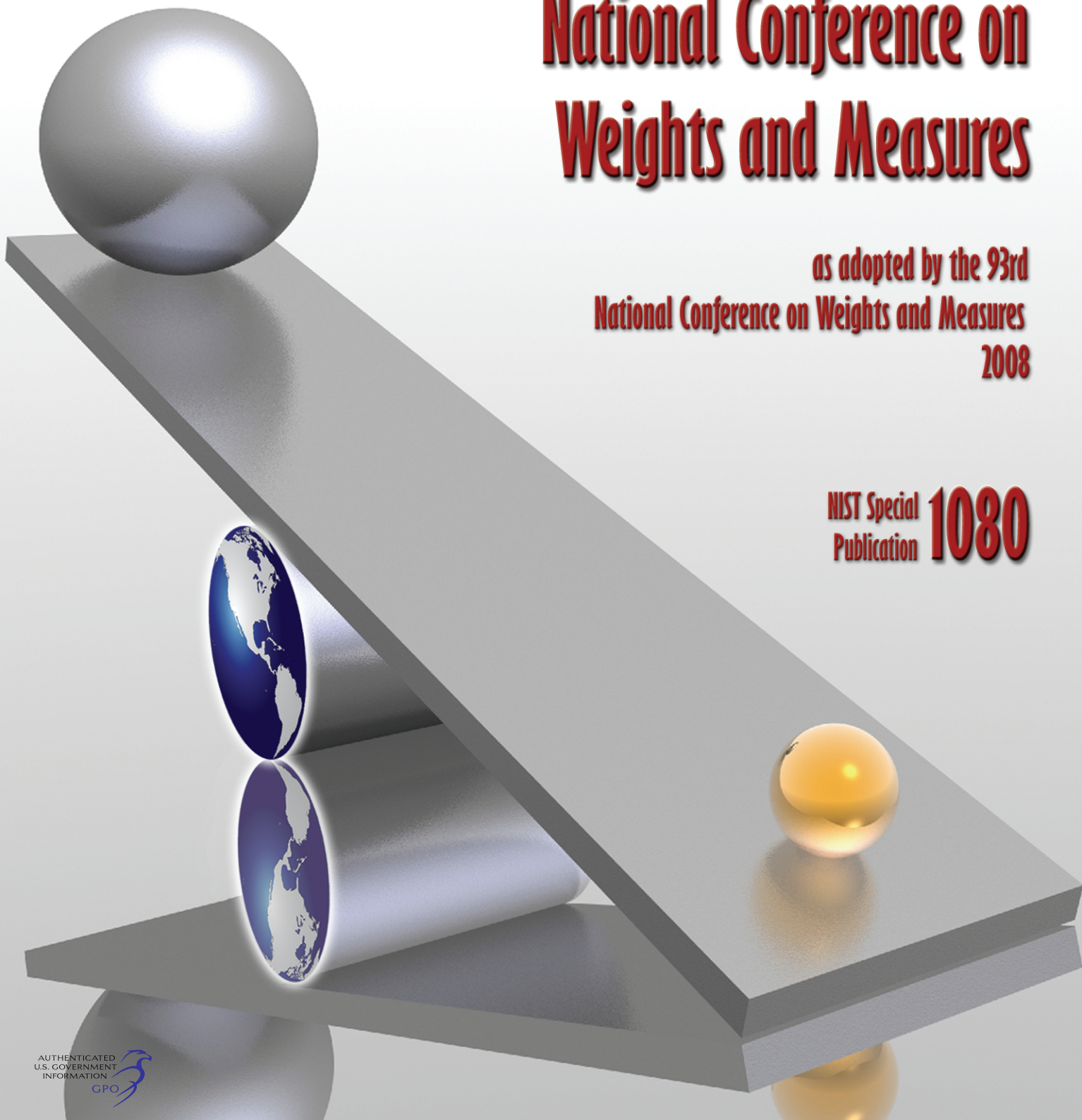
NIST
National Institute of Standards and Technology
U.S. Department of Commerce

Report of the 93rd National Conference on Weights and Measures

as adopted by the 93rd National Conference on Weights and Measures 2008

NIST Special Publication 1080



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Report of the 93rd National Conference on Weights and Measures

Burlington, Vermont – July 13 through 17, 2008

as adopted by the 93rd National Conference on Weights and Measures 2008

Editors:

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November 2008

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 93rd Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 13 - 17, 2008, at the Sheraton Burlington Hotel, Burlington, Vermont. The theme of the meeting was "Seeking Balance."

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.

Library of Congress Catalog Card Number 26-27766.

Note: The policy of the National Institute of Standards and Technology is to use metric units of measurement in all of its publications. In this publication, however, recommendations received by the NCWM technical committees have been printed as they were submitted and, therefore, may contain references to inch-pound units where such units are commonly used in industry practice. Opinions expressed in non-NIST papers are those of the authors and not necessarily those of the National Institute of Standards and Technology. Non-NIST speakers are solely responsible for the content and quality of their material.

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WASHINGTON: 2008

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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

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National Conference on Weights and Measures, Inc.
Organization Chart
2007/2008

Board of Directors

Office Representation	Name/Affiliation	Term Expires
Chairman:	Judy Cardin, WI*	2008
Chairman-Elect:	Jack Kane, MT*	2009
NTEP Committee Chair:	Steve Malone, NE*	2008
Treasurer:	Will Wotthlie, MD	2008
Active Membership/Northeastern:	Charles Carroll, MA*	2009
Active Membership/Central:	Steven Malone, NE	2010
Active Membership/Southern:	Randy Jennings, TN*	2008
Active Membership/Western:	Steven Grabski, NV	2012
At-Large:	Christopher Guay, Procter & Gamble	2008
At-Large:	Tim Tyson, KS	2011
Associate Membership:	Robert Murnane, Seraphin Test Measure	2012

***National Type Evaluation Program (NTEP) Committee Member**

Honorary NCWM President:	Dr. James M. Turner, NIST Deputy Director
NCWM Executive Secretary:	Carol Hockert, Chief, NIST W&M Division
NCWM Co-Executive Director:	Don Onwiler, NCWM Headquarters
NCWM Co-Executive Director:	Beth Palys, CAE, NCWM Headquarters
BOD Advisor:	Gilles Vinet, Measurement Canada
NTEP Director:	Stephen Patoray, NCWM Headquarters*
NTEP Administrator:	Jim Truex, NCWM Headquarters*
NTEP Committee Technical Advisor:	Steven Cook, NIST W&M Division

Committees

Laws & Regulations Committee		***Specifications & Tolerances Committee***	
Position	**Name/Affiliation (Term Ends)**	**Position**	**Name/Affiliation (Term Ends)**
Chair:	Vicky Dempsey, Montgomery County, OH (2008)	**Chair:**	Carol Fulmer, SC (2008)
Members:	Roger Macey, CA (2009) Stephen Benjamin, NC (2010) Joe Benavides, TX (2011) John Gaccione, Westchester County, NY (2012)	**Members:**	Todd Lucas, OH (2009) Brett Saum, CA (2010) Kristin Macey, CO (2011) Steve Giguere, ME (2012)
Associate Member Rep:	O.R. "Pete" O'Bryan, Foster Farms		
Canadian Tech Advisors:	Doug Hutchinson	**Canadian Tech Advisor:**	Ted Kingsbury
NIST Tech Advisors:	Kenneth Butcher Lisa Warfield	**NIST Tech Advisors:**	Tina Butcher Steven Cook

Committees (continued)

Professional Development Committee

Position	Name/Affiliation (Term Ends)
Chair:	Agatha Shields, OH (2008)
Members:	Richard Cote, NH (2009) Ross Andersen, NY (2010) John Sullivan, MS (2011) Stacy Carlsen, CA (2012)
NIST Advisor:	Tina Butcher, NIST/W&M
Safety Liaison:	Charles Gardner, NY
Staff Liaison:	Linda Bernetich, NCWM
Associate Member Rep:	TBD

Metrology Committee

Position	Name/Affiliation (Term Ends)
Chair:	TBD
Co-Chair:	TBD
Members:	
NIST Tech Advisor:	TBD

Nominating Committee

Chair:	Steve Malone, NE
Members:	Ross Andersen, NY Dennis Ehrhart, AZ Thomas Geiler, MA Maxwell Gray, FL TBD

Legislative Liaison

Chair:	TBD
Members:	TBD

Credentials Committee

Chair:	Mark Buccelli, MN (2008)
Members:	Raymond Johnson, NM (2009) Dave Pfahler, SD (2010)
Coordinator:	Linda Bernetich, NCWM Staff

Appointed Officers

Parliamentarian:	Lou Straub, Fairbanks Scales
Chaplain:	Stephen Langford, Cardinal Scale Manufacturing Company
Sergeants-At-Arms:	Hugh Lund, VT Marc Paquette, VT
Presiding Officers:	Jerry Butler, NC Tim Chesser, AR Kurt Floren, CA Mike Sikula, NY

Associate Membership Committee

Chair:	Christopher Guay, Procter and Gamble (2009)
Vice Chair:	Paul Lewis, Rice Lake Weighing Systems (2009)
Secretary/Treasurer:	Michael Gaspers, Farmland Foods, Inc. (2009)
Members:	Darrell Flocken, Mettler-Toledo (2008) Cary Frye, International Dairy Foods Assoc. (2008) Thomas Herrington, Nestle USA (2010) Doug Biette, Sartorius North America (2010) Dave Wankowski, Kraft Foods, Inc. (2010)

National Type Evaluation Technical Committees

NTETC Weighing Sector

Chair: Darrell Flocken, Mettler-Toledo

Technical Advisor: Steven Cook, NIST/WMD

Public Sector Members:
Cary Ainsworth, GIPSA
Ross Andersen, NY
William Bates, GIPSA
Andrea Buie, MD
Luciano Burtini, Measurement Canada
Tina Butcher, NIST/WMD
Gary Castro, CA
Terry Davis, KS
Ken Jones, CA
Jack Kane, MT
Todd Lucas, OH
Ronald Rigdon, MN
Juana Williams, NIST/WMD
Russ Wyckoff, OR

Private Sector Members:
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Doug Biette, Sartorius North America
John Elengo, Contractor
Robert Feezor, Norfolk Southern Corp.
Willliam GeMeiner, Union Pacific Railroad
David Hawkins, Thurman Scale Co.
Scott Henry, NCR
John C. Hughes, Avery Weigh-Tronix
Rafael Jimenez, Association of American Railroads
Gary Lameris, Lameris Consulting
Stephen Langford, Cardinal Scale Mfg.
Paul Lewis, Rice Lake Weighing Systems
Thomas Luna, Scales Unlimited, Inc.
L. Edward Luthy, Brechbuhler Scales, Inc.
Nigel Mills, Hobart Corporation
Naresh Puri, NMB Technologies, Inc.
Louis Straub, Fairbanks Scales, Inc.
Jerry Wang, A&D Engineering, Inc.
Otto Warnlof, Consultant
William West, Consultant
Nathaniel Wieselquist, Sick, Inc.
Walter Young, Emery Winslow Scale

NTETC Measuring Sector

Chair: Michael Keilty, Endress & Hauser Flowtec AG

Technical Advisor: Tina Butcher, NIST/WMD

Public Sector Members:
Ross Andersen, NY
Jerry Butler, NC
Gary Castro, CA
Steve Hadder, FL
Ted Kingsbury, Measurement Canada
Todd Lucas, OH
John Makin, Measurement Canada
Dan Reiswig, CA
Richard Wotthlie, MD

Private Sector Members:
F. Michael Belue, Belue Associates
Joseph Beyer, Liquid Controls, Inc.
Marc Buttler, Emerson Process Management - Micro Motion
Joe Buxton, Daniel Measurement & Control
Rodney Cooper, Actaris Neptune
Maurice Forkert, Tuthill Transfer Systems
Mike Gallo, Clean Fueling Technologies
Paul Glowacki, Murray Equipment
Alex Gutierrez, MEGGITT Fueling Products,Whittaker Controls
Gordon Johnson, Gilbarco, Inc.
Yefim Katselnik, Dresser Wayne, Inc.
Douglas Long, RDM Industrial Electronics
Wade Mattar, Invensys/Foxboro
Daniel Maslowski, LTS Sales
Richard Miller, FMC Measurement Solution
Robert Murnane, Jr., Seraphin Test Measure
Andre Noel, Neptune Technology
Charlene Numrych, Liquid Controls
Johnny Parrish, Brodie Meter Company, LLC
David Rajala, Veeder-Root Company
Richard L. Tucker, RL Tucker Consulting
Otto Warnlof, Consultant

National Type Evaluation Technical Committees (continued)

NTETC Software Sector

Co-Chairs: Norm Ingram, CA
James Pettinato, FMC Technologies

Technical Advisor: Stephen Patoray, NCWM

Public Sector Members:
Dennis Beattie, MC
Andrea Buie, MD
Bill Fishman, NY
Mike Frailer, MD
Todd Lucas, OH
John Roach, CA
Ambler Thompson, NIST/WMD

Private Sector Members:
John Atwood, Tyson Food
Doug Bliss, Mettler-Toledo
André Elle, Endress & Hauser Flowtec AG
Travis Gibson, Rice Lake Weighing Systems
Teri Gulke, Liquid Controls LLC
Keith Harper, Gencor Industries, Inc.
Bryan Haynes, Liquid Controls, LLC
Tony Herrin, Cardinal Scale Mfgr. Co.
Robert Hoblit, IBM
Gordon Johnson, Gilbarco, Inc.
Gary Lameris, Gainco Inc.
Paul Lewis, Rice Lake Weighing Systems
Mike McGhee, Actaris US Liquid Measurement
Richard Miller, FMC Measurement Solutions
Charlene Numrych, Liquid Controls LLC
Michael Parks, Vulcan Materials Co.
Steve J. Pollmann, Tyson Food
Mike Roach, Verifone
Robin Sax, CompuWeigh Corp.
Jim Sexton, Rice Lake Weighing Systems
Chris Scott, Gilbarco, Inc.
David Vande Berg, Vande Berg Scales
Roland Wagner, Flow Measurements & Engineering GmbH
Nathaniel Wieselquist, Sick, Inc
Kevin M. Williams, Gilbarco, Inc.

NTETC Grain Analyzer Sector

Chair: Cassie Eigenmann, DICKEY-john Corp.

Technical Advisors: G. Diane. Lee, NIST/WMD
John Barber, J. B. Associates

Public Sector Members:
Randy Burns, AR
Tina Butcher, NIST/WMD
Karl Cunningham, IL
Todd Lucas, OH
Richard Pierce, GIPSA
Edward Szesnat, Jr., NY
Cheryl Tew, NC

Private Sector Members:
James Bair, NA Miller's Association
Martin Clements, The Steinlite Corp.
Victor Gates, Shore Sales Company
Andrew Gell, Foss North America
Charles Hurburgh, Jr., Iowa State University
David Krejci, Grain Elevator & Processing Society
Jess McCluer, National Grain & Feed Association
Thomas Runyon, Seedboro Equipment

National Type Evaluation Technical Committees (continued)	
NTETC Belt Conveyor Sector	
Chair:	TBD
Technical Advisor:	Steven Cook, NIST/WMD
Public Sector Members:	Andrea Buie, MD
Private Sector Members:	R. Jimenez, Association of American Railroads L. Marmsater, Merrick Industries B. Ripka, Thermo Electron P. Sirrico, Thayer Scale - Hyer Industries, Inc. T. Vormittag, Sr., SGS Minerals Services O. Warnlof, Consultant

Regional Weights and Measures Associations	
Regional Weights and Measures Contacts	
Northeastern Weights and Measures Association (NEWMA): Interim Meeting 2008: October 15 - 16 Springfield Sheraton Monarch Springfield, Massachusetts	John P. Gaccione Westchester County Weights & Measures (914) 995-2160 jpg4@westchestergov.com
Southern Weights and Measures Association (SWMA): Annual Meeting 2008: October 5 - 8 DoubleTree Airport Hotel Atlanta, Georgia	Rich Lewis Georgia Department of Agriculture (404) 656-3605 rlewis@agr.state.ga.us
Central Weights and Measures Association (CWMA): Interim Meeting 2008: September 14 - 17 Holiday Inn Rock Island Hotel & Conference Center Rock Island, Illinois	Steve Gill Missouri Department of Agriculture (573) 751-4278 steve.gill@mda.mo.gov
Western Weights and Measures Association (WWMA): Annual Meeting 2008: September 7 - 11 Anchorage Marriott Downtown Anchorage, Alaska	Doug Deiman Alaska Div of Measurement Standards/CVE (907) 365-1222 doug.deiman@alaska.gov

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President's Address
National Conference on Weights and Measures
Burlington, Vermont
July 15, 2008

Dr. Belinda Collins
NIST, Technology Services Director

Dr. Belinda Collins addressed the National Conference on Weights and Measures Annual Meeting attendees in Burlington, Vermont, on July 15, 2008. Dr. Collins' gave a presentation based on this year's conference theme "Seeking Balance." She began her presentation with two quotes. The first quote was from George Washington's 1790 State of the Union Address: "Uniformity in currency, weights, and measures of the United States is an object of great importance, and will, I am persuaded, be duly attended to." And, the second quote was from the U.S. Constitution: "…The Congress shall have Power to … and fix the Standard of Weights and Measures." Both of these quotes are powerful statements. NIST (formerly the National Bureau of Standards) has worked since 1901 to fulfill the mission of the founding fathers to achieve this balance and uniformity in weights and measures.

Dr. Collins elaborated on NIST's contributions to innovative technology and today's mission to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways to enhance economic security and improve our quality of life. The many facets of weights and measures contribute to the success of this mission. You are invited to review the following slide presentation, which was used at the Annual Meeting.

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NIST: Seeking Balance – Address to the National Conference on Weights and Measures



Belinda L. Collins, Ph.D.
Director, Technology Services

NIST
National Institute of Standards and Technology
U.S. Department of Commerce

In the Minds of the Founding Fathers

"Uniformity in the currency, weights, and measures of the United States is an object of great importance, and will, I am persuaded, be duly attended to."

George Washington, State of the Union Address, 1790

... The Congress shall have Power To ...

