales, and other platform scales over 30 000 lb and up to and including 200 000 lb.

A CC will apply to all models having:

a. **nominal capacities** up to 135 % of evaluated capacity;
~~**b. a platform area for any two section portion no less than 50 percent of smallest two section portion incorporated in the device evaluated.**~~
c. widths up to 120 % of the width of the platform tested;
d. lengths 150 % of the length of the platform tested;
e. a **span** between sections is not more than 20 % greater than the equipment evaluated;

Discussion: Mr. Steve Cook, NIST Technical Advisor, reported on past Publication 14 language and WS discussions on this item. Mr. Cook noted that the above referenced language has been in Publication 14 since its earliest publication. Additionally, he found references to the current language as far back as 1983 in the notes of the National Type Approval work group. The National Type Evaluation work group included NIST, Weights and Measures Officials, scale manufacturers, and load cell manufactures. Mr. Cook contacted some of the work group participants (Richard Suiter and Henry Oppermann) to inquire if they recall the justification for the accepted language and report any additional information during the WS meeting. They recalled that it was agreed that a lower limit was needed and that the selections of the 50 % lower limit was not based on any technical justifications. Mr. Truex was concerned that completely eliminating the lower limit for platform area may result in variations in sizes that may be used in unsuitable applications (e.g., a small Class III L vehicle scale used in a Class III platform scale application.). The WS agreed with Mr. Langford's suggestion of 7 foot minimum length.

Conclusion: The Sector agreed to amend the criteria in DES Technical Policy 8.1.b and c by deleting 8.1.b. and adding "lengths no shorter than 7" . . ." to 8.1.c. since the platform area is deleted. This recommendation can be found in Appendix A - Agenda Item 11.

12. Auxiliary Reading Means when $e \neq d$.

Source: Mr. Steven Cook, NIST Technical Advisor

Background: WMD recently received an inquiry from the Ohio NTEP lab regarding an interpretation on Scales Code paragraph S.1.2.2.1. that may, in some circumstances, conflict with the Table 3 footnote 1. ***(Technical Advisor Note:*** *There appears to be only two references to≠d in Publication 14, pages DES 17 for marking requirements and DES-19 in Table 3. Additionally, a checklist item that verifies compliance to S.1.2.2.1. was unable to be located.)*

Table 3. Parameters for Accuracy Classes – Footnote

[1] For Class I and II devices equipped with auxiliary reading means (i.e., a rider, a vernier, or a least significant decimal differentiated by size, shape, or color), the value of the verification scale division "e" is the value of the scale division immediately preceding the auxiliary means.

S.1.2.2.1. Class I and II Scales and Dynamic Monorail Scales. If e ≠ d, the verification scale interval "e" shall be determined by the expression:

$$d < e < 10\ d$$

If the displayed division (d) is less than the verification division (e), then the verification division shall be less than or equal to 10 times the displayed division.

The value of e must satisfy the relationship, $e = 10^k$ of the unit of measure, where k is a positive or negative whole number or zero.

This requirement does not apply to a Class I device with d < 1 mg where e = 1 mg. If e ≠ d, the value of "d" shall be a decimal submultiple of "e," and the ratio shall not be more than 10:1.

If e ≠ d, and both "e" and "d" are continuously displayed during normal operation, then "d" shall be differentiated from "e" by size, shape, color, etc. throughout the range of weights displayed as "d."

(Added 1999)

The initial question was could the value of e be something other than 10 d. WMD believes that the answer is yes and demonstrated in the following table (copied from R 76).

The values of e, calculated following the d < e < 10 d rule			
d =	0.1 g	0.2 g	0.5 g
e =	1 g	1 g	1 g
e =	10 d	5 d	2 d

Typically, NTEP applicants submit Class II devices where e = 10 d. However, an applicant has submitted a device with e = 5 d. The lab asked how are d and e going to be displayed when e = 5 and d = 0.1e or 0.2e. One possible solution is shown in the following example.

Max: 12 kg n_{max}: 12 000
e: 0.5 g d: 0.1 g Class II

Example of possible indications?

3.0000 kg	e is displayed normally
3.0001 kg	d is differentiated
3.0002 kg	d is differentiated
3.0003 kg	d is differentiated
3.0004 kg	d is differentiated
3.0005 kg	e is displayed normally
3.0006 kg	d is differentiated

As shown, d would occupy the same location in the display as e therefore; both e and d can't be continuously displayed in S.1.2.2.1. Additionally, Table 3 footnote one states that "e" precedes the auxiliary means.

The language in S.1.2.2.1. states that d shall be differentiated from "e" by size, shape, color, etc. throughout the range of weights displayed as d if both e and d are continuously displayed. However, HB 44 Table 3 footnote 1 states that the value of the verification scale division "e" is the value of the scale division immediately preceding the auxiliary means (to display d). (Note that there is a slight difference in the way "differentiation" is described between Table 3 and S.1.2.2.1. Language in Table 3 states "differentiated by size, shape, or color," whereas S.1.2.2.1. states "differentiated from "e" by size, shape, color, etc.")

The NIST Technical Advisor reviewed the discussion on the adoption of S.1.2.2.1. in 1999 NCWM Annual Report. There were two items on the Committee's agenda that year regarding S.1.2.2.1. and words "continuously displayed" was added as part of the proposal to include dynamic monorail scales.

> "If e ≠ d, and both e and d are continuously displayed during normal operation then "d" shall be differentiated from "e" by size, color, etc. throughout the range of weights displayed as "d."

Additionally, the discussion paragraphs of each item did not provide guidance on examples where e = 2d or 5d.

The NIST Technical Advisor also reviewed equivalent terminology, definitions and language in R 76 for Nonautomatic Weighing Instruments (http://oiml.org/publications/R/R076-1-e06.pdf). R 76 includes the following subtypes of auxiliary displaying devices in Terminology Clause T.2.5:

- verniers,
- complementary displaying devices (estimated values corresponding to the distance between graduations), and
- indicators with differentiated scale divisions.

Clause T.2.6. describes extended displaying indicators as a device for temporarily changing the displayed interval "d" to a value less than "e."

In R 76, Clause 4.4.3, an extended indicating device shall not be used on an instrument with a differentiated scale division.

Additionally, a scale fitted with an extended indicating device can only provide an indication with a scale interval smaller than e:

- while pressing a key, or
- for a period not exceeding 5 seconds after a manual command.

In all cases, printing shall not be possible while the extended indicating device is in operation.

The NIST Technical Advisor has not developed a proposal for this item and asks the WS to review the background information and discuss possible solutions (e.g., amending HB 44 S.1.2.2.1. by changing the language to read ". . . then the verification division shall be ~~**less than or**~~ equal to 10 times the displayed division"). Or, recognizing the extended indicating device as described in R 76.

Discussion/Conclusion: The WS reviewed the background information and agreed that *the example in the background information is unacceptable since both "e" and "d" are not continuously displayed and "e" does not precede the auxiliary means*. The WS also agreed that in nearly all cases, e =10 d. However, there are combinations of e < 10 d that are acceptable when the "e" value and "d" value would be displayed in separate columns on the display as shown below as shown in the following example, or if there is a separate display for "d". The WS believes that there is no further action is needed for this item.

Max: 12 kg **n_{max}: 12 000**
e: 1 g d: 0.2 g **Class II**

Example of possible indications

3.001$_0$ kg d is differentiated by size and shading
3.001$_2$ kg d is differentiated by size and shading
3.001$_4$ kg d is differentiated by size and shading
3.001$_6$ kg d is differentiated by size and shading
3.001$_8$ kg d is differentiated by size and shading

13. Method of Sealing – G-S.8. Provisions for Sealing Adjustable Components

Source: NCWM S&T Committee

Background: During the open hearings at the July 2009 Annual Meeting, the S&T Committee received comments on its agenda Item 310-1, G-S.8. Provisions for Sealing Adjustable Components, suggesting that no action may be needed and that the existing language in HB 44 is sufficient. Additional comments indicated that other proposals in the Committee's Interim Report (Publication 16) are overly complex. Oregon and Maryland believe that amended requirements for sealing are needed by the NTEP labs and field staff in order to consistently interpret and apply sealing requirements. The SMA amended its position at the spring 2009 SMA Meeting and submitted the revised proposal to the Committee.

The Committee believes that all parties agree with the intent of the proposal. Both WMD and SMA submitted similar proposals that retain the existing language in G-S.8. WMD essentially reformatted G-S.8. for clarification and including new requirements for providing indications when a device is in adjustment mode. WMD included and additional proposal to address devices that may have more than one method of sealing.

The Committee suggests that the WS and other interested parties consider breaking the proposal into two or three separate agenda items for consideration by the Conference.

Additional information on the past S&T Committee discussion on the item can be found at:

- **2008 Final Report** - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/09-ST-08-Annual-FINAL.doc
- **2009 Interim Report** - http://ts.nist.gov/WeightsAndMeasures/Publications/upload/11-ST-09-Pub16-FINAL.doc

Discussion/Conclusion: The WS reviewed the comments from the S&T Committee, the background information in the NCWM 2008 Annual and 2009 Interim Reports, and the summary of proposals provided by the NIST Technical Advisor. The WS believes that existing language in HB 44 is sufficient and that the sectors review existing type evaluation criteria to verify that devices shall be designed with:

1. **provision(s) for applying a physical security seal that must be broken before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism, or**

2. **other approved means of providing security to document any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism (e.g., data change audit trail available at the time of inspection.**

The NIST Technical Advisor will forward the WS recommendation on the proposal to amend General Code paragraph G-S.8. Provisions for Sealing Adjustable Components the 2010 S&T Committee.

14. Publication **14 – Editorial Suggestions**

Source: Mr. Patoray, Consultants on Certification

Background: Mr. Patoray submitted six (6) items that have been submitted to the NTEP Administrator and NIST Technical Advisor. The WS was asked to review these items and provide a recommendation to NTEP that these suggestions be considered editorial corrections to Publication 14.

14 (a). Publication 14 DES Section 58.

Discussion/Conclusion: It was noted that the way 58.1 is worded seems to be opposite of the way paragraph T.N.4.5.1. (a) is worded in HB 44, and code references are needed. The WS supports the recommended changes as shown in Appendix A - Agenda Item 14 (a).

14 (b). Publication 14 DES Section 40.

Discussion/Conclusion: Mr. Patoray recommended changing the title in Section 40 from Zero Load Adjustment to Zero Setting Mechanisms to match the terminology and definitions in HB 44. The WS suggested some minor changes and supports the recommended changes as shown in Appendix A - Agenda Item 14 (b).

14 (c). Publication 14 DES Section 43.

Discussion/Conclusion: Mr. Patoray recommended changing the title in Section 43 from Automatic Zero-Setting Mechanism to Zero-Tracking Mechanism. No Actions is required since the recommended changes were incorporated into the 2009 Edition of Publication 14.

14 (d). Publication 14 DES Section 15.1.

Discussion/Conclusion: Mr. Patoray noted that the Table is Section 15.1 has an error, the word should be "net" not "tare." The WS supports the recommended changes as shown in Appendix A - Agenda Item 14 (d).

14 (e). Publication 14 FT Table 1.

Discussion/Conclusion: Mr. Patoray noted that Table 1 in Pub 14 FT needs corrected to show the correct loading capabilities of the CA NTEP lab. The WS supports the recommended changes as shown in Appendix A - Agenda Item 14 (e).

14 (f). Publication 14 FT Section I-10.

Discussion/Conclusion: Mr. Patoray noted that there seems to be a word missing at the end of FT Section I step 10 in the test conditions and it appears that the number "1" was inadvertently deleted between the 2000 and 2002 editions of Publication 14. The WS supports the recommended changes as shown in Appendix A - Agenda Item 14 (f).

15. Delete DES Section 66 (c).

Source*:* Mr. Ed Luthy, Brechbuhler.

Background: Mr. Luthy requested the WS to consider deleting DES Section 66 (c). Performance and Permanence Tests for "Side-by-Side" Modular and Non-Modular Vehicle Scales, stating that the time and expense is too large for the value added to having the option listed on an NTEP CC.

Discussion/Conclusion. The NIST Technical Advisor stated that the WS worked on the development of the type evaluation procedures in DES Sections 66 (b) and 66 (c) for Extra Wide and Double-wide scales in 1998, (WS Agenda Item 2), 2000 (WS Agenda Item1), and 2001 (WS Agenda Item2).

The Sector is not in favor of removing the section. The goal of the proposal is to reduce the expense of type evaluation on these devices. The scale manufacturers in attendance volunteered to form a small work group to review the existing procedures and develop proposals to amend existing language for a possible abbreviated test procedure.

This item will be carried over until the 2010 WS meeting.

16. Creep Recovery for Complete Scales.

Source: NTETC Weighing Sector

Background: During the discussion of WS Agenda Item 1, Creep recovery for load cells, the WS reviewed the report of the S&T Committee and the language adopted by the NCWM. There was support for the proposal to amend Publication 14 to agree with the adopted language in HB 44.

Discussion: The WS noted that the S&T Committee discussion included comments pertaining to a relationship between load creep recovery and a scales ability to return to a zero-balance condition after a load had been on the load-receiving element over a period of time, and that the WS should review the zero-tracking requirements and creep recovery tolerances for scales. Mr. Patoray stated that the adopted language may impact a scales ability to comply with Scales Code paragraph "N.1.9 Zero Balance Change" if the value of creep recovery in field applications exceeds the zero-tracking requirements in S.2.3.1.2. A zero balance change, greater than 0.5 d, will not be set to zero by the zero-tracking mechanism after a load has been resting on a scale for an extended period of time. However, because near capacity loads are rarely left on scales for 30 minutes in actual use, it is unlikely that there will be problems in the field.

Conclusion: The WS stated it believes that:

1. **There will be little impact on zero-tracking requirements due to manufacturers designing scales and separable weighing/load-receiving elements with load cell capacities that are typically larger than the scale capacities, and that loading a scale to 90 % capacity for 30-minutes (a test conducted during type evaluation) rarely occurs in most Class III applications.**

2. **HB 44 Scales Code paragraph T.N.4.1. should be amended to coincide with the changes to T.N.4.6.**

Mr. Nigel Mills, Hobart submitted a proposal to amend creep recovery requirements for scales to coincide with the creep recovery tolerance adopted for load cells. The WS agreed with the proposed language. Mr. Cook (NIST) and Mr. Scott Davidson (Mettler-Toledo) volunteered to further develop the proposal as shown below and submit the Form 15 to the NCWM S&T Committee and to fall regional weights and measures association meetings.

T.N.4.5.1. Time Dependence: Class II, III, and IIII Non-automatic Weighing Instruments. – A non-automatic weighing instrument of Classes II, III, and IIII shall meet the following requirements at constant test conditions. During type evaluation, this test shall be conducted at 20 °C ± 2 °C (68 °F ± 4 °F):

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed 0.5 e. However, the difference between the indication obtained at 15 minutes and the indication obtained at 30 minutes shall not exceed 0.2 e.

(b) If the conditions in (a) are not met, the difference between the indication obtained immediately after placing the load on the instrument and the indication observed during the following 4 hours shall not exceed the absolute value of the maximum permissible error at the load applied.

~~**(c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes, shall not exceed 0.5 e.**~~

~~**For a multi-interval instrument, the deviation shall not exceed 0.5 e_1 (where e_1 is the interval of the first partial weighing range or segment of the scale).**~~

~~**On a multiple range instrument, the deviation on returning to zero from Max_1 (load in the applicable weighing range) shall not exceed 0.5 e_1 (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max_1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e_1 (interval of the first weighing range) during the following 5 minutes.**~~

(Added 2005) (Amended 2006 **and 2010**)

T.N.4.5.2. Time Dependence: Class III L Non-automatic Weighing Instruments. – A non-automatic weighing instrument of Class III L shall meet the following requirements:

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing the load and the indication observed during the following 30 minutes shall not exceed 1.5 e. However, the difference between the indication obtained at 15 minutes and the indication obtained at 30 minutes shall not exceed 0.6 e.

(b) If the conditions in (a) are not met, the difference between the indication obtained immediately after placing the load on the instrument and the indication observed during the following 4 hours shall not exceed the absolute value of the maximum permissible error at the load applied.

~~**(c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes, shall not exceed one-half of the absolute value of the applicable tolerance for the applied load for Class III L devices.**~~

(Added 2005) **(Amended 2010)**

T.N.4.5.3. Zero Load Return: Non-automatic Weighing Instruments. – A non-automatic weighing instrument shall meet the following requirements at constant test conditions. During type evaluation, this test shall be conducted at 20 °C ± 2 °C (68 °F ± 4 °F). The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes shall not exceed:

(a) 0.5 e for Class I, II, and IIII devices,

(b) 0.5 e for Class III devices with 4000 or fewer divisions,

(c) 0.83 e for Class III devices with more than 4000 divisions, or

(d) one-half of the absolute value of the applicable tolerance for the applied load for Class III L devices.

For a multi-interval instrument, the deviation shall not exceed 0.83 e_1 (where e_1 is the interval of the first partial weighing range or segment of the scale).

On a multiple range instrument, the deviation on returning to zero from Max_i (load in the applicable weighing range) shall not exceed 0.83 e_i (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max_1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e_1 (interval of the first weighing range) during the following 5 minutes.

(Added 20XX)

Next Sector Meeting:

Discussion: Next in the rotation for lab and WS meetings is Sacramento, California for 2010. The WS believes that late August (24 -27) 2010, is acceptable. The WS second choice is the Ohio NTEP Lab.

Conclusion: The NCWM Board members reviewed and discussed the WS discussion and recommendations. The Board considered a number of other of other factors and agreed that the next WS meeting is scheduled for August 31 – September 2, 2010, in Columbus, Ohio.

Appendix A - Recommendations for Amendments to Publication 14[1]

Agenda Item 1.(a).

9. Permissible Variations of Reading for Creep Recovery

a. The difference between the initial reading of the minimum load of the measuring range (D_{min}) and the reading after returning to minimum load subsequent to the maximum load (D_{max}) having been applied for 30 minutes shall not exceed:

(1) 0.5 times the value of the load cell verification interval (0.5 v) for Class I, II, ~~II~~, and IIII load cells, ~~or~~

(2) 0.5 times the value of the load cell verification interval (0.5 v) for Class III load cells with 4000 or fewer divisions,

(3) 0.83 times the value of the load cell verification interval (0.83 v) for Class III load cells with more than 4000 divisions, or

(4) 1.5 times the value of the load cell verification interval (1.5 v) for Class III L load cells.

Agenda Item 1.(b).

12. Summary Table

A three-column table of the following critical test results, the corresponding limiting values of each quantity, and the ratio of each critical test result to the correspondence limiting value shall be provided. An example is given in Table 6.

a. **Force transducer (load cell) error** - The combined error due to non- linearity, hysteresis, and temperature effect on sensitivity.

b. **Repeatability error** - The greatest absolute value of non-repeatability in relation to the tolerance value for that test load.

c. **Temperature effect on minimum dead load output** - The greatest value of this effect for consecutive test temperatures.

d. **Creep** - The greatest differences between the initial reference output (**~~at 20 seconds~~ at the time specified in Table 5**) and any output recorded during the remaining period of the test.

e. Change in indications from 20 to 30 minutes – (per HB 44 T.N.4.6.)

f. Creep Recovery - The difference between the initial reading of the minimum load of the measuring range (D_{min}) and the reading after returning to minimum load subsequent to the maximum load (D_{max}) (at the time specified for initial reading in Table 5).

g. Barometric pressure sensitivity.

[1] Recommended changes to Publication 14 are indicated in shaded, ~~strike out~~, and underlined text.

Table 6.
Example of a Summary Table for a Class III 3000 Single Load Cell

Summary Table
(As requested in Item 12 of the force transducer (load cell) data format paper)

		Critical Result[1]	Tolerance[2]	Result/Tolerance
(a)	Force transducer (load cell) Error	0.68 v	0.7 v	0.97
(b)	Repeatability Error	0.19 v	0.35 v	0.55
(c)	Temperature Effect on MDLO	0.57 v_{min}/5 °C	0.7 v_{min}/5 °C	0.82
(d)	Creep (Time dependence)	0.98 v	1.5 v	0.65
(e)	**Δ Creep = $I_{20\ min} - I_{30\ min}$**	**0.09 v**	**0.15 x |mpe| = 0.225v**	**0.40**
(f)	**Creep Recovery**	**0.17 v**	**0.5 v**	**0.34**
(g)	Effect of Barometric Pressure	0.185 v_{min}/kPa	1.0 v_{min}/kPa	0.15

[1] The critical test result is the test result that gives the greatest ratio of result to tolerance. There may be other errors of greater absolute value but that give smaller ratios of result to tolerance.
[2] The tolerance is the value from the tolerance table of the NTEP procedure that corresponds to the critical test result.

Agenda Item 4.