... and fix the Standard of Weights and Measures;

From the U. S. Constitution

2

Early NIST: Founded 1901

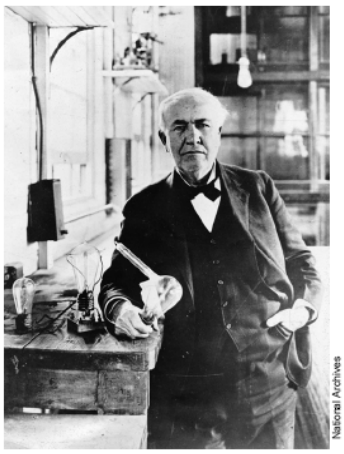
Established by Congress in 1901

Eight different "authoritative' values for the gallon

Nascent electrical industry needed standards

American instruments sent abroad for calibration

Consumer products and construction materials uneven in quality and unreliable



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NIST Today: Mission

To promote U.S. innovation and industrial competitiveness by advancing

measurement science, standards, and technology

in ways that enhance economic security and improve our quality of life



4

A Call to Action . . .2008

America COMPETES Act (P.L.110-69)

- A comprehensive strategy to keep America the most innovative nation in the world
- Authorizes American Competitiveness Initiative (ACI)-related programs at NIST, NSF, and DOE
- ACI highlighted in the President's State of the Union address
- First NIST authorization bill enacted in 12 years, the Act authorizes substantial increases in funding for basic research in physical sciences — NIST, DOE, NSF



"The only way we can hope to compete is with brains and ideas that set us above the competition—and that only comes from investments in education and R&D"

Craig Barrett, Chairman, Intel

NIST Infrastructure Paves the Way to Innovation

The equivalent of research "roads and bridges" the industrial and scientific communities need to develop and commercialize new technologies



- Groundbreaking research tools that foster new fields — quantum information, nanotechnology, bioscience
- Better measurement methods to ensure quality
- Performance measures for accurate technology comparisons
- **Standards to assure fairness in trade**

6

NIST Responds to Urgent National Needs



Comprehensive World Trade Center Investigation

- Recommended 30 improvements in building standards and practices, many already being put in place by private sector

NIST Initiative for Enabling the Use of Hydrogen as a Fuel

- Develop standards for pipeline safety and reliability
- Ensure accurate fuel measures at point of sale
- Improve efficiency, durability of fuel cells



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NIST Products and Services

Measurement Research

- ~ 2,200 publications per year

Standard Reference Data

- ~ 100 different types
- ~ 6,000 units sold per year
- ~ 130 million data downloads per year





Standard Reference Materials

- ~ 1,300 products available
- ~ 33,000 units sold per year

Calibration Tests

- ~ 16,000 tests per year

Laboratory Accreditation

- ~ 800 accreditations of testing and calibrations laboratories per year by NVLAP

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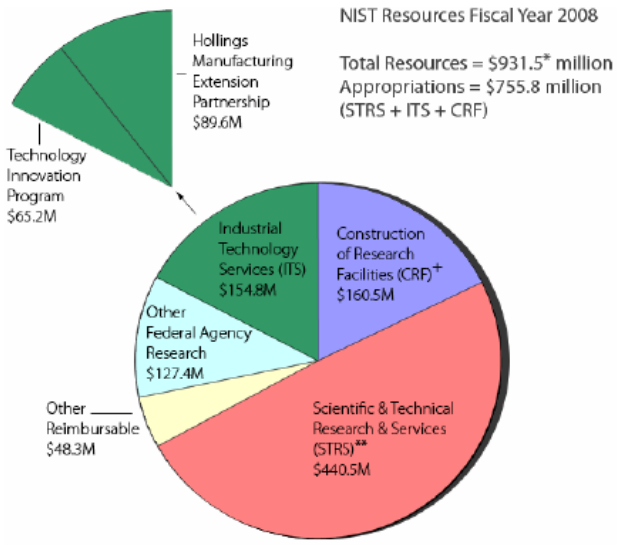
NIST 2008 Budget:



* Excludes Working Capital Fund Investments

** Includes $893,000 in congressionally directed projects

\+ Includes $51.3 million in congressionally directed projects and $30 million for a new construction grant program

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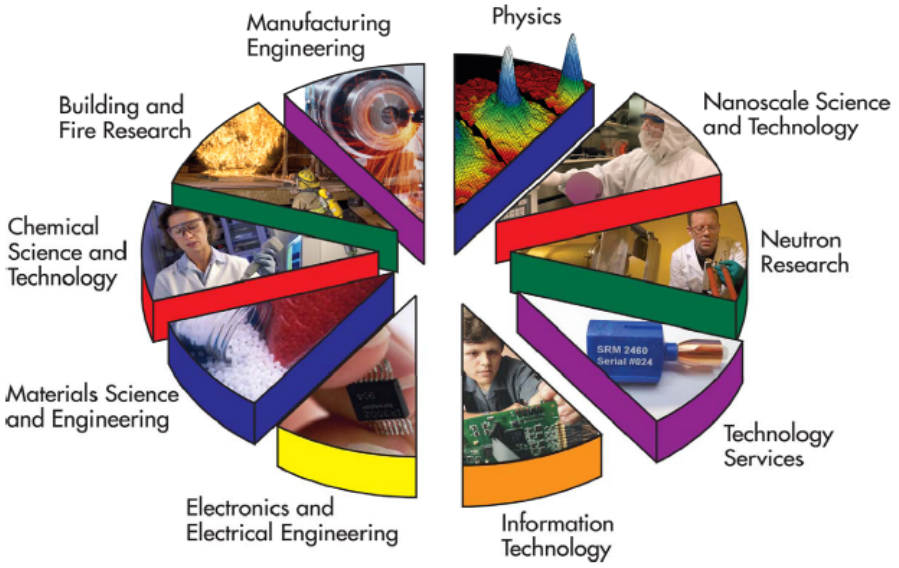
FY 2009 Budget Request Summary

The President and Congress have agreed on a strong innovation plan:

- NIST research and facilities play a critical role in advancing innovation
- Current U.S. safety, security, and quality of life is supported in many ways by past NIST accomplishments
- NIST "roads and bridges" built now enable today's innovation and tomorrow's products, services, and economic growth

The Bottom Line:
Investment in NIST research and facilities will help ensure that the U.S. continues to be the world's economic and innovation leader.

The NIST Laboratories



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Technology Services Provides

- Access to NIST Standard Reference Materials and Data, calibrations, and laboratory accreditation
- Guidance, coordination, information and training on documentary standards and conformity assessment activities
- **Weights and Measures (Legal Metrology) training, technical expertise, guidance, standards development**
- Technology partnerships, including patents, licenses, cooperative agreements, etc.
- Technical information and access to NIST library and publications
- Oversight of the U.S. Measurement System

A Changing Marketplace.....to technology for tomorrow



Robotic Dispenser

It is Never a Static Marketplace!





Pricing schemes for gasoline require HB44 changes

Protect consumer and allow innovative marketing

Increasing fuel blends and types (biofuels or additives) mean issues for fuel quality, blending of products, temperature compensation

The Weights and Measures Division

Promotes national and international uniformity in:

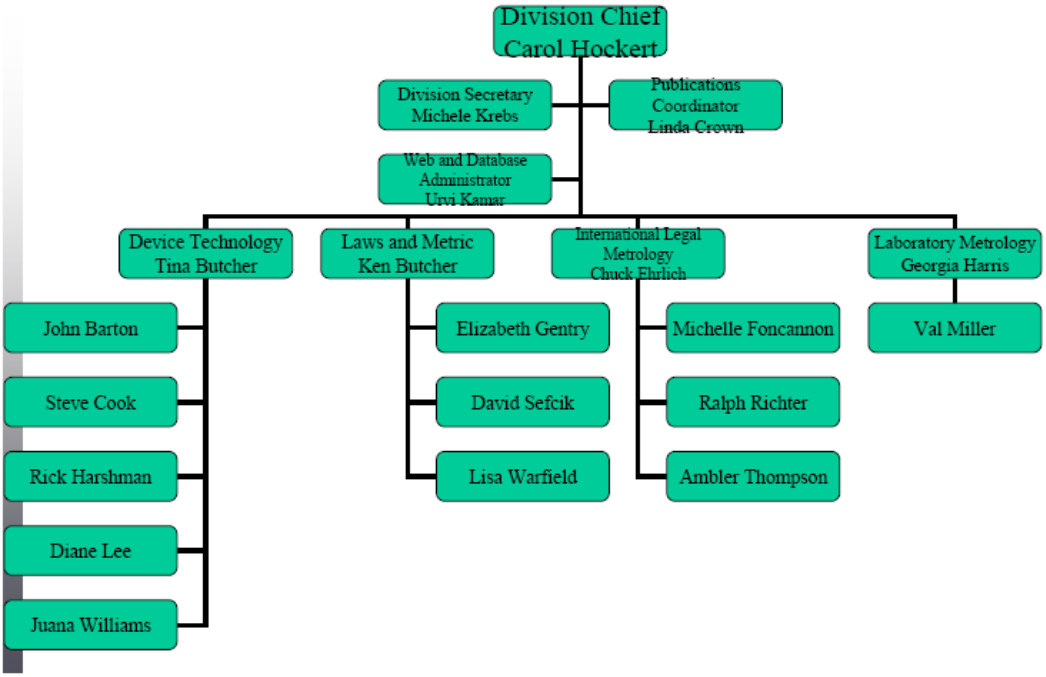
- Laws and regulations
- Weights and measures standards
- Inspection procedures and practices
- Enforcement policies
- Laboratory operation

Enhances consumer protection

Promotes fair competition and equity in the marketplace

Seeks to balance interests of industry, consumers, regulatory officials

Weights and Measures Division



How WMD Accomplishes its Mission

Coordination

- Responses to regulatory issues to promote uniformity and fair trade.

Technical Support to Stakeholders

- Regulatory officials
- Business & industry
- Standards Committees (including NCWM)
- Federal Agencies
- Laboratories
- NTEP

Training

- State and Industry Laboratory Metrology
- Field Officials
- Administrators

Information Dissemination

- Publications and NIST Handbooks and test procedures

Representation

- OIML, APLMF and other international organizations
- ASTM, Industry Associations

Coordination with States, Federal Agencies and Industry

Promote fair competition and equity in the marketplace

Development of standards

Widespread adoption across the country

Seek for a balance of interests between industry, consumers, regulatory officials

Bring groups together to solve problems

Laws and Regulations – Coordination with Other Federal Agencies

Assisting the USDA - Food Safety and Inspection Service with their plans to adopt the 4th Edition - 2005 of NIST HB133.

Assisting the U.S. Department of Commerce Seafood Inspection Program with their plans to adopt key provisions of NIST HB 133 for testing seafood.





Pelletized Ice Cream



Pelletized Ice Cream – Seeking Balance!

- Sold by fluid volume according to FDA
- NIST, FDA, NCWM, W&M officials, industry working together to solve issues regarding measurement of product
  - Determine correct labeling for net content
  - Develop and validate test method
- Compliance will take time
  - Change labels
  - Implement new fill methods

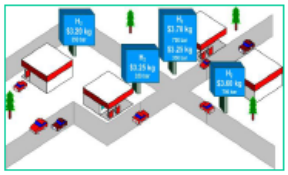
Coordination - Developing Commercial Hydrogen Measurement Standards



Photo courtesy CaFCP

Method of Sale





Fuel Quality



Device Standards



Photo courtesy Hydrogencarsnow.com

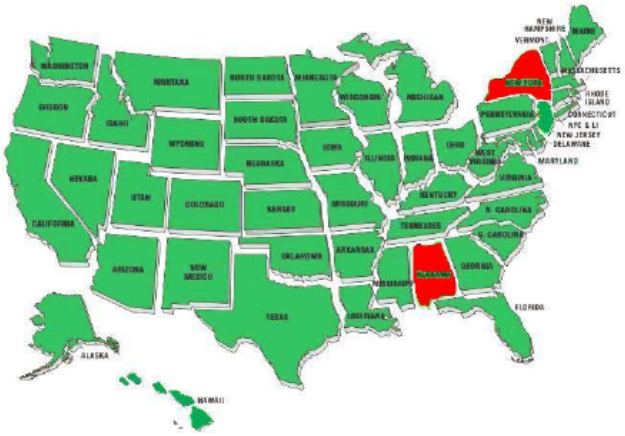
Test Procedures



Coordination - Metric Program

Voluntary metric-only labeling

- Since 1994 the FPLA has required both metric and inch-pound units
- 48 States allow metric-only labeling, for products regulated at the state level



Training

Promotes Uniformity in:

- Inspection procedures and practices
- Enforcement policies

Enhances consumer protection

- Traceability
- Accurate measurements

Promotes fair competition and equity in the marketplace

Device Technology – Field Training

Small Volume Prover Training
- First time course offered in 2007 - Ohio

Retail Motor Fuel Dispenser Training
- Wisconsin W&M Assn – October 2007
- Virginia W&M – February 2008
- New Hampshire - June 2008 (for 130 service agents)

Carcass Evaluation Systems (with USDA)
- Nebraska – February 2008

Small Scales – Instructor Training
- NIST Sept 2008

Laws and Metric Training

Price Verification
- Maryland – April 2008
- Connecticut – May 2008
- NIST – September 2008

Checking the Net Contents of Packaged Goods
- Instructor Training - Tennessee in September 2007

Laboratory Metrology Training

Proficiency Testing Training
First time course in November 2007

Laboratory Administrator Training
June and July, 2008

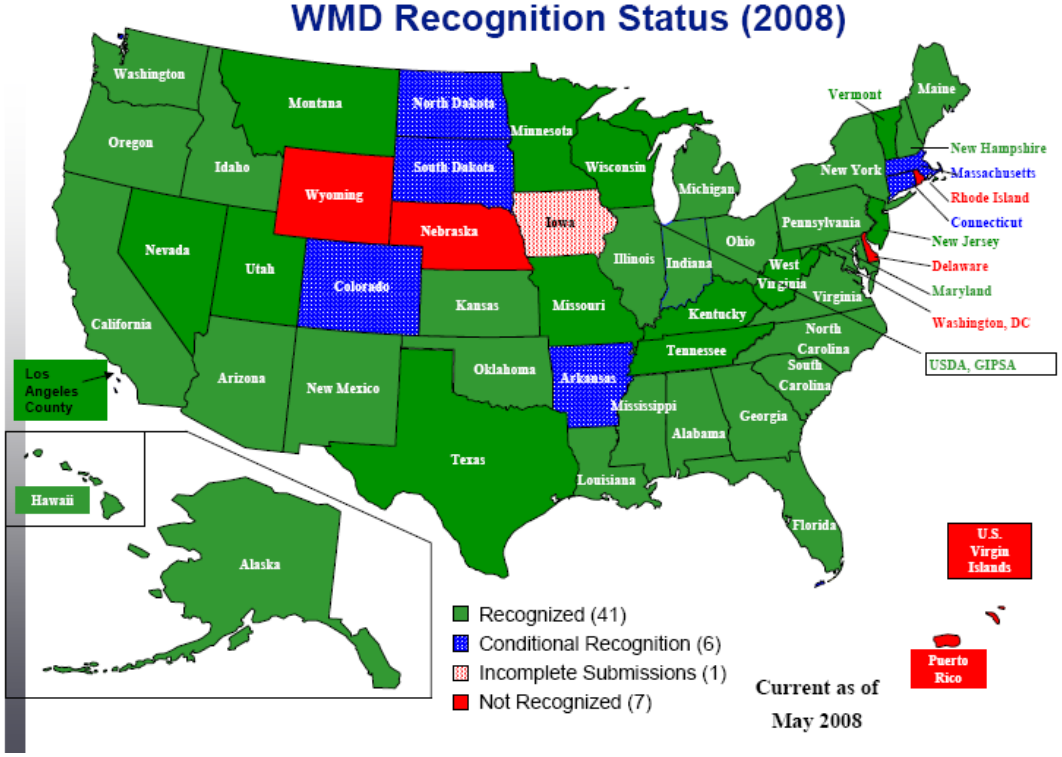
Annual Regional Training
April, May, September and October (2 regions)

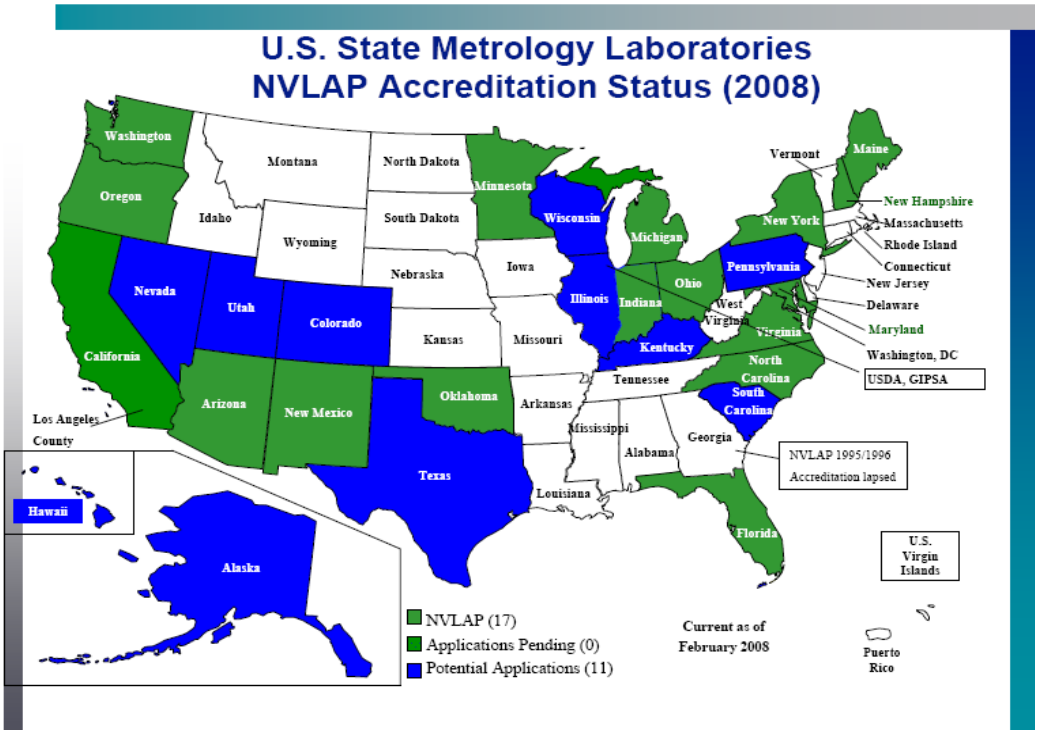
Combined Regional Training – April 2009

Basic, Intermediate and Advanced Training

Tutorials: Balance and Scale Calibration and Uncertainties (NCSLI)
Measurement Assurance Short Course (MSC)

U.S. State Metrology Laboratories
WMD Recognition Status (2008)





Assessing the Impact of Training

Satisfaction – Did you like the course?

Customer Satisfaction Survey

Learning – Did you learn something?

Before and After Testing

Application – Will you be able to apply what you learned?

Specific Example Requested

Impact – Will this improve the quality of your work?

Measured by Marketplace Surveys or Results in Proficiency testing

Technical Support to Stakeholders

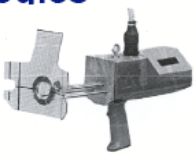
Promote fair competition and equity in the marketplace

Promote national and international uniformity

- Consistent Application of Standards and Procedures
- Accurate and Technically Correct Information
- Timely Response to New Technologies, Including New Measuring Devices
- Metric Acceptance

Answer over 1000 inquiries annually

Technical Support – New Device Technologies





Carcass evaluation

- Tentative code adopted in 2006

Multiple Dimension Measuring Devices

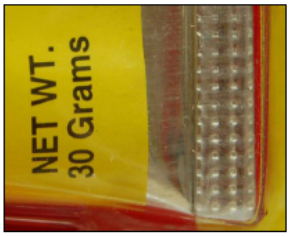
- Standards available on loan from NIST/WMD

Weighing in Motion technology

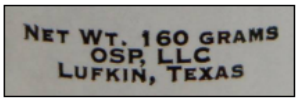
- Used for legal actions in other countries

Technical Support - Facilitating the Use of the Metric System

- **2008 Market Survey**
  - Establish baseline Fair Packaging and Labeling Act (FPLA) labeling compliance
  - Measure metric-only labeling use in U.S. retail outlets









NIST and NCWM – Working together

Technical Support
- Technical Advisors to NCWM committees, sectors
- ATC Steering Committee

Publication of Handbooks and other documents
- NIST Handbooks 44, 130, 133
- Meeting Agendas (Pubs 15 and 16)
- Annual report of the Conference

Representation – Seeking Balance

Promote national and international uniformity
- Weights and measures standards
- Inspection procedures and practices

Promote fair competition and equity in the marketplace
- Support for U.S. manufacturers

Maintain a balance of interests between industry, consumers, regulatory officials
- Participate in national and international work groups

International Legal Metrology

OIML Mutual Acceptance Arrangement (MAA)

- International program requested by NCWM
- Facilitates acceptance of measuring instrument test data obtained in another country – essential for supporting U.S. instrumentation industry
- Initial instrument categories include:
  - Non-automatic weighing instruments;
  - Load cells; and
  - Water meters

Representation - International Legal Metrology

Publication of the OIML Flow Meter Standard

- OIML R117-1 "Measuring Systems for Liquids other than Water" published in March 2008 with 100% international consensus.
- Multi-year international project with direct participation of US industry and technical experts from 28 nations (US + Germany are co-secretariats.)
- Incorporates several new instrument technologies and covers all types of liquid flow systems.



International Legal Metrology

Development of OIML Standard on Software

- Complexity of commercial device technology instigated need for software subcommittee and sector
- OIML has constituted a software subcommittee.
- Participation by NCWM Software Sector members on US National Working Group for the international effort.
- New OIML draft document "General requirements for software-controlled measuring instruments" is currently being voted upon.



Information Dissemination

Promote national and international uniformity
- Weights and measures standards
- Inspection procedures and practices

Enhance consumer protection
- Respond to requests for information
- Educational Outreach

Promote fair competition and equity in the marketplace
- Handbooks and technical publications

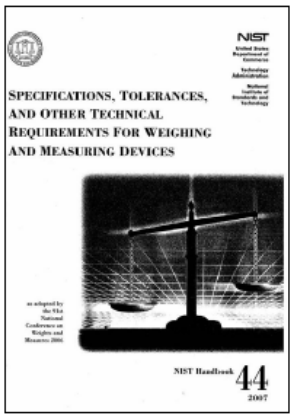
NIST Handbook 44

"Specifications, Tolerances, and Other Technical Requirements for Commercial Weighing and Measuring Devices"
- also applies to law enforcement equipment

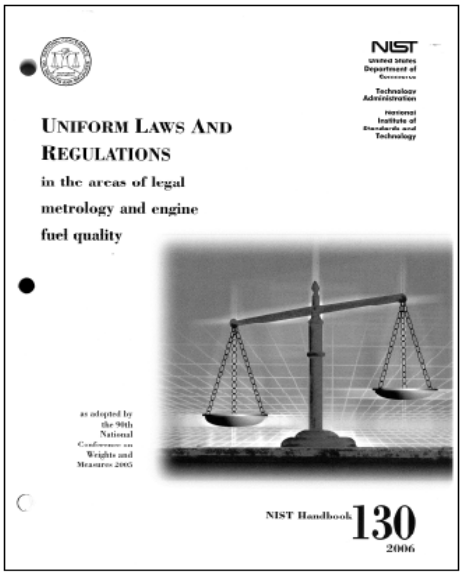
A product of the weights & measures community
Published annually by NIST to promote uniformity

Developed through the NCWM
Adopted by all states
- By reference
- By incorporation

Not all States use the same edition



Handbook 130



"Uniform Laws and Regulations in the areas of legal metrology and engine fuel quality"

Published by NIST to promote uniformity

Developed through the NCWM

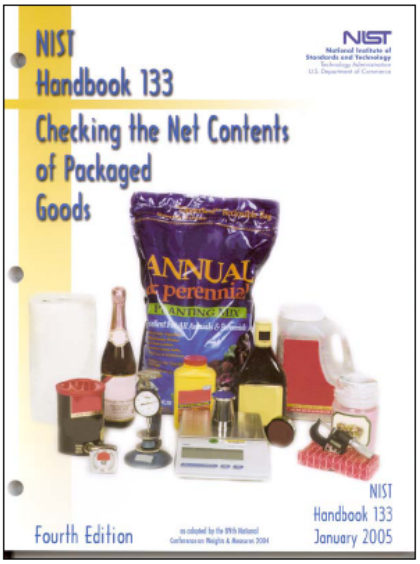
Uniform laws and regulations

- Serve as template or model

Adoption by States:

- Some adopt in entirety
- Some use as guideline
- Some do not use at all

Handbook 133



"Checking the Net Content of Packaged Goods"

Published by NIST to promote uniformity in package inspections

Developed through the NCWM

Adoption by States:

- 44 states or territories adopt in its entirety
- 7 use as guideline
- 2 do not use at all

Other Publications

NIST Handbooks 105 Series
- Specifications for standards used to test commercial devices

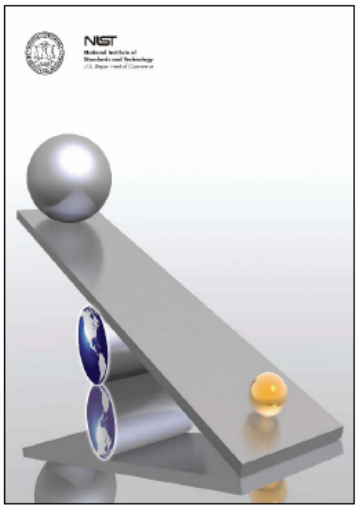
NIST Handbook 143 and 145
- Laboratory metrology procedures and standards

NIST Special Publications
- Interpretations
- Guides
- Manuals

NCWM Publications 15, 16, and Annual Report

The Power of Partnerships – NIST and NCWM

- Together, addressing topics essential for ensuring equity in commerce
  - Changing device technology
  - New engine fuels and test methods
  - Automatic temperature compensation
  - Unique products such as pelletized ice cream
  - Hydrogen as a fuel
  - Use of metric units as appropriate
- Together – we seek balance!



Chairman's Address
93rd National Conference on Weights and Measures
Burlington, Vermont
July 15, 2008

Judy Cardin
Wisconsin Department of Agriculture & Consumer Protection

Good Morning Everyone,

Thank you for trusting me to lead the conference during this year of challenging issues and change. We emerged from the challenges a stronger organization, focused on increasing our efficiency and effectiveness.

My theme this year was "Seeking Balance," and our organization did a tremendous job of handling difficult and complex issues with a steady, thoughtful and balanced approach that helped us make the right decisions.

The standing committees are outstanding this year, and I'd like to thank them for their balanced approach, expertise, attention to due process, and hard work.

I would like to recognize our strengthening partnership with NIST, and to thank Carol Hockert, Chief of the NIST Weights and Measures Division, for her dedication to growing our partnership, in addition to the friendship and support she has given me personally. NIST has added talented, positive personnel this year who helped us greatly in achieving our shared goals.

Thank you to Measurement Canada for their commitment the NCWM, and for their continued involvement in improving the implementation of our Mutual Recognition Agreement.

The Board of Directors merits special recognition this year. They worked long hours this year to plan and implement changes in NCWM management structure. Their dedication, cooperation and focus allowed us to accomplish all of our goals.

This year of change is also a very strong year for membership, meeting attendance, and participation. Thanks to all of the membership and meeting attendees for their involvement.

We are welcoming a new Executive Director and NTEP Administrator this year, and changing our structure to allow direct management of the conference. As a result, we are saying a fond goodbye to Beth Palys and Management Solutions Plus. Beth and her staff partnered with us over the last 10 years to help us grow and reach the point where we are ready to self manage.

Now, I'll introduce our new management team, and also honor the contributions that Beth, Steve Patoray, and the rest of Management Solutions' staff made to our organization.

Our new Executive Director is well known and respected in the weight and measures community, Don Onwiler. Don comes to us from the Nebraska Weights and Measures program. He has been active in the NCWM for 11 years, including serving as the NCWM Chairman, NTEP Committee chair for two years, and on the NCWM Board of Directors for six years.

In addition to his weights and measures expertise and strong leadership abilities, he brings to his new role a strong dedication to NCWM, and a passion for our purpose and goals. Don will now say a few words, and recognize Beth Palys' years of service.

Next, it's my pleasure to re-introduce you to another familiar face, Jim Truex our new NTEP Administrator. Jim has been active in the NCWM for 25 years. He comes to us from the Ohio Weights and Measures program, where he was Chief for many years.

Jim has been a strong leader in our conference, serving on the board of directors, and as the NCWM Chairman and as NTEP Committee Chair for three terms. He's been closely involved with NTEP since its inception, including participating in the weighing, measuring and software sector, and overseeing the Ohio NTEP laboratory. Jim will now say a few words, and recognize Steve Patoray's contributions to the NTEP Program.

Please join me in welcoming Don Onwiler and Jim Truex!

I'd like to add my thanks to Beth, Steve, and all of the staff at Management Solutions for the excellent service and partnership we've enjoyed over the last 10 years. Aves Thompson asked that I share his letter of appreciation for Management Solutions with you, and Ross Anderson would also like to make some comments about Beth and her staff.

Thanks to Ross and Aves for their comments.

October 1, 2008, is the transition date for the management change. Don will keep us informed on transition progress, including new phone numbers and important dates for any communication changes. Our goal is a seamless management transfer, and with the excellent cooperation we are receiving from Beth and Steve, and the leadership of Don and Jim, we will successfully achieve that goal.

New Chairman's Address
93rd National Conference on Weights and Measures
Burlington, Vermont
July 15, 2008

Jack Kane
Montana Business Standards Division

Good Morning,

First, I would like to let you all know how honored I am to stand before you as the Chairman of the National Conference on Weights and Measures, and I would like to thank all those that helped to prepare me to take on this role. Without the guidance and advice from many people, some sitting here today, and several who have retired from Weights and Measures or moved on in their careers, it would not be possible for anyone to assimilate the knowledge and background necessary in the short amount of time many of us have while with our respective programs.

As you are all aware, the NCWM is facing several challenges in the near future. We are moving forward in our evolution of becoming a standalone organization with our own employees in charge of our day to day operations. For NTEP and our industry partners, we need to implement an effective verification program to insure that production meets type; and we all need to effectively react to market driven changes to the world we work in and regulate, such as retail price posting and alternative fuels, which are already here.

In conjunction with our partners in industry and at NIST, we have faced similar challenges in the past, and we will deal with these and other issues as they arise. However, in order to rise to these challenges, we need to develop leaders for this conference and the best way is to identify, mentor, and task them with increasingly difficult positions. In other words, we need to help them grow so they will be able to meet these future challenges, which leads into my theme for the coming year "Getting Involved, Making a Difference." At my first weights and measures conference, a regional Western Weights and Measures Association, held in Anchorage, Alaska, back in 1995, I was approached by two of the more involved members in the west – Monty Hopper of Kern County and Gary West from the State of New Mexico. While sitting down at dinner towards the end of the conference, I was asked point blank what my intentions were: was I going "to bail in and get involved helping further the work of the conference," or was I "just going to be a tourist?" As is my nature, I chose bail in. As I became more active in the conference, both at the regional and national level, I looked to the leaders of the national conference, Ron Murdock, Lou Straub, Aves Thompson, and Sid Colbrook, by either asking for or being involuntarily volunteered to various committee work.

What I would like to ask from all of you here is that when you return to your state, actively search out and promote the best and brightest in your local jurisdictions and make them aware of the issues. At your regional meetings, identify and promote those among your group who are active and involved to take on committee assignments in preparation for possible national level participation.

In my travels to the various regional meetings during the last year, I had an opportunity to listen to the folks who came to the microphone to speak and was very impressed with the depth of knowledge. Let's work to get these folks even more involved and help them step up and make the difference. With that said I'd like to make the following appointments.

Specifications and Tolerances (S&T) Committee:

- Ken Ramsburg, Maryland Department of Agriculture.

Laws and Regulations (L&R) Committee:

- Jonelle Brent, Illinois Department of Agriculture, for a five-year term replacing Vicky Dempsey, Montgomery County Weights and Measures, Ohio;
- Terrance McBride, Memphis Weights and Measures, for a two-year term replacing Steven Benjamin, North Carolina Department of Agriculture, who is moving on to the Board of Directors;
- Joe Gomez, New Mexico Department of Agriculture, for a one-year term replacing Roger Macey, California Division of Measurement Standards, who will be retiring this year; and
- Rob Underwood, Petroleum Marketers Association of America, replacing Chris Guay, Procter& Gamble.

To the PDC Committee:

- Julie Quinn, State of Minnesota, Department of Commerce, Weights and Measures Division.

To the Credentials Committee:

- Kim Connor, Barnstable (MA) Weights and Measures.

Presiding Officers:

- Tim Chesser, Arkansas Bureau of Standards;
- Kirk Robinson, Washington Department of Agriculture;
- Jack Walsh, Framingham (MA) Weights and Measures; and
- Ivan Hankins, Iowa Weights and Measures Bureau.

I've also asked for and received confirmation that Lou Straub, Fairbanks Scales, Inc. will continue in his role as Parliamentarian and Steven Langford, Cardinal Scale Manufacturing Company, will continue as our Chaplain for the coming year.

Again, thank you for the privilege of being asked to serve this conference, and travel safe.

NCWM 2008 Annual Meeting Honor Award Recipients

Full Name	Organization	State	No. of Years
Joe Buxton	Daniel Measurement and Control, Inc.	GA	10
James Cassidy, Jr.	Cambridge Weights and Measures	MA	10
Maurice J. Forkert	Tuthill Transfer Systems	IN	10
Alan Johnston	Measurement Canada	Canada	10
Ted Kingsbury	Measurement Canada	Canada	10
L. Edward Luthy	B-Tek Scales, LLC	OH	10
Beth W. Palys, CAE	National Conference on Weights and Measures	MD	10
Darrell E. Flocken	Mettler-Toledo, Inc.	OH	15
Randy Jennings	Tennessee Department of Agriculture	TN	15
Leon Lammers	Avery Weigh-Tronix	MN	15
Neal J. Nover	Nover Englestein and Associates, Inc.	NJ	15
Michael Pinagel	Michigan Department of Agriculture	MI	15

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Report of the Board of Directors

Judy Cardin, Chief
Wisconsin, Weights and Measures

Reference
Key Number

100 INTRODUCTION

The Board held its quarterly Board of Directors (BOD) meeting on Saturday, July 12, 2008, and continued that meeting during work sessions throughout the remainder of the Annual Meeting. The Board of Directors and the 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.

Table A
Table of Contents

Reference Key Items		Title of Item	Page
INTRODUCTION			1
1.	I	NCWM Automatic Temperature Compensation (ATC) Steering Committee	2
2.	I	Marketplace Surveys Update	2
3.	I	Membership and Meeting Attendance	2
4.	I	Newsletter and Website	3
5.	I	Meetings Update	3
6.	I	Participation in International Standard Setting	3
7.	I	Efficiency and Effectiveness	3
8.	V	Bylaws Amendment: Replace A&P Committee with PDC	3
9.	I	NCWM Policies	5
10.	I	Improving Standards Development	5
11.	I	U.S. Participation in the MAA for R 76	5
12.	I	Strategic Planning	5

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	Final Report of the NCWM Associate Member Committee (AMC)	B1

Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
8 (voice vote)					Passed

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

1. I NCWM Automatic Temperature Compensation (ATC) Steering Committee

The Automatic Temperature Compensation (ATC) Steering Committee has been meeting by conference call. Ross Andersen will serve as the NCWM liaison to the California Energy Commission for their work on ATC. The NCWM Chair, Judy Cardin, met with a representative from the GAO to offer the NCWM's assistance in their cost benefit analysis. The Steering Committee presented a report and a presentation on options for test procedures at the NCWM Annual Meeting. The Steering Committee will continue its work.

2. I Marketplace Surveys Update

The Board is planning on conducting a marketplace survey in 2009. The NCWM will work with NIST on this survey.

3. I Membership and Meeting Attendance

NCWM Membership Report

	12/31/07	**12/31/06**	**12/31/05**	**12/31/04**	**12/31/03**	**12/31/02**
Associate	**807**	804	783	784	780	879
Foreign Assc	**53**	49	51	33	34	31
Federal Gov't	**9**	9	13	13	18	17
NIST	**14**	14	10	8	14	18
State Gov't	**814**	794	791	826	804	852
Local Gov't	**548**	547	465	453	515	556
Int'l Gov't	**22**	29	21	29	18	23
Retired	**222**	221	221	224	226	229
Total	**2489**	2467	2355	2370	2409	2605

As of the 2008 Interim Meeting, the total NCWM membership was 2497. This is the highest membership total since December 2002. The 2008 Interim Meeting had a record number of members in attendance. Attendance at the 2008 Annual Meeting was down slightly from 2007.

4. I Newsletter and Website

Steve Grabski has been reviewing the NCWM website and newsletter over the past months. .He has determined that the website is easy to navigate and works well and no further study is required; however, he would welcome feedback from the membership. This item will be removed from future Board agendas.

5. I Meetings Update

Interim Meetings

January 11 - 14, 2009	Hilton Daytona Beach Hotel, Daytona Beach, Florida
January 24 - 27, 2010	Hilton Nashville, Nashville, Tennessee
January 23 - 26, 2011	Fairmont Dallas, Dallas, Texas

Annual Meetings

July 12 - 16, 2009	Marriott Plaza Hotel, San Antonio, Texas
July 11 - 15, 2010	Crowne Plaza St. Paul Hotel, St. Paul, Minnesota

6. I Participation in International Standard Setting

Chuck Ehrlich and other NIST Weights and Measures Division (WMD) staff briefed the NCWM Board and NCWM members on key activities of OIML and regional legal metrology organizations (see Appendix A).

7. I Efficiency and Effectiveness

To increase the efficiency and effectiveness of the NCWM, the Board of Directors announced changes to the conference management structure. Management Solutions Plus (MSP), the company currently supplying management support, elected not to participate in the new management structure. MSP will continue in its current role until September 30, 2008.

On October 1, 2008, the following changes will be in place:

- Don Onwiler has been hired to serve as the NCWM Executive Director and Jim Truex has been hired to serve as NTEP Administrator.
- The NCWM's new office will be located in Lincoln, Nebraska. The Executive Director will report to the NCWM Board of Directors. Two support staff have been hired to work in the new office and will report to the Executive Director.
- The NTEP Administrator will work from his home and will report to the Executive Director.
- The membership will not see changes in their services, only the necessary telephone number and address changes after October 1, 2008.

8. V Bylaws Amendment: Replace A&P Committee with PDC

Background: In 2003, the Board of Directors disbanded the Administration and Public Affairs Committee. At the same time, the Professional Development Committee was formed. This new standing committee has a much narrower scope than its predecessor. Even though this change occurred in 2003, the board neglected to change the corresponding by-laws to reflect the current committee name and its new scope. The changes proposed below address this issue.

Article IX, Section 2 – Standing Committees

The Board of Directors may create and disband standing committees in the best interests of the Corporation. As referenced in Article IX, Section 1, the Chairman makes appointments to the several special purpose committees. The current standing committees are:

Committee on Specifications and Tolerances (S&T);
Committee on Laws and Regulations (L&R); and
~~Committee on Administration and Public Affairs (A&P)~~**Professional Development Committee (PDC)**.

Article IX, Section 5

D. ~~**Committee on Administration and Public Affairs**~~**Professional Development Committee**
The mission of the Committee is:

To provide leadership to develop and implement uniform, quality weights and measures services in the areas of:
- effective program management,
- education, and
- public relations.

The ~~**Committee on Administration and Public Affairs**~~**Professional Development Committee** annually presents a report for Corporation action.