B. Certificate of Conformance Parameters

6. Weighing Systems Using a Tank or Hopper Load-receiving Element

6.1. For a cylindrical cone bottom tank or hopper, a CC will apply to all models having:

a. weighing capacities from 20 % to 125 % (approximately a 6:1 ratio) of the evaluated capacity;

b. tank or hopper height from 50 % to 125 % of the height of the evaluated device;

c. tank or hopper diameter from 50 % to 110 % of the diameter of the evaluated device;

d. tank or hopper construction and materials similar to that of the equipment evaluated; (see also section titled "Platform Material" below);

e. scale division values equal to or greater than the value of the scale division used in the scale evaluated;

f. n_{max} equal to or less than the value of the n_{max} used in the scale evaluated

g. **number of load supports equal to or greater than the number of supports in the device submitted for evaluation.**

6.2. For a rectangular tank or hopper a CC will apply to all models having:

a. weighing capacities from 20 % to 125 % (approximately a 6:1 ratio) of the evaluated capacity;

b. tank or hopper height from 50 % to 125 % of the height of the evaluated device;

c. tank or hopper length from 50 % to 110 % of the length of the evaluated device;

d. tank or hopper width from 50 % to 110 % of the width of the evaluated device;

e. tank or hopper construction and materials similar to that of the equipment evaluated;

f. scale division values equal to or greater than the value of the scale division used in the scale evaluated;

g. n_{max} equal to or less than the value of the n_{max} used in the scale evaluated.

h. number of load supports equal to or greater than the number of supports in the device submitted for evaluation.

Agenda Item 5.

69. Performance and Permanence Tests for Railway Track Scales Used to Weigh Statically

*(**NOTE:** For combination vehicle/railway track scales, see also additional test considerations under "Test Considerations for Other Scales" in the application.)*

It is desirable, but not required that a new installation should be calibrated by a railroad test car after a representative of the railroad has inspected the installation for compliance with railroad design and construction specifications.

The Performance Test (69.1 thru 69.6) is conducted to determine compliance with the tolerances and, in the case of nonautomatic indicating scales, the sensitivity requirements specified in NIST Handbook 44. The tests described here apply primarily to the weighing/load-receiving element. It is assumed that the indicating element used during the test has already been examined and found to comply with applicable requirements. If the design and performance of the indicating element is to be determined during the same test, the applicable requirements for weighbeams, poses, dials, electronic digital indications, etc., must also be referenced. A 100 000 lb field standard weight cart, or a combination of field standard weights **safely** added to a field standard weight cart in 10 000 lb increments for a total of 100 000 lb will be used to conduct the Performance test.

The Permanence Test (69.7) shall not be conducted sooner than thirty (30) days after the Performance Test. If a 100 000 lb field standard weight cart, or a combination of field standard weights **safely** added to a field standard weight cart for a total of 100 000 lb, is not available for the Permanence Test a 100 000 lb "Test Weight Railcar" or "Test Weight Railcart" may be used.

***NOTE:** A field standard Test Weight Railcar and Test Weight Railcart shall have a footprint no greater than 7'. The Association of American Railroads, AAR Scale Handbook Section 1.5 "Specifications for Railway Track Scale Test Weight Loads" defines the requirements for test weight loads including "Test Weight Railcarts" and "Test Weight Railcars." A "Standard Rail Car," as described in AAR Scale Handbook Section 1.5.7, is not suitable for use during NTEP evaluations.*

The following definitions from the AAR Safety and Operations Scale Handbook ©2009 Edition Section 1.5 Specifications for Railway Track Scale Test Weigh Cars and have been reprinted with the permission of the AAR.

1.5.5. TEST WEIGHT RAILCAR
Test weight load designed as a certified mass standard supported by two-axle trucks, built for AAR interchange service, with the following design characteristics:

a. All metal construction except ballast. Ballast material must be stable.
b. Loading points must not exceed 7ft (2.2 m) and have uniform load distribution.
c. No unnecessary equipment.
d. A minimum of ledges, cavities, or projections that hold dirt, water, or other foreign matter.

e. The calibration cavities, capable if holding at least 1,000 lb (500 kg), must be waterproof and sealable.
f. Operational controls functional from both sides of the railcar.
g. Drive system, when used, shall be adequate to propel the railcar on a 3% grade.
h. Smooth and sloped top to ensure drainage.
i. Accessibility of all parts for inspection.
j. Ruggedness and durability in order to minimize repairs,
k. Overall truck centers shall not exceed 50 ft (15 m).
l. Side-mounted hand brake accessible from the ground.
m. Fuel tank, when used, must be attached and not exceed 16 lb (7 kg) capacity or 2 gal (8 L).
n. Lifting system must be adequate to lift all wheels a minimum of 2 in. (5 cm) above the rail.
o. Hydraulic oil tank, when used, must be equipped with a sight gauge or other means to indicate proper amount of oil to maintain calibration.

1.5.6. TEST WEIGHT RAILCART

Test weight load designed as a certified mass standard supported by two-axles on steel wheels, with the following design characteristics:

a. All metal construction.
b. Loading points must not exceed 7ft (2.2 m) and have uniform load distribution.
c. No unnecessary equipment.
d. A minimum of ledges, cavities, or projections that hold dirt, water, or other foreign matter.
e. The calibration cavities, capable if holding at least 1,000 lb (500 kg), must be waterproof and sealable.
f. Minimum surface area with smooth and sloped top to ensure drainage.
g. Accessibility of all parts for inspection.
h. Ruggedness and durability in order to minimize repairs,
i. Fuel tank, when used, must be attached and not exceed 16 lb (7 kg) capacity or 2 gal (8 L).
j. Hydraulic oil tank, when used, must be equipped with a sight gauge or other means to indicate the proper amount of oil to maintain calibration.
k. The weight cart, as well as the separable weights, must be traceable.

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69.1. Influence Factors

If tests are necessary to determine compliance with influence factors, individual main elements and components tests must be conducted according to NTEP Policy that is outlined in NCWM Publication 14, Section B.1. Influence Factor Requirements.

69.2. Test Standards

A 100 000 lb field standard weight cart or a 100 000 lb combination of field standard weights safely added to a field standard weight cart shall be used for the Performance test. Weights must be incremented by 10 000 lb from 30 000 lb to 100 000 lb. A test weight railcar shall not be used for the Performance Test.

69.3. Sensitivity and Discrimination Tests

69.3.1. Weighbeams

The sensitivity test is conducted at zero load and at maximum test load for mechanical railway track scales with non-automatic indicating elements. The sensitivity test is conducted by determining the actual test weight value necessary to bring the beam from a rest point at the center of the trig loop to rest points at the top and bottom of the trig loop. The maximum load at which the sensitivity test is conducted need not be comprised of known test weight.

69.3.2. Automatic Digital Indicating Elements

The discrimination test is conducted at zero load and at maximum load for railway track scales with indicating elements (e.g., electronic digital indicating elements, mechanical dials). See also DES Section 54 regarding the specific procedures for the discrimination test.

69.4. Digital Indications

Width-of-zero, zone of uncertainty and, if so equipped, automatic zero-tracking mechanism tests shall be conducted as specified in other sections of NCWM Publication 14.

69.5. Increasing Load/Shift Tests

69.5.1. Conduct increasing load tests in 10 000 lb load increments up to 100 000 lb. Conduct shift tests over each section at 50 000 lb and 100 000 lb, testing all sections and midspans between sections in both directions with each load. The scale shall be capable of returning to a no-load indication within prescribed limits [3 d per 5 °C change in temperature] and within 15 minutes after increasing or shift test load is removed. Zero balance change is limited to acceptance tolerance (1/2 d). The indication may be re-zeroed before the start of any increasing load or shift test, but not during any sequence.

(a) Begin increasing-load test by placing 30 000 lb on one end section. Record error

(b) Remove test load and record balance change. Do not reset zero.

(c) Increase to 40 000 lb on end section and record error.

(d) Remove test load and record balance change. Do not reset zero.

(e) Repeat this process, incrementing to 50 000 lb.

(f) After 50 000 lb is removed and balance change is recorded, reset zero.

(g) Begin the shift test by loading one end section with 50 000 lb and record the error.

(h) Move the test load to the midspan and to the left and right of each section so that one set of the test cart wheels are spotted over the load cell or lever bearing points. Record errors at each test position. .

(i) Remove load from opposite end of scale. Record balance change and reset zero.

(j) Repeat shift test in opposite direction according to steps (g) through (i).

(k) Continue with increasing load test following the procedures in steps (a) through (e) for test loads from 60 000 lb to 100 000 lb.

(l) After 100 000 lb is removed and balance change is recorded, reset zero.

(m) Conduct shift test in each direction using 100 000 lb following the procedures in steps (g) through (j).

69.5.2. Results shall be within acceptance tolerance as specified in Handbook 44, Section 2.20. Scales Code, T.N.4.4.

69.6. Strain Load Tests

69.6.1. The minimum test for a strain load test for single-load receiving element scales greater than 35 feet and for multiple load receiving element scale systems designed to weigh railroad cars in a single draft is 200 000 lb, or if practicable, at least 80% of scale capacity.

(a) Load one end of the scale with a strain load.

(b) Record the “reference point” for the start of the strain load test.

(c) Add 100 000 lb of test weight to the opposite end of the scale. The target strain load is the sum of the unknown weight and the test weights.

(d) Record the indicated strain-load value after the maximum amount of test weights have been added and calculate the strain load test error. The scale shall perform within prescribed tolerances based upon tolerance for the known test weights.

(e) Remove the test weights from the end of the scale without conducting a decreasing load test.

(f) If a higher strain load value is desired, increase the strain load at this time before proceeding with next step.

(g) Record the new strain load reference value and reapply the test weights.

(h) Record the indicated strain load value and calculate the strain load test error. The scale shall perform within prescribed tolerances based upon the known test weights.

(i) Evaluate repeatability of results in test weight values obtained in step (d) and step (g) to agree within the absolute value of maintenance tolerances.

(j) Remove the strain load (railcar or material of unknown weight) from the scale, decreasing to 100 000 lb of known test weights.

(k) Record error based on a decreasing load test to 100 000 lb.

(l) Remove weights from scale.

(m) Record zero balance change.

69.6.2. The results of all observations shall be within acceptance tolerance.

69.7. Permanence Test

69.7.1. Minimum Use Requirements for the Field Permanence Test

69.7.1.1. There must be at least 300 weighing operations executed over the scale prior to conducting the type evaluation Permanence Test. The entire NTEP evaluation should be performed at a customer location to facilitate “normal” use during the permanence period.

69.7.1.2. There must be at least 30 days between the Performance Test and the Permanence Test. If the prescribed weighments have not been completed, the time between tests shall be extended. Acceptance tolerances apply regardless of the time between Performance Test and the Permanence Test.

69.7.1.3. Only loads, which reflect “normal” use, will be counted during the permanence-testing period.
- 100 percent of the loads must be above 20 percent of scale capacity; and
- 50 percent of the loads must be above 50 percent of scale capacity.

The scale may be used to weigh other loads, but only the loads specified above are counted as part of the Permanence Test.

69.7.2. Subsequent Type Evaluation (Field) Permanence Test

69.7.2.1. It is recommended that the Performance Test procedure as described above be repeated for the Permanence Test. However, if the original test equipment is not available, the test may

be conducted to the extent possible with a "Test Weight Railcar" or " Test Weight Railcart" with at least a 100 000 lb capacity and a suitable and current calibration report.

69.7.2.2. Repeat width-of-zero, zone of uncertainty, sensitivity, and discrimination tests near zero (outside the range of the AZSM) and at or near capacity on the subsequent tests.

The results of these tests must be within acceptance tolerance. If the device does not meet these tolerance limits the scale will be rejected and the entire test must be repeated, including successful performance testing and a subsequent test after a minimum of 30 days.

Agenda Item 6.

35. Weigh-In/Weigh-Out Systems

A weigh-in/weigh-out system is typically used in vehicle scale and other applications that involve two weight determinations. The larger of the two weights is printed as the gross weight. The other weight is printed as the tare weight and the difference computed as the net weight. Weights, recalled weight values, and gross, tare, and net weights must be identified to clearly document the transaction. The storage, recalling, and printing actions are limited so they do not facilitate fraud.

NOTE: Manual weight entries are only permitted to correct erroneous tickets printed in error provided the conditions in DES Section "17. Manual Weight Entries" are met.

S. Cook: During the drafting of the summary for this item, the NIST Technical Advisor suggests that the NTEP Committee include a checklist item for DES Section 35 to document if "manual weight" capability was verified as not applicable or complied with applicable requirements as shown below:

35.10.	The data processing system performing the weigh-in/weigh-out operation will only accept weight values when the scale indicator is in the gross mode or give an error signal.	Yes ☐ No ☐ N/A ☐
35.11.	**Manual weight entries are only permitted to correct erroneous tickets printed in error provided the conditions in DES Section "17. Manual Weight Entries" are met.**	**Yes ☐ No ☐ N/A ☐**

Agenda Item 9.

Device Application	Term	Acceptable	Not Acceptable
General:			
	Semiautomatic (pushbutton) tare	tare, T, TA	
	Keyboard, programmable, and stored tare	**tare, T, TA, or PT**	
	net	net, N, NT	

Agenda Item 10.

8.2c Widths up to 120 % of the width of the platform tested ~~no greater than~~ that of the device tested; [3]

[3&5] For scales with widths greater than 12 feet, this policy on range of widths may not be applied retroactively **unless the criteria in DES 66 b or 66 c have been performed.** ~~**Additional testing is required for devices with widths greater than 12 feet.**~~ Test procedures for scales wider than 12 feet will be addressed by NTEP management and the NTEP laboratories on a case-by-case basis.

Agenda Item 11.

8.1. Additional criteria for vehicle scales, railway track scales, combination vehicle/railway track scales, and other platform scales over 30 000 lb and up to and including 200 000 lb.

A CC will apply to all models having:

a. **nominal capacities** up to 135 % of evaluated capacity;
~~b.~~ ~~a platform area for any two section portion no less than 50 percent of smallest two section portion incorporated in the device evaluated~~.
b~~c~~. **widths** up to 120 % of the width of the platform tested**;**
c~~d~~. **lengths no shorter than 7' and up to** 150 % of the length of the platform tested**;**
de. a **span** between sections is not more than 20 % greater than the equipment evaluated;

Agenda Item 14 (a).

Publication 14 DES Section 58.

Publication 14

Time Dependence Test T.N.4.5., T.N.4.5.1.
58.1 ~~Load the instrument close to Max. Take one reading as soon as the indication has stabilized and then note the indication in one hour intervals while the load remains on the instrument for a period of four hours. During this test the temperature should not vary more than 2 °C.~~

~~The test may be terminated after 30 minutes if the indication differs less than 0.5 e during the first 30 minutes and the difference between 15 and 30 minutes is less than 0.2 e.~~

When any load is kept on an instrument, the difference between the indication obtained immediately after

placing the load and the indication observed during the following 30 minutes shall not exceed 0.5 e. However, the difference between the indication obtained at 15 minutes and the indication obtained at 30 minutes shall not exceed 0.2 e.

If these conditions are not met, the difference between the indication obtained immediately after placing a load on the instrument and the indication observed during the following four hours shall not exceed the absolute value of the maximum permissible error at the load applied.

58.2. ~~The deviation in the zero indication before and after a period of loading with a load close to Max for half an hour, shall be determined. The reading shall be taken as soon as the indication has stabilized.~~

The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for 30 minutes, shall not exceed 0.5 e.

Agenda Item 14 (b).

40. ~~Zero-Load Adjustment~~ ~~(~~Zero-Setting Mechanisms~~)~~ - General
Code References: S.2.1.1. and S.2.1.2.

To prevent fraudulent or inappropriate adjustments of the zero setting mechanism . . .
-
-
Indicate the zero load adjustment method provided.

- ☐ **~~Tool operated zero-load adjustment.~~** ~~(~~Manual zero-setting mechanism~~)~~
- ☐ Semi-automatic zero-**~~load adjustment.~~** **~~(Semi-automatic zero-~~**setting mechanism~~)~~
- ☐ Power switch zero-load adjustment.

Agenda Item 14 (d).

15.1. Test Method 1 Yes ☐ No ☐ N/A ☐
Use this method when tare is taken to the internal resolution and the scale prints gross, tare, and net weight.

a.
b.
c.

Example of possible noncompliance: Capacity 120 000 x 20 lb	
Load perceived by the scale to the internal resolution	Recorded Value
45011 lb gross 20009 lb tare 25002 lb **~~tare~~ net**	45020 LB G 20000 LB T 25000 LB N

Agenda Item 14 (e).

Table 1. NTEP Participating Laboratory Force transducer (load cell) Test Capabilities				
Participating Laboratory	**Test Range**	**Minimum Dead Load**	**Test Machine Capacity**	**Direction of Loading**
NIST Force Group	200 - 555 lbf	10 lbf	500 lbf	Tension Compression
	4000 - 28 000 lbf	400 lbf	25 000 lbf	Tension Compression
	28 000 - 120 000 lbf	3000 lbf	112 000 lbf	Compression
California DMS	Less than 20 kg	0.5 kg	20 kg	Tension **Compression**
	20 - 110 kg	5 kg	110 kg	Tension **Compression**
	500 - 1000 lbf	*	*	*
* In special cases, force transducers (load cells) from 500 to 1000 lbf can be tested in a walk-in test chamber with special loading hardware provided by the manufacturer.				

Agenda Item 14 (f).

Amend Publication 14 FT Section I-10 to read as follows:

10. Stability - Use an indicating instrument and a loading means which provide sufficient stability to permit readings within the limits specified in ~~**point**~~ **FT Section I point 1**.

Appendix B

National Conference on Weights and Measures / National Type Evaluation Program

Weighing Sector Final Attendee List

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National Conference on Weights and Measures / National Type Evaluation Program

Weighing Sector Final Attendee List
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Appendix D

National Type Evaluation Technical Committee (NTETC)
Software Sector

Annual Meeting Summary
March 11 - 12, 2009, Reynoldsburg, Ohio

National Type Evaluation Technical Committee (NTETC) **D1**
Carry-over Items: **D1**
1. Issuing Certificates of Conformance (CC) for Software D1
2. Definitions for Software-Based Devices (2009 Interim Agenda Item 310-2) D3
3. Marking of Software Identification – G-S.1. (2009 Interim Agenda Item 310-3) D5
4. Identification of Certified Software D8
5. Software Protection/Security D10
6. Software Maintenance and Reconfiguration D12
7. Verification in the Field, by the W&M Inspector D14
8. NTEP Application for Software Requiring a Separate CC D14

New Items: **D15**
9. Sealing Requirements for Electronic Devices D15
10. Next Meeting D15

Appendix A – Attendee List D16
Appendix B – Slide Show (Draft) for Presentation at Regional Meetings D18
Appendix C– Draft Article for NCWM Newsletter, Software and Software-Based Measuring Equipment D19

Carry-over Items:

1. Issuing Certificates of Conformance (CC) for Software

Source: National Conference on Weights and Measures (NCWM) Reports

Background: Excerpts of reports from the 1995 - 1998 Executive Committees were provided to National Type Evaluation Technical Committee (NTETC) Software Sector members at their April 2006 meeting. The chair asked the sector to review the following National Type Evaluation Program (NTEP) policy decision adopted by the NCWM in 1998 relative to the issuance of a separate Certificate of Conformance (CC) for software. During the 1998 NCWM Annual Meeting, the following recommendation was adopted as NTEP policy:

- "Software, regardless of its form, shall not be subject to evaluation for the purpose of receiving a separate, software CC Conformance from the NTEP."

- "Remove all of the software categories from the index of NCWM Publication 5, NTEP Index of Device Evaluations."

- "Reclassify all existing software CCs according to their applicable device categories."

Also relevant, from Section C of NCWM Publication 14: "In general, type evaluations will be conducted on all equipment that affect the measurement process or the validity of the transaction (e.g., electronic cash registers interfaced with scales and service station consoles interfaced with retail fuel dispensers); and all equipment to the point of the first indicated or recorded representation of the final quantity on which the transaction will be based."

Recommendation: The Sector recommended the following language to be submitted to the NTEP Committee as a policy change, and requested that the NTEP Committee place this issue on their agenda:

> **Software Requiring a Separate CC: Software, which is implemented as an add-on to other NTEP Certified main elements to create a weighing or measuring system and its metrological functions, are significant in determining the first indication of the final quantity. Such software is considered a main element of the system requiring traceability to an NTEP CC.**
>
> **NOTE: OEM software *may* be added to an existing CC or have a stand-alone CC with applicable applications (e.g., a manufacturer adding a software upgrade to their ECR or point-of-sale system, vehicle scale weigh-in/weigh-out software added as a feature to an indicating element, automatic bulk weighing, liquid-measuring device loading racks, etc.) and minimum system requirements for "type P" devices (see proposed software definition below). It may be possible for a manufacturer to submit a single application for both hardware and software contained in the same device. A single CC would be issued.**
>
> **In this instance, OEM refers to a 3rd party. The request to add software could be made by the original CC holder on behalf of the 3rd party. Alternatively, a new CC could be created that refers to the original CC and simply lists the new portions that were examined.**

The NTEP committee included this item in their agenda (*NTEP Committee 2009 Interim Agenda Item 8*). There was no discussion during the open hearing, and it was determined that this item be given voting status for the 2009 Annual Meeting Agenda.