~~Its scope embraces all matters dealing with:~~
~~1. development and recommendation of administrative procedures;~~
~~2. education and training of weights and measures officials;~~
~~3. promotion of weights and measures principles and techniques among users of weights and measures devices and the~~
~~general public; and~~
~~4. liaison with Federal agencies, State agencies, and other groups and organizations on issues within the purview of the~~
~~committee. This entails explaining, advocating, and coordinating Corporation positions, recommendations, and needs before~~
~~Federal Government agencies, consumer groups, the Associate NCWM membership, domestic and international standards~~
~~organizations, industry, trade associations, and others. The goals are to provide and solicit information, develop a spirit of~~
~~cooperation, and promote uniformity with the activities and standards of the NCWM.~~
~~The Professional Development Committee annually presents a report for Corporation action.~~

The four main areas for focusing their efforts are:

National Training Program – The focus of the National Training Program (NTP) is to increase technical knowledge, strengthen credibility, and improve the professionalism of the individual weights and measures official. A strong NTP would promote uniformity across the nation.

National Certification System – Develop a national certification system to recognize or accredit weights and measures programs as competent or capable. The program would include requirements around individual training, proper test standards, use of national handbooks, and a data gathering system.

Conference Training Topics – The Committee would be the focal point for gathering and recommending workshops or symposia on leadership, management, and emerging issues to be presented during the Annual Meeting. These topics would provide a forum for the exchange of ideas and discussion of changes in the marketplace.

Uniformity of Data – The Committee would develop standard categories for devices and inspection areas so that such things as the number of devices, compliance rates, frequency of inspection and other areas could be compiled and compared at the national level. These statistics could be used to benchmark organizations and to communicate the value of weights and measures to the public and to decision makers.

The by-laws amendment passed.

9. I NCWM Policies

The NCWM Board of Directors sets policies for the board, committees, and for the corporation. These policies are documented and will be made available as they are approved. In the future, NCWM policies will be posted on the NCWM website.

The board adopted a policy prohibiting acceptance of contributions from associate members to fund special events at meetings. The board recommends that regional associations adopt similar policies.

10. I Improving Standards Development

Randy Jennings, NCWM Chair-elect, and Carol Hockert, NIST, will work on recommendations to improve the standards development process for NCWM. They invite comments from stakeholders.

11. I U.S. Participation in the MAA for R 76

The NCWM position has been to not participate in the Mutual Acceptance Agreements (MAA) for R 76 (non automatic weighing instruments) until we can do so as an issuing participant. A brainstorming session was held at the Annual Meeting to identify barriers and possible solutions to U.S. labs becoming authorized for conducting evaluations and issuing test data under this MAA.

12. I Strategic Planning

The board has decided to review and update the NCWM strategic plan during the coming year.

Judy Cardin, Wisconsin, NCWM Chairman
Jack Kane, Montana, Chairman-elect
Don Onwiler, Nebraska, NTEP Chairman
Will Wotthlie, Maryland, Treasurer
Charles Carroll, Massachusetts, Northeastern Regional Representative
Steven Malone, Nebraska, Central Regional Representative
Randy Jennings, Tennessee, Southern Regional Representative
Steven Grabski, Nevada, Western Regional Representative
Christopher Guay, Procter & Gamble, At-large
Tim Tyson, Kansas, At-large
Robert Murnane, Seraphin Test Measure, Associate Membership Representative
Don Onwiler, NCWM Executive Director
Carol Hockert, NIST, Executive Secretary

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.

Table A
Table of Contents

Subject	Page
I. Report on the Activities of the OIML Technical Committees	A2
II. Report on the 42nd CIML Meeting in Shanghai, China, October 24 - 26, 2007	A5
III. Future OIML Meetings	A7
IV. Regional Legal Metrology Organizations	A7

Table B
Glossary of Acronyms

BIML	International Bureau of Legal Metrology	IR	International Recommendation
B	Basic Publication	IWG	International Work Group
CD	Committee Draft[1]	MAA	Mutual Acceptance Arrangement
CIML	International Committee of Legal Metrology	MC	Measurement Canada
CPR	Committee on Participation Review	OIML	International Organization of Legal Metrology
D	Document	R	Recommendation
DD	Draft Document[2]	SC	Technical Subcommittee
DR	Draft Recommendation[2]	TC	Technical Committee
DoMC	Declaration of Mutual Confidence	WD	Working Draft[3]
DV	Draft Vocabulary[2]	USNWG	U.S. National Work Group
ILMG	International Legal Metrology 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 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 1 "Pattern approval and evaluation" (United States)
The subcommittee approved the U.S. proposal for a combined revision of OIML D 19 "Pattern evaluation and pattern approval" and D 20 "Initial and subsequent verification of measuring instruments and processes" into a single document entitled "Principles of metrological control of measuring instruments: type approval and verification." Key elements of OIML D 3 "Legal qualification of measuring instruments," R 34 "Accuracy classes of measuring instruments," and R 42 "Metal stamps for verification officers" will also be incorporated into the combined revision of OIML D 19 and D 20. The revised documents will incorporate recent developments such as the OIML certificate system, D 27 "Initial verification of measuring instruments utilizing the manufacturer's quality management system," and the "Framework for a mutual acceptance arrangement (MAA) on OIML type evaluations." Consideration will be given to the appropriate conformity assessment options developed by the ISO Council Committee on Conformity Assessment (ISO CASCO), including quality systems, product certification, and accreditation. Consideration will also be given to information technology and statistical methods to increase or decrease verification intervals based upon proven instrument performance. For more information on this activity, contact Dr. Ambler Thompson at (301) 975-2333 or at ambler@nist.gov.

TC 3/SC 5 "Conformity assessment" (United States and BIML)
The subcommittee held a meeting in May 2008 to begin revision of the documents B 3 (Certificate System) and B 10 (MAA). The meeting included discussion of a new document on the incorporation of measurement uncertainty into conformity assessment decisions in legal metrology; in January 2008, a revised WD was sent to the BIML and other technical advisors for review. For more information on this activity, contact Dr. Charles Ehrlich at (301) 975-4834 or at charles.ehrlich@nist.gov.

TC 5/SC 2 "Software" (Germany and BIML)
A 1 CD of OIML "General requirements for software-controlled measuring instruments" was received in June 2007 and circulated to the NCWM Software Sector and other interested U.S. parties. The U.S. comments on the 1 CD were submitted to the International Secretariat in September 2007, and a meeting of the OIML Software Subcommittee was held in Berlin in December 2007. When complete, the OIML document will serve as guidance for software requirements in International Recommendations by OIML technical committees. A 2 CD was received in February 2008. The final draft document is out for vote with a September 2008 deadline. The ILMG participated in NCWM Software Sector meetings in Lake Tahoe, California, and Little Rock, Arkansas, in October and May 2007. Please contact Dr. Ambler Thompson at (301) 975-2333 or at ambler@nist.gov if you would like to receive information and participate in this project.

TC 6 "Prepackaged products" (South Africa)
In September 2007, NIST hosted the OIML TC 6 committee at NIST in Gaithersburg, Maryland. There was continued discussion on the issue of 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 requirements, and packers in exporting countries want to be sure prepackaged goods 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 will develop 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. Please contact Lisa Warfield at (301) 975-3308 or at lisa.warfield@nist.gov if you would like more information about the work of this subcommittee or to participate in any of these projects.

TC 8/SC 1 "Static volume and mass measurement" (Austria and Germany)
The subcommittee has two documents currently out for a CIML postal ballot: OIML R 71 "Fixed storage tanks," and R 85 "Automatic level gages for measuring the level of liquid in fixed storage tanks." Final approval for both of these recommendations is expected in October 2008. The revision of R 80 "Road and rail tankers" should be completed in 2009. Please contact 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" has undergone an extensive revision. The Recommendation obtained 100 % international "yes" votes and final CIML approval at the CIML meeting in Shanghai, China, in October 2007. The revision incorporates new instrument technologies and includes a merger with OIML Recommendations R 86 "Drum meters" and R 105 "Mass flowmeters." After publication of R 117-1, Recommendations R 86 and R 105 will be withdrawn. The ILMG has worked closely with the USNWG on flowmeters, Germany, and the Netherlands on this effort. Meetings of the USNWG on flowmeters were held during the NCWM Interim Meeting in January 2007 in Jacksonville, Florida, the NCWM Annual Meeting in July 2007 in Utah, and the NCWM Annual Meeting in July 2008 in Burlington, Vermont. Measurement Canada has also been a strong contributor to this effort. Subcommittee work on R 117-2 "Test methods" and R 117-3 "Test report format" has begun. If you have any questions, would like a copy of the R 117-1 DR, or would like to participate in the next phases of this project, please contact Ralph Richter at (301) 975-3997 or ralph.richter@nist.gov.

TC 8/SC 6 "Measurement of cryogenic liquids" (United States)
In July 2007 the Secretariat (United States) requested that Participating members and U.S. stakeholders decide if there was sufficient justification for opening a new project to revise R 81 "Dynamic measuring devices and systems for cryogenic liquids." The response 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.

Subsequently, the Secretariat submitted a proposal to the BIML requesting approval for the start of a new project to revise R 81. The BIML submitted the proposal at the October 2007 42nd Meeting of the CIML and was granted approval of the project. The Secretariat will ask members of TC 8/SC 6 to review and formally comment on R 81. The Secretariat is forming a National Work Group to establish a U.S. position on the appropriate updates to the document. To obtain more information or to participate in this project, please contact Juana Williams at (301) 975-3989 or juana.williams@nist.gov.

TC 8/SC 7 "Gas metering" (Netherlands)
In October 2007, the CIML approved the merger of TC 8/SC 7 (with France and Belgium as co-secretariats) and TC 8/SC 8 "Gas meters" (with Netherlands as secretariat). Netherlands has assumed responsibility of this newly merged technical subcommittee. In April 2007, a DR of the new Recommendation "Measuring systems for compressed natural gas (CNG) for vehicles" was circulated with annexes covering performance tests for electronic devices and basic test procedures. The Recommendation was approved by the CIML in October 2007. The United States voted "no" on this document at the CIML meeting because some of the systems testing requirements were considered to be excessive and very expensive.

Also in April 2007, a postal ballot was circulated on another new Recommendation, "Measuring systems for gaseous fuel" and U.S. comments were submitted in June 2007. This Recommendation is intended for large pipelines with large flow rates and high operating pressures. This Recommendation was approved by the CIML in October 2007.

The final draft of OIML R 137-1 "Gas meters" was approved by the CIML at their October 2006 meeting in Cape Town, South Africa. Published in 2007, OIML R 137-1 combines and replaces three old Recommendations that will soon be withdrawn: R 6 "General provisions for gas volume meters," R 31 "Diaphragm gas meters," and R 32 "Rotary piston gas meters and turbine gas meters." Development of R 137-2 "Test methods" is now underway. Please contact Ralph Richter at (301) 975-3997 or ralph.richter@nist.gov if you would like to obtain a copy of any of these gas measurement documents or if you would like to participate in future work of this subcommittee.

TC 9 "Instruments for measuring mass" (United States)
The Secretariat of TC 9 reported that the new edition of R 76-1 was published in December 2007. Members of TC 9 and the USNWG will be solicited on whether or not to initiate a new project to review R 60 "Metrological regulation for load cells." Based on the results of the solicitation, the Secretariat will provide the BIML with a recommendation on whether or not a project to revise R 60 should be initiated. The questionnaire will ask for feedback on everything from the basic principles of R 60 (e.g., tolerances and accuracy classes) to exploring the addition of new requirements. For more information on these efforts, please contact Steve Cook at (301) 975-4003 or steven.cook@nist.gov.

TC 9/SC 1 "Nonautomatic weighing instruments" (Germany and France)
The revision of R 76 "Non-automatic weighing instruments" is of major importance to U.S. interests because the Recommendation serves as the foundation for a majority of the laws and regulations that govern weighing instruments around the world. The revision includes new language addressing metrological controls for type evaluations, conformity, initial and subsequent inspections, suitability of separable components and requirements for metrological software. The USNWG was consulted concerning proposals to harmonize NIST Handbook 44 and R 76. As reported at the 2007 NCWM Interim Meeting, the DR of R 76-1 was approved by the CIML in October 2006. Most recently, the United States voted "yes" on the DR of R 76-2 "Test report format." R 76 was published in December 2007. For more information on these efforts, please contact Steve Cook at (301) 975-4003 or steven.cook@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" was approved by CIML in October 2006. 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 is going through a final editorial process at the BIML.

The 3 CD of R 106 Parts 1 and 2, "Automatic rail-weighbridges" were distributed by the Secretariat to members of TC 9/SC 2 in September 2007. In distributing the 3 CD, the Secretariat commented that although the 2 CD achieved majority approval, there were substantial comments and some amendments to the technical requirements of the 2 CD. Comments and a U.S. "yes" vote on the 4 CD of R 106 Parts 1 and 2 were sent in July 2008.

The subcommittee approved a revision of R 107 "Discontinuous totalizing automatic weighing instruments (totalizing hopper weighers)," and approval was granted on the 1 DR at the October 2007 42nd meeting of the CIML. However, the Secretariat first accommodated U.S. concerns by inserting into the document that national legislation will dictate whether the automatic zero-tracking feature is allowed in a country. The U.S. CIML member pointed out at the CIML meeting that the United States does not allow the automatic zero-tracking feature. If you would like to receive copies of these documents or work on these projects, contact Richard Harshman at (301) 975-8107 or at harshman@nist.gov and John Barton at (301) 975-4002 or john.barton@nist.gov.

TC 17/SC 1 "Humidity" (China)
The Secretariat (China) is working closely with the United States and 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. A 4 CD was circulated to the IWG in August 2006. U.S. comments on the 4 CD were returned to the Secretariat in November 2006. A TC 17/SC 1 meeting was hosted by NIST in September 2007 to discuss the comments to the 4 CD. At the TC 17/SC 1 September 2007 meeting, the subcommittee also discussed harmonization of the Recommendation for moisture with the TC 17/SC 8 subcommittee's Recommendation for protein. Please contact Diane Lee at (301) 975-4405 or at diane.lee@nist.gov if you would like to participate in this work group.

TC 17/SC 8 "Quality Analysis of Agricultural Products" (Australia)
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 work group meeting was held in September 2006 in Ottawa, Canada, to discuss comments on the 1 CD. A TC 17/SC 8 meeting was hosted by NIST in September 2007 to discuss the 2 CD. At the September 2007 meeting, the TC 17/SC 8 subcommittee also 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. Please contact Diane Lee at (301) 975-4405 or at diane.lee@nist.gov if you would like to participate in this work group.

OIML Mutual Acceptance Arrangement (MAA)
Note: The report on the OIML Mutual Acceptance Arrangement (MAA) has moved. It can now be found in the NTEP section of the NCWM Annual Report. 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 42nd CIML Meeting in Shanghai, China, October 24 - 26, 2007

The International Committee of Legal Metrology (CIML) opened with addresses given by Mr. Li Chuanqing, Minister of the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ), Mr. Zhou Taitong, Deputy Mayor of Shanghai, and Mr. Alan E. Johnston, CIML President. A quorum was reached as 48 Member States out of 59 were present or represented at the meeting.

The Committee noted that two new Corresponding Members, the United Arab Emirates and Sudan, had joined the OIML in the past year.

The CIML gave final approval to the following publications in China:

- Combined Revision of R 4, R 29, R 45 and R 96 "Vessels for commercial transactions" (now R 138)
- Combined Revision of R 117, R 105 and R 86 "Dynamic measuring systems for liquids other than water, Part 1: Metrological and technical requirements" (new R 117-1)
- New OIML Recommendation "Compressed gaseous fuel measuring systems for vehicles" (now R 139) New OIML Recommendation "Measuring systems for gaseous fuel" (now R 140)
- Revision of R 21 "Taximeters"
- Revision of R 107-1 "Discontinuous totalizing automatic weighing instruments (totalizing hopper weighers), Part 1: Metrological and technical requirements – Tests, and Part 2: Test report format" (the United States voted "yes", but indicated that the "automatic zero-tracking feature" is not permitted in the United States)
- Revision of R 35 "Material measures of length for general use, Part 1: Metrological and technical requirements"
- Amendment 2 to D 2 "Legal units of measurement"

The CIML took action on the following publications:

- Recommendation R 24 "Standard one meter bar for verification officers" was re-confirmed
- Document D 4 "Installation and storage conditions for cold water meters" was withdrawn

The CIML approved the following new work projects:

- Project to revise R 79 "Labeling requirements for pre-packaged products"
- Project to revise R 81 "Dynamic measuring devices and systems for cryogenic liquids"
- Project to revise R 66 "Length measuring instruments"
- Project to revise the new OIML Draft Recommendation "Compressed gaseous fuel measuring systems for vehicles" – a new work item in (the newly merged) TC 8/SC 7.

The CIML also approved the following proposals in China:

- Proposal to merge subcommittees TC 8/SC 7 Gas metering and TC 8/SC 8 Gas meters, with the Netherlands as the Secretariat of the combined subcommittee
- Proposal to reallocate the responsibility for Measuring Container Bottles from TC 8 to TC 6

The Committee noted efforts by the "Conformity to Type Work Group." The WG is in the early stages of developing a project to study the issue of conformity to type on a global basis. The WG conducted two surveys on the subject in the past year, but survey results have thus far proved to be inconclusive as to how OIML should proceed on this. Further study will follow. A few countries have indicated they will be conducting some tests related to this effort, although this is not a formally sanctioned OIML activity.

The Committee also took note of a presentation given by the BIML Director concerning the development of the first draft tables of correspondence between OIML Recommendations and the applicable requirements in the European "Measuring Instruments Directive (MID)." The Bureau plans to continue its cooperation with WELMEC on this issue and requested the European participants of the appropriate TCs/SCs to assist in this effort as soon as a Recommendation reaches DR status.

The CIML presented awards to the following individuals in recognition of their outstanding contribution to legal metrology:

- Mr. Romain Eggermont (Belgium)
- Mr. Gerard Lagauterie (France)
- Mr. Wayne Stiefel (United States)
- Mr. Ali Tukai (Tanzania)
- Mr. Bruno Vaucher (Switzerland)

It also gave Letters of Appreciation to:

- Mr. Peter Brandes (Germany)

- Dr. Charles Ehrlich (United States)
- Mr. Mikhalchenko Vassily Nikolaevich (Kazakhstan)

III. Future OIML Meetings

The 13th OIML Conference and the 43rd CIML Meeting will be held in Sydney, Australia, in October 2008, and the CIML accepted Kenya's invitation to hold the 44th CIML Meeting in 2009.

IV. Regional Legal Metrology Organizations

Meeting of the SIM General Assembly and SIM Legal Metrology Working Group (LMWG)

The SIM General Assembly was held in Ottawa, Canada, in September 2007. Dr. Humberto S. Brandi, Director of Scientific and Industrial Metrology (SIM) at INMETRO Brazil, is the SIM President (elected last year). Marcos Senna (senna@inmetro.rs.gov.br), also of INMETRO in Brazil, was announced as the new Chairman of the SIM Legal Metrology Work Group (LMWG). A meeting of the SIM LMWG was held in March 2008. Topics that were discussed at the meeting included composition of the SIM Legal Metrology Working Group, SIM Legal Metrology directory, survey on training needs and their implementation, events organization costs (translation, mikes, data-show, etc.), events calendar (dates, venue, organization committee, instructors, etc.), budget for 2008-2009, and correspondence/communications in LMWG. The next Annual SIM meeting will be held in the Honduras in September 2008. Please contact Dr. Ambler Thompson at (301) 975-2333 or at ambler@nist.gov for more information.

APLMF Meeting

The 14th APLMF Meeting was held October 18 - 20, 2007, in Zouzhuang, China (just outside of Shanghai). The United States was represented by Dr. Charles Ehrlich, who serves as Chairman of the APLMF Work Group on Mutual Recognition Arrangements, and Mr. Wayne Stiefel. The APLMF conducted three training courses/seminars in 2007, including a train-the-trainer course on the verification of Mechanical Weighing Scales. A workshop on Metrology of Agricultural Products and Foods was held February 7 - 9, 2007, in Chiang Mai, Thailand, and a Seminar on Electricity Meters was held March 19 - 22, 2007, in Shanghai, China. The Peoples Republic of China assumed the Presidency and Secretariat of the APLMF at the conclusion of this meeting. The next meeting of the APLMF will be in late October 2008 in Sydney, Australia, just prior to the 43rd CIML meeting and the 13th OIML Conference.

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Appendix B

Final Report of the
NCWM Associate Member Committee (AMC)

Burlington, Vermont
Minutes, July 14, 2008

CALL TO ORDER:

Chairman Guay called the meeting to order at 12:11 p.m.

APPROVAL OF JANUARY 27, 2008, MINUTES:

The minutes of the January 27, 2008, meeting were distributed and read individually, Pete O'Bryan made a motion to approve the minutes, and Darrell Flocken seconded that motion and the minutes were approved.

FINANCIAL CONDITION:

Chairman Guay reported the following:

Fund Balance as of September 30, 2007	$ 3,041.66
Revenue as of July 6, 2008	$13,545.00
No money was paid out since the Interim Meeting	
Balance Remaining	$16,586.66*

*Social event will get $10,000 of this balance leaving $ 6,586.66 of disbursable monies for training or other worthy initiatives to help the national conference.

BOARD OF DIRECTORS REPORT:

1. Board of Directors (BOD) – Bob Murnane reported:

- NTEP applications slow for two quarters in a row.
- Two hundred thirty-four meeting participants representing 37 states.
- Automatic Temperature Compensation (ATC) committee presentation scheduled on ATC testing procedure recommendations. Currently, there is little agreement within the committee – four options still under consideration.
- VCAP – verified conformity assessment program – for testing of load cells is moving forward. Look for a pilot program soon.
  - Pilot program for NTEP load cell certificate holders;
  - Designed to ensure production meets type.
- Brainstorming session to be held Wednesday morning from 8:00 a.m. to 9:00 a.m. regarding how to get a U.S. lab for R 76 OMIL testing.
- Mutual Acceptance Agreements
  - Not moving as fast as expected;
  - Germany and UK want test data accepted from the manufacturer; and
  - OMIL certificates are currently being issued that way.

- NCWM 2009 Budget approved.
  - In the future, the BOD voted not to take funding from either associate members or sponsors to fund events.
  - This year's special event is unaffected by this decision as arrangements were already underway when decision was contemplated.
- Restructuring from outsourced management to internal management underway and proceeding well.
  - Office will be in Lincoln, Nebraska;
  - Don Onwiler will be the executive Director and is already working in that capacity;
  - Jim Truex will be the director over NTEP;
  - They have hired a full-time office manager who is onboard now; and
  - Currently interviewing for a second full time office position.
- BOD looking for financial help from AMC for completion of the new office set-up in Lincoln, Nebraska.

2. Professional Development Committee (PDC) – Paul Hoar Absent:

- Committee has not yet met.

3. Laws and Regulations (L&R) – Pete O'Bryan:

- ATC covered.
- Moisture Loss workgroup met. Good Conversation – momentum building and looking for practical accomplishments soon.
- Pete reminded all that his term is up, and the AMC will need a new representative for the L&R.

AMC FUND DISBURSEMENT REPORTS:

- No formal training requests received.
- NIST verbally requested help for small-scale training to enable bringing people to Gaithersburg, but the request was not specific enough so it was not considered.
- Discussion about request from BOD pertinent to the new national office in Lincoln.
- Without the special event, the AMC needs to decide the best use of this previously allocated money.
  - Can consider best in January or July after new dues are available.
- Over the next year Paul Lewis and Chris Guay will make a concerted effort to get the word out at regionals (meetings) about available training money.
- One suggestion made is for AMC to hire web-based training development and place training on the website independently.
  - There were several voices of concern that the AMC should not usurp the PDC's role of developing training.
  - PDC, still struggling on the training issue; could be leading the conversion of existing documents and modules into web-based training.
  - This would be a great benefit not only to the weights and measures community but also to the service personnel from the various industry stakeholders.
- Moisture loss workgroup may have applicable materials appropriate for conversion to the website.
- AMC members present indicated a strong message be given to the BOD to get something going out of the PDC.
- Further discussion was entertained about the request to use the AMC additional monies to fund the set-up of the Lincoln office and training of its staff.
  - Darrell Flocken moved that the remaining monies – $6,586.66 and any additional funds/deposits made this year – be given to the National Conference for the Lincoln office set-up and training needs. Paul Lewis seconded the motion. Approved.

2008 SPECIAL EVENT

- Dinner boat cruise on Lake Champlain.
- Last time this will be co-sponsored by the AMC.

- Next year this will mean $10,000 more money in the AMC treasury for helping the conference.

SELECTION OF INDUSTRY REPRESENTATIVES

Historically these had been 3-year terms but 10 years ago were changed to 5-year terms. Openings exist for the PDC and L&R committees.

- PDC Representative
  - Last year Paul Hoar accepted a one-year appointment to complete the PDC committee term.
  - Some discussion that Gary Lameris may be interested but it's unclear as he has changed jobs.
  - Position left open for this year; PDC committee unlikely to meet at this meeting.
- L&R Representative
  - Rob Underwood from the Petroleum Marketer's Association was nominated and selected to the L&R committee.

SELECTION OF AMC COMMITTEE AND OFFICERS

- Currently eight positions on the committee.
  - Two positions, Frye and Flocken are expired; and
  - One position open due to the resignation of Wankowski.
- Darrell Flocken selected to another five-year term
- Paul A. Hoffman, Kraft, selected to a five-year term.
- Michael Gaspers selected to another five-year term, leaving one year unexpired from his current term.
- Rob Underwood selected to fill Gaspers unexpired one-year term.
- Chris Guay will move out of the Chair following this meeting, Paul Lewis will move from Vice Chair to Chair, and Mike Gaspers will move from Secretary/Treasurer to Vice Chair.
- New Recording Secretary/Treasurer for the coming year – no nominations; however Tom Herrington's name has been put forward as a possible candidate.

OLD BUSINESS:

- No old business.

NEW BUSINESS:

- Paul Lewis and Chris Guay volunteered to review the by-laws and make necessary changes to reflect the special event change and any others that seem appropriate.
  - Changes to the by-laws to be available for consideration at the Interim Meeting.
- Paul Lewis will research cost and practical considerations for purchasing lapel pins for conference attendees.
  - Someone will need to approach the board and secure their approval to use the NCWM logo on the pin.

ADJOURNMENT:

Pete O'Bryan moved and Darrell Flocken seconded a motion for adjournment. The meeting was adjourned at 1:03 p.m.

Respectfully submitted,

Chris Guay, Chair
Michael Gaspers, Secretary-Treasurer, AMC

Members in Attendance at the Associate Membership Committee (AMC) Meeting July 14, 2008

Name	Company	E-mail Address	Phone
Chris Guay	Procter & Gamble	guay.cb@pg.com	(513) 983-0530
Paul Lewis	Rice Lake Weighing Systems	plewis@ricelake.com	(715) 234-9171
Michael Gaspers	Farmland Foods Inc	mpgaspers@farmland.com	(712) 490-2809
Stephen Langford	Cardinal Scale MFG. Co	slangford@cardet.com	(417) 673-4631
Darrell Flocken	Mettler-Toledo	darrell.flocken@mt.com	(614) 438-4393
Steve Patoray	Consultants on Certification, LLC	steve@consultoncert.com	(828) 859-6178
Bob Murnane	Seraphin Test Measures	rmurnane@pemfab.com	(609) 636-6498
Pete O'Bryan	Foster Farms	obryanp@fosterfarms.com	(209) 765-4978
Steve Steinborn	Hogan and Hartson	sbsteinborn@hhlaw.com	(202) 632-5969
Ann Hines	Arkansas Oil Marketer's Assn	ann@aoma.org	(501) 374-6293
Jim Hewston	Seale Source	jhewston@sealesource.com	(402) 455-2143
Dennis Kolsun	H.J. Heinz Co.	dennis.kolsun@us.hjheinz.com	(724) 778-4503
Kevin Mikoski	Irving Oil	kevin.mikoski@irvingoil.com	(603) 559-8755
Rob Underwood	Petroleum Marketers Association of America	runderwood@pmaa.org	(703) 351-8000
Leon Lammers	Avery Weigh-Tronix	llammers@awtxglobal.com	(507) 238-8225
Cary Frye	International Dairy Foods Association	cfrye@idfa.org	(202) 220-3543

Report of the Laws and Regulations Committee

Vicky Dempsey, Chairperson
Montgomery County, Ohio

200 INTRODUCTION

This is the report of the Laws and Regulations Committee (hereinafter referred to as the "Committee") for the 93rd 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, 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 recommendations to amend National Institute of Standards and Technology (NIST) Handbook 130, 2008 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
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Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law (EFL) ..... 223 Series

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Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
223-1	37	0	35	0	Passed
232-2	34	2	31	2	Passed
237-1 (amendment)	37	0	34	1	Passed
237-1 (includes amendment)	36	1	35	0	Passed
250-1	38	0	38	1	Passed

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

223 UNIFORM ENGINE FUELS, PETROLEUM PRODUCTS, AND AUTOMOTIVE LUBRICANTS INSPECTION LAW (EFL)

223-1 V Revision of the Uniform Engine Fuels, Petroleum Products and Automotive Lubricants Inspection Law

(This item was adopted)

Source: Fuels and Lubricants Subcommittee (formerly the Petroleum Subcommittee)

Background/Discussion: Since 2007 the FALS Subcommittee had met at all Interim and Annual Meetings and other various times to carry out the revision of the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law and Regulation in HB 130. At the 2007 WWMA and SWMA meetings and at the 2008 CWMA and NEWMA annual regional meetings, all regions supported this item. In advance of the 2008 Interim Meeting, the Subcommittee distributed their report to the Committee, state Weights and Measures Directors and other stakeholders for review. Written comments received on this item are in Appendix B. At the 2008 Interim Meeting, the Fuels and Lubricants Subcommittee (FALS) presented a proposed revision of the Engine Fuels, Petroleum Products and Automotive Inspection Law. The Subcommittee reviewed the Engine Fuels, Petroleum Products and Automotive Lubricants Regulation and prepared a draft revision (refer to 237-1 below). At the 2008 Annual Meeting there were no additional comments on this item.

Recommendations: The Subcommittee recommended the title of the uniform law be amended by deleting "petroleum products" (also delete the definition) so the title reflects the growing use of alternative and renewable fuels in the marketplace. Other proposed amendments will add additional power to provide the Director with authority to review records and grant waivers to specific requirements in the event of an emergency or national disaster. Editorial revisions were also made to update several references and to reflect the name change of the Society of Automotive Engineers to SAE International.

The Subcommittee recommended that an "active" standard be the current, official version of an ASTM standard. An "active" standard supersedes the previous historical versions of a standard. Both "active" and "historical" versions are published at www.astm.org or by mail ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania 19428-2959. See the proposal for details on other recommended changes.

Ron Hayes, FALS Chairperson, can be contacted at (573) 751-2922 or at ron.hayes@mda.mo.gov.

Committee Recommendation: Adopt the revised Uniform Fuels and Automotive Lubricants Law as presented in the following text.

Uniform Engine Fuels~~, Petroleum Products~~ and Automotive Lubricants Inspection Law

As adopted by
The National Conference on Weights and Measures*

1. Background

In 1984, the National Conference on Weights and Measures adopted a section in the Uniform Regulation for the Method of Sale of Commodities requiring that motor fuel containing alcohol be labeled to disclose to the retail purchaser that the fuel contains alcohol. The delegates deemed this action necessary since motor vehicle manufacturers were qualifying their warranties with respect to some gasoline-alcohol blends, motor fuel users were complaining to weights and measures officials about fuel quality and vehicle performance, and the ASTM International had not yet finalized quality standards for oxygenated (which includes alcohol-containing) fuels. While many argued that weights and measures officials should not cross the line from quantity assurance programs to programs regulating quality, the delegates were persuaded that the issue needed immediate attention.

A Motor Fuels Task Force was appointed in 1984 to develop mechanisms for achieving uniformity in the evaluation and regulation of motor fuels. The Task Force developed the Uniform Motor Fuel Inspection Law and the Uniform Motor Fuel Regulation (see the Uniform Regulations section of this handbook) to accompany the law. The recommended law required registration and certification of motor fuel as meeting ASTM standards. It established a motor fuel quality testing capability by the state. Funding for the installation and support of the testing facility was established by a fee per liter or per gallon on all fuel marketed within the state.

In 1992, the NCWM established the Petroleum Subcommittee under the Laws and Regulations Committee. The Subcommittee recommended major revisions to the law that was adopted at the 80th NCWM in 1995. The scope of the law was expanded to include all engine fuels, petroleum products, and automotive lubricants, and its title was changed accordingly. Other changes included expansion of the definitions section, limitation of the scope of the registration section to engine fuels designed for special use, and addition of sections on administrative and civil penalties and on criminal penalties.

In 2007 the Petroleum Subcommittee (now referred to as the Fuels and Lubricants Subcommittee) undertook a review of this uniform law to update it to eliminate reference to "petroleum products" and reflect the addition of new engine fuels to the marketplace. The amendments included new provisions to provide officials with the authority to review delivery records and grant waivers of requirements adopted under the law in times of emergency or natural disasters.

At the 2008 NCWM Interim Meeting, the Laws and Regulations Committee changed the Petroleum Subcommittee's name to the Fuels and Lubricants Subcommittee (FALS) in recognition of its work with a wide variety of fuels including petroleum and biofuels.

2. Status of Promulgation

The current Uniform Fuels and Automotive Lubricants Inspection Law was recommended for adoption by the Conference in ~~1995~~**2008**. The table beginning on page 10 shows the status of adoption of the law.

* *The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology in partial implementation of its statutory responsibility for "cooperation with the states in securing uniformity in weights and measures laws and methods of inspection."*

Uniform Engine Fuels~~, Petroleum Products~~ and Automotive Lubricants Inspection Law

Section 1. Purpose

There should be uniform requirements for engine fuels, ~~**petroleum products**~~ **non-engine fuels**, and automotive lubricants among the states. This Act provides for the establishment of quality specifications for these products.
(Amended 2008)

Section 2. Scope

The Act establishes a sampling, testing, and enforcement program, provides authority for fee collection, requires registration of engine fuels, and empowers the state to promulgate regulations as needed to carry out the provisions of the Act. It also provides for administrative, civil, and criminal penalties.

Section 3. Definitions

As used in this act:

3.1. Engine Fuel. – any liquid or gaseous matter used for the generation of power in an internal combustion engine.

3.2. Director. – the _____ of the Department of _____ and designated agents.

3.3. Person. – an individual, corporation, company, society, association, partnership, or governmental entity.

3.4. ASTM International (www.astm.org) – an international voluntary consensus standards organization formed for the development of standards on characteristics and performance of materials, products, systems, and services, and the promotion of related knowledge.

~~**3.5. Petroleum Products. – products obtained from distilling and processing of petroleum (crude oil), unfinished oils, recycled oils, natural gas liquids, refinery blend stocks, and other miscellaneous hydrocarbon compounds.**~~

3.~~6~~5. Automotive Lubricants. – any material interposed between two surfaces that reduces the friction or wear between them.

3.~~7~~6. Engine Fuel Designed for Special Use. – engine fuels designated by the Director requiring registration. These fuels normally have no ASTM or other national consensus standards applying to their quality or usability; common special fuels are racing fuels and those intended for agricultural and other off-road applications.

3.~~8~~7. Sold. – kept, offered, or exposed for sale.

3.8. Non-engine Fuels. – any liquid or gaseous matter used for the generation of heat, power, or similar uses.
(Added 2008)

Section 4. Administration, Adoption of Standards, and Rules

The provisions of this Act shall be administered by the Director. For the purpose of administering and giving effect to the provisions of this Act, the specification and test method standards set forth in the most recent ~~**edition**~~ **version available** ~~**of the Annual Book of ASTM standards and supplements thereto, and revisions thereof**~~ **of ASTM International standards as published on its website (www.astm.org)** are adopted, except as amended or modified, as required by the Director to comply with federal and state laws. When no ASTM standard exists, other generally recognized national consensus standards may be used. The Director is empowered to write rules and regulations on the advertising, posting of prices, labeling, standards for, and identity of fuels~~**, petroleum products,**~~ **non-engine fuels,** and automotive lubricants and is authorized to establish a testing laboratory.

(Amended 2008)

Section 5. General Duties and Powers

The Director shall have the authority to:

5.1. Enforce and administer all the provisions of this Act by inspections, analyses, and other appropriate actions.

5.2. Have access during normal business hours to all places where engine fuels, ~~**petroleum products,**~~ **non-engine fuels** and automotive lubricants are kept, transferred, offered, exposed for sale, or sold for the purpose of examination, inspection, taking of samples, **and review of fuel storage, receipts, transfers, sales records or delivery records for determining compliance with this Act.** If such access is refused by the owner, agent, or other persons leasing the same, the Director may obtain an administrative search warrant from a court of competent jurisdiction.

(Amended 2008)

5.3. Collect, or cause to be collected, samples of engine fuels, ~~**petroleum products,**~~ **non-engine fuels** and automotive lubricants marketed in this state, and cause such samples to be tested or analyzed for compliance with the provisions of this Act.

(Amended 2008)

5.4. Define engine fuels for special use and refuse, revoke, suspend, or issue a stop-order if found not to be in compliance and remand stop-order if the engine fuel for special use is brought into full compliance with this Act.

5.5. Issue a stop-sale order for any engine fuel, ~~**petroleum product,**~~ **non-engine fuels** and automotive lubricant found not to be in compliance and remand a stop-sale order if the engine fuel, petroleum product, or automotive lubricant is brought into full compliance with this Act.

(Amended 2008)

5.6. Refuse, revoke, or suspend the registration of an engine fuel, petroleum product, or automotive lubricant.

5.7. Delegate to appropriate personnel any of these responsibilities for the proper administration of this Act.

5.8. The director is empowered to waive specific state requirements adopted under this Act or may establish alternative requirements for fuels as determined to be necessary in the event of an emergency or a natural disaster for a specified period of time.

(Added 2008)

Section 6. Registration of Engine Fuels Designed for Special Use

All engine fuels designed for special use must be registered with the Director. Such registration shall include:

6.1. Name, brand, or trademark under which the fuel will be sold.

6.2. Name and address of person registering the engine fuel.

6.3. The special use for which the engine fuel is designed.

6.4. A certification, declaration, or affidavit stating the fuel specifications.

Section 7. Inspection Fee

There shall be a fee of $_____ per appropriate unit of measure on all products covered under the scope of this Act marketed within this state for the purposes of administering and effectively enforcing the provisions of this Act.

Section 8. Prohibited Acts

It shall be unlawful to:

8.1. Represent engine fuels, ~~**petroleum products**~~ **non-engine fuels**, or automotive lubricants in any manner that may deceive or tend to deceive the purchaser as to the nature, brand, price, quantity, and/or quality of such products.
(Amended 1996 **and 2008**)

8.2. Fail to register an engine fuel designed for special use.

8.3. Submit incorrect, misleading, or false information regarding the registration of an engine fuel designed for special use.