Discussion: Dr. Ambler Thompson observed that in reality, this type of software represents only a small portion of type evaluations; the vast majority of them are not standalone software. Ms. Cassie Eigenmann indicated that this item as written might not clearly state the intention, which is to simply allow the labs to call standalone software packages that are type approved to be categorized as 'software.' It is an administrative change, not a regulatory change. The labs will not be doing anything differently at type approval time.

Mr. Dennis Beattie made the statement that if you follow the concept of 'first final,' then you have to address every step of the process, and if that is done with software, then the requirement to address software is obvious. Mr. David Vande Berg explained that it is not always black/white (i.e., external software for tare/net calculations is sometimes not judged subject to type approval.) It was suggested by Mr. Norm Ingram to define what is meant by 'software requiring a separate CC;' Ms. Cassie Eigenmann recommended using specific examples.

Mr. Steve Patoray listed some goals he felt were important the Sector accomplish:

- Answer the question, "What is this item that is up for vote going to change in practice?"
- Address Scale Manufacturers Association's (SMA) concerns on the S&T agenda Items 310-2 and 310-3.

Dr. Ambler Thompson agreed, further suggesting that the Sector needs to 'sell' the concepts we have realized, and it was mentioned that the Regional meetings might be an opportunity to approach the states.

Mr. Jim Truex, NTEP Administrator, felt that the upcoming vote will be a technical vote, requiring at least 27 states to vote in the affirmative to pass. He also indicated that this will not change the way the labs operate – it is merely the ability for the labs to label evaluated standalone software as such, and not be forced to categorize it as some type

of device, such as 'weigh-in-weigh-out-system'. Mr. Patoray also suggested that this is an important vote for the Sector; and asked that if the states continue to avoid dealing with software what is the future of the Sector?

Conclusions:

- **The Sector feels that this item is important and that there exists the possibility of misinterpretation of the scope/intent of this item by other interested parties, hence the Sector agreed to the following actions:**
  - Generate Problem Statement and specify benefits addressed by change (Done)
  - Feedback from labs/inspectors (Lucas, Frailer, Ingram?)
  - 'Sales flyer'/Newsletter article (Bliss et al.)
  - Request added as Agenda item at CWMA/NEWMA? (Pettinato/Ingram)
  - Attend CWMA/NEWMA regional meetings? (?)

NCWM was contacted and the staff indicated that if it is desired to include an article in the newsletter, a final draft must be submitted by April 15th. The Sector work group should have a draft circulating by April 3, 2009, so comments can be gathered by April 10, 2009, for consideration prior to the final draft.

Mr. Doug Bliss provided a draft 'slide show' format presentation as a starting point for clearly presenting the ideas put forth by the Sector, and started on a draft article for the newsletter. Further work has progressed since the meeting *(see Appendices B & C).*

2. Definitions for Software-Based Devices (2009 Interim Agenda Item 310-2)

Source: NTETC Software Sector

Background: Discussed was marking and G-S.1.1. It was initially suggested that "not built-for-purpose" be removed from the wording in NIST HB 44 G-S.1.1. However, after further discussion, this may not be the correct or final decision. There is no definition for a 'not built-for-purpose device' in HB 44. The current HB 44 definition for a built-for-purpose device reads:

> *Built-for-purpose device.* Any main device or element, which was manufactured with the intent that it be used as, or part of, a weighing or measuring device or system. [1.10] (Added 2003)

The Sector recommended the following definitions be submitted to the S&T Committee as an item and be considered for inclusion in Appendix D of NIST Handbook 44 to replace the current definition of 'build-for-purpose device':

> **Electronic devices, software-based. Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:**
>
> **(a) Embedded software devices (Type P), aka built-for-purpose. A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security and will be called a "P," or**
>
> **(b) Programmable or loadable metrological software devices (Type U), aka not-built-for-purpose. A personal computer or other device and/or element with PC components with programmable or loadable metrological software and will be called "U." A "U" is assumed if the conditions for embedded software devices are not met.**
>
> **Software-based devices – See Electronic devices, software-based.**

At the 2009 NCWM Interim Meeting, the Committee received comments from the SMA stating that it now opposes this item since there is no technological justification for making a distinction in software-based device types. Mr. Darrell Flocken added that the SMA can only provide limited responses. SMA continues to support the efforts of

the Software Sector and the SMA response is based on the concern that the proposed definitions in this recommendation and the marking requirements proposed in agenda Item 310-3 will require weighing devices be more complex than those currently produced.

The Meter Manufacturers Association indicated that it supports the item as written in the recommendation.

Mr. Will Wotthlie, Maryland, did not agree with the SMA position that there are no technological difference between the types of software-based devices. He added that Type P devices and separable elements have limited flexibility in changing software and indications and frequently include the sensing elements necessary for the measurement (e.g., load cells, meters, etc.). Whereas, Type U devices and separable elements are typically devices that do not contain measuring elements; can be replaced with compatible equipment and display devices purchased from any number of sources; and only process metrological information received from measuring and other sensing elements.

Mr. Stephen Patoray, Consultants in Certification, agrees with the SMA that there are few differences between Type P and U software-based devices. However, there are significant differences between Type P and U devices in that a Type P device is defined as an instrument that requires a security means since the instrument has fixed hardware (including sensing components) where the metrological software is ***embedded*** into the instrument. Type U devices do not include fixed components and metrological software cannot be sealed using physical security seals or the minimum form of an audit trail (i.e., two event counters).

Software Sector Co-Chair, Jim Pettinato,FMC Technologies, added that international recommendations recognize the differences between embedded software and programmable/loadable software. Additionally, the Software Sector recommends that this item remain informational to allow conference members to further study that proposed definitions.

The S&T Committee agreed with the comments received during the open hearing and the request from the co-chairman of the software sector and agreed that this item should remain an Informational item for further review.

Additional background information on this item can be reviewed in the 2009 Interim Agenda (NCWM Pub 15).

Discussion: It was reiterated by several individuals that again it seems that resistance to this item stems not from a disagreement with the intention, but from either a misunderstanding of the applicability or unrelated concerns over marking requirements.

Further discussion was related to how to best present the opinion/goals of the Sector to the interested external parties, such as the NCWM standing committees and the individual states. Some discussion on the wording of the definitions took place as well, with the slightly modified version being proposed:

Electronic devices, software-based. Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:

(a) Type 'P' (aka built-for-purpose) software-based electronic devices. A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security; or

(b) Type 'U' (aka not-built-for-purpose) software-based electronic devices. All metrological software-based devices not meeting the conditions of a Type 'P' device. Example: a personal computer or other device and/or element with PC components with programmable or loadable metrological software.

Software-based devices – See Electronic devices, software-based.

Conclusion: No consensus was reached on any language change. The Sector did agree that including the reason(s) for proposing these definitions as part of the effort to educate/promote external parties would be

beneficial; and that we would attempt to explain the reasoning/intent of the proposed definitions together with/as part of the action items for Item 1.

3. Marking of Software Identification – G-S.1. (2009 Interim Agenda Item 310-3)

Source: 2008 Carryover Item

Background: Starting at the October 2007 meeting, the Software Sector has discussed the value and merits of required markings for software. After several iterations, the Sector developed a table to reflect their positions:

Method	NTEP CC No.	Make/Model/Serial No.	Software Version/Revision[1]
TYPE P electronic devices shall meet at least one of the methods in each column:			
Hard-Marked	X	X	Not Acceptable[1]
Continuously Displayed	X	X	X
By command or operator action	Not Acceptable	Not Acceptable	X[2]

[1] If the manufacturer declares that the primary **sensing** element "software" is integral, has no end user interface and no print capability, ~~**the element may be considered exempt from the marking requirement for version/revision.**~~ **the version/revision shall be hard marked on the device**. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).
[2] Information on how to obtain the Version/Revision shall be included on the NTEP CC.
Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be only dedicated for the metrologically significant portion.

Method	NTEP CC No.	Make/Model~~/Serial No.~~	Software Version/Revision
TYPE U electronic devices shall meet at least one of the methods in each column:			
Hard-Marked	X[3]	X	Not Acceptable
Continuously Displayed	X	X	X
Via Menu (display) or Print Option	Not Acceptable	X[4]	X[4]

[3] Only if no means of displaying this information is available.
[4] Information on how to obtain Make/Model, Version/Revision shall be included on the NTEP CC.
Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be only dedicated for the metrologically significant portion.

This table was submitted to NCWM S&T Committee and was assigned Developing status in 2008.

Prior to the 2009 Interim NIST Weights/Measures Division commented on this item and presented an alternate proposal with significant modifications, which were included in the Interim Meeting Agenda background for the item (See 2009 Pub 15 for more details).

This item was assigned Informational status for the NCWM 2009 Annual Meeting.

Discussion: It was noted by several Sector members that the perceived scope of the original proposal has been extended by the modifications made by WMD and now appears to exceed both the purview and the intent of the Sector, and it has become difficult to discern what our intentions were. Based on the fact that the table seems to have actually made the Sector's intent less clear, it was proposed by the chair to revisit this item in relation to the current text of G-S.1. to clarify exactly what real changes to Handbook 44 would be required to achieve the intent of the Sector. It was also noted that there was some validity to the SMA argument that there is no justification for differentiation of marking requirements based on device type (P or U). After additional lengthy discussions, the following modified versions of G-S.1./G-S.1.1. were drafted:

> **G-S.1. Identification. –** All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect **and manufactured** ~~**prior to**~~**after January 1, 201X**, shall be clearly and permanently marked for the purposes of identification with the following information:
>
> (a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model identifier that positively identifies the pattern or design of the device;

(1) The model identifier shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod." Prefix lettering may be initial capitals, all capitals, or all lowercase.
[Nonretroactive as of January 1, 2003]

(Added 2000) (Amended 2001)

(c) a non-repetitive serial number, except for equipment with no moving or electronic component parts and ***~~not built for purpose software based~~*** ***software that is not part of a Type P (built-for-purpose) device.****;*
[Nonretroactive as of January 1, 1968]

(Amended 2003 **and 201X**)

(1) The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.
[Nonretroactive as of January 1, 1986]

(2) Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No., and S. No.).
[Nonretroactive as of January 1, 2001]

(d) the current software version or revision identifier for ***~~not built for purpose~~*** ***software-based electronic devices;***
[Nonretroactive as of January 1, 2004]

(Added 2003) **(Amended 201X)**

(1) The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.
[Nonretroactive as of January 1, 2007]

(Added 2006)

(2) Abbreviations for the word "Version" shall, as a minimum, begin with the letter "V" and may be followed by the word "Number." Abbreviations for the word "Revision" shall, as a minimum, begin with the letter "R" and may be followed by the word "Number." The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2007]

(Added 2006)

(e) an NTEP CC number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the word "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.)
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Amended 1985, 1991, 1999, 2000, 2001, 2003**~~, and~~**, 2006 **and 201X**)

G-S.1.1. ~~***Location***~~ ***Method*** *of Marking Information for* ~~***Not Built For Purpose***~~ ***all*** *Software-Based Devices. –* ***For*** ~~***not built for purpose, software based***~~ ***devices*** *manufactured* ~~*prior to*~~***after*** *January 1, 201X,* ***either****:*

(a) The required information in G-S.1. Identification. ~~***(a), (b), (d), and (e)***~~ *shall be permanently marked or continuously displayed on the device; or*

(b) The CC Number shall be:

(1) permanently marked on the device;

(2) continuously displayed; or

(3) accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, "Help," "System Identification," "G-S.1. Identification," or "Weights and Measures Identification."

Note: *For (b), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*

[Nonretroactive as of January 1, 2004]

(Added 2003) (Amended 2006 **and 201X**)

It was noted that though currently it is allowable to display the CC number via a menu, there has been some challenges locating this information in the field due to the vagueness of the term 'easily recognized.' Hence, since it is left to the interpretation of the NTEP laboratory to ascertain whether a device's method for displaying the CC number meets the requirements, this vagueness has not been addressed in this new recommendation.

Mr. John Roach, California NTEP Lab, indicated that if the proposed table (or some version thereof) is not eventually included as part of G-S.1. that it may be useful to incorporate a suitable table into Pub 14.

Conclusion: The Sector wishes to address concerns related specifically to software and does not wish to debate the merits of general marking requirements beyond that related to software identification. We feel the above proposed changes better reflect the Sector position. If WMD and NCWM S&T feel a table outlining general marking requirements would clarify the intent of G-S.1., then the Sector suggests that following simplified version may better suit the purpose.

Table G-S.1.~~a~~ Identification for Devices Manufactured on or after January 1, 201X		
Required Marking	**Full Mechanical Devices and Separable Mechanical Elements**	**Electronic Devices, Software Based**
Manufacturer or CC holder ID	**Hard Marked**	**Hard Marked, Continuously Displayed, or Via Menu (display) or by command or operator action**
Model identification	**Hard Marked**	**Hard Marked, Continuously Displayed, or Via Menu (display) or by command (operator action)**
Serial number	**Hard Marked**	**Hard Marked, Continuously Displayed** [1]
Metrologically Significant significant Software software version	**Not Applicable**	**Continuously Displayed, Via Menu (display) or by command (operator action)** [2]
Certificate of ConformanceCC number	**Hard Marked**	**Hard Marked or Continuously Displayed, or Via Menu (display) or by command (operator action)**[3]

[1]**Type 'U' devices need not have a non-repetitive serial number.**

[2]**If the manufacturer declares that the primary sensing element "software" is integral, has no end user interface and no print capability, the version/revision shall be hard marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).**

[3]**If the Certificate of ConformanceCC number is to be displayed via menu and/or submenu, the means of access must be easily recognizable. In addition, instructions on how to obtain the remaining required information not hard-marked or continuously displayed shall be included on the NTEP CC.**

(Added 201X)

Note that this new version of the table reflects the aforementioned changes proposed for the G-S.1. text as well as homogenizing Type P and Type U requirements, with the exception of the serial number requirement being waived for standalone software. It was also noted that much of the information previously included in the separate proposed Table G-S.1.b was redundant as it is already stated verbatim in the text of G-S.1.; hence the Sector questions the benefit of the WMD - proposed separate Table G-S.1.b.

4. Identification of Certified Software

Source: NTETC Software Sector

Background: This item originated as an attempt to answer the question "How does the field inspector know that the software running in the device is the same software evaluated and approved by the lab?" In previous meetings it was shown that the international community has addressed this issue (both WELMEC and OIML). From WELMEC:

Required Documentation:
The documentation shall list the software identifications and describe how the software identification is created, how it is inextricably linked to the software itself, how it may be accessed for viewing and how it is structured in order to differentiate between version changes with and without requiring a type approval**.**

From OIML:

Example from DSW 2 CD (now D 31):

> The executable file "**tt100_12.exe**" is protected against modification by a checksum. The value of checksum as determined by algorithm **XYZ** is **1A2B3C**.

Previous discussions have included a listing of some additional examples of possible valid methods (not limiting):

- CRC (cyclical redundancy check)
- Checksum
- Inextricably Linked version No
- Encryption
- Digital Signature

Is there some method to give the W&M inspector information that something has changed? (Yes, the Category III audit trail or other means of sealing). How can the W&M inspector identify an NTEP Certified version? (They cannot, without adding additional requirements like what is described here, in conjunction with including the identifier on the CoC).

Recommendation: The Sector believes that it should work towards language that would include a requirement similar to the OIML requirement in HB 44. It is also the opinion of the Sector that a specific method should not be defined; rather the manufacturer should utilize a method and demonstrate the selected identification mechanism is suitable for the purpose. It is not clear from the discussion where such proposed language might belong.

NTEP strongly recommends that metrological software be separated from non-metrological software for ease of identification and evaluation. From OIML:

> Separation of software parts - All software modules (programmes, subroutines, objects, etc.) that perform metrologically significant functions or that contain metrologically significant data domains form the metrologically significant software part of a measuring instrument (device or sub-assembly). The conformity requirement applies to all parts and parts shall be marked according to Section G-S-X.X.
>
> If the separation of the software is not possible or needed, then the software is metrologically significant as a whole.

(Segregation of *parameters* is currently allowed - see table of sealable parameters)

Initial draft proposed language: (G-S.1.1.?)

Identification of Certified Software:

Software-based electronic devices shall be designed such that the metrologically significant software is clearly identified. The identification of the software shall be inextricably linked to the software itself.

- **Unique identifier must be displayable/printable on command or during operation, etc. (marking req't in addition)**

- **At a minimum, a version/revision indication (1.02.09, rev 3.0 a, etc). Could also consist of / contain checksum, etc (crc32, for example)**

Discussion: Discussion on this item was brief, as it was the general consensus that those in attendance understood the goals of this item and were in agreement of those goals. However, the conceptual language was not far enough along to warrant detailed discussion specific to a draft proposal and more work offline should be done.

Conclusion: A work group will be designated by the Sector Co-Chairs prior to the NCWM Annual Meeting to further promote the state of this item, to be discussed at the next Sector meeting.

5. Software Protection/Security

Source: NTETC Software Sector

Background: The sector agreed that Handbook 44 already has audit trail and physical seal, but the question on the table is does the Handbook need to be enhanced to sufficiently discourage the facilitation of fraud, intentional or accidental, where software is concerned?

WELMEC and OIML again have addressed this issue specifically when dealing with software. From WELMEC:

Protection against accidental or unintentional changes:
Metrologically significant software and measurement data shall be protected against accidental or unintentional changes.

Specifying Notes:
Possible reasons for accidental changes and faults are: unpredictable physical influences, effects caused by user functions and residual defects of the software even though state of the art of development techniques have been applied.

This requirement includes:

a) Physical influences: Stored measurement data shall be protected against corruption or deletion when a fault occurs or, alternatively, the fault shall be detectable.

b) User functions: Confirmation shall be demanded before deleting or changing data.

c) Software defects: Appropriate measures shall be taken to protect data from unintentional changes that could occur through incorrect program design or programming errors(e.g., plausibility checks).

Required Documentation:
The documentation should show the measures that have been taken to protect the software and data against unintentional changes.

Example of an Acceptable Solution:

- The accidental modification of software and measurement data may be checked by calculating a checksum over the relevant parts, comparing it with the nominal value and stopping if anything has been modified.

- Measurement data are not deleted without prior authorization (e.g., a dialogue statement or window asking for confirmation of deletion).

- For fault detection, see also Extension I.

Recommendation: The Sector derived a suitable checklist for Pub 14 from the OIML checklist, and asked the current NTEP labs to begin using this checklist on a trial basis for new type approval applications.

Devices with embedded software TYPE P (aka built-for-purpose)			
	Declaration of the manufacturer that the software is used in a fixed hardware and software environment, and		**Yes ☐ No ☐ N/A ☐**
	cannot be modified or uploaded by any means after securing/verification		**Yes ☐ No ☐ N/A ☐**
	Note: *It is acceptable to break the "seal" and load new software, audit trail is also a sufficient seal.*		
	The software documentation contains:		
		description of the (all) metrologically significant functions OIML states that there shall be no undocumented functions	**Yes ☐ No ☐ N/A ☐**
		description of the securing means (evidence of an intervention)	**Yes ☐ No ☐ N/A ☐**
		software identification	**Yes ☐ No ☐ N/A ☐**
		description how to check the actual software identification	**Yes ☐ No ☐ N/A ☐**
	The software identification is:		
		clearly assigned to the metrologically significant software and functions	**Yes ☐ No ☐ N/A ☐**
		provided by the device as documented	**Yes ☐ No ☐ N/A ☐**
Personal computers, instruments with PC components, and other instruments, devices, modules, and elements with programmable or loadable metrologically significant software TYPE U (aka not built-for-purpose)			
	The *metrologically significant* software is:		
		documented with all relevant (see below for list of documents) information	**Yes ☐ No ☐ N/A ☐**
		protected against accidental or intentional changes	**Yes ☐ No ☐ N/A ☐**
	Evidence of intervention (such as changes, uploads, circumvention) is available until the next verification / inspection (e.g., physical seal, Checksum, CRC, audit trail, etc. means of security)		**Yes ☐ No ☐ N/A ☐**
Software with closed shell (no access to the operating system and/or programs possible for the user)			
	Check whether there is a complete set of commands (e.g., function keys or commands via external interfaces) supplied and accompanied by short descriptions		**Yes ☐ No ☐ N/A ☐**
	Check whether the manufacturer has submitted a written declaration of the completeness of the set of commands		**Yes ☐ No ☐ N/A ☐**
Operating system and / or program(s) accessible for the user:			
	Check whether a checksum or equivalent signature is generated over the machine code of the metrologically significant software (program module(s) subject to ~~legal control~~ W&M jurisdiction and type-specific parameters)		**Yes ☐ No ☐ N/A ☐**
	Check whether the metrologically significant software will detect and act upon any unauthorized alteration of the metrologically significant software using simple software tools (e.g., text editor).		**Yes ☐ No ☐ N/A ☐**
Software interface(s)			
	Verify the manufacturer has documented:		
		the program modules of the metrologically significant software are defined and separated	**Yes ☐ No ☐ N/A ☐**

		the protective software interface itself is part of the metrologically significant software	**Yes □ No □ N/A □**
		the *functions* of the metrologically significant software that can be accessed via the protective software interface	**Yes □ No □ N/A □**
		the *parameters* that may be exchanged via the protective software interface are defined	**Yes □ No □ N/A □**
		the description of the functions and parameters are conclusive and complete	**Yes □ No □ N/A □**
		there are software interface instructions for the third party (external) application programmer.	**Yes □ No □ N/A □**

Discussion: The Chair requested feedback from the NTEP Labs as to whether they had the opportunity to utilize the checklist; each lab reported either they have not had any applications for devices where the checklist could be used, or were unaware of the request to try the checklist. The labs were again asked to try to use the checklist should the opportunity present itself.