8.4. Hinder or obstruct the Director in the performance of the Director's duties.

8.5. Represent an engine fuel, ~~**petroleum product**~~ **non-engine fuels**, or automotive lubricant that is contrary to the provisions of this Act.
(Amended 2008)

8.6. Represent automotive lubricants with an SAE International viscosity grade or API (American Petroleum Institute) service classification other than those specified by the intended purchaser.
(Added 1996)

Section 9. Civil Penalties

9.1. Assessment of Penalties. – Any person who, by himself or herself, by his or her servant or agent, or as the servant or agent of another person commits any of the acts enumerated in Section 22 may be assessed by the _____ a civil penalty of:

a. not less than $ _____ nor more than $_____ for a first violation,

b. not less than $_____ nor more than $_____ for a second violation within ____ from the date of the first violation, and

c. not less than $_____ nor more than $_____ for a third violation within ____ from the date of the first violation.

9.2. Administrative Hearing. – Any person subject to a civil penalty shall have a right to request an administrative hearing within _____ days of receipt of the notice of the penalty. The director or his/her designee shall be authorized to conduct the hearing after giving appropriate notice to the respondent. The decision of the director shall be subject to appropriate judicial review.

9.3. Collection of Penalties. – If the respondent has exhausted his or her administrative appeals and the civil penalty has been upheld, he or she shall pay the civil penalty within ___ days after the effective date of the final decision. If the respondent fails to pay the penalty, a civil action may be brought by the director in any court of

competent jurisdiction to recover the penalty. Any civil penalty collected under this Act shall be transmitted to _____.

Section 10. Criminal Penalties

10.1. Misdemeanor. – Any person who violates any provision of this Act or regulations promulgated thereto shall be guilty of a Class ___ misdemeanor and upon conviction shall be punished by a fine of not less than $_____ nor more than $_____, or imprisonment for not less than ___ nor more than ___ or both.

10.2. Felony. – Any person who intentionally violates any provision of this Act or regulations promulgated thereto or is convicted under the misdemeanor provisions of this section more than three times in a 2-year period shall be guilty of a Class _____ felony and upon conviction shall be punished by a fine of not less than $_____ nor more than $_____, or imprisonment for not less than _____ nor more than _____, or both.

Section 11. Restraining Order and Injunction

The Director is authorized to apply to any court of competent jurisdiction for a restraining order or a temporary or permanent injunction restraining any person from violating any provision of this Act.

Section 12. Severability Provisions

If any word, phrase, provision, or portion of this Act shall be held in a court of competent jurisdiction to be unconstitutional or invalid, the unconstitutionality or invalidity shall apply only to such word, phrase, provision, or portion, and for this purpose the provisions of this Act are declared to be severable.

Section 13. Repeal of Conflicting Laws

All laws and parts of laws contrary to or inconsistent with the provisions of this Act are repealed except as to offense committed, liabilities incurred, and claims made thereunder prior to the effective date of this Act.

Section 14. Citation

This Act may be cited as the "Engine Fuels~~, Petroleum Products,~~ and Automotive Lubricants Inspection Act of _____."

(Amended 2008)

Section 15. Effective Date

This Act shall become effective on _____.

232 METHOD OF SALE REGULATION

232-1 I Automatic Temperature Compensation (ATC) for Petroleum Products

Background/Discussion: At the 2007 Annual Meeting, the Committee received eighteen comments requesting this item be made Informational to allow the Committee time for additional study and deliberation. The Committee believed that the concerns of the commentators were valid but that they were issues to be addressed by the S&T and NTEP Committees. Additional studies of the method of sale proposal would not bring anything new to the current recommendation that could not be addressed through further revisions next year if needed. The Committee believed adopting this proposal would provide guidance to policymakers and others currently considering action on temperature compensation at the national, state, or local level. Jurisdictions opposing the proposal because their state laws or their policies were against it would not be affected by the adoption of this method of sale because their laws prohibit it. The implementation of temperature compensation will be a slow process primarily because there is not an existing nationally approved temperature-compensation device, and NIST Handbook 44 must be revised to set forth the specifications, tolerances, and other technical requirements for this technology. NTEP will then need to undertake its work where needed. The Committee acknowledged that some states may move ahead with their own type approvals to allow temperature compensation. The majority of the Committee believed that the proposed method of sale was ready for NCWM adoption, as there was not a reasonable justification for delaying the adoption of the proposal as presented. Therefore, the Committee recommended adoption of this item. This item was subjected to a lengthy discussion at the general voting session, and several issues were raised along with calls for further study. The vote in the House of Representatives was 23 yeas and 16 nays, while the vote in the House of Delegates was 24 yeas and 16 nays; therefore, the item did not garner enough support to pass. When an item does not clearly pass or fail under NCWM procedures, it is carried forward for reconsideration by the appropriate committee.

At the 2008 Interim Meeting, the Committee considered the recommendations and comments received from the consumer groups, petroleum marketers associations, and independent business operators on this issue. The Committee received written comments (see Appendix A). During the open hearings, the Committee received comments, opinions, and concerns from more than 36 attendees. Opponents of the regulation argue that it may put the small business owners out of business due to the cost to retrofit their older equipment. A majority of the opposing comments argued that consumers would pay more for fuel at the pump to cover the implementation of ATC and that they would receive no benefit from the change in methods of sale. The comments also expressed concern that weights and measures officials would burden their already strained resources because of the additional time that would be needed to test pumps equipped with ATC. There was a recommendation that if the proposed method of sale was adopted, an exemption be included for the small business owner. Several speakers said the only winners in ATC are the equipment and testing companies, lawyers, and lobbyists.

Supporting comments were received from a few state and local officials, an organization of independent truckers, and a consumer advocacy group. Supporters argued that consumers obtaining gas in “hot spots” are not getting what they pay for when they purchase fuel. A few jurisdictions requested that the NCWM act to provide a uniform national standard should retailers begin selling on the basis of temperature-compensated deliveries in states where the practice is permissive. Concern was voiced over the possibility that national uniformity in the method of sale of fuels at retail will diminish if some jurisdictions allow temperature compensation at retail stations while others do not. It was decided to make this item Informational, so that additional information and data could be received.

At the 2008 Annual Meeting it was reported that the California Energy Commission (CEC) is conducting a study entitled “AB868 Fuel Delivery Temperature Study.” One of the goals of this study is to determine what impact ATC will have on consumers, businesses, agencies and the marketplace within the State of California. The CEC advisory panel held three public meetings prior to the NCWM Annual Meeting in July. In September 2008 the CEC panel plans to publish preliminary staff findings and recommendations. Two members requested that this item be developed to assist states in which ATC is prohibited by a state law or regulation.

The Government Accountability Office (GAO) is actively working on a study on ATC. GAO submitted the following statement to the NCWM since they were not able to attend the 2008 Annual NCWM Meeting.

At the request of the Chairman of the House Committee on Science and Technology, the United States Government Accountability Office (GAO) is conducting a review of the issues surrounding automatic temperature compensation in the retail sales of motor vehicle fuels. This fall the GAO plans to release a report that provides information on 1) the views of stakeholders on the costs related to the use of automatic temperature compensation devices; 2) who would bear the costs of implementation and the support for those views; 3) other factors that might affect the decision of whether or not to install such devices; and 4) the reasons some states and nations have promoted or rejected implementation of automatic temperature compensation. In its work GAO has or will interview stakeholders including state, federal, and international officials as well as representatives of industry and consumer organizations.

The Committee will continue to monitor the progress of the CEC and GAO studies. The Committee agrees with the majority of the comments that the cost and benefits of temperature compensation at the retail level are still unknown. The members unanimously agreed that further information is needed before a proposal for a temperature compensation method of sale can be considered by the NCWM. For the reasons detailed above and in the written comments (see Appendix A), this item was kept in Informational status.

Information on the consideration of this item by the Regional Associations following the NCWM Annual Meeting in July 2007 is presented below.

Central Weights and Measures Association (CWMA): At the Central 2008 Annual Meeting, the Committee recommended that this item remain Informational. The Committee heard from an industry representative that this item does not resolve the issue of consumers being shorted at the pump. This representative further commented that there are alternative methods for measuring BTU contents, but does not support these alternative methods. A regulatory official opposed the word "permissive."

This is an excerpt from the report of the CWMA's Laws and Regulations Committee, which considered this item at its 2007 Interim Meeting in Bettendorf, Iowa, on September 16 - 19, 2007. (The full report is available at www.ncwm.net/central/lr/lr_2007_interim.doc.)

…considerable testimony both in support and opposition of the Temperature Compensation proposal during the open hearings. Many industry representatives opposed the item due to the anticipated cost of equipment and the lack of data that supports whether a better system of measurement is worth the cost. The CWMA L&R Committee cannot support the item as proposed due to the considerable opposition to the permissive language. Several state regulators feel that if permissive is adopted, it will be implemented in the northern states, not in the southern states where there appears to be more pressure to implement temperature compensation. A good example of this was given that in Canada where temperature compensation is allowed, it is not widely used in areas west of the Rockies where the climate is more temperate. The Committee further feels that making the item "informational" will not resolve the issue. The most requested information of a cost-benefit analysis is not currently being conducted by any organization. Although several statements were made that temperature compensation may be a more equitable method of sale, many stated that it is not "perfect" nor will it resolve current issues of fraud such as artificial heating of fuel. To address the concern of "hot spots," the Committee discussed the option of amending the proposal to exclude sales at retail based upon the flow rate of dispensers as previously proposed. The Committee feels that another potential solution for a more equitable method of sale is to formulate an alternate proposal to change the method of sale to mass. Technology exists to sell motor fuel through mass flow meters. This method of sale would be more equitable for all types of fuel including alternative fuels which would allow consumers to make value comparisons. The Committee expects that the ATC Steering Committee will provide more information which will provide direction to the conference on this issue. We look forward to their information which will provide answers to many questions. Based upon the testimony heard, the Committee recommends that the item be withdrawn. Note: In response to the ATC Steering Committee request, the CWMA L&R Committee suggests that if this proposal goes forward as a voting item, that there be a mandatory implementation date with little to no permissive period as a transition.

Northeastern Weights and Measures Association (NEWMA): At the 2008 NEWMA Annual Meeting, this issue was discussed extensively. NEWMA would like to see wording developed in the method of sale to assist states in which ATC is prohibited by state law or regulation. In the past, NEWMA had recommended a method of sale of gross gallons at retail only. NEWMA would like to have further development of the method of sale of gross gallons at retail. This item could possibly be reviewed separately.

This is an excerpt from the report of the Laws and Regulations Committee meeting held at that association's 2007 Interim Meeting in Springfield, Massachusetts, on October 9 - 10, 2007.

> It is clear from the majority of comments received (both in written and oral form) that strong opposition exists to the item as proposed, especially the inclusion of permissive ATC sales. NEWMA could not support an item which allowed for two methods of sale. Confusion would be widespread. Additionally, the item raises far too many questions and uncertainties that to date have not been answered. Further research must be conducted to answer those questions. The National Conference on Weights and Measures is an organization made up of weights and measures officials and industry representatives that consistently over the years has worked as a consensus organization. A consensus on this item does not exist and the item should be withdrawn. Making the item "informational" would not bring us to the needed consensus.

Western Weights and Measures Association (WWMA): The WWMA held its Annual Meeting September 9 - 13, 2007, in Lake Tahoe, Nevada. It voted to recommend that the Committee move a modified version of the original proposal forward as a voting item at the 2008 NCWM Annual Meeting. The WWMA recommended removal of the term "Permissive" from the title in Section 2.30. ***Refined Petroleum Products – Temperature Compensation***. The full report is available from NIST WMD.

Southern Weights and Measures Association (SWMA): The SWMA held its Annual Meeting October 21 - 24, 2007, in Little Rock, Arkansas. It voted to recommend that the Committee move a modified version of the original proposal forward as a voting item at the 2008 NCWM Annual Meeting. The amendments and other changes proposed by the SWMA are presented below. (The full report is available from NIST WMD.)

> The SWMA L&R Committee heard opposition to permissive temperature compensation for retail and other meters during the open hearing primarily from industry representatives many of whom suggested that further study was needed to determine if the cost versus benefit justified adoption of the original proposal. The Committee agrees that more information would be helpful in determining the value of using ATC on retail motor fuel dispensers that are marked to deliver less than 30 gallons per minute. Several comments called for the withdrawal of the item but the Committee recognized that the item will be on the NCWM L&R Interim Agenda in 2008 because it was carried over from the 2007 Annual Meeting and because the Western Weights and Measures Association supported adoption of the original item at its recent meeting. The Committee also believes that withdrawing this item as some regions have suggested would only delay consideration of this issue, which has been on the NCWM agenda in one form or another for almost a decade, because the item would likely be resubmitted by a regional association. There were other comments recommending that no further action be taken on this item or that it be tabled. One comment suggested that the original proposal be amended to limit the method of sale to Loading Rack Meters, Vehicle Tank Meters and Retail Dispensers which are marked to deliver 30 gallons per minute or more (which are typically used in making larger quantity deliveries at truck stops). The Committee believes that separating large flow meters (some of which are already equipped with ATC) from the proposal may reduce the opposition to the proposed method of sale for ATC. A majority of the Committee recommends the following to the SWMA for adoption.

SWMA recommendation to the NCWM L&R Committee:

1. Remove the word "Permissive" from the title of the proposed method of sale for ATC.

2. Divide the item into two separate proposals.

   a. For retail motor fuel dispensers marked to deliver less than 30 gal/min, make it Developmental and recommend that the NCWM ATC Steering Committee lead or coordinate a study to determine if the cost/benefit justifies the implementation of ATC.

   b. For retail motor fuel dispensers marked to deliver 30 gal/min or more, amend the method of sale proposal and establish a mandatory implementation date. The SWMA recommends that the NCWM L&R Committee move this item for adoption at the 2008 Annual Meeting with the following amendments:

      i. Amend Section 2.30.2. to read: When products are sold on the basis of temperature compensated volume through Loading Rack Meters, Vehicle Tank Meters and Retail Motor Fuel Dispensers marked to deliver 30 gal/min or more.

      ii. Add an implementation date of 10 years from date of adoption.

METHOD OF SALE PROPOSAL

The Method of Sale is presented in two parts. Part I includes a proposed method of sale developed by the NCWM Automatic Temperature Compensation Steering Committee (ATCSC). Part II includes the original recommendation for a method of sale developed by the Committee at the 2007 Interim Meeting. Part II was not adopted at the 2007 NCWM Annual Meeting.

Part I. Automatic Temperature Compensation Steering Committee (ATCSC) Background and Recommended Method of Sale

Background: The ATCSC held a meeting August 27 - 29, 2007, in Chicago, Illinois, to address issues associated with potential implementation of ATC for retail motor fuel. Valuable input was received during that meeting from marketers, manufacturers, consumers, and regulatory officials. Following the meeting, the ATCSC continued to receive input from the four regional weights and measures associations.

It is not the charge of the ATCSC to endorse or oppose the implementation of ATC at retail. The ATCSC is tasked with addressing issues associated with the implementation of ATC to assist the NCWM membership in coming to a consensus on the issue. The proposals of the ATCSC reflect the Committee's opinion on the best approach to ATC if NCWM votes to implement it.

The ATCSC considered the following discussion points in forming a proposal for the Method of Sale Regulation:

1. Permissive vs. Mandatory ATC

In cold climates, voluntary introduction of ATC can be fairly successful. In regions where fuel temperatures average below 60 °F, a retailer who implements ATC could lower the unit price while maintaining the same profit margin. This acts as an enticement for retailers to take that step. Conversely, in regions where fuel temperatures average above 60 °F, retailers would find it necessary to raise the unit price to maintain profit margins. As a result, it could be expected that under a permissive implementation, cooler regions will see implementation of ATC, while warmer climates will not. In regions where there is no definite advantage one way or the other, it is possible that consumers will find price and quantity comparisons impossible between retail outlets that compensate and outlets that do not.

The preamble to the Method of Sale Regulation states, "The purpose of this regulation is to require accurate and adequate information about commodities so that purchasers can make price and quantity comparisons." The

ATCSC is convinced that introduction of ATC in the marketplace without making ATC mandatory is in direct conflict with the purpose of the regulation. Therefore, the ATCSC proposal provides a transition to ATC where the equipment is made available, followed by a period of time when ATC may be implemented (turned on), followed by a date when ATC would be mandatory. The timeline for this transition should provide a reasonable timeframe for natural replacement of the majority of dispensers in the country.

It is unclear whether ATC would provide a cost savings to U.S. consumers. The ATCSC believes we must make this decision based on facts and data. ATC is a superior method of measurement that provides a higher degree of transparency in unit pricing. With mandatory ATC at retail, consumers would have assurance that, no matter where they choose to purchase motor fuel, the price stated represents a gallon at 60 °F. This level of transparency does not exist in a gross gallon market or a permissive ATC market.

2. Referencing 60 °F and 15 °C

The ATCSC realized that the difference between 60 °F and 15 °C is relevant and must be rectified. Testimony disclosed that many international markets have established 60 °F as the reference temperature. This practice is also implemented throughout the U.S. distribution of petroleum products. One option is to only reference 60 °F, but this approach conflicts with the NCWM's commitment to acknowledge the metric system. To balance the need to recognize the metric system without disrupting the current marketing practices throughout the production and distribution system in the United States, the ATCSC recommends referencing 60 °F with the metric equivalent of 15.56 °C. The ATCSC proposes the use of 60 °F (15.56 °C) as the reference temperature for both gallons and liters to maintain a common reference temperature in the United States when both gallons and liters are used. However, the ATCSC recognizes that when liters are used as the volume measurement unit in other countries, then the reference temperature of 15 °C is used. The ATCSC recommends that other parties provide input to the NCWM committees on this subject for further discussion.

3. Establish Standardized Product Densities for Calculating Volume Correction Factors

To implement ATC for retail motor fuel, there must be an agreement on product densities to be used in volume correction factors. In late July 2007, the ATCSC conducted an outreach to accumulate data on the densities for various products falling under ASTM Committee D02 standards across the United States. Outreach went to weights and measures jurisdictions, the Alliance of Automobile Manufacturers, and the American Petroleum Institute. The ATCSC also considered standard densities used in Canada for temperature compensation. The ATCSC set out to use this data to develop a single set of standard densities to be used throughout the country for volume correction factors. Details of this item can be reviewed in the reports of the ATCSC, which are available at www.ncwm.net on the Internet.

There was much discussion whether to reference standard density as Canada has done, or reference standard API gravity as is done throughout much of the U.S. petroleum market. Ultimately, the ATCSC has opted to reference standardized API gravity for the following products based on the density data it has reviewed.

- 62 API for gasoline, including ethanol blends up to E10
- 37 API for No. 2 diesel, including biodiesel blends up to B20

More data are needed to determine standard densities for additional products such as No. 1 diesel and higher blends of biodiesel and ethanol.

4. Disclosure – Street Signs, Dispensers, Receipts or Invoices, and Other Advertisements

Based on comments the ATCSC received, the following issues were considered regarding disclosure when ATC is in use.

- Terminology needs to be uniform to assist consumer recognition.
- Disclosure on street signs must be prominent to be seen and not too wordy to allow for easy recognition by motorists while operating their vehicles.
- Disclosure on the dispenser should be near the display of volume delivered.

- Any other advertising of unit price for motor fuel should also disclose if it represents the price of temperature compensated volume.
- Examples were provided of disclosure labeling for dispensers in Canada for the ATCSC's consideration.

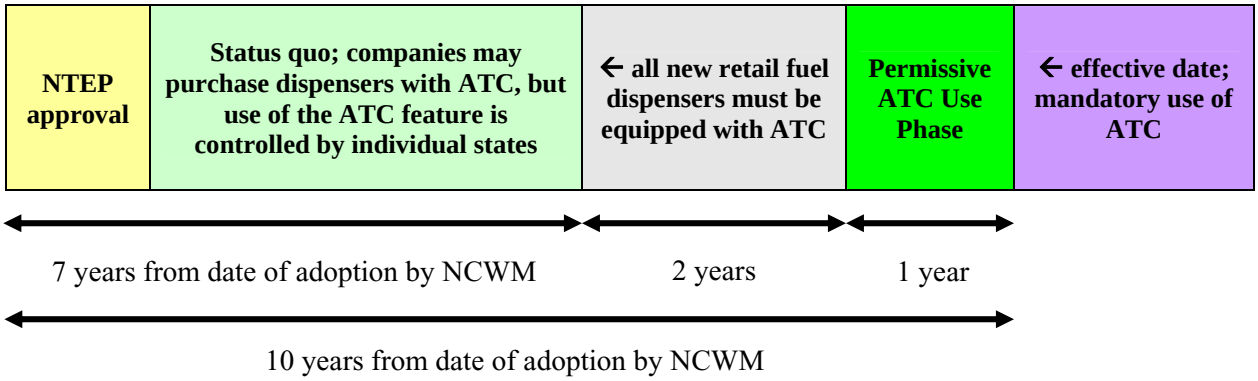
The ATCSC recommends a simple, uniform, and prominent display of "ATC" on street signs. It will eventually become understood and recognized by motorists. For disclosure on dispensers, receipts, or invoices, the ATCSC recommends the statement, "Volume Corrected to 60 °F." This follows the model found in Canada and seems to be clear and concise.

5. Implementation

Following the August 27 - 29, 2007, meeting of the ATCSC, its members suggested several options that could be considered to address the implementation of ATC in the United States. The ATCSC discussed different proposals and comments made at the meetings of the regional weights and measures associations on this subject. The ATCSC is not charged with endorsing or opposing the implementation of ATC at retail; it is tasked with addressing issues associated with the implementation of ATC. The proposal will also allow ATCSC to assist NCWM membership in coming to consensus on the issue. Hence, the ATCSC discussed the various options again and has decided to recommend a single option to the NCWM's Specifications and Tolerances Committee and Laws and Regulations Committee for consideration.

The recommended option is shown below.

Implementation Option:



Discussion (ATCSC): The ATCSC believes that if temperature compensation is adopted for the retail sales of refined petroleum products, then the ultimate goal is to have mandatory use of ATC to provide a single method of sale. The time period before the mandatory use of ATC is a debatable point. The ATCSC recommends that 10 years after the adoption of an ATC method of sale, using temperature compensation should be mandatory. During the first seven years after adoption, the use of ATC should be controlled by the individual states based upon existing state laws and regulations. A relatively short period of time (two years) is suggested during which new dispensers must be equipped with ATC capability before permissive use of ATC would be allowed. This approach would allow station owners to decide, based on their business needs and plans, when to buy dispensers equipped with ATC, and this limits the time period during which they would be unable to use the feature after having purchased it. This requirement should be placed in NIST Handbook 44 as a nonretroactive requirement to address this design requirement.

The time period for the permissive use of ATC should be kept reasonably short to reduce the potential confusion that may exist in the marketplace when both compensated and uncompensated sales occur. One year is a recommended time period for the permissive use of ATC. The ATCSC discussed whether to have different implementation dates for large and small service stations based upon throughput. The ATCSC recommended a single implementation date for all service stations to reduce the time period during which gasoline and diesel fuel will be sold in compensated and uncompensated volumes. A short time period must be provided for the permissive use of ATC. Time is needed

to activate the ATC capability in dispensers equipped with ATC and to allow service companies and weights and measures officials to test the accuracy of dispensers equipped with ATC.

Under this implementation plan, there will be a seven-year period of continued uncertainty regarding the legal method of sale of these products. Some have argued that the lack of definitive language in setting a method of sale means that any volume unit is acceptable, compensated or uncompensated. This is based on the principle that laws proscribe activity. All other activities not proscribed are legal. Another interpretation is the broad policy change made by the NCWM in 1969 and 1970 in adopting specific language on ATC use. Language in NIST Handbook 44 was clear and directed specifically, and solely, to wholesale sales of petroleum products and for both wholesale and retail sales of LPG products. The ATCSC believes that inevitably each state will have to resolve this issue, unless it is resolved for us through federal class action suits currently pending.

Alternative Proposal for a Method of Sale for Engine Fuels and Non-Engine Fuels

Source: The NCWM Automatic Temperature Compensation Steering Committee (ATCSC).

2.31. Engine Fuels and Non-Engine Fuels.

2.31.1. Definitions.

2.31.1.1. Engine fuel – any liquid or gaseous matter used for the generation of power in an internal combustion engine.

2.31.1.2. Non-engine fuel – any liquid or gaseous matter used for the generation of heat, power, or similar uses.

2.31.1.3. Temperature correction. – the process of correcting volume measurements at any temperature to an equivalent volume at a reference temperature.

2.31.1.4. Net volume – the volume after temperature correction.

2.31.1.5. Gross volume – a volume measurement that has not been subject to temperature correction.

2.31.2. Quantity.

2.31.2.1. Quantity, Wholesale Transactions.

(a) All engine fuels and non-engine fuels shall be sold, offered, or exposed for sale to wholesale customers either in terms of liquid volume in liters or gallons or barrels, or in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons or barrels.

(b) Effective January 1, 200X, all engine fuels and non-engine fuels shall be sold, offered, or exposed for sale to wholesale customers in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons or barrels.

(c) When engine fuels and non-engine fuels are sold temperature corrected to wholesale customers:

(1) Correction shall be made automatically for the fuel temperature either based on the fuel standard density and reference tables specified in Table 2.31.X. or based on the actual measured density of the fuel and using reference tables specified in Table 2.31.X.

(2) If using a measured density, the seller shall maintain records of the density determination for one year and shall make those records available for inspection by a weights and measures official on request during normal business hours.

(3) All primary indications of net volume quantities on measuring devices and all receipts, invoices, bills of lading, and other transfer documents shall clearly and conspicuously identify net volume quantities with the unit of measure and the terms "Volume corrected to 60 °F" or "Volume corrected to 15.56 °C."

(4) Unless otherwise agreed to by both the buyer and seller in writing, engine fuels and non-engine fuels sold temperature corrected shall be sold in that manner over at least a consecutive 12-month period.

2.31.2.2. Quantity, Retail Transactions.

(a) Effective January 1, 2XXX, all engine fuels and non-engine fuels identified in Table 2.31.X shall be sold, offered, or exposed for sale to retail customers either in terms of liquid volume in liters or gallons, or in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons.

(b) Effective January 1, 2XXX, all engine fuels and non-engine fuels identified in Table 2.31.X shall be sold, offered, or exposed for sale to retail customers in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons.

(c) When engine fuels and non-engine fuels are sold temperature corrected to retail customers:

(1) Correction shall be made automatically for the fuel temperature based on the fuel standard density and reference table in Table 2.31.X.

(2) All primary indications on measuring devices and all receipts, invoices, and other transfer documents shall clearly and conspicuously identify net volume quantities with the unit of measure and the terms "Volume corrected to 60 °F" or "Volume corrected to 15.56 °C."

(3) If a fuel is sold temperature corrected from a measuring device at a business or fleet location, all sales of the same fuel from that business or fleet location shall be sold temperature corrected over at least a consecutive 12-month period.

(4) All unit price advertisements shall be clearly and conspicuously marked with the term "ATC."

Table 2.31.X. Reference Tables and Fuel Densities for Temperature Correction		
Fuel	**Reference Table for Wholesale or Retail Temperature Correction**	**Standard Fuel Density for Retail Transactions (optional density for wholesale transactions)**
Gasoline, gasoline-oxygenate blends (3.7 mass % oxygen, max.), gasoline ethanol blends (10 vol. %, max.)	**API Table 6b.**	**62 API (730 kg/m^3)**
Diesel Fuel (grade 2-D), biodiesel blends (20 vol. % biodiesel, max)	**API Table 6b.**	**37 API (840 kg/m^3)**
Other fuels TBD	**-**	**-**

(Added 200X)

Part II. Permissive Temperature Compensation for Refined Petroleum Products and Other Fuels

(The following text describes the original proposal which was returned to the Committee after it was not adopted at the 2007 NCWM Annual Meeting.)

Sources: The Southern Weights and Measures Association (SWMA), the Western Weights and Measures Association (WWMA), and the Central Weights and Measures Association (CWMA).

Note: This or similar proposals, which have been on the Committee's agenda for several years, were reviewed by each of the regional weights and measures associations. The review process resulted in the submission of several different proposals and numerous comments and suggestions for the Committee to consider. Everyone expressed concern over the scope, cost, and impact of establishing a method of sale for petroleum products which required temperature compensation. This subject was widely discussed by the NCWM at public forums dating back more than 30 years. A similar proposal was made by NEWMA as recently as 2000, but the Committee withdrew it in 2001. NEWMA noted at that time that Pennsylvania, New Hampshire, Maine, and Canada permit temperature-compensated sales of products such as home heating fuel and retail gasoline. Additional historic and background information is available in previous editions of the Committee's agenda. For recent discussions on this subject, see Item 232-1 in the report of the 91st NCWM Annual Meeting (2006) on the Internet at www.nist.gov/owm. This information is also available from NIST WMD on a searchable DVD, NIST Special Publication 979 "Reports of the National Conference on Weights and Measures 1905 to 2007" (Spring 2008).

Background: At its 2007 Interim Meeting, the Committee received correspondence from consumer groups and other organizations and heard testimony from weights and measures officials, the petroleum industry (including the American Petroleum Institute (API)), consumers and others regarding temperature compensation of refined petroleum products. The Committee appreciates all of the data, discussion, and especially the high level of interest. The Committee acknowledges the media attention this item has drawn, and the members were pleased to learn that some agricultural commissioners and other policy makers, as well as some governors and state attorneys general, have expressed interest in temperature compensation.

Proponents for the item supported the need for an improvement in the accuracy of measurements of petroleum products because of their cost and of the need to improve accountability; opponents spoke to the cost of implementing temperature compensation and the potential for confusion in the marketplace. The Committee was made aware of legislation under consideration in Missouri and Texas that would establish different definitions for a gallon based on the ambient temperature in various areas of their states. The Committee was especially sensitive to

concerns expressed by weights and measures inspectors about the potential cost and increased inspection time they may expend if temperature compensation is allowed in all applications, especially at the retail level.

The Committee duly considered the presentations, discussions, letters, data, media stories, comments received at public hearings and in hallways, and the proposed legislation. The NCWM has posted this information and information on the activities of its ATC Steering Committee at www.ncwm.net.

Following is a list of justifications for adopting a standard that will facilitate the implementation of an orderly yet permissive approach to allowing broader use of temperature compensation in the marketplace:

- Cost of fuel has led to increased consumer and business interest in better methods of measurement, inventory control, and accountability. By now, everyone has realized or should realize that ambient temperatures are but one factor which impacts the volume of any liquid. Thus, basing a state's temperature-compensation program on regional ambient temperatures is not a technically valid approach to addressing the issue.
- The use of dual-wall storage tanks and deliveries of fuel directly from refineries result in higher temperature product.
- Awareness and concerns over the impact of temperature on the cost of fuel has come about at the same time advances in technology such as electronics and software have made compensation possible in both new and existing measuring devices at lower costs.
- Increased consumer requests that temperature compensation be used, especially in high volume deliveries, for improved measurement accuracy.
- The dramatic growth of public interest in recent years is evidenced by articles in many newspapers and widely-read magazines such as *Scientific American.* This national conversation about energy has led to greater consumer awareness, as well as interest on the part of political leaders, of energy issues and has contributed to creating an opportunity for change.

After a thorough discussion and polling by its chairman, the Committee was unanimous that it would recommend to the NCWM the adoption of a method of sale for refined petroleum products and other fuels. This would allow industry the option of selling these products on the basis of temperature-compensated sales. The decision to submit the permissive temperature-compensated method of sale for NCWM consideration was unanimous, the representative from the CWMA supported going forward with the recommendation but did not agree with including retail sales in the scope of the regulation. The Committee ultimately decided it was in the best interest of the U.S. commercial measurement system for the NCWM to adopt a standard that would provide guidance to states considering legislation in this area. This action would support the work of the Specifications and Tolerances Committee, the National Type Evaluation Program (NTEP), and others to develop technical requirements and test procedures for both type approval and field testing for devices equipped with temperature compensation. The Committee believed those efforts were critical to facilitating the introduction of temperature compensation to the marketplace, especially in NTEP states, as the NCWM learned there are no retail motor-fuel dispensers available with Certificates of Conformance that included temperature-compensation functions.

The following topics/considerations were addressed by the Committee:

1. Temperature Compensation was Already Legal for Use in Trade Unless Prohibited by State or Local Requirements.

The Committee was aware that temperature compensation was already required or permitted in a number of states for vehicle-tank meters, liquefied petroleum gas, and wholesale deliveries to retailers, and that it had been used in the marketplace in these applications for decades. At the WWMA Annual Meeting, the State of California reported that for transactions involving 5000 gal or more, purchasers may request temperature compensation; Idaho said that for transactions involving 8000 gal or more, the purchaser had an option to buy, on a yearly basis, temperature-compensated product and that all terminal transactions were temperature compensated; Arizona responded that any transactions involving more than 5000 gal must be compensated for temperature; and currently Hawaii is the only jurisdiction that has taken some action to account for temperature variations in retail sales. The Committee heard enough supportive comments from a broad base of weights and measures directors, inspectors, and metrologists to

recognize that temperature compensation may find broad acceptance in the marketplace, especially once the potential benefits it offers were realized and implementation costs fall.

The Committee also believed that unless prohibited by state law, temperature compensation at retail dispensers is already legal in most states. Additionally, the Committee believed it would be difficult to argue against a measurement practice that could only improve the accuracy and reproducibility of a volumetric measurement. The Committee position was that legal metrology must not stand in the way of the marketplace striving to change the way fuels and other products are marketed and sold.

2. Under a Permissive Approach Consumers and Businesses Will Decide Where and When to Implement Temperature Compensation.

The Committee was convinced the marketplace will best determine where and when the benefits from temperature compensation should be implemented to improve accuracy. The Committee recommended the adoption of a method of sale that would allow temperature compensation to be used in sales of petroleum products on a permissive (voluntary) basis, allowing the marketplace (e.g., industry, consumers, and other government agencies) to decide if and when it was appropriate to use temperature compensation in specific commercial applications (e.g., sales at truck stops). This recommendation was proposed solely for the purpose of ensuring the delivery of an accurate volume of petroleum at a specific reference temperature. It was not the intent of the Committee to attempt to define a standard energy content of a liter or gallon of gasoline or other engine fuel with this recommendation.

3. Temperature Compensation Would be Permissive, But Controlled.

Although the Committee's recommendation allowed for permissive use of temperature compensation, it included mandatory provisions requiring compensation be made by automatic means to ensure that the measured quantity is accurately determined. It also defined a temperature-compensated volume for both liters and gallons, requiring the posting of information on dispensers, street signs, and on documents to ensure full disclosure and fair competition. Additionally, it required a business location to have all of the devices operating on temperature compensation on a year-round basis unless a written waiver was granted by the Director.

4. The Basis of the Committee's Recommendation Was the Proposal from the WWMA.

The Committee's recommendation was based on the proposal submitted by the WWMA, which was developed at its 2006 Annual Meeting in Salt Lake City, Utah. The Committee made several amendments to the proposal, but found it represented a well-reasoned foundation for the recommendation presented below. The CWMA L&R Committee supported the WWMA's proposal and supported submitting it to the NCWM for a vote. The CWMA agreed with the WWMA that temperature compensation, which is currently utilized at every step of distribution except for retail sales is the most equitable method of sale. Additionally, the CWMA believed the proposal should not be restricted to petroleum products, but should also include alternative fuels such as E85, biodiesel and biodiesel blends. The Committee's recommendation incorporated some of the CWMA's suggestions and included additional requirements to address many of the concerns raised at the 2007 NCWM Interim Meeting open hearings and discussions. For the purpose of this recommendation, the Committee used the definition for "refined petroleum products" as presented in Handbook 130 Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law which reads, "products obtained from distilling and processing of petroleum (crude oil), unfinished oils, recycled oils, natural gas liquids, refinery blend stocks, and other miscellaneous hydrocarbon compounds," with the understanding that its intent was that the requirements would also apply when petroleum was blended with other products such as ethanol.

5. Full Disclosure Will Allow Informed Consumers to Make Value Comparisons.

The Committee believes that consumers, when educated through marketing and outreach efforts, will accept new technology and measurement practices. When provided with sound information, consumers will gain confidence that government oversight will prevent deceptive practices. The Committee believes that full disclosure provisions of the method of sale will reduce both unfair competition and consumer confusion. If, for example, a truck stop offers temperature-compensated sales of diesel fuel through high-speed dispensers for truckers, the road signs with price per unit of volume (e.g., gallon or liter) and dispensers must include a declaration that the volume is sold on the basis of temperature compensation. If the price per gallon is higher or lower than the usual price per gallon,

consumers will be informed that the volume was compensated to a reference temperature. Several people expressed concern over marketplace confusion if diesel fuel is sold on the basis of both compensated and uncompensated volume. It is incorrect to say that there would be two methods of sale for the same product under this recommendation, just as it is inaccurate to say that some consumers will not receive a "full" gallon if temperature compensation is used, as some opponents to this method of sale have claimed. The reality is that consumers will be able to compare price per gallon between stations and they will receive a "full" gallon as defined under the Method of Sale of Commodities Regulation. While confusion is possible with any method of sale, the Committee was not deterred by that possibility. If confusion occurs, the proper response is to educate consumers and address any changes identified from the confusion through further refinement of the method of sale. In this application, full disclosure will inform consumers that one product is sold on the basis of temperature compensation and one is not. When consumers are educated, they can make sound value comparisons between these choices just as they already make decisions when choosing between different brand name products, octane ratings, additive offerings, and types of fuels. Business and industry is also well equipped and very experienced in educating its customers whenever they introduce new products or services to the marketplace. Should they decide to use the method of sale, they should be sure to introduce it using an informative marketing effort.

The Committee was urged to clarify that there may be situations in which there is a valid contract where the price is based on the fuel being sold on the basis of uncompensated measurement. The Committee agreed with the comment that if a purchaser operating under such a contract fills up at a location where the dispensers are temperature compensated, the contract should prevail in those transactions. Similarly, the American Petroleum Institute (API) said that the Committee should permit either uncompensated or compensated methods of sale at loading-rack meters when such sales are under contract. The Committee believes its proposal will not interfere with the contracts or understandings that API described.

6. Costs

The Committee heard from some users that the lack of temperature compensation was costing them great sums of money, while industry representatives said the cost of equipment and installation will cost industry and, ultimately, consumers even larger amounts of money. The cost of any NCWM action is a concern to the Committee, which must defend its actions on both sides of any issue. However, it is very difficult to give each side everything it wants in any recommendation. While the Committee was concerned about cost, it was skeptical of the economic claims from both sides in this debate. For example, at the 2007 Interim Meeting one estimate of the cost of implementing temperature compensation dropped nearly two billion dollars once industry learned that an alternative technology was available in the marketplace.