Conclusion: The Sector will again wait for laboratory feedback on this item; discussion on this item will continue as part of the next agenda item since the two are closely related.

6. Software Maintenance and Reconfiguration

Source: NTETC Software Sector

Background: The following Items were reviewed by the Sector in previous meetings.

a. Verify that the update process is documented (OK)
b. For traced updates, Installed Software is authenticated and checked for integrity
   Technical means shall be employed to guarantee the authenticity of the loaded software (i.e., that it originates from the owner of the type approval certificate). This can be accomplished (e.g., by cryptographic means like signing). The signature is checked during loading. If the loaded software fails this test, the instrument shall discard it and either use the previous version of the software or become inoperative.
   Technical means shall be employed to guarantee the integrity of the loaded software (i.e., that it has not been inadmissibly changed before loading). This can be accomplished e.g. by adding a checksum or hash code of the loaded software and verifying it during the loading procedure. If the loaded software fails this test, the instrument shall discard it and either use the previous version of the software or become inoperative.
   Examples are not limiting or exclusive.
c. Verify that the sealing requirements are met
   The Sector asked, what sealing requirements are we talking about?
   This item is only addressing the software update, it can be either verified or traced. It is possible that there are two different security means, one for protecting software updates (software log) and one for protecting the other metrological parameters (Category I II or III method of sealing).
   Some examples provided by the Sector members include but are not limited to.
      Physical Seal, software log
      Category III method of sealing can contain both means of security
d. Verify that if the upgrade process fails, the device is inoperable or the original software is restored

The manufacturer shall ensure by appropriate technical means (e.g., an audit trail) that traced updates of metrologically significant software are adequately traceable within the instrument for subsequent verification and surveillance or inspection. *This requirement enables inspection authorities, which are responsible for the metrological surveillance of legally controlled instruments, to back-trace traced updates of metrologically significant software over an adequate period of time (that depends on national legislation).* The statement in italics will need to be reworded to comply with U.S. weights and measures requirements.

Recommendation: The Sector **agreed** that the two definitions below for Verified update and Traced update were acceptable.

> **Verified Update**
> A verified update is the process of installing new software where the security is broken and the device must be re-verified. Checking for authenticity and integrity is the responsibility of the owner/user.
>
> **Traced Update**
> A traced update is the process of installing new software where the software is automatically checked for authenticity and integrity, and the update is recorded in a software update log or audit trail.

The Sector also worked towards language proposed for defining the requirements for a Traced Update (currently considered as relevant for Publication 14):

> **For a Traced Update, an event logger is required. The logger shall be capable of storing a minimum of the 10 most recent updates. An entry shall be generated for each software update.**
>
> **Use of a Category 3 audit trail is acceptable for the software update logger. In this case, the existing requirement of 1000 entries supersedes the 10 entry requirement. A software update log entry shall include the following:**
>
> - **An event counter;**
> - **the date and time of the change;**
> - **the event type/parameter ID, which indicates a software update event (if not using a dedicated update log); and**
> - **the new value of the parameter, which is the *software identification* of the newly installed version.**
>
> **A Category III device may include the software update events in the Category III audit log in lieu of a separate software update log; the existing requirement for 1000 entries supersedes the requirement for 10 entries.**
>
> **The traceability means and records are part of the metrologically significant software and should be protected as such. If software separation is employed, the software used for displaying the audit trail belongs to the fixed metrologically significant software. *(Note: This needs to be discussed further due to some manufacturer's concerns about where the software that displays the audit trail information is located and who has access if this feature is provided. Manufacturers did indicate that there are methods available to encrypt the audit trail information; however, it cannot be protected from being deleted.)* (include flowchart from OIML D 31)**

Discussion: The Sector discussed how to best move this item forward, and there was also some discussion as to whether new language for the General Code was required. The following new text was proposed:

> **G-S.9. Metrologically Significant Software Updates**
>
> **The updating of metrologically significant software shall be considered a sealable event.**
>
> **Metrologically significant software that does not conform to the approved type is not allowed for use.**

Mr. Jim Truex indicated that the current requirements in G-S.8. already make the statement that any changes that affect metrological function are sealable, hence, software updates may be covered and the proposed G-S.9. unnecessary. Mr. Todd Lucas suggested to go ahead and submit the proposed G-S.9. to the Committee and request a clarification/interpretation of G-S.8.

Conclusion: The Sector feels that the explicit language proposed for G-S.9. is clearer than any implied requirement in G-S.8.. The Sector would like a clarification/interpretation of G-S.8. as it relates to software updates from the S&T Committee (with their response preferably to be included in Pub 16). The Sector will also continue to develop the proposed text (and flow chart) targeted for inclusion in Pub 14.

(Note to S&T Tthis item assumes additional requirements in individual codes will be eventually added to address this requirement; (e.g., L.M.D. code has philosophy of sealing section that could be enhanced to include processes described.)

7. Verification in the Field, by the W&M Inspector

Source: NTETC Software Sector

Background: What tools does the field inspector need as relates to software-based electronic devices? Some possible answers:

NTEP CC – hard marked, continuously displayed, via menu command or operator action
Clear and simple instructions on NTEP CC to get to the other Inspection Information
The metrologically significant software identifier needs to be easily accessible from operator console
Clear and simple instructions on NTEP CC to access audit trail(s)

Recommendation: The Sector needs to continue to develop this item.

Discussion: Some discussion about system information requirements for the inspector took place. Does the inspector really need to have access to OS, RAM information, etc? (General opinion seems to be if there is a dependency, then the NTEP Lab would specifically include that requirement in the CoC.)

Audit trail info – the question was asked, does there need to be a specific requirement for providing access to this information?

Regarding the concept of First Final – There was some concern expressed as to how the inspectors are able to discern where the indication of first final be found for the SYSTEM (as opposed to the DEVICES in the system). What devices in the system are of concern to the inspector? The NTEP Administrator indicated that field inspectors need to follow the system all the way to receipt/bill generation.

Data transmission is an issue when considering systems as opposed to devices. How far does the inspector's jurisdiction extend? (Should we model future requirements on the WELMEC section concerning DTD/DSD?) Data transmission/storage is not currently being addressed by the Sector at this time.

Since part of the Sector's mission is education, do we want to assist in developing training aids for labs/inspectors related to evaluating/inspecting software-based devices? This will be a topic to be added to the Sector's agenda for the next meeting.

Conclusion: The Sector will continue to develop this item, and initiate a new agenda item specific to inspector training in relation to evaluating/validating software-based devices.

8. NTEP Application for Software Requiring a Separate CC

Source: NTETC Software Sector

Background: This item had been on the agenda of previous meetings, but was not discussed due to time limitations.

Recommendation: Identify issues, requirements and processes for type approving type U device applications.

Discussion: It was suggested that it may be useful to the labs to devise a separate submission form for software for Type U devices. What gets submitted? What requirements/mechanisms for submission should be available?

Validation in the lab – all required subsystems shall be included to be able to simulate the system as installed.

It was noted this agenda item is irrelevant if the NTEP Committee does not approve the pending item up for vote.

Mr. John Roach, California NTEP Lab, stated that if the software package being evaluated supports platforms/subsystems from multiple manufacturers, testing should be done using at least two platforms/subsystems. Scale labs and scale manufacturers indicated that this is not usually done for scale evaluations.

Conclusion: The Sector will continue to develop this item, contingent on the status of the related NTEP Committee agenda item after the 2009 Annual meeting.

New Items:

9. Sealing Requirements for Electronic Devices

Source: Weighing Sector Tech Advisor

Background: Steve Cook of NIST has been involved in attempting to address some concerns with the current wording of G-S.8. as it relates to the sealing of electronic devices and configuration modes. Since this is related in some respects to other items within the purview of the Software Sector, it was suggested that it may be beneficial for the Sector to review and comment on the proposed language.

Discussion: The Sector discussed the relevance of this item, and though it is related somewhat to the discussions on software security and maintenance/reconfiguration, it is broader in scope and hence it was decided that the item was not wholly relevant to the Sector's mission.

Conclusion: The Software Sector takes no position on these proposed changes.

10. Next Meeting

Recommendation: The Sector was asked to develop a proposed date and location for the next meeting.

Discussion: The Sector discussed two options for the next meeting; continuing to meet in Ohio or alternating to a Western location to maintain equity in travel for the various participating labs. There appeared to be a preference (after an informal polling) to alternate the meeting location from year to year.

Conclusion: The Sector recommends that the next meeting be held in Sacramento in or around March 2010. Sector Co-Chair Norm Ingram will investigate suitable hotels and meeting facilities and report back to NCWM. Details need to be firmed up by December of this year.

Appendix A
2009 Software Sector Attendees

2009 Software Sector Meeting Attendee List
March 11-12, 2009 / Reynoldsburg, Ohio

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Appendix B

Slide Show (Draft) for Presentation at Regional Meetings

Software COC

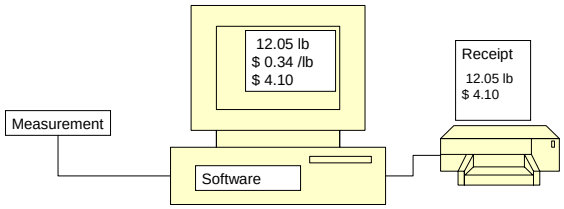
What is it and why do we need it?

Why? What's Broken?

- Software that runs on a PC may execute metrological functions
  - Display indication
  - Tare manipulation
  - Price computation
  - Receipt printing
- PC based software is often difficult to
  - Identify
  - Verify
  - Protect

First Final

- Refer to first final requirement here (Pub 14 admin policy)



PC-based Software Examples

- Point of Sale Cash Register
- Gas Station Pump Control
- Vehicle Scale In-Out

Point of Conflict?

- Current NTEP policy states that software shall not be separately evaluated and given a CoC
- It could be interpreted that Type Evaluation of the example systems is in conflict with the above rule.
  - No hardware was evaluated in these

What Software is NOT Affected?

- Software that executes confined within purpose-built hardware is generally not an issue
  - Hardware provides a ready place to mark for identification
  - Software is not easily modified (by design)
  - Physical seal is often an option

Appendix C
Draft Article for NCWM Newsletter
Software and Software-Based Measuring Equipment

Throughout most of the history of measurement, measuring equipment was purely mechanical in construction. The Industrial Revolution enabled the manufacture of mechanical devices that were identical to all other devices of its type, thus enabling the concept of metrological Type Evaluation. Critical adjustment points, being mechanical, could be readily identified and protected by a physical seal, which, when broken, provided visible evidence of tampering. Purely mechanical devices were (and remain) difficult to repurpose. A device, once installed, could be expected to continue throughout its working lifetime to do only the job for which it was designed. For all stakeholders, including the manufacturer, type evaluator, equipment owner and the field inspector, life was good.

The first electronics added to measuring equipment merely assisted the mechanical design, adding electrical "muscle" to the mechanical signals and perhaps provided a remote or a printed indication of the measurement value. The addition of electronics to measuring equipment created some new type evaluation checklist items, but remained easy to understand during both type evaluation and field inspection.

Next equipment designers cut the mechanical measurement signal and inserted a transducer to convert the mechanical energy into an electrical signal. The first true electronic-based measurement equipment was thus created. This transformation of measurement technology was strange and mysterious; no longer could one see the measurement along the entire measurement path. Nevertheless, the new transducer and associated electronic devices could each be evaluated as a "black box"; each component was built for a specific purpose, had well defined physical input and output characteristics, had a special adjustment point that could accept a physical seal and remained difficult to repurpose in the field. More checklist items and new device types were required and eventually created.

Purely electronic measuring components did not last very long; perhaps only one equipment generation. The invention of the microprocessor allowed equipment designers to condense much of the electronics into a single chip, providing cost savings and increased reliability, and permitting the addition of many new features and functions. Software performed much of the work previously accomplished using electronic hardware. This revolution, being internal, went almost unnoticed for a time. Software within the device was built for purpose and was difficult or impossible to modify in the field. More checklist items were added to cover the new software features.

Alongside the development of the microprocessor that is now embedded within most measuring equipment was a similar development in general purpose computing. Rapidly falling costs for general purpose computers moved the computer out of the high security computer room and onto the desktop. New operating systems not only allowed but encouraged users to control the operation of and data stored on their computer. It was a natural consequence of the flexibility and usefulness of general purpose computers that they would eventually be employed to perform measurement functions. Today, general purpose computers are routinely used in retail Point of Sale (POS) cash registers, fuel dispensing systems and vehicle scale weigh-in/weigh-out systems, to name a few examples.

Example: Retail Point of Sale

In a grocery store a general purpose computer is connected to a combination bar code scanner/weighing platform. No local display is provided at the scale; instead the computer provides a continuously updating weight display along with its running tally of the grocery bill items. The computer is also connected to a receipt printer, a cash drawer, and a central database computer. The bar coded item number and gross weight are sent to the cash register computer, which performs an item record look up to obtain the tare value and unit price (price per pound). The computer subtracts the tare weight from the gross weight to create a net weight, multiplies the unit price by the net weight and rounds to obtain total price. It then displays the net weight, unit price, and total price for the customer and clerk to see. In this case, the first indication of the final value for the transaction is displayed on the computer screen.

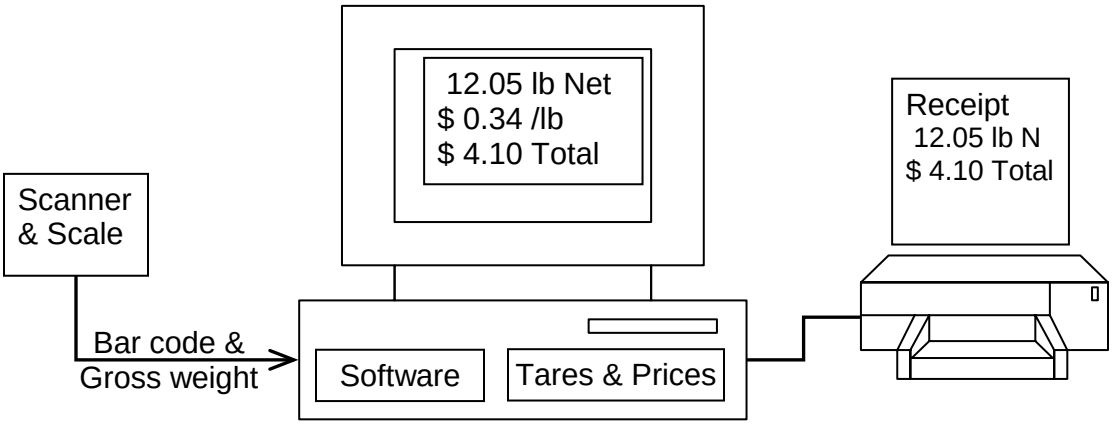
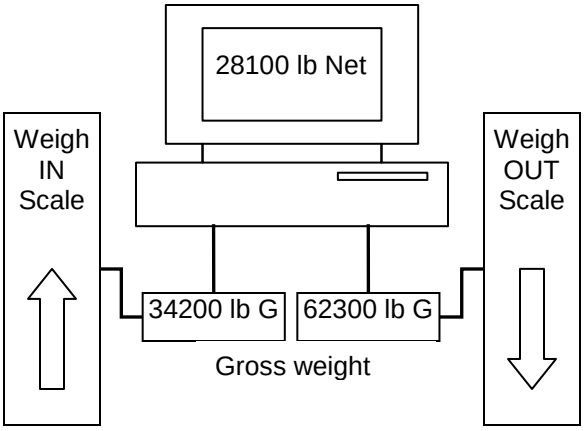


Figure 1 - Retail POS

Example: Vehicle Weigh-In / Weigh-Out

A user already owns one or two vehicle scale weighbridges and electronic weight indicating devices. The user then purchases a general purpose computer and a CDROM containing Vehicle Weigh-In/Weigh-Out software. The computer is loaded with the new software and is connected to the vehicle scales. In normal operation the gross weight is sent continuously from each scale to the computer, which provides an indication of the weight on its screen. Vehicles enter the facility by stopping on an inbound scale. A database record is created that includes the inbound weight and the vehicle ID. The vehicle either picks up or drops off a load and exits the facility by stopping on an outbound scale. The previously stored data record for this vehicle is retrieved and a net weight is calculated and displayed on the computer screen. A bill record or credit record is created and stored and the bill or credit amount is also displayed. The computer may provide net sign correction to prevent display of negative weights if the computer does not know whether the vehicle is empty or full when inbound. In some cases, the vehicle's empty weight is known and was previously stored in the computer. If the empty weight is available, the bill record or credit record may be created in a single transaction. In this case, the computer performs a gross/tare/net calculation, price computing, and net weight display. Note that the scale weighbridge, indicating device and computer software may each be provided by a different vendor. The computer is creating the "first final" indication of net weight and computing the transaction price/credit.



Also note that since times are hard, this computer will have other uses; during the 2nd shift an accounts payable software package is run and during 3rd shift the rather bored security guard plays *World of Warcraft* ®.

As we can see from history and examples, personal computer (PC) based software is a natural evolutionary step in the development of measuring devices. But how to handle PC based software during type evaluation and subsequent field inspection? This is exactly the same type of question that was asked each time the technology changed!

NCWM Publication 14, Administrative Policy, Section C (DEVICES TO BE SUBMITTED FOR TYPE EVALUATION) describes that the scope of NTEP evaluations is limited to equipment for which definitive criteria exist and to new technologies or applications where the development of criteria is deemed necessary. It further describes "…the minimum amount of equipment that must undergo type evaluation is all of the parts of a device or system that performs the measurement up to the first indicated or recorded value of the final quantity on which the transaction is based." Thus if a general purpose computer will execute software that is part of the chain up to that "first final" output, then that computer, or at the least, its software[1], must be evaluated for type approval.

But no one wants to evaluate a general purpose computer. They are not completely specified (a CoC only lists minimum requirements) and computer vendors and models change often. We are then left with evaluating the software, or rather the functions that the software performs. This in itself is not so bad; software can be treated like a "black box" with defined inputs and outputs. A major sticking point in the investigation is that a general purpose computer and its operating system are specifically designed to allow the user complete freedom to modify both the operating software and any data stored within!

Equipment Classification for Software Evaluation

Before any Type Evaluation can begin, it is necessary to know something about the design. When investigating software-based equipment this is especially true.

Software that executes confined within purpose-built hardware is generally not an issue.

- Hardware provides a ready place to mark for identification

[1] *Current NTEP policy states that software shall not be separately evaluated and given a Certificate of Conformance (CoC). It could be interpreted that Type Evaluation of some systems such as Vehicle Weigh-In/Weigh-Out is in conflict with the above rule since no hardware need be evaluated.*

- Software is not easily modified (by design)
- Physical seal is often an option for protection of software and parameters

A general purpose computer is by intent easy to modify; its value is derived from the ability to modify its data and its operation. A general purpose computer presents issues in the areas of:

- Identification and marking
- Verification of type
- Protection against intended and unintended changes to metrologically significant software and parameters

For the purposes of identifying and limiting the depth of investigation required, it is useful to create two classes; one of which is the well known Handbook 44 "built for purpose", also known as "Type P". The other class, based on a general purpose computer, is not presently defined by the NCWM but is known elsewhere as "Type U", which stands for Universal computer.

Software Identification Position Statement

- **The Software Sector recommends that all software-based devices be required to provide version identification for the metrologically significant portion of the software, regardless of whether such software runs on a built for purpose device (type "P") or a universal computer (type "U").**
- **Based on feedback from the Scale Manufacturers Association and other sources, there is a desire to eliminate the present device-type dependent differences in allowable marking/identification methods. The Software Sector agrees that all software-based devices should have identical marking options.**

The Software Sector is confident that both of these positions can be accommodated by simple text edits to Handbook 44 G-S.1. and G-S.1.1.

In addition, the Software Sector acknowledges that there are still reasons to differentiate between Type P and Type U software-based electronic devices (unrelated to the marking requirements) hence continues to support the proposed addition of these terms as definitions in Appendix D of Handbook 44, replacing the previously used term 'built-for-purpose'.

Appendix E

National Type Evaluation Technical Committee (NTETC)
Belt-Conveyor Scale Sector

Meeting Summary
February 26, 2009, St. Louis, Missouri

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Carry-Over Items from 2008:

1. Proposed Update to NCWM Publication 14 Belt-Scale Checklist

Source: Mr. Bill Ripka, Sector Chairman

Background: At the February 2008 meeting of the Belt Sector, NIST Technical Advisor, Mr. Steven Cook reviewed recent changes to NIST Handbook 44 Section 2.21. (Belt-Conveyor Systems) and recommended that the NCWM Publication 14 (Pub 14) Belt-Conveyor Scale Checklist, which was based on the 2006 edition of NIST Handbook 44, be reviewed and updated. The Sector members reviewed suggested amendments and no further changes were recommended.

Prior to the 2009 Sector meeting, Sector Chairman, Mr. Bill Ripka, provided the draft Pub 14 Belt-Conveyor Scale Checklist technical policies on the substitutions of Master Weight Totalizers and other minor editorial suggestions for review. Among the suggested changes that were included in this draft were proposed changes for procedures involving testing semi-automatic and automatic zero-setting mechanisms.

Discussion/Conclusion: Comments were heard during the February 2009 Sector meeting regarding the draft proposed changes submitted by Mr. Ripka. Manufacturers generally agreed the proposal for evaluation of substitution MWTs is not intended to apply to devices produced by different manufacturers. The Sector also agreed to recommend that this criterion be used to amend existing certificates.

The Sector discussed whether or not a substitute totalizer needs to undergo a permanence test during type-evaluation. Mr. Ian Burrel, Control Systems Technology, stated that a totalizer submitted for evaluation should undergo a permanence test during the laboratory portion of the type-evaluation. Mr. Steven Cook, NIST, questioned whether or not totalizers from different manufacturers could be evaluated on a one-to-one comparison basis during a field test when different totalizers are used with identical associated equipment/systems.

NTEP Administrator, Mr. Jim Truex, polled the manufacturers present as to whether any among them have an instrument which is developed or being developed and will be submitted for NTEP evaluation. If so, would the manufacturers be willing to submit that device and have the above Pub 14 draft used during the evaluation? Mr. Ripka responded that Thermo-Ramsey may have a totalizer which might be available for evaluation by the end of 2009. Mr. Jim Truex stated that NTEP is ready to apply the draft on a trial basis, and that this step is necessary prior to amending Pub 14 by adopting the draft.

Language highlighted in shaded font indicates recommended changes to Pub 14 Belt-Conveyor Scale Checklist as shown below.

** A MWT submitted for approval as a stand-alone device can only be accepted as an addition to an existing Certificate of Conformance (CC) for a complete Belt Conveyor Scale System.

A. Models to be Submitted for Evaluation

A type is a model or models of the same design as defined in the NTEP Policy and Procedures. A complete list and description of all models of a type to be included in the CC shall be submitted with the request for type-evaluation. All options and features to be included on the CC must be submitted for evaluation. If the CC is to include more than one model of the same type, the submitter shall contact the evaluation agency to determine which model or models will be evaluated. A CC will be amended when new models of the same type meeting the specified criteria are applied for by the manufacturer.

The models to be submitted for evaluation shall be those having:

a. Laboratory Test – A master weight totalizer (MWT) or integrator, that as a minimum meets the requirements of the original evaluation, with defined enhancements and additional options indicated. The submitter shall also provide all necessary devices or instruments to represent the load receiving and speed sensing elements.

b. Field Test – The field test shall be performed with a previously "approved for commercial use" weighbridge model by the same manufacturer.

B. Certificate of Conformance (CC) Parameters

A CC will apply to all models that have:

1. Equivalent hardware and software, and

2. Subsets of standard options and features of the equipment evaluated.

Metrological features not recognized by Handbook 44, but capable of being used as the basis for commercial transactions, shall be capable of being disabled and sealed before the device can receive an NTEP CC.

C. Replacement Parts

The policy for addressing the conformance of replacement parts with the parts being replaced is:

1. If a MWT has received an NTEP evaluation and an NTEP, it must be repaired with parts that are consistent with the original design or metrologically equivalent parts.

D. Substitution of the Master Weight Totalizer

For a MWT to be considered an appropriate substitute for the MWT tested during the original type evaluation of a belt-conveyor scale system, the following criteria must be satisfied:

1. The MWT must be tested in the laboratory using appropriate load and speed signal simulators capable of being adjusted within the tolerances indicated in the checklists and tables in this document.

2. All MWT laboratory tests must be performed on the replacement MWT, including temperature testing.

3. During the test, the device must be within the acceptance tolerance.

4. A field test will be performed meeting new initial installation testing criteria.

5. A field permanence test will be performed.

6. A separate CC will not be issued for the new MWT. Instead, the original CC will be amended to include the new MWT as an option.

7. Application limits, such as capacity and speed ranges, established during the original type evaluation will not be amended.

E. Checklist and Test Procedures

1. Indicating and Recording Elements

The integrator of a belt-conveyor scale normally includes the master weight totalizer (MWT and a rate of flow indicator and rate of flow alarms. The MWT must have adequate resolution to be able to establish a valid zero reference value and must have sufficient capacity to totalize loads over a reasonable period of time. The integrator may also have a resettable partial totalizer for indicating the mass of loads conveyed over a limited period of time and may have a supplementary totalizer with a scale interval greater than that of the MWT that will indicate the mass of loads conveyed over a fairly long period of operation. The partial totalizer is normally used for indicating the values for the zero test, simulated load tests, materials tests, and individual measurements of interest to the scale owner.

The MWT shall be equipped with provisions for applying a security seal that must be broken or another approved security means before any change that affects the metrological integrity of the device can be made to the MWT.

1.1	The scale must have a master weight totalizer (MWT).	Yes ☐ No ☐ N/A ☐
1.2	The MWT shall not be resettable without breaking a security means.	Yes ☐ No ☐ N/A ☐
1.3	A power failure test must be conducted on digital electronic MWT's both in the laboratory and in the field permanence test.	Yes ☐ No ☐ N/A ☐

Test Procedure

1.3.1	Accumulate a measured quantity on the MWT and stop the flow of material. Note the reading.	Yes ☐ No ☐ N/A ☐
1.3.2	Disconnect power to the MWT.	Yes ☐ No ☐ N/A ☐
1.3.3	Connect power to the MWT.	Yes ☐ No ☐ N/A ☐
1.3.4	The quantity indication shall return to the previously displayed quantity within 1 division.	Yes ☐ No ☐ N/A ☐

Laboratory Test: The accumulated measured quantity for the MWT is retained in memory during a power failure of 24 hours and is displayed again when power is returned.

Field Test: The accumulated quantity for the MWT is retained in memory during a power failure of 10 seconds up to 24 hours and is displayed again when power is returned.

1.4	The capacity of the MWT shall be at least 10 hours times the maximum rated flow rate indicated on the original CC.	Yes ☐ No ☐ N/A ☐
1.5	The value of the scale division shall be capable of being established for a value less than or equal to 0.1 % of the minimum totalized load.	Yes ☐ No ☐ N/A ☐
1.6	The MWT shall indicate in one or more of the weight units indicated in table T.1 [check the applicable unit(s)]	Yes ☐ No ☐ N/A ☐
	The scale division shall be in increments of 1, 2, or 5 times 10k where k is	Yes ☐ No ☐ N/A ☐

an integer.

Table T.1	
Unit	**Abbreviation**
_____ pounds	Lb or LB
_____ U.S. short ton	Ton or T
_____U.S. long ton	LT
_____ Metric ton	T
_____ kilograms	kg

1.7 The indicated weight value must be expressed without the use of a multiplier. Yes ☐ No ☐ N/A ☐

1.8 The MWT may have a no-flow lockout provided the lockout is limited to not more than 3 % of the rated belt loading in terms of weight per unit length. The no-flow lockout must be deactivated during the zero test. Yes ☐ No ☐ N/A ☐

1.8.1 During normal operation, the MWT shall advance only when the belt conveyor is in operation and under load. Yes ☐ No ☐ N/A ☐

1.8.2 If a no-flow lockout is provided, verify that it is limited to not more than 3 % of the rated belt loading. Yes ☐ No ☐ N/A ☐

1.8.3 It must be possible to deactivate the no-flow lockout during the zero test Yes ☐ No ☐ N/A ☐

2. Recording Element

2.1 The MWT shall incorporate or be capable of interfacing with a recording element. Yes ☐ No ☐ N/A ☐

2.1 The value of the scale division for the recording element shall be the same as for the MWT. Yes ☐ No ☐ N/A ☐

2.3 The recording element shall record the initial indication and the final indication of the MWT, the quantity delivered, the unit of measurement, (i.e., kilograms, tones, pounds, tons,), the date and time (see Table T.2). This information shall be recorded for each delivery. The indicated and recorded weight values must agree to the nearest scale division. Yes ☐ No ☐ N/A ☐

All weight values shall be recorded as digital values.

Information required on the ticket:

Table T.2	
Date	05 06 2008
Time	15:30
Master Start Total	44113.5 T
Master Stop Total	44300.5 T
Quantity	187.0 T

2.4 If a reset to zero mechanism is incorporated, there must be an interlock to prevent the zeroing of the device between the printing of the initial and final values of the totalized weight. Yes ☐ No ☐ N/A ☐

2.5 The printing of weight values shall be inhibited when the flow rate is greater than either: Yes ☐ No ☐ N/A ☐

~ 3 % of the maximum flow rate, or
~ The flow rate at which the MWT is engaged unless the weight value is identified as a subtotal, in process weight, or the equivalent.

2.6 The recorded weight value must be expressed without the use of a multiplier. Yes ☐ No ☐ N/A ☐

2.7 The printer must automatically sequence through a print cycle so that each printed document includes two weight values to represent the initial and final values. Yes ☐ No ☐ N/A ☐

3. Rate of Flow Indicator and Recorder

A rate of flow indicator and recorder are required. The MWT shall incorporate or be capable of interfacing with a rate of flow indicator and recorder. They may express the rate in weight units per hour or as a percent of capacity. The indicator and recorder may be either analog or digital.

3.1 The system must have both a rate of flow indicator and rate of flow recorder. Yes ☐ No ☐ N/A ☐

The rate of flow recorder is:
_____ analog
_____ digital

3.2 If a digital flow rate recorder is provided, the readings must be taken at time intervals not exceeding 10 seconds. Yes ☐ No ☐ N/A ☐

3.3 The rate of flow indicator must indicate from zero to at least 100 % of capacity. Yes ☐ No ☐ N/A ☐

3.4 The rate of flow recorder shall record from zero to at least 100 % of capacity. Yes ☐ No ☐ N/A ☐

4. Rate of Flow Alarms

The system shall be equipped with a permanent means to provide an audio or visual alarm (signal) when the rate of flow is equal to or less than 20 % and equal to or greater than 100 % of the rated capacity of the scale. The alarm shall be located such that it will be noticed by the operator during normal operation.

The rate of flow alarm is:

_____ both audio and visual _____ audio _____ visual

4.1 The alarm (signal) is located so it will be noticed during normal scale operation. Yes ☐ No ☐ N/A ☐

4.2 Record the values at which the alarm is triggered: Yes ☐ No ☐ N/A ☐

Low alarm:_____

High alarm:_____

4.2.1 The alarm triggered when the rate of flow is equal to or less than 20 % and equal to or greater than 100 % of the rated capacity of the scale. Yes ☐ No ☐ N/A ☐

4.3 Access to the parameters for setting the alarm limits shall be through a security means. Yes ☐ No ☐ N/A ☐

5. Zero-Setting Mechanism

The zero-setting mechanism may be either a manual or automatic mechanism. If the zero-load reference is recorded at the beginning and end of a delivery, the range of the zero-setting mechanism shall not be greater than ± 5 % of the rated capacity of the scale. Where the zero-load reference is not recorded at the beginning and end of a delivery, the range of the zero-setting mechanism shall be limited to ± 2 % of the rated capacity of the scale. If a greater adjustment is needed, the access to the adjustment must be through some security means. An audio or visual signal shall be given when the automatic and semi-automatic zero-setting mechanisms reach the limit of adjustment. The zero-setting mechanism must be constructed such that the zero-setting operation is done only after a whole number of belt revolutions (a minimum of three minutes). The completion of the zero-setting operation must be indicated. The low-flow lockout must be deactivated for this test.

5.1 To verify the ± 5 % range of the zero setting mechanism and the zero load reference recording capability: Yes ☐ No ☐ N/A ☐

5.1.1 Verify that the zero-setting range is limited to ± 5 %. Yes ☐ No ☐ N/A ☐

5.1.2 Adjust the load simulating device to represent 8 % of the scale capacity. Yes ☐ No ☐ N/A ☐

5.1.3 Zero the scale. Yes ☐ No ☐ N/A ☐

5.1.4 Adjust the load simulating device representative of a 1 % of scale capacity decrease; the automatic-zero-setting mechanism shall reset the zero of the scale and the recording element shall indicate the change in zero.. Yes ☐ No ☐ N/A ☐

Adjust for another 1 % of scale capacity decrease.

Again, the MWT shall reset the zero and the recording element shall indicate the change.

Continue to decrease the load simulating device in 1 % increments until the automatic-zero-setting mechanism no longer resets the zero.

Record the total amount of adjustment.

Return the load simulating device to the initial zero value. Increase the load simulating device in 1 % increments, verifying zero corrections and recordings until the MWT will no longer automatically reset the zero.

Record the value where automatic zero correction is restricted.

The total range of the automatic-zero-setting mechanism shall not exceed 10 % of the scale capacity.

5.1.4 The zero should move a maximum of ± 5 % either in its Yes ☐ No ☐ N/A ☐

automatic-zero setting mode or as manually adjusted.

5.2	To verify the ± 2 % range of the zero setting mechanism:	Yes ☐ No ☐ N/A ☐
5.2.1	Verify that the zero-setting range is limited to ± 2 %.	Yes ☐ No ☐ N/A ☐
5.2.2	Adjust the load simulating device to represent 5 % of the scale capacity.	Yes ☐ No ☐ N/A ☐
5.2.3	Zero the scale.	
5.2.4	Adjust the load simulating device representative of a 1 % of scale capacity decrease; the automatic-zero-setting mechanism shall reset the zero of the scale. Adjust for another 1 % of scale capacity decrease. Again, the MWT shall reset the zero. Continue to decrease the load simulating device in 1 % increments until the automatic-zero-setting mechanism no longer resets the zero. Record the total amount of adjustment. Return the load simulating device to the value initial zero value. Increase the load simulating device in 1 % increments, verifying zero corrections, until the MWT will no longer automatically reset the zero. Record the value where automatic zero correction is restricted. The total range of the automatic-zero-setting mechanism shall not exceed 4 % of the scale capacity.	Yes ☐ No ☐ N/A ☐
5.2.5	The zero should move a maximum of ± 2 % either in its automatic-zero setting mode or as manually adjusted.	Yes ☐ No ☐ N/A ☐
5.3	The zero-setting operation shall be performed only after a whole number of belt revolutions and at least 3 minutes of operation.	Yes ☐ No ☐ N/A ☐
5.4	The completion of the automatic zero-setting operation must be indicated.	Yes ☐ No ☐ N/A ☐
5.5	The range of the zero-setting mechanism must be limited to ± 2 % or ± 5 % of the capacity of the scale without breaking a security means.	Yes ☐ No ☐ N/A ☐
5.6	An audio or visual signal shall be given when the automatic and semi-automatic Zero-setting mechanisms reach the limit of adjustment.	Yes ☐ No ☐ N/A ☐

6. Sensitivity at Zero Load

The purpose of this requirement is to assure that the MWT has sufficient resolution and sensitivity to establish a good zero reference value. The manufacturer may specify an alternate test procedure to demonstrate the required sensitivity. The no-flow lockout must be deactivated for this test.

6.1	Adjust the load simulating device to represent the weight required to determine compliance based on the equation:	Yes ☐ No ☐ N/A ☐

$$\frac{2*W_c}{C_m}$$

For example: $\frac{2*500}{1000} = 1$ lb

Where: C_m = counts in dynamic weighing scale divisions required for the minimum totalized load

W_c = weight required to reach the static scale capacity of the weighbridge.

Static scale capacity = (maximum weight/foot)(length of weighbridge)

6.2 Operate the scale for a time equal to the time required to deliver the minimum totalized load.

6.2.1 Record the time period: _____ minutes.

6.3 The totalizer shall advance at least one but not more than three divisions. Yes ☐ No ☐ N/A ☐

6.3.1 Record the quantity registered: _____ divisions.

6.4 The MWT has the sensitivity specified at zero. Yes ☐ No ☐ N/A ☐

7. Marking Requirements

7.1 The marking of the MWT shall meet the requirements established during the initial CC evaluation. Yes ☐ No ☐ N/A ☐

8. Provisions for Metrological Sealing of Adjustable Components or Audit Trail

Due to the ease of adjusting the accuracy of electronic MWTs, all MWT's must provide for a security seal that must be broken or provide an audit trail, before any adjustment that detrimentally affects the performance of the electronic device can be made. Only metrological parameters that can affect the measurement features that have a significant potential for fraud and features or parameters whose range extends beyond that appropriate for the device compliance with HB 44 or the suitability of equipment, shall be sealed.

For additional information on the proper design and operation of the different forms of audit trail, see the Appendix for Audit Trail

8.1 The device has the capability for a physical seal. Yes ☐ No ☐ N/A ☐

8.2 The device meets the requirements for Audit Trail. Yes ☐ No ☐ N/A ☐

9. RFI/EMI Environment

The equipment shall be suitable for the environment in which it is intended to be used, including resistance to electromagnetic and radio-frequency interference generated by electromechanical equipment, portable hand-held radio transmitters and citizen's band transmitting equipment (if normally used at the site of installation).

9.1 The instrument meets standard NTEP RFI/EMI influence requirements. Yes ☐ No ☐ N/A ☐

10. Laboratory Test Procedures

A. Technical Policy

The MWT is to be placed in the environmental chamber to determine performance with respect to influence factors. It is not necessary to re-rest a previously type approved weighbridges, speed sensors or ancillary devices. It is not necessary, nor recommended, that signal simulators for load and speed be located in the chamber. The simulated test loads to be used for the MWT evaluation shall be equal to the signal levels from the actual tests loads used during the initial type evaluation.

B. Initial Tests

1. Determine and record the load simulating device setting for zero and full scale ranges.
2. Calibrate the MWT at 20 °C.
3. Conduct the sensitivity test at zero load.
4. Verify that the range of the automatic zero setting mechanism(s) do not exceed ±2 % and ±5 % of capacity.
5. Test the alarms for flow rates below 20 % and above 100 % of rated capacity.

Once the laboratory test is started, after completion of the voltage tests, neither the zero nor the span are to be adjusted. The data should be normalized for the many tests.

The laboratory tests consist of a combination of simulated dynamic tests. These tests require adjusting a load simulating device and a speed simulating device to pre-calculated values and conducting a simulation of belt travel distances, integrating the weight on the MWT.

C. Soak Requirements

The laboratory test is to be run at 20 °C, the upper temperature limit and the lower temperature limit. The surface temperature of the MWT is to be measured. In consultation with the manufacturer, place the temperature sensor on the portion of the MWT that is expected to be the last part to reach thermal equilibrium. After the surface temperature has reached the test temperature, allow the equipment to soak for at least an additional two hours, but not more than six hours, before starting the test. For convenience of the test, however, an overnight period may be used for the soak period before running the next temperature test.

1. Stabilize the temperature at 20 °C.
2. Enable the speed simulating device for a constant signal level.
3. Deactivate the automatic zero setting mechanism and no-flow lock-out.
4. Zero the MWT.

The MWT shall have sufficient resolution (that is a sufficiently small dynamic scale division) to permit this test to be completed in the greater of 20 minutes, or for a time equivalent to the test time required for the test run at 35 % of the minimum static capacity.

The beginning and ending MWT indications shall not change more than ± 1 scale division.

D. Voltage Tests

Verify the line power source, AC or DC, is set to the manufacturers recommended nominal value (i.e., 120 VAC or 24 VDC)

1. Run an accuracy test at 98 % of scale capacity for the time to deliver 800d.
2. Reduce the line power supply to 85 % of nominal (i.e., 100 VAC or 20.4 VDC).
3. Run a zero test.
4. Run an accuracy test at 98 % of scale capacity for the time to deliver 800d.
5. Increase the line power supply to 110 % of nominal (i.e., 130 VAC or 26.4 VDC).
6. Run a zero test.
7. Run an accuracy test at 98 % of scale capacity for the time to deliver 800d.

8. Return the line power supply to the nominal value.

E. Temperature Tests

1. Run a zero test.
2. Do not reset zero or adjust the span at any time after the start of this test.
3. Adjust the load simulating device to achieve the desired load representations.
4. Test the MWT simulating dynamic operation of the belt conveyor scale system at the following "flow rates" (all percent values represent percent loads of static scale capacity (SSC)):

0 (zero test), 35 % (SSC_{min}), 35 %, 70 %, 98 %,

Leave the MWT under simulated load for 1 hour, then:

98 %, 70 %, 35 %, 35 % (SSC_{min}), and 0 (zero test)

Table T.3

Percent of Static Scale Capacity	Nominal Time (Minutes)	Equivalent Belt Travel
0	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater	_____
35 % of SSC_{min}	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater	_____
35 % of SSC_{max}	Time to deliver 800d	
70 % of SSC_{max}	Time to deliver 800d	
98 % of SSC_{max}	Time to deliver 800d	
Leave MWT under simulated load for 1 hour		
98 % of SSC_{max}	Time to deliver 800d	
70 % of SSC_{max}	Time to deliver 800d	
35 % of SSC_{max}	Time to deliver 800d	
35 % of SSC_{min}	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater	_____
0	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater	_____

The tolerance to be applied for the laboratory test is set at 0.45 times the tolerance for the complete installation times 0.3 (30 %). The formula is shown in Table T.4 to illustrate the process. The reference value for a particular accuracy test is the simulated load times the simulated belt travel distance. The values to be used for the laboratory test are shown in the following example:

F. 98 % load – Zero load test = difference

Proportion the effect of the zero-load test to the time of the tests for each simulated load. The values for the differences represent the simulated material measured by the MWT and are compared to the reference value for accuracy.

1. Change the temperature to − 10 °C (14 °F) at a rate no faster than 1 °C/min following the "soak requirements."
2. Repeat the simulated dynamic tests.

3. Change the temperature to 40 °C (104 °F) at a rate no faster than 1 °C/min following the "soak requirements."
4. Repeat the simulated dynamic tests.
5. Change the temperature to 20 °C (68 °F) at a rate no faster than 1 °C/min following the "soak requirements."
6. Repeat the simulated dynamic tests.

G. Data Analysis

1. The data are evaluated on the Simulated Dynamic MWT Test Work Sheet, Item 14 and 15, for pass or fail.

11. Field Test

A field test is required prior to final type approval. The field test can be performed as a retrofit on a previously approved for commercial use belt-conveyor scale system or in a new application. The Field Test Procedures as defined in paragraph 13 of the initial belt-conveyor scale Type Evaluation section of Publication 14 and as defined in HB 44 are to be followed. The results of all tests must be within acceptance tolerances.

12. Permanence Test

A permanence test is conducted to determine the accuracy of the device in use over a period of time. The permanence test shall be conducted after a minimum of 20 days after successful completion of the initial performance test, and after a minimum volume of material has been transported across the belt-conveyor scale. This minimum volume of material shall be no less than the maximum scale capacity times 8 hours times 20 days. (i.e. A system with a maximum scale capacity of 1000 TPH requires a minimum volume of 160 000 tons [1000 * 8 * 20] to have been transported prior to the permanence test.). The results of all tests must be within acceptance tolerances.

The permanence test shall include:

1. initial stable zero tests
2. at least two test loads at normal use capacity
3. simulated load tests
4. verification of audit trail recorded events

13. Data Sheet and Laboratory Test Procedure

Temperature Testing: Belt-Conveyor Scale Systems Code paragraphs T.3.1., T.3.1.1., T.3.1.2. The accuracy of the MWT is to be adjusted at 70 % of the static scale capacity (SSC). A weight display of 0.01 % (1 part in 10 000) is required for the laboratory tests. The allowable error is adjusted to 30 % of the allowable error for the entire system type approval. If tests are run for a time greater than that needed for the minimum test load (MTL), substitute the totalized load (TL) for the MTL in the tolerance calculation in Test Conditions, step 3 (Table T.4).

Table T.4				
Device Parameters	**Abbrev.**	**Maximum**	**Minimum**	**Dim**
1. Load per unit length from existing CC; corresponds to the largest capacity and the lowest capacity rating	BL			lb/ft
2. Length of the weighbridge (inches) from existing CC				In
3. Belt Speed from existing CC	SP			ft/min
4. Determine scale capacity in units per hour SC=SP*BL*60/2000 (must correspond to existing CC)	SC			ton/hr
5. Record the static scale capacity in units of weight SSC=(maximum weight per foot)(length of weighbridge)	SSC			lb
6. Allowable zero error for temperature change of 10 °C (18 °F) AZE=(.003)(0.0007)(SC_{min})(time)/60 where "time" is the time of the zero test in minutes	AZE			ton
7. Size of scale division required for zero	SD			ton
8. Determine the minimum and maximum totalized loads	MTL			ton
Test Conditions	**Abbrev.**			
1. Determine the time in minutes to acquire MTL with the test load to be simulated in the laboratory.	Test load, pound/foot			lb/ft
	Test load, total			lb
	Time (minutes) to deliver MTL (at least 10 minutes)	Time		min
2. Determine number of belt travel sensor revolutions required for the above time. Manufacturer to provide revolutions per foot or pulses per foot as appropriate to determine 3 belt revolutions and a delivery of 800d.		BTR		revolutions
3. Allowable weighing error (units of weight) for simulated dynamic tests which will be divisions on master weight totalizer. AWE = (0.003)(0.45)(0.005)(TL)	AWE			ton

Table T.5
Initial Tests
1. Set up the unit at 20 °C (68 °F), zero the MWT, and adjust the span following the manufacturer's procedure.
2. Conduct the sensitivity test at zero load.
3. Verify that the range of the automatic zero setting mechanism(s) do not exceed ± 2 % and ± 5 % of capacity.
4. Test the alarms for flow rates below 20 % and over 100 % of scale capacity.

Table T.6
Laboratory Tests
1. Stabilize the temperature at 20 °C.
2. Enable the speed simulator to represent 100 % speed.
3. Deactivate the automatic zero setting mechanism and zero the MWT.
4. Run a zero test.
Voltage tests
5. Run an accuracy test at 98 % of scale capacity for the time to deliver 800d.
6. Reduce the live voltage to 85 % of nominal.
7. Run a zero test.
8. Run an accuracy test at 98 % of scale capacity for the time to deliver 800d.
9. Increase the line voltage to 110 % of nominal.
10. Run a zero test.
11. Run an accuracy test at 98 % of scale capacity for the time to deliver 800d.
12. Return the live supply to nominal.
Temperature Tests
13. Run a zero test. Do not reset zero or adjust the span at any time after the start of this test.
14. Adjust the load simulating device to represent normal loading of the scale (70 % of scale capacity).
15. At 20 °C, test the MWT dynamically with simulation of the load and speed. Test the MWT at the following "flow rates" (all percent values represent percent loads of static scale capacity): 0 (zero test); 35 %(SSC_{min}); 35 %; 70 %; 98 %. Then, leave the MWT at full load for 1 hour and test at the following flowrates: 98 %; 70 %; 35 %; 35 %(SSC_{min}); and 0 (zero test).

Table T.7			
Percent of Static Scale Capacity	**Time (Minutes)**	**Totalaized Load TL (ton)**	**Tolerance AWE= (0.003)(0.45)(0.005)(TL)**
0	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater		
35 % of SSC_{min}	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater		

35 % of SSC_{max}	Time to deliver 800d		
70 % of SSC_{max}	Time to deliver 800d		
98 % of SSC_{max}	Time to deliver 800d		
Leave MWT under simulated load for 1 hour			
98 % of SSC_{max}	Time to deliver 800d		
70 % of SSC_{max}	Time to deliver 800d		
35 % of SSC_{max}	Time to deliver 800d		
35 % of SSC_{min}	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater		
0	20 minutes, or $MTL_{min}/[(0.35)(BL_{min})$(belt speed for test)], whichever is greater		

Table T.8
Laboratory Tests *continued*
16. Change the temperature to − 10 °C (14 °F) at a rate no faster than 1 °C/min. Follow soak requirements.
17. Repeat the simulated dynamic tests performed in step 15 (Table T.6)
18. Change the temperature to 40 °C (104 °F) at a rate no faster than 1 °C/min. Follow soak requirements.
19. Repeat the simulated dynamic tests performed in step 15 (Table T.6)
20. Change the temperature to 20 °C (68 °F) at a rate no faster than 1 °C/min. Follow soak requirements
21. Repeat the simulated dynamic tests performed in step 15 (Table T.6)
Data Analysis
1. The data are evaluated on the following Simulated Dynamic MWT Test Work Sheets for pass or fail
2. Approval is for addition of MWT to existing Certificate of Conformance without changes to minimum and maximum ranges.

14. Dynamic MWT Test Work Sheet and Laboratory Test Procedure No. 1

The calibration point is the 70 % load for the initial room temperature (20 °C) test. Because the weight indication when in the test mode may not be at zero and may not be adjusted to indicate n weight values (e.g., the quantity indication may be voltage output or "counts." the table provides for calculations to convert indications into weight units). The scale indication shall not be zeroed during the test process. Corrections for the change in zero tests are to be done by calculation.

Places to record information needed for the test and the formulae needed to compute table entries are given below.

Static Scale Capacity, SSC = (maximum weight per foot)(length of weighbridge) = _____ lb.

Test load for 70 % SSC = _____ lb.

Weight/foot = (static scale load)/(length of weighbridge) = Static scale capacity)/(length of weighbridge)

Start and end readings are in divisions and must be converted to weight values.

Conversion factor for divisions to weight = (change in static weight indication from zero to 70 % SSC load) / (70 % SSC load in pounds)

Change in zero = (Total change of zero during zero test) {(time of test for applied load)/(time of zero test)}

Indication corrected for change of zero = (Indicated change) – (Change of zero)

Scale indication in lb = (Indication corrected for change of zero) / (Conversion factor)

Actual weight = {(Applied load)/(length of weighbridge)}(speed)(time)

Note: Speed and time must use the same units of time (e.g., feet per minute and minutes)

Error = Scale indication – actual weight

Tolerance is from the Belt-Conveyor Scale Data Sheet and Laboratory Test Procedure, step 3.

15. Dynamic MWT Test Work Sheet and Laboratory Test Procedure No. 2

Scale indication at zero load (static scale indication) = _____ divisions

(Not required if MWT can display static weight)

Scale indication at 70 % SSC (static scale indication) = _____ divisions (Not required if MWT can display static weight)

Conversion factor = (change in static weight indication from zero to 70 % SSC load) / (70 % AAC load in pounds) = divisions/lb

Temperature_____ °C

Type of Tests_____ Signature_____

Table T.9

Test Load (lb)	Applied load (lb)	Time of test in minutes	Reading in counts		Indicated Change = End – Start	Change in Zero	Indication corrected for change in zero	Scale Indication (lb)	Actual Weight	Error (lb)	Tolerance (lb)
			End	Start							
Zero test	0										
35 % SSC_{min}											
35 % SSC_{max}											
70 % SSC_{max}											
98 % SSC_{max}											
Leave scale under simulated load for 1 hour											
98 % SSC_{max}											
70 % SSC_{max}											
35 % SSC_{max}											
35 % SSC_{min}											
Zero test	0										

16. Zero Change with Respect to Temperature

Table T.10							
	Low Temperature		**High Temperature**		**20 °C**		**Performance limit for temperature effect on zero test, AZE, per 10 °C**
Previous Temperature T_P	**20 °C**						
Current Temperature T_C					**20 °C**		
Change in Temperature ($T_C - T_P$)							
	Divisions	**lb**	**Divisions**	**lb**	**Divisions**	**lb**	
Zero load indication at T_P							
Zero load indication at T_C							
Change in zero							
Change in zero per 5 °C (9 °F)							

Date: _____

Indicator Model Number:_____ Indicator Serial Number:_____

_____ _____

Signature **Title**

2. Develop a List of Sealable Parameters for BCS Systems

Background: During the Sector's February 2008 meeting, members were asked to develop a list of programmable parameters within belt-conveyor scale systems which should have access restricted by means of some form of security seal. In developing this list, members were asked to consider all instruments which would have any metrological effect to the system. Mr. Paul Chase agreed to poll those manufacturers which currently hold NTEP certificates in order to develop a list of parameters that would be inclusive of the different design types. The resulting list was intended to be incorporated in NCWM Publication 14 and used in the type evaluation process.

A copy of the "Requirements for Metrological Audit Trails" from NCWM Publication 14 was provided to Sector members prior to the meeting for a review and discussion and recommendations.

Discussion: During the February 2009 Sector meeting, Mr. Chase indicated that he did not receive replies from all the manufacturers polled. Some members stated during the 2009 meeting that not all manufacturers give similar parameters within their particular devices, the same name, or terminology as do other manufactures do. Also,

pointed out during discussion were situations where several (if not all) programmable parameters could have access limited through the use of one security seal, and what consequence this type of situation has on the development of a list that is useful to an NTEP evaluator. Mr. Ian Burrell stated that an adjustable parameter (such as span adjustment) may, in some systems, involve more than one component or module, and thereby, require the use of more than just one seal to limit access to a single parameter.

Mr. Jim Truex, NTEP Administrator, stated that NTEP evaluators require some foundation to base the test procedures on when various devices go through the type approval process. There was discussion among the members about various specific features (e.g., coarse zero adjustment; high/low flow alarm settings; etc.) that may be found on a device and whether or not to require a security seal to limit access.

Conclusion: The following table was initially developed showing what parameters should be protected by limiting access to them through a security seal or other security means. The Sector agreed that this table is simply a generic basis for the evaluator to use as a starting point, and the need to seal additional features would be assessed on a case-by-case basis for each manufacturer during the application for type evaluation.

Mr. Truex stated that NTEP evaluators will employ this table on a trial basis and note and comment on any changes that are deemed necessary.

Belt-Conveyor Scale Features and Parameters

Typical Features to be Sealed	Typical Features and Parameters Not Required to be Sealed
• Official verification zero reference • Official verification span/calibration reference • Linearity correction values • Allowable range of zero (if adjustable) • Selection of measurement units • Division value, d • Range of over capacity indications (if it can be set to extend beyond regulatory limits) • Alarm limits for flow rate (high/low) • Automatic zero-setting mechanism (on/off) • Automatic zero-setting mechanism (range of a single step) • Configuration (speed, capacity, calibrated test weight value if applicable, pulses per belt revolution, load cell configuration,)	• Display update rate • Baud rate for electronic data transfer • Communications (Configuration of input, output signal to peripheral devices)

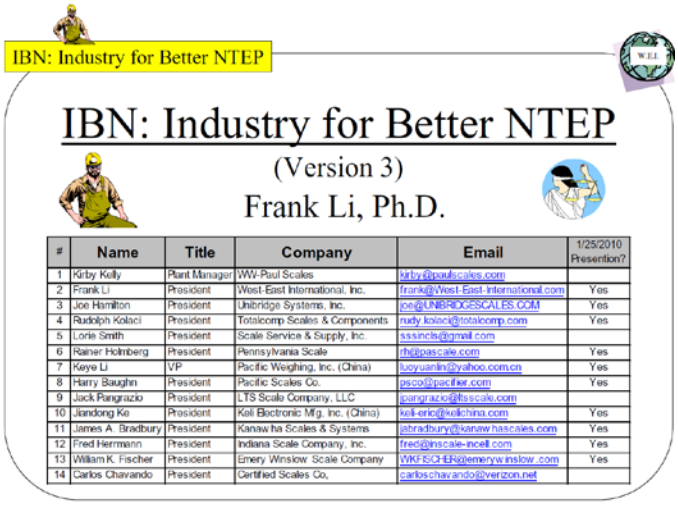
NOTE: *The above examples of adjustments, parameters, and features to be sealed are to be considered "typical" or "normal." This list may not be all inclusive, and there may be parameters other than those listed which affect the metrological performance of the device and must, therefore, be sealed. If listed parameters or other parameters which may affect the metrological function of the device are not sealed, the manufacturer must demonstrate that the parameter will not affect the metrological performance of the device (i.e., all settings comply with the most stringent requirements of Handbook 44 for the applications for which the device is to be used).*

Attendees			
Steve Cook	NIST	(301) 975-4003	steven.cook@nist.gov
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Al Page	Montana Dept. of Agric.	(406) 841-2058	awp88bb@gmail.com
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Johnie Nix	Alabama Weights & Measures	(334) 240-7133	nix.johnie@agi.alabama.gov

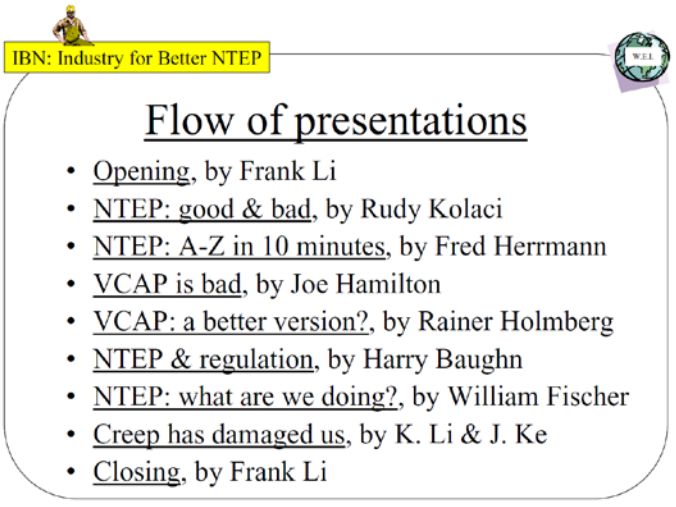
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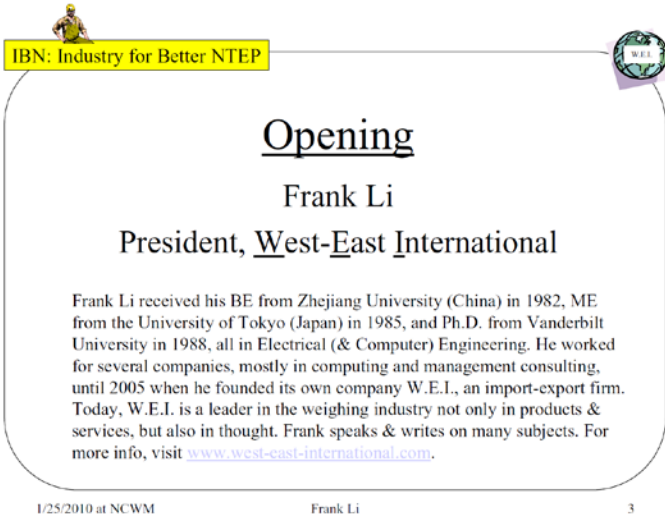
APPENDIX F

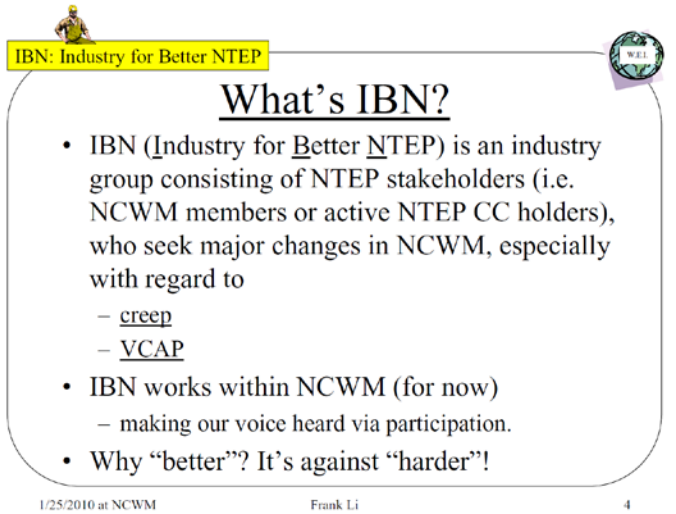
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#	Name	Title	Company	Email	1/25/2010 Presention?
1	Kirby Kelly	Plant Manager	WW-Paul Scales	kirby@paulscales.com	
2	Frank Li	President	West-East International, Inc.	frank@West-East-International.com	Yes
3	Joe Hamilton	President	Unibridge Systems, Inc.	joe@UNIBRIDGESCALES.COM	Yes
4	Rudolph Kolaci	President	Totalcomp Scales & Components	rudy.kolaci@totalcomp.com	Yes
5	Lorie Smith	President	Scale Service & Supply, Inc.	sssincla@gmail.com	
6	Rainer Holmberg	President	Pennsylvania Scale	rh@pascale.com	Yes
7	Keye Li	VP	Pacific Weighing, Inc. (China)	luoyuanlin@yahoo.com.cn	Yes
8	Harry Baughn	President	Pacific Scales Co.	psco@pacifier.com	Yes
9	Jack Pangrazio	President	LTS Scale Company, LLC	jpangrazio@ltsscale.com	
10	Jiandong Ke	President	Keli Electronic Mfg. Inc. (China)	keli-eric@kelichina.com	Yes
11	James A. Bradbury	President	Kanawha Scales & Systems	jabradbury@kanawhascales.com	Yes
12	Fred Herrmann	President	Indiana Scale Company, Inc.	fred@inscale-incell.com	Yes
13	William K. Fischer	President	Emery Winslow Scale Company	WKFISCHER@emerywinslow.com	Yes
14	Carlos Chavando	President	Certified Scales Co,	carloschavando@verizon.net	







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Better vs. harder

- For the past 5 years at least, NTEP has been in the wrong direction of making it harder for the little and new guys through the introduction of such changes as
  - creep, which discriminates against the new guys.
  - VCAP, which discriminates against the little guys.
- Yes, we are talking about an organizational & systematic discrimination here, on top of anti-competitiveness!

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Creep in analogy

- Until 2005, the "standard" required that, in order to sell cars in the US, a car manufacturer demonstrate that it can produce a sample car capable of exceeding 100 miles/hour. 1000 CCs were issued (Group A).
- In 2006, the "standard" was raised to 150 miles. 200 CCs were issued (Group B).
  - The change was for the new guys only, leaving existing CCs as-is.
- In 2009, the "standard" was lowered to 125 miles. 40 CCs were issued (Group C).
  - Again, this was for the new guys only, leaving existing CCs as-is.
- As a result, Group A does not meet the current standard in HB44 (while Group B exceeds it). Most problematically, NCWM has no plan to remotely address this issue.

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VCAP in analogy

- An auditor comes to your company and asks you to sign on a piece of paper, promising that all the cars you make will be "consistent with the sample car previously certified" or your CCs may be cancelled.
  - This will be done despite the fact that Group A does not meet the current (creep) standard in HB44.
    - This is a discrimination against the new guys (groups B and C).
- The auditor will check your Q/A program, fill out a form, and submit it to an authority who will decide the fate of your CCs (and the fate of your company).
  - Obviously, this will be more work for the little guys.

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NTEP vs. VCAP

- NTEP: National Type Evaluation Program
  - It's type evaluation, not production evaluation!
  - It's capability demonstration, not product measurement!
- VCAP: Verified Conformity Assessment Program
  - It's rooted in "production meets type" from SMA
    - But which type to conform or meet? There are 3 "types" for creep alone and Group A does not meet the current creep "type" in HB44!
- VCAP redefines NTEP from type evaluation to production evaluation. In other words, by its very name & definition, NTEP lends itself to abuse!

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2 basic questions for NCWM

- What are you? Are you still a standards-setting org?
  - If yes, how could you have changed the creep standard several times without respecting the 1st principle (i.e. all conform to HB44)?
  - If no, what are you? Do you really want to become a 3-in-1 organization at the risk of destroying yourself?
- Why such a big organizational failure?
  - Who did you listen? Special interests (i.e. Industry representatives on the board, SMA, and consultants)!
  - Who should you represent? The silent majority! The little guys (i.e. ~80% of the industry) have spoken out, and will speak out more. But will you listen?

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Summary

- Restore the 1st principle (i.e. all conform to HB44) without exception nor discrimination!
  - Group A must all be re-certified to meet the current creep standard without exception.
  - If this cannot be done practically, NCWM must undo its changes on creep since 2006, or NCWM, as a standards-setting organization, must be abolished as a result of self-destruction.
- Immediately suspend all the new initiatives like VCAP before the 1st principle is restored.

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Concluding remarks – 1st one

- NCWM must change, both organizationally and philosophically. How?
  - Listen to the people, not special interests



Our next speaker is Rudy Kolaci of Totalcomp …

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Totalcomp Scales & Components

NTEP: good & bad

Rudy Kolaci

President, Totalcomp Scales & Components

Rudy Kolaci has over 45 years of experience in the weighing industry. In 1970, he founded Totalcomp Scales & Components, a wholesale distributor of electronic scales, balances and components. Prior to Totalcomp, Rudy was a regional Manager with Revere Corporation for 6 years handling a full line of load cells. Extensive experience was gained from 4 years engineering with Henderson Industries specializing in automatic batching systems. Basic scale experience came during 6 years with Fairbanks Scales. Rudy is a Mechanical Engineering graduate from New Jersey Institute of Technology.

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Totalcomp Scales & Components

My messages

- For the scale industry,
  - VCAP is bad
  - NTEP for load cells is bad
  - NTEP for scales is good

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Totalcomp Scales & Components

VCAP is bad (1)

- VCAP will be a detriment to the scale industry. It will raise costs and not provide a benefit for the consumer or the scale manufacturer.
- Verification of product quality should not be legislated or dictated by a government or private agency. Quality of a product should be the choice of the consumer and manufacturer. This should be the choice of a free market. The government or other agency should not determine a product's quality.

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Totalcomp Scales & Components

VCAP is bad (2)

- Market forces will determine which manufacturer will be successful and have a larger market share. If one manufacturer gets an excess number of red tags when being inspected by a weights & measures official, that brand will suffer in reduced or no sales of their equipment. It does not take long for the market to weed out the low quality scales from the market.
- The economic marketplace for weighing equipment will be stifled by VCAP. The increased costs will make manufacturers rethink planned new products and innovations.

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Totalcomp Scales & Components

NTEP for load cells is bad (1)

- NTEP, when applied to load cells, is a detriment to the scale industry. It will stifle innovation, new products and new companies from developing new products.
- For years after NTEP was introduced, load cells did not have NTEP certificates. At one point some of the larger load cell manufacturers wanted to push to have NTEP certificates for load cells thinking that the burden of getting a certificate would limit the competition. Their idea did not work. It did not stop new manufacturers from competing with them. It simply increased the cost of the load cell.
- There appears to be a conflict in the NCWM procedure when load cells need NTEP certificates but scales can have an NTEP certificate and use non-NTEP load cells. I noticed on certificate 08-008 a bench and counter scale uses a non-NTEP load cell. That means that when the load cell is repaired or replaced it would be replaced with a non-NTEP load cell. It seems contradictory that a counter scale can have a non-NTEP load cell but a truck scale must have an NTEP load cell.

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NTEP for load cells is bad (2)

- Innovation for load cells can be envisioned by this one example. New load cells can be made without temperature compensation when the microprocessor used by the scale or indicator does a more efficient job. The temperature can be sensed at the load cell with a thermister and the microprocessor will calibrate the scale including the effects of temperature changes. The result is a better and more accurate scale that costs less. The load cells can be made more efficiently and quickly without the temperature requirement. Having an NTEP certificate requires that the load cell perform to specifications when subjected to a temperature range. The innovation would not be allowed if an NTEP certificate is required for this component of a scale. Luckily we do not need NTEP certificates for the other components.

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NTEP for load cells is bad (3)

- The load cell does not need an NTEP certificate. Just as the A/D converter doesn't have one. Just as the junction box doesn't have one. As well as the mounting hardware, eyebolts, potentiometers, resistors, integrated circuits, wire, capacitors, oscillators and other components used in building a scale that effect the accuracy. If any one of these items is faulty, poorly designed, improperly installed the scale will not work properly. Just as these items do not have NTEP certificates, the load cells do not need them either. The NTEP certificate for load cells should be discontinued.
- I think that we want the scale industry to flourish. We need to remove the restrictions that are imposed when an NTEP certificate is required for a load cell.

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Totalcomp Scales & Components

NTEP for scales is good (1)

- The initial concept of NTEP was well founded and I support it. Prior to NTEP each of the (50) states had their own standards for Type Approval. The scale manufacturer had to get separate approval from each state to be able to sell "legal for trade" scales in that particular state. NTEP simplified that process and reduced it from (50) to (1). That was a good cost savings and the consumer benefited because the lower overhead cost for simpler approval was passed on with lower prices for their weighing equipment.
- The sealing of a "Legal for Trade" scale by a local Weights & Measures official was the confidence builder that both the consumer and merchant needed to be assured that the scale was accurate and neither of them would be cheated. To this day it is still the most important task of the government to make sure that scales are accurate. This can only be done with local testing.

1/25/2010 at NCWM Rudy Kolaci 19

IBN: Industry for Better NTEP

Totalcomp Scales & Components

NTEP for scales is good (2)

- So many things can go wrong that would make a scale weigh inaccurately. A few stones crushed in between a truck scale platform and the foundation coping. A build-up of fat and grease in a poultry scale. A scale that was accidentally dropped and became slightly bent. A scale that was overloaded and not recalibrated. The list can go on and on. The merchant that owns the scale wants to make sure that they are not being cheated and the weights & measures inspector will make sure the scale is accurate for both buyer and seller.
- VCAP will not help to improve this condition. Nor will NTEP for load cells. They will simply add additional burdens to the scale manufacturer. This additional costs will be added on to the cost of the scale and the purchaser of the scale will pay more and get no benefit from the VCAP program nor from having NTEP for load cells. All the problems previously mentioned can still happen. VCAP and NTEP for load cells will still be a waste of time and money.

1/25/2010 at NCWM Rudy Kolaci 20

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Totalcomp Scales & Components

NTEP for scales is good (3)

- The local testing of scales by weights & measurers officials should continue and be encouraged to expand to make sure that all "Legal for Trade" scales are sealed often to assure that both the consumer and merchant benefit from accurate weights.

1/25/2010 at NCWM Rudy Kolaci 21

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Totalcomp Scales & Components

Summary

- VCAP: Stop it immediately.
- NTEP for load cells: Eliminate it asap.
- NTEP for scales: Make it better and keep it strong!

1/25/2010 at NCWM Rudy Kolaci 22

IBN: Industry for Better NTEP INSCALE

NTEP: A-Z in 10 minutes

Fred Herrmann

President, Indiana Scale

Fred Herrmann is the founder of Indiana Scale Company. He started in the scale industry 45 years ago and worked for Fairbanks, Hardy, Revere and Emery-Winslow. He has experience in field sales and service, manufacturing, engineering and marketing.

His background is electronics. He holds a patent for the Versadeck clean-in-place floor scale.

1/25/2010 at NCWM Fred Herrmann 23

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NTEP: back to its early days

- I personally know some of the men who were originally involved in NTEP and it stems from the SMA. The people writing the specs were load cell people. The others were scale people with little, if any, knowledge of load cells, but thought NTEP would be a neat way to stifle the little guys beating on their doors. Unfortunately, NTEP leveled the playing field and opened the door to anyone. The Bailey-Hazen Road all over again!

1/25/2010 at NCWM Fred Herrmann 24

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NTEP: single-cell testing

- Testing of compression or beam cells used (always) in multi-cell scales to capacity is silly. Applying a full-capacity specification does not reflect real use of cells that, for floor scales, can never be used at over 50% of capacity.
- The people who authored these specs had no practical knowledge of actual scale use and I would speculate that most of them had never actually seen a scale in situation.

1/25/2010 at NCWM Fred Herrmann 25

IBN: Industry for Better NTEP INSCALE

NTEP & OIML (1)

- 30+ years ago, some well-intentioned Americans traveled to Europe to learn how to harmonize U.S. weight regulations with Europe's OIML, so that we could export scales that would be accepted by France, Germany, etc. The result was incorporated into our NTEP. Free trade was never accomplished (due, in large part, to strong protectionism on the part of France), but we remain today with the ill effects of a well-intentioned but obsolete effort.

1/25/2010 at NCWM Fred Herrmann 26

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NTEP & OIML (2)

- The resultant “NTEP" and its “production meets type" is inarguably good. What is NOT good is a leftover requirement which mimicked OIML and was required by the E.U.. Since free trade never resulted, the sole blanket application within the U.S. to ALL scales does not make sense. For instance, European retail scales are largely used outdoors in open-air stalls, while U.S. retail scales are used indoors in supermarkets at constant temperature.

1/25/2010 at NCWM Fred Herrmann 27

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The cost of T.N.8 (1)

- My observations while employed at Revere in the 80's (probably not changed much since): To test and certify a floor scale shear beam load cell (used here as a most common example) requires a weight test under load at several points and at several temperature excursions. This can only be accomplished using a testing machine which incorporates a stack of calibrated weights applied to the load cell while cycling through hot, cold and room temperature, the cell being housed in an environmental chamber at the top. This process necessitates a soaking time for each change. The whole test of weights applied from zero in steps to capacity and down again while cycling the temperature requires a lab time of 8 HOURS for EACH cell! This is not possible in a process which must produce several thousand cells per month. Imagine also what the product would cost.

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INSCALE

The cost of T.N.8 (2)

- Since no one can do this in practice, how is it accomplished? Statistical process control, which means a sample (2%?) is tested from each batch. Maybe.
- At Revere, the solution was to simply ignore T.N.8 after NTEP testing and certification was obtained.
- I would submit that this is the practice at most load cell manufacturers today. I would also bet that if you pull a random cell from ANYONE, it probably would not pass.
- You force the manufacturer to be duplicitous to achieve a standard that is meaningless. How wise is that?

1/25/2010 at NCWM Fred Herrmann 29

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T.N.8 should be changed!

- I believe the whole subject of "T.N.8" in temperature in the HB 44 should be discontinued or modified as it serves no useful metrological purpose on all but a few electronic scales used outdoors such as truck scales.

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On creep

- Creep has very little practical meaning in industrial scales. Most have a less than 1% actual duty cycle and items are never left on the scale in commercial weighing applications. Where they are left on the scale for periods of time, as in down-weighing, this is usually an in-house weighing application not for trade.

1/25/2010 at NCWM Fred Herrmann 31

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INSCALE

Summary

- It is about time to add some pragmatism to this whole NTEP thing and stop damaging our industry and our competitiveness with unnecessary costs like VCAP!

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UniBridge SCALE SYSTEMS

VCAP is Bad

Joe Hamilton

President, Unibridge Systems, Inc.

Joe has 39 years of working experience. Right after receiving his BS in Agricultural Engineering from Oklahoma State University in 1971, Joe founded Oklahoma Industries and Engineering, which began with design and fabrication of cattle equipment. In 1985, Joe founded UniBridge Systems, manufacturing weighing systems.

Joe holds a US patent (4,828,055) on "UniLatch" bridge connection system, which has been in production since 1988 and incorporated into both electronic and mechanical weighing systems.

1/25/2010 at NCWM Joe Hamilton 33

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UniBridge SCALE SYSTEMS

Quotes from NCWM's website

- The NTEP for National Standards "maintains equity in the marketplace" and for manufacturers "comply with these standards without incurring costs of multiple redesigns or marketing delays" and various weights and measures jurisdictions "have confidence that these newly designed devices are capable of meeting the applicable weight and measures standards", "the answer to these …is the National Type Evaluation Program." "It provides a one-stop evaluation process that satisfies the initial requirements for introduction of weighing and measuring devices in the U.S." "Ultimately, the savings that result from the efficiency of this process are passed along to consumers, making early type evaluation an integral link in the U.S. production chain."

1/25/2010 at NCWM Joe Hamilton 34

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UniBridge SCALE SYSTEMS

NTEP for scales is good

- After successful evaluation of a device, the product can be sold and used in "legal for trade" applications. The further testing of the devices is performed by the states (and companies licensed to perform testing) in which the devices are installed. If the device(s) fail to meet specifications for commercial weighing set forth by the government, they are taken out of service. This is the system that is in place and insures both the consumer and the retailer equity in the marketplace.

1/25/2010 at NCWM Joe Hamilton 35

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UniBridge SCALE SYSTEMS

NTEP for load cells is bad

- The additional load cell testing done several years ago in which product was picked up at random and tested at the expense of NIST did not result in the desired outcome (the small manufacturers provided product that tested as well as the large manufacturers).
- VCAP is yet another intrusion in the manufacturing process with the only guarantee is that the cost with increase.

1/25/2010 at NCWM Joe Hamilton 36

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UniBridge SCALE SYSTEMS

VCAP is bad (1)

- VCAP is another attempt to shut down the small manufacturer since the cost is spread over fewer items produced and this program is funded at the expense of the manufacturer. The initiation of yet another program to conduct further testing is designed to:
  - Generate additional funds for bureaucratic entities.
  - Eliminate competition in the marketplace from smaller manufacturers.
  - Increase consumer cost (which was supposed to be reduced by the NTEP program).

1/25/2010 at NCWM Joe Hamilton 37

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UniBridge SCALE SYSTEMS

VCAP is bad (2)

- At a time when global economy and jobs are a priority, this is not a sound policy.
  - Where is this demand originating?
  - Is it the consumer, the retailer, or a design to eliminate competition and create more bureaucratic interference?

1/25/2010 at NCWM Joe Hamilton 38

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UniBridge SCALE SYSTEMS

Summary

- VCAP is, in no way, designed to benefit the consumer or help the manufacturer become more competitive in the global marketplace.
- VCAP goes against what NCWM is supposed to be standing for, as quoted at the beginning.

1/25/2010 at NCWM Joe Hamilton 39

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PENNSYLVANIA

VCAP: a better version?

Rainer Holmberg

President, Pennsylvania Scale

Rainer has 36 years of experience in electrical engineering. He worked for A. H. Emery, Revere, BLH, Consolidated Controls, Emery Winslow and Pennsylvania Scale.

1/25/2010 at NCWM Rainer Holmberg 40

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PENNSYLVANIA

Current VCAP is bad

- Cost is too high
  - VCAP puts almost all its cost to the manufacturers, thus continuing a growing trend in redundancy to protect consumers without regard to the added cost, which will be passed on to the same consumers.
  - We test prior to submission for a CC. NTEP lab testing fees continue to escalate. Adding VCAP fees without regard to these costs is not in the best interest of the business or consumer.
- It's very flawed: I endorsed Steve Patoray's open letter (i.e. the 3-legged stool) before and I hereby endorse it again, with an addition.

1/25/2010 at NCWM Rainer Holmberg 41

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PENNSYLVANIA

A better VCAP?

- Patoray's 3-legged stool can be described as follows:
  - Certificate Review. An administrative review of NTEP CCs to ensure their compliance with the requirements.
    - Obviously, Group A (as described in the opening) does not meet the current creep requirement in HB44. NCWM must address this.
  - Initial Verification
  - VCAP
- Add the 4th leg: VCAP certified manufacturers can perform Type Evaluation themselves.

1/25/2010 at NCWM Rainer Holmberg 42

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PENNSYLVANIA

Summary

- VCAP, in its current form, is unacceptable.
- Patoray's 3-legged stool is a valid place to begin VCAP.
  - Do not cut corners, or it would be a disaster for the industry and most likely for NCWM.
- Reduce redundancy – Certify manufacturers.

1/25/2010 at NCWM Rainer Holmberg 43

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NTEP & regulation

Harry Baughn

President, Pacific Scales

I have my partner Lee Offield speak for me.

Lee is an 83-year-old gentleman full of wisdom. In 1949, Lee started purchasing scales for various plants he managed. In 1959, he entered the scale industry. He worked for a major scale company for 14 years before becoming independent. Today Lee feels passionately about the debate on NTEP and VCAP. Lee said, "being involved in the industry for 61 years, I feel uniquely qualified to make some statements."

1/25/2010 at NCWM Harry Baughn 44

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83-year-old man's words

- When you sold a scale to perform a particular function, you sold it with the understanding that it would pass Weights and Measures tests. Then NTEP stepped in and people got lazy relying on manufacturers to produce quality equipment, only to find out that in some instants the equipment submitted for NTEP was a higher quality than that produced later.
- I realize that I'm from the old school. But I think that we are over-regulated already. A scale can be NTEPed but still be unacceptable for the use it was sold to perform. More regulations will not assure a weighing device be acceptable. You must rely on the final inspection at the job site.

1/25/2010 at NCWM Lee Offield 45

IBN: Industry for Better NTEP

Emery Winslow

NTEP: what are we doing?

William Fischer

President, Emery Winslow Scale

I hereby publish the letter from Walter Young, Emery's Chairman & CEO, to Rudy Kolaci, president of Totalcomp.

Walter is an 87-year-old gentleman who regards himself as "perhaps the most active senior in the industry." A WWII veteran, Walter served in North Africa and Europe. He received a mechanical engineering degree with post graduate work in electrical engineering. He joined Richardson Scale in 1948. In the early 1960s, Richardson Scale merged with Howe Scale to become Howe Richardson Scale. Walter served as its president until he joined The A. H. Emery Co (now Emery Winslow Scale) in 1973. Walter served as SMA's president 1969-1971.

1/25/2010 at NCWM William Fischer 46

IBN: Industry for Better NTEP

Emery Winslow SCALE CO

Young's letter to Kolaci (1)

- December 15, 2009 -

Dear Rudy,

Rainer handed me a group of e-mails concerning VCAP, NTEP and NCWM, some of which you had authored. I am taking the liberty of writing to you because of your strong views on these subjects.

I have been in this business a long time, and am perhaps the most active senior in the industry. For quite some time, I have been disturbed by the turn of events on the regulatory aspects of our industry, specifically the NCWM, NTEP and now VCAP.

My last effort to make our voice heard was during Steve Kendra's short tour of duty as President of ISWM. I am generally not a joiner, do not involve myself in causes, but I felt sufficiently upset to suggest to Steve that a separate voice of small scale companies be established within ISWM, a voice equally as loud and powerful as the SMA.

IBN: Industry for Better NTEP

Emery Winslow SCALE CO

Young's letter to Kolaci (2)

Emery Winslow, perhaps more than other scale manufacturers, knows the difficulties of trying to introduce a new technology into our industry. We paid a dear price for not caving, more than you can imagine, and it continues to this day.

As you know, I am a past president of the SMA and I can attest to the good work accomplished. However, I am also aware that some of the SMA members were less than even handed when it came to protecting their turf.

It has cost Emery Winslow many hundreds of thousands of dollars to accommodate NTEP, only for the right to stay in business. There were times we wondered if it was all worthwhile.

We departed the SMA with regret only because we no longer had the means to remain a member.

IBN: Industry for Better NTEP

Emery Winslow SCALE CO

Young's letter to Kolaci (3)

Let me summarize my views.

1) The day the NCWM was removed from NIST was a sad day for the scale industry.
2) I remember when I first walked into the NIST lobby at Gaithersburg many years ago. There on the wall is written the following.
   - "It is therefore the unanimous opinion of your committee that no more essential aid could be given to manufacturing commerce, the makers of scientific apparatus, the scientific work of the government, of schools, colleges and universities than by the establishment of the institution proposed in this bill."
   - This was a report on the bill to establish the National Bureau of Standards, May 14, 1900.

   These wonderful words are no longer appropriate for our industry. We have lost our "weigh".

IBN: Industry for Better NTEP

Emery Winslow SCALE CO

Young's letter to Kolaci (4)

Summary

1) The NCWM be returned to NIST.
2) VCAP be shelved. It will not benefit the consumer or our industry.
3) Review the need for load cell NTEP certification. Its benefit to the scale user is highly questionable, and assuredly increases cost and limits innovation.
   - Based on our past experience, Emery Winslow could not possibly embark on HYDROSTATIC™ load cell development under today's rules. There simply would not be enough money.
   - Only the big guys would have the money, but not have the will nor the need to develop a HYDROSTATIC™ cell in the face of the tremendous success of electronic load cell business.

IBN: Industry for Better NTEP

Emery Winslow SCALE CO

Young's letter to Kolaci (5)

4) Place maximum effort in field testing. I agree NTEP serves a good purpose. If nothing else, it at least illustrates that, for one moment in time, the scale performed to a standard. In early 2008, I expressed some of my concerns to Steve Patoray. He was kind enough to give me some straightforward comments such as ...
   - "H44 does not have requirements for the durability or life of your device."
   - "H44 does not address customer expectations."
   - "H44 does not limit how many weighments are made on a device."

   I asked Steve if it would be in the spirit of H44 to have a 90K CLC and DTA rating, but have small print that states the weighbridge is designed for a legal DTA road limit of 34K. Steve's answer: "What you have indicated would not be in the 'spirit' of the definition of CLC and DTA according to H44." And, yet, this is common practice.

   All of the above leads to field problems on NTEP certified scales. And, in many States, there is no one looking after these many non-performing installations. Conclusion ... The priority should be on field testing, not VCAP and NTEP. Fix the field problem and the rest will become evident.

IBN: Industry for Better NTEP

Emery Winslow SCALE CO

Young's letter to Kolaci (6)

5) The common complaint by the States is a lack of funds and manpower and, of course, they are right. State Weights & Measures have taken a tremendous beating over the past years.

   But the strong desire to regulate remains, and so we expand into NTEP, VCAP, NCWM.

   The consumer remains the victim, and now we add regulation upon regulation on the back of the manufacturer, resulting in higher scale prices, reduced innovation, more end user downtime, high maintenance and expense, and none of this answers the consumer benefit problems.

   It does not make sense.

6) I would like to see a group effort made to resolve some of these issues. I would like to see a report generated and submitted to the Secretary of Commerce of the USA. To be heard, the group must be comprised of substantial scale people, have an official standing, such as the ISWM.

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Young's letter to Kolaci (7)

There is a lot more to be said. From the e-mails I have seen, the "group" has made a beginning. The group voice will have to get louder and louder and the message must go beyond the NCWM to Federal and State officials, to the U.S. Department of Commerce, to NIST, to the Office of Weights & Measures, etc.

If I can be of some help, I would be pleased to contribute. Emery Winslow has probably endured as much as anyone.

Kind regards,

Walter M. Young

1/25/2010 at NCWM Walter Young 53

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Creep has damaged us!

Keye Li
VP, Pacific Weighing
China

Jiandong Ke
President, Keli
China

1/25/2010 at NCWM Keye Li & Jiandong Ke 54

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Our NTEP app #6127

- Here is what happened:

Date	NTEP test result
10/28/2008	1st cell passed but 2nd cell failed in creep
03/06/2009	3rd cell passed creep but failed in error
08/06/2009	4th cell was about to be tested, but became unnecessary, due to the 2009 change by which the 2nd cell passed automatically.

We over-compensated creep at the cost of error!

- Result:
  - Costing us $15K extra and 1+ year delay!
  - Giving existing CC holders a huge competitive advantage!

1/25/2010 at NCWM Keye Li 55

IBN: Industry for Better NTEP

Our NTEP app #6417

- Here is what happened:

Date	NTEP test result
10/26/2009	1st cell failed in creep
11/15/2009	2nd cell failed in both creep and error

- Result: We are preparing the 2nd pair
  - Costing us $25K extra and 1+ year delay!
  - Giving existing CC holders a huge competitive advantage!

1/25/2010 at NCWM Jiandong Ke 56

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Summary

- NCWM must always respect and follow the 1st principle (i.e. all conform to HB44). In other words, Group A must all be re-certified to the current creep standard in HB44. If this cannot be done practically, NCWM must undo the creep changes since 2006, or NCWM, as a standards-setting org, must be abolished.

1/25/2010 at NCWM Keye Li & Jiandong Ke 57

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Closing

Frank Li

President, West-East International

1/25/2010 at NCWM Frank Li 58

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Recap

- In the opening, I stated "for the past 5 years at least, NTEP has been in the wrong direction of making it harder for the little and new guys ..."
  - Clearly, that was an under-statement! NTEP went wrong in the late 1980s when it started requiring the certification for load cells.
- What was wrong, specifically?
  - NTEP for load cells
  - creep
  - VCAP
- Anything in common among these wrongs? Yes, they are all along the same line of thinking with the same goal of making it harder for the little and new guys!!!

1/25/2010 at NCWM Frank Li 59

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Why so wrong?

- Because that's how our system works (it's structural)! An org like NCWM was formed with good intentions and then something went wrong big time for 2 main reasons:
  - weak leadership on the top. All directors are volunteers, and none (other than the industry representatives) have a vital stake in the org.
  - relentless drive by the special interests
    - The louder people get heard. A manufacturer heavily involved in the org has only 1 purpose: gaining competitive advantages for itself (or anti-gaining by the others). As a result, most of the changes (e.g. T.N.8 and creep) were bad for the industry. Incidentally, many of these bad changes were disguised under the same reason: harmonization with OIML! What a clever way to fool around, for so long! But no more???
    - The majority is typically silent. Even today, many agree with IBN, but they would rather watch from the sideline than to join.

1/25/2010 at NCWM Frank Li 60

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Can the wrongs be fixed?

- Yes, because that's *also* how our system works (or at least how it's supposed to work): We make mistakes and we fix them! 2 musts though
  - The people must speak out – We did!
  - The leaders must lead correctly (& correctively)!
    - It's no single person's fault or single BODs' fault for all the wrongs. But this BODs is having a historical moment to right these wrongs, and bring the org back on track.
    - You have both the power and the responsibility to do so. But will you?

1/25/2010 at NCWM Frank Li 61

IBN: Industry for Better NTEP

Suggested actions

- VCAP: Stop it immediately!
- Creep: Restore the 1st principle (i.e. all conform to HB44) without discrimination!
  - Group A must all be re-certified to meet the current creep standard without exception.
  - If this cannot be done practically, NCWM must undo its changes on creep since 2006.
- NTEP for load cells: Eliminate it asap!
- NTEP for scales: Make it better & keep it strong!
  - Have a different class for T.N.8
  - No need for NTEP load cells

1/25/2010 at NCWM Frank Li 62

IBN: Industry for Better NTEP

Concluding remarks – 2nd one

- NCWM must change, both organizationally and philosophically. How?
  - Listen to the people, not special interests.
    - We just spoke - Did you listen?
  - Act wisely
    - Avoid [obvious] conflicts of interest.
      - Have more industry representatives on the board?
    - Do things rationally with commonsense & discipline
      - Get some basics right before comparing yourself to ISO or OIML.
      - Focus on getting NTEP CCs out sooner, rather than diverting the limited resources to "exotic" ventures like VCAP.
    - Simply be good Americans!
      - Freedom and justice to all!

1/25/2010 at NCWM Frank Li 63

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Justice = Scale?



1/25/2010 at NCWM Frank Li 64

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Appendix G

Industry Letters: Verified Conformity Assessment Program (VCAP)

Letter to the Editor, Weights and Measures Magazine
re: "Open Letters to NCWM", December 2009 Issue

Three types of parties are involved in weights and measures activity:

- buyers and sellers of goods and services based on measurement
- manufacturers, dealers and service organizations that provide measuring devices
- regulators that set measurement laws and regulations and enforce them

NTEP matters affect all and the issues should be openly discussed in proper forums. Rather than after the fact, any interested individual could have participated and still can participate in the development of standards and procedures by joining with the NCWM Conference and its various NTEP Sectors and Task Forces. The same is true with international standards by joining US National Working Groups dealing with OIML issues.

I have read the article, "Open Letters to NCWM" by Rudi Kolaci that appeared in W&M Magazine's December 09 issue. I respect Rudi, his desire to be open, and his opinions but in this case they are lacking in knowledge.

Rudi suggests the ultimate measure of quality of a specific measuring device is the number of red tags issued by a W&M official for it and that the marketplace itself will then weed out non-conforming ones. While accepting the need for enforcement, he sets aside the lesson learned over time that this level of enforcement alone is insufficient.

Rather than expect each and every field inspector to evaluate a device against all W&M requirements, the NTEP system employs specialists that perform type evaluations thereby relieving the field inspector from having to perform certain specialized evaluations, particularly those requiring a change in environmental conditions that is not readily possible in the field. The field inspector may then concentrate on determining the device's validity of measurement on-site and at the environmental condition existing at the moment of testing.

Rudi infers that, when applied to load cells, the NTEP system stifles innovation, new products and new companies from developing new products. When any company wishes to enter a market there are hurdles to overcome. In the case of measuring devices to be used in legal metrology, one hurdle is to gain the necessary authorizations to employ a particular device in legal for trade measurements. This is true for any NTEP kind of device.

The evaluation time and cost to gain authorization might slow the introduction of products with new innovations. NTEP is very conscious of the need to not stifle innovation. The NTEP Administrative Procedure specifically anticipates that the NTEP will encounter features for which test criteria or procedures have not yet been developed. To that effect:

- NIST and Participating Laboratory representatives are to develop "ad hoc" criteria and procedures as expeditiously as possible.
- these are then submitted to the NTEP Technical Committee for ballot or the convening of a specially called meeting depending on complexity and sensitivity of the material. The accepted material will be immediately introduced into the NCWM process, however
- pending completion of the NCWM process, NTEP will issue Provisional Certificates of Conformance based on the material accepted by the Technical Committee.

Rudi correctly identifies that some scales having an NTEP Certificate use non-NTEP load cells. These are scales that can be evaluated through temperature in a chamber. NTEP offers type evaluation of load cells as a separate main component in order to not force the construction of special chambers for the evaluation of larger scales.

Likewise, some scales use non-NTEP A/D converters while NTEP offers type evaluation of others. This is not to raise barriers to entry but to reduce them.

Rudi sites an example of innovation being stifled when the load cell temperature compensation might be effected remotely. Each load cell has differing characteristics that must be determined. This is no different than various combinations of smart load cell technology. Regardless of where and how various compensations are performed, the scale must meet requirements. Load cells provide outputs and do not normally indicate. When one chooses to gain a NTEP load cell certificate no matter how the cell is configured it cannot be evaluated without the use of an appropriate corresponding readout. The conditions on which a certificate is based are listed thereon.

I expect that despite attempts to twist things about, wisdom will prevail.

JOHN ELENGO
NCWM Member (Retired) and former measurement industry executive

December 26, 2009

SCALE MANUFACTURERS ASSOCIATION

6724 Lone Oak Blvd. Naples, FL 34109
Tel: 239-514-3441 Fax: 239-514-3470
Web Site: http://www.scalemanufacturers.org

January 18, 2010

Judy Cardin
NTEP Chair
PO Box 8911
Madison, WI 53708

Dear Judy,

As you know, SMA has been a longtime supporter of the NCWM and NTEP process. While we have had some differences on some issues in the past, supporting VCAP has never been one of them.

The SMA and our members have supported the need for a VCAP program from the first time it appeared on the NCWM/NTEP radar. Our support has not wavered. All interested individuals and companies could have participated in the development of VCAP and attended the NTEP weighing sector meetings. Some chose not to.

It is difficult to understand how a reputable company would not be in favor of such a program. Further refinement and development of VCAP is only natural but we urge you to not waiver from your commitment to a level playing field for all parties.

We've all faced the same hurdles in obtaining NTEP Certificates of Conformance. A good quality system is necessary to ensure that production devices perform like those submitted for NTEP evaluation. Let's not allow those deliberately taking shortcuts circumventing the requirements to weaken or eliminate this valuable program.

The time has arrived to level the playing field by removing non-conforming load cells and devices from the marketplace.

Very truly yours,

Robert A. Reinfried
Executive Director

C: Don Onwiler
Jim Truex

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National Conference on Weights and Measures
National Type Evaluation Committee

Dear NTEP Committee Members,

I would like to take this opportunity to provide the Committee with my comments regarding the information provided by Mr. Frank Li and other members of the Industry for Better NTEP.

First and foremost, Mettler Toledo has been and will continue to be a strong supporter of the National Type Evaluation Program and the Verified Conformity Assessment Program. The NTEP is a valuable program for all parties:

- It provides a framework for state, county and city weights and measures programs by providing product compliance confidence that a single sample of the product was evaluated and found to conform to NTEP requirements.
- It provides a level of confidence to the owner/user of an approved instrument that the instrument is not favoring either party in a transaction.
- It provides the beginning of a level playing field for all manufacturers of scales or scale components.

While not personally involved in the initial development of NTEP, conversations with those that were, clearly indicate that considerable thought went into all aspects of the program. This includes the understanding of the impact a load cell has on a scales' overall performance when subjected to external influences such as changes in temperature. This understanding created the requirement to evaluate load cells separately if the load cell is to be used in a load receiving element that is to large to be tested inside a temperature chamber. This is a clear example of NTEP and manufacturers developing an evaluation method that insures product conformity with the technical and performance requirements.

We are all aware that technology is constantly changing and these changes permit manufacturers to continuously rethink current designs and in some cases the outcome of this process is a new design approach. NTEP is very open to this concept and has created workgroups called Sectors to embrace these changes and develop new evaluation methods intended to ensure product compliance. To hear suggestions that load cells should no longer be evaluated because of a technology change or advancement is not consistent with the basic principles of NTEP and can only lead one to believe that there are other reasons for this suggestion. I have always been told that NTEP does not evaluate technology but does evaluate a products ability to meet performance and operational specifications. A change in this principle would not only change the current NTEP process; it would also change the basic intent of standards development.

I mentioned at the beginning of this letter that Mettler Toledo supports the Verified Conformity Assessment Program. This support is based on the fact that both the buyer and the seller suffer when scales do not meet NTEP performance requirements. This is what can happen when only

METTLER TOLEDO

an initial sample is evaluated and subsequent production samples are not verified. VCAP was created to ensure manufacturers produce scales that continue to meet these requirements not just the first time but at all times throughout the models manufacturing life.

History has shown us that the idea of "trust me manufacturing" has been hurt by the pressures of cost containment, cost reduction and increased sales requirements. We have seen where these pressures have been addressed in some very creative and acceptable manufacturing and process control methods. However, we have also seen, too frequently, where un-acceptable methods have been used and covered up by the "trust me manufacturing" approach. VCAP is designed to ensure that these company objectives are not realized by a reduction in scale performance levels.

The average consumer does not see this and therefore will not demand changes; it is our responsibility as consumers and members of the regulatory community to adjust our requirements to changing needs whether it is the development of a new method of sale or the correction of a weakness in our NTEP program. The implementation of VCAP is one such correction and one that is long overdue.

VCAP is not the first conformity assessment program that places requirements on a scale manufacturer: third party certification agencies such as Underwriters Laboratory, Factory Mutual and NSF have similar programs and audit schedules. VCAP is a program that has long been needed and those companies that decide not to comply or those that can not should not be permitted to offer their products under the NTEP logo.

Regards,



Darrell Flocken
Head, Quality and Compliance Services

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Cardinal

Cardinal Scale Manufacturing Co.

June 16, 2009

Mr. Jim Truex, NTEP Administrator
National Type Evaluation Program
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RE: Verified Conformity Assessment Program

Dear Mr. Truex,

In preparing for our upcoming VCAP audit, we have encountered a requirement that leaves me a little puzzled. Please recall that the initial device type to be covered by the program is the load cell. Section 1.2 of the VCAP states *Identify the applicable Metrologically Significant Components (MSC's) of the device.* Based on this statement, one might reason that the device, the load cell at this time, contains one or more Metrologically Significant Component. This line of reasoning is further supported by paragraphs 1.2.4.1 and 1.2.4.2 where various examples of MSC's are listed for analog and digital load cells respectively. Granted, paragraph 1.2.4 states that the lists of components may or may not be identified by the manufacturer as a MSC but, I believe, the intent remains that the device or load cell contains at least one, if not more, MSC.

Paragraph 1.2.3 of the VCAP states *Metrological integrity is maintained by verification that the applicable characteristics of those components identified as metrologically significant are unchanged from those used in the device certified.* I believe that the word "verification" in this paragraph implies testing meaning that the individual component(s) used in the load cell that are MSC's must be tested. In fact, the checklist written for the VCAP includes an item asking if test procedures and test records exist for MSC's.

In practice, most or all load cell manufacturers treat the load cell as the MSC and verify its compliance through testing of the completed load cell and not by testing the individual components. Therefore it would seen that some clarification is needed in these sections of VCAP to allow a manufacturer to either identify the completed device as the MSC or to identify components of the device as MSC's. I fear that in its present form, the VCAP does not allow this option.

I have discussed this with Darrell Flocken. Darrell feels that the VCAP does allow the manufacturer this option but also agrees that one could interpret the language as I have. Because it appears possible to interpret this specific language in one of two ways, I respectfully suggest that the language in paragraph 1.2.3 be revised to clarify the options available to the device manufacturer. I suggest the addition of the following underlined text to paragraph 1.2.3 of the VCAP:

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Phone: 417-673-4631 • Fax: 417-673-5001 • www.cardinalscale.com

Metrological integrity is maintained by verification that the applicable characteristics of those components identified as metrologically significant are unchanged from those used in the device certified. Verification can also take place by testing of the finished device to verify that it is unchanged from the device certified.

If you have any questions about this suggestion or if I may be of service during the review of this suggestion, please do not hesitate to contact me.

Sincerely,

Stephen Langford, P.E.
Vice president, Engineering Services

Copy Don Onwiler
Darrell Flocken
Mark Knowles

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Appendix H
NTEP INITIAL VERIFICATION REPORT FORM

Initial Verification is the first official inspection and test of a commercial weighing and measuring device by a weights and measures official. It is another element in the metrological control system. These tests offer an invaluable means to check production devices and many of their features against the current requirements of *NIST Handbook 44* and to verify the information provided in the National Type Evaluation Program (NTEP) Certificate of Conformance is both accurate and correct.

The information gathered by the states during Initial Verification may be submitted through this simple form to provide feedback to NTEP. NTEP will use this information to assist in the process of verifying that production devices remain in compliance and that the information on the NTEP Certificate of Conformance remains accurate.

GENERAL INFORMATION

Date:	First Name:	Last Name:

Email Address (required):

Weights and Measures Jurisdiction Reporting:

DEVICE INFORMATION

NTEP CC Number:

Make of Device (CC Holder):

Model:

Device Type (select one):

☐ Automatic Bulk Weighing System	☐ Automatic Weighing System	☐ Belt-Conveyor Scale
☐ Card Reader	☐ Computing Scale	☐ Console Controller
☐ Crane Scale	☐ Dry Measure	☐ ECR Interfaced with Scale
☐ ECR/POS Interfaced with RMFD	☐ Equal Arm Scale	☐ Grain Analyzer
☐ Grain Test Scale	☐ Hanging Scale	☐ Hopper Scale
☐ Indicating Element	☐ Load Cell	☐ Meter Indicating Mass
☐ Meter Indicating Volume	☐ Monorail Scale	☐ Multiple Dimension Measuring Device
☐ Non-Computing Scale	☐ Onboard Weighing System	☐ Point-of-Sale Scale
☐ Point-of-Sale System	☐ Register	☐ Retail Motor Fuel Dispenser
☐ Scale System Controller	☐ Taximeter	☐ Weigh-In/Weigh-Out System
☐ Weighing/Load Receiving Element	☐ Other (describe below)	

If "Other" was selected for Device Type, describe:

Description of Non-conformity (e.g., failure, deficiency, etc.):

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Report of the Nominating Committee

Jack Kane, Chairman
Administrator, Business Standards Division
Montana Department of Labor & Industry

Reference Key
Number

500 INTRODUCTION

The Nominating Committee met during the Interim Meeting at the Hilton Nashville Downtown, Nashville, Tennessee, at which time the Committee nominated the persons listed below to be officers of the 96th National Conference on Weights and Measures. In the selection of nominees from the active membership, consideration was given to professional experience, qualifications of individuals, conference attendance and participation, and other factors considered to be important.

The following slate of officers was selected by unanimous vote of the Nominating Committee and elected by unanimous vote of membership at the 95th National Conference on Weights and Measures.

CHAIRMAN-ELECT: Mr. Kurt Floren, Los Angeles County Weights and Measures

BOARD OF DIRECTORS CENTRAL REGION: Mr. Ron Hayes, Missouri Department of Agriculture

BOARD OF DIRECTORS ASSOCIATE MEMBERSHIP: Mr. Gordon Johnson, Gilbarco Inc.

TREASURER: Mr. Richard Cote, New Hampshire Department of Agriculture

Mr. Jack Kane, Montana, Chairman

Mr. Ross Andersen, New York
Ms. Judy Cardin, Wisconsin
Mr. Dennis Ehrhart, Arizona
Mr. Tom Geiler, Massachusetts
Mr. Maxwell Gray, Florida
Mr. Steve Malone, Nebraska

Nominating Committee

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