That example is but one illustration of the weaknesses the Committee saw in cost or damage claims over the years. The issue dates back to the Committee's work in the 1990s on the price verification procedures where some groups claimed that supermarkets were overcharging consumers billions of dollars a year. The Committee never saw data that supported such claims; yet the damage values received wide notice in the media. Some members of the NCWM may remember the claims made during Congressional consideration of the Metric Conversion Act of 1975 that changing to the metric system would cost billions of dollars. In reality those high costs never materialized, which was confirmed through several reliable studies. One reason Congress made conversion to the metric system voluntary was to allow industry to make changes as part of their normal equipment replacement cycle. The automotive industry, for instance, found it cost effective to make the change to metric units when purchasing replacement equipment. Advancements in technology also made conversions easier or allowed dual-unit displays on equipment as standard features. These factors were key contributors in reducing costs.

Each State Director in the NCWM, not the Committee, determines whether or not to incorporate what is adopted by the NCWM into his state law or regulations. Even states that adopt the Method of Sale of Commodities Regulation by reference or citation can take action to exclude a specific section of a uniform regulation that conflicts with other requirements or policies. As for taking time for additional study, the NCWM record on consideration of the issue of temperature compensation dates back to the mid-1970s and has arisen for consideration every few years since then. The Committee was aware of the history, the issues, the various points of view, and the potential costs of temperature compensation, and believed it was time for the NCWM to move forward on temperature compensation by establishing standards by which this method of sale can be brought into the marketplace on a voluntary, yet

controlled, basis. The Committee also heard that no action should be taken pending further studies. The Committee was wary of calls for no action pending another study or action by Congress.

As one speaker alluded to in his presentation, the marketplace is to some degree "intelligent" in that it helps address many factors through its price-setting function and can generally be trusted to balance costs and prices as well as justify investment in new technology and marketing practices if there is a need, demand, or opportunity. A voluntary approach will allow early adopters to develop experience and pull advances in technology into the equipment market while competition and other factors will reduce costs even further if the method of sale is broadly adopted. The Committee believed a permissive approach to temperature compensation turned the choice over to the marketplace where, if consumer demand was sufficient, sellers would make a business decision to invest in the technology and marketing according to the new method of sale when the benefits offset costs.

7. Limiting the Option of Temperature Compensation to Specific Applications

The Committee received suggestions that temperature compensation be limited to certain applications or not allowed in retail sales, but it did not hear sufficient justification for taking such positions. Temperature compensation is not new to the commercial measurement system. It is widely used in wholesale transactions in many jurisdictions, and consumers in many states have purchased LPG and oil for heating and other uses for decades on the basis of temperature-compensated sales. No information was presented to the Committee indicating that its use in those applications has been anything but successful. The Committee recognizes that verifying devices with temperature compensation may require additional inspection time and require weights and measures officials to purchase thermometers or other equipment for testing. However, those factors are not sufficient justification to prohibit the marketplace from implementing this method of sale. If a jurisdiction adopts this method of sale and a business decides to use temperature compensation, the weights and measures agency would need to obtain funding to implement appropriate testing procedures to verify devices. However, the Committee would expect that innovation, risk-based testing, and random sampling techniques, as well as technology, would lessen the time required to conduct additional tests, just as those factors have reduced the burden of testing many weighing and measuring instruments in the past.

8. Permissive vs. Mandatory Implementation

The Committee heard from the regional associations and others that temperature-compensated sales should be implemented on a permissive basis. The Committee opposed the inclusion of a future mandatory date at this time. The Committee believed temperature-compensated sales should be market driven and that suppliers will conduct sales on a compensated basis when consumers demand it and should not be required to do so before then. The Committee, based on the comments of many jurisdictions, believed the imposition of a mandatory requirement was too burdensome on the industry, requiring upgrades and possibly the replacement of many meters without adequate justification.

The Committee agreed that a mandatory requirement would not be justified at this point in time. The Committee felt it was important to get some form of regulation regarding temperature-compensated sales of petroleum into Handbook 130 and thought as many barriers as possible should be removed in order to achieve that goal. Although the Committee's recommendation is a permissive requirement for temperature-compensated sales, the Committee was willing to consider establishing future mandatory dates if a justified need was demonstrated after this permissive regulation was implemented and used for a period of time.

9. Comments Reviewed by the Committee at the 2007 Annual Meeting

a. The Committee noted if the temperature compensation proposal was adopted at the 2007 Annual Meeting, it would go into effect January 1, 2008, in the eighteen jurisdictions that indicated they automatically adopt that regulation by reference or citation (see 2008 Edition of NIST Handbook 130, "II Uniformity of Laws and Regulations" (page 9) for a list of those states). The Committee recognized that if the recommendation was adopted in July 2007, some jurisdictions might want to delay its implementation or exempt that particular section from being automatically adopted. Since rulemaking typically takes longer than six months to complete, the Committee debated whether or not it should include a delayed effective date of July 1, 2009, for this regulation but took no action on this issue.

b. The Committee discussed the subject of unscrupulous retailers artificially heating fuels and that this deceptive practice has occurred from time to time. Arizona actually forbids the practice; however, the Committee did not address that issue in the following recommendation. The Committee considered whether a prohibition on the artificial heating of fuels for the purpose of increasing volume at the time of sale should be added to the recommendation, but no action was taken on this issue.

c. The Committee asked to receive comments on whether or not the recommendation should allow the state director to grant (and, when justified, revoke) written waivers to some provisions if sufficient justification was provided by the business owner. The Committee discussed whether or not the requirement that all devices that dispense product at a single location might result in a hardship for some retailers or difficulties in implementing the new method of sale for specific customers (e.g., over-the-road truckers). For example, if a station decided to sell gasoline and diesel fuel on a temperature-compensated basis but also had a dispenser for K-1 Kerosene, from which limited sales were made, a waiver from the temperature-compensation requirement on all dispensers could be justified. Likewise, if a chain of truck stops decided to sell diesel fuel on a temperature-compensated basis through its high-output dispensers to truckers (e.g., its prime customers), but did not want to implement temperature-compensated sales through its gasoline dispensers, a waiver could also be justified. The purpose of the requirement that all devices at a single location either be temperature compensated or not was to prevent a retailer from selling through the compensated or uncompensated dispensers when it benefited the seller. The Committee agreed flexibility was warranted and could make acceptance of the method of sale easier to implement, but took no action on this issue.

Committee Recommendation: Amend the Method of Sale of Commodities Regulation in Handbook 130 by adding a new Section 2.30. Refined Petroleum Products:

2.30. Refined Petroleum Products – Permissive Temperature Compensation.

2.30.1. Where not in conflict with other statutes or regulations, these products may be sold on the basis of temperature-compensated volume.

2.30.2. When products are sold on the basis of temperature compensated volume:

(a) All sales shall be in terms of liters or gallons with the delivered volume adjusted to 15 °C or gallons with the delivered volume adjusted to 60 °F;

(b) Temperature compensation must be accomplished through automatic means.

2.30.3. Full Disclosure Requirements.

2.30.3.1. The primary indicating elements of measuring devices, recording elements, and all recorded or display representations (e.g., receipts, invoices, bills of lading, etc.) shall be clearly and conspicuously marked to show that the product was delivered on the basis of temperature compensated volume;

2.30.3.2. When a product is offered for sale on the basis of temperature compensated volume, street signs or other advertisements of its unit price must clearly and conspicuously indicate that the volume is temperature compensated.

2.30.4. Other Provisions.

2.30.4.1. At a business location all sales on a temperature-compensated basis shall be made continuously and for a period of not less than 12 months (e.g., a person may not engage the automatic temperature compensator on a device only during certain times of the year to prevent the person from taking advantage of temperature compensation).

2.30.4.2. At a business location which offers products for sale on the basis of a temperature compensated volume, all measuring devices shall dispense on the basis of temperature compensated volume (e.g., a person must not operate some devices at a location with automatic temperature compensators and others without compensators to prevent them from taking advantage of temperature variations).

Annotations:

1. **As defined in Handbook 130 Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law, refined petroleum products are products obtained from distilling and processing of petroleum (crude oil), unfinished oils, recycled oils, natural gas liquids, refinery blend stocks, and other miscellaneous hydrocarbon compounds as well as biofuels such as E85 and biodiesel at various blends.**

2. **A temperature compensated liter is defined as having a reference temperature of 15 °C and a temperature compensated gallon is defined as 231 in^3 at a reference temperature of 60 °F;**

3. **When a product is sold on the basis of a temperature-compensated volume, it is typically called "net" or "net volume," whereas the volume before compensation is called the "gross" or "gross volume."**

4. **The metric units are shown solely for the purpose of showing metric equivalents in this uniform regulation in this NIST handbook. There is no requirement that dual units be shown in any full disclosure information required under this section.**

5. **Temperature Compensation may be abbreviated (e.g., "Temp Comp," or "Compensated to 60 °F") in the interest of space as long as its meaning is clear.**

6. **The seller is not prohibited from providing both gross and net gallons on receipts, invoices, bills of lading or other documentation as long as it is not misleading or deceptive.**

7. **A "business location" means a single outlet and should not be interpreted to mean all of the outlets or locations that a business or company operates in a jurisdiction.**

232-2 V Biodiesel Labeling

(This item was adopted)

Source: Central Weights and Measures Association (CWMA) (See Item 232.3 in the Report of the 92nd Annual NCWM Meeting in 2006)

Committee Recommendation: Add Section 3.15. "Biodiesel Labeling," which is presented in the proposed revision to the Engine Fuels and Automotive Lubricants Regulation in Item 237-1, to the Method of Sale of Commodities Regulation.

2.31. Biodiesel and Biodiesel Blends.

2.31.1. Identification of Product. – Biodiesel shall be identified by the term "Biodiesel" ~~followed~~ with the designation "B100." Biodiesel ~~b~~Blends shall be identified by the term "Biodiesel Blend."

2.31.2. Labeling of Retail Dispensers.

2.31.2.1. 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.

2.31.2.2. 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.

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

2.31.2.4. 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 than 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.

2.31.3. 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.

2.31.4. Exemption. – Biodiesel Blends that contain less than or equal to 5 % biodiesel by volume are exempt from the requirements of Sections 2.31.1, 2.31.2, and 2.31.3. when it is sold as diesel fuel.

(Added 2008)

~~**2.31.2. Containing Between More Than 5 % and Up To and Including 20 % Biodiesel. – Each retail dispenser of biodiesel blend containing more than 5 % and up to and including 20 % biodiesel shall be labeled with either:**~~

~~**2.31.2.1. The capital letter "B" followed by the numerical value representing the volume percentage of biodiesel fuel and ending with "biodiesel blend." (e.g., B10 biodiesel blend; B20 biodiesel blend), or;**~~

~~**2.31.2.2. The phrase "biodiesel blend between 5 % and 20 %" or similar words.**~~

~~**2.31.3. Labeling of Retail Dispensers Containing Biodiesel Blend More Than 20 % Biodiesel. – Each retail dispenser of biodiesel blend containing more than 20 % biodiesel shall be labeled with the capital letter "B" followed by the numerical value representing the volume percentage of biodiesel fuel and ending with "biodiesel blend." (e.g., B60 biodiesel blend).**~~

~~**2.31.4. Additional Labeling Requirements. – The dispenser shall be labeled with "Consult Manufacturer fuel recommendations."**~~

~~**2.31.5. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, with 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.**~~

~~**2.31.6. Exemption. – Biodiesel blends containing 5 % or less biodiesel by volume are exempted from the requirements of Sections 2.31.1. through 2.31.5.**~~

~~**(Added 200X)**~~

Background/Discussion: The Committee does not believe this proposal will impose any new requirements. However, by including these requirements in the Method of Sale of Commodities Regulation, the Committee is obligated to give notice that the requirements will become effective on January 1 of the year following adoption in the eighteen jurisdictions which indicate they automatically adopt that regulation by reference or citation (see the 2008 Edition of NIST Handbook 130, "II Uniformity of Laws and Regulations" [page 9] for a list of those states). These requirements have already been adopted and are published in the Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in Handbook 130.

Section 2.20. within the Method of Sale of Commodities Regulation in Handbook 130, currently contains requirements for the disclosure of oxygenates in gasoline blends. Included are requirements for the disclosure of biodiesel and biodiesel blends and consistent practices that should be required to ensure consumers are fully informed when making purchasing decisions.

The Committee received numerous comments in support of this item and heard from the National Biodiesel Board (NBB) that, in general, supported this item. However, the NBB requested the Committee keep this item on its agenda as an Informational item until ASTM finalizes its biodiesel specifications. Waiting for the ASTM biodiesel standard before moving this item forward for a vote will ensure there is no conflict with those specifications.

At its 2006 Annual Meeting, the WWMA L&R Committee received no comments regarding this item. The WWMA supported the NBB request to keep this item as Informational pending ASTM action. The WWMA concurred that waiting for adoption of the ASTM specifications will prevent conflicts in the final labeling requirement for biodiesel. At a recent CWMA meeting, a few comments were received that the biodiesel label requirement should include percentages below 5 %. An update on activity within ASTM to develop a stability specification for B100 was provided. After negative votes were addressed, ballots were circulated to add a B5 limit to the D975 diesel specification and to establish a B20 specification.

At the 2007 Interim Meeting, the CWMA and others recommended the Committee keep this proposal on hold until ASTM finalized its work on the biodiesel blend specifications. In response to those suggestions, the Committee agreed to separate this item from the Fuel Ethanol requirements and carried this item forward as an Informational item. At the Annual Meeting, several people called for this item to be presented for a vote at the 2008 Annual Meeting and asked the Petroleum Subcommittee to encourage all stakeholders to move quickly to resolve their concerns so this important consumer protection requirement can be adopted by the NCWM.

Information on the consideration of this item by the Regional Associations following the NCWM Annual Meeting in July 2007 is presented below.

At the fall 2007 meetings of the CWMA and NEWMA and the WWMA meeting, a representative from the National Biodiesel Board expressed support for the item as presented. The CWMA and SWMA recommended that additional labeling be required for fuels containing more than 5 % biodiesel and the dispenser be labeled with "Consult manufacturer fuel recommendations."

The CWMA also recommended the following wording:

2.XX.2. Labeling of Retail Dispensers Containing More Than 5 % and Up To and Including 20 % Between 5 % and 20 % Biodiesel. – Each retail dispenser of biodiesel blend containing more than 5 % and up to and including 20 % biodiesel shall be labeled with either:

The SWMA recommends that the proposal be amended based on discussions with the Fuel and Lubricants Subcommittee at the NCWM Annual Meeting. The Subcommittee is working on further revisions to this section and recommendations. The following language is being considered to require additional labeling for fuels containing more than 5 % biodiesel: The dispenser shall be labeled with "Consult manufacturer fuel recommendations".

2.XX. Biodiesel.

2.XX.1. Identification of Product. – Biodiesel shall be identified by the term "Biodiesel" followed with the designation "B100." Biodiesel blends shall be identified by the term "Biodiesel Blend."

At the 2008 Interim Meeting, the Committee learned that the Federal Trade Commission (FTC) would publish a similar biodiesel labeling regulation later this summer. The Committee will work with the Fuels and Lubricants Subcommittee to ensure that this item is revised and consistent with the FTC requirements.

At the CWMA 2008 Annual Meeting it was mentioned that the language should not conflict with the finalized language that will be issued by FTC. A member of the National Biodiesel Board (NBB) commented that he sent comments to FTC opposing the inclusion of "biomass" in the label. A regulatory official also opposed the exemption for fuels containing 5 % or less biodiesel. An industry representative requested that this item be made Informational, since retailers may not be able to identify the percentage of biodiesel blended due to a lack of disclosure through the chain of distribution. This representative would support the following language "may contain up to 5 %."

At the NEWMA 2008 Annual Meeting, the Association agreed that the language should not conflict with the finalized language from FTC. A state Director recommended changing the term "retailer" to the word "purchaser." The Director believes that the buyer/purchaser should be provided, at the time of delivery a declaration of the maximum volume percent of the product purchased. NEWMA also was opposed to the disclosure exempting fuels containing 5 % or less biodiesel. There was concern that warranties on motor vehicles may be voided due to the mixing of fuel that contains less than 5 % biodiesel with other fuels. There was also concern regarding the chain of custody of fuels for the purpose of enforcement. Issues would be minimized when a buyer knows that the maximum of 5 % biodiesel disclosure requirements are in place and provided by a seller. The Committee would like to review the final FTC proposal and to see if any information is distributed after the FALS meeting in Vancouver, Canada in June 2008.

On July 11, 2008, FTC released its final rule (Federal Register/Vol, 73, No. 134, Friday July 11, 2008, [40154-40165]). The Fuels and Lubricants Subcommittee worked on language similar to the FTC language for the biodiesel and biodiesel blends. At the 2008 Annual Meeting, the Committee heard comments regarding the lack of regulation for blends that contain less than 5 % biodiesel. However, labeling for blends less than 5 % was not necessary because the ASTM standard requires this type of product to meet requirements for diesel fuel. The FALS representative reported that biodiesel is frequently added to diesel fuel in concentrations up to 2 % to increase lubricity.

237 ENGINE FUELS, PETROLEUM PRODUCTS AND AUTOMOTIVE LUBRICANTS INSPECTION REGULATION

237-1 V Revision of the Engine Fuels, Petroleum Products and Automotive Lubricants Inspection Regulation

(This item was adopted)

Source: Fuels and Lubricants Subcommittee (FALS) (formerly the Petroleum Subcommittee)

Background/Discussion: The Subcommittee recommends the title of the uniform regulation be amended by deleting reference to petroleum products (and the related definition) to recognize the use of alternative and renewable fuels in the marketplace. Editorial revisions were also made to reflect the name change of the Society of Automotive Engineers to SAE International. The ASTM International standard identification was also changed to be consistent with that now used by ASTM by deleting the space between the letter and number of a standard throughout the regulation (e.g., D 4814 is shown as D4814). Among the other proposed changes is a revised definition for Reformulated Fuels and new definitions for "Lubricant" and "MTBE." The addition of a second ASTM International standard for Aviation Gasoline is also proposed. A change in Section 3.3. "Diesel Fuel" is recommended so that the regulation acknowledges EPA dispenser labeling requirements. Additional information is proposed for other sections to either clarify or correct references to other standards. The Subcommittee is recommending that E85 dispensers bear a label to encourage consumers to consult their engine manufacturer's recommendations on the appropriate fuel to use in their vehicle and amendments to the M85 labeling requirements are also suggested. There is a new subsection proposed for Section 4 to provide requirements for Dispenser Filters. The Subcommittee could not agree on a variety of proposed revisions to Section 2.1. Proposed changes have been submitted for the Committee to consider as a separate item and are presented in Item 237-2 in this agenda.

Ron Hayes, FALS Chairperson, can be contacted at (573) 751-2922 or at ron.hayes@mda.mo.gov.

The Subcommittee met on January 24, 2007, at the Interim Meeting in Jacksonville, Florida, to undertake a review of a number of significant issues related to fuel standards. One of its first projects was a review of the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in NIST Handbook 130. The goal of the Subcommittee was to prepare a draft revision of this regulation for consideration by the Committee at the 2008 Interim Meeting. The Subcommittee also reviewed the Engine Fuels, Petroleum Products, and Automotive Lubricants Law, and a draft revision of the law is presented in Item 223-1 above.

The Subcommittee met at the 2007 Annual Meeting and continued its work on a number of items, including a substantive revision of the fuel ethanol labeling requirement that the NCWM adopted at that meeting. The Subcommittee met again on December 5, 2007, at the ASTM International Meeting in Phoenix, Arizona, and held a conference call on January 15, 2008, in order to complete its work on the draft revisions of the law and regulation that it presented to the L&R Committee at the NCWM 2008 Interim Meeting.

At the 2008 Interim Meeting, the Fuels and Lubricants Subcommittee presented their final update of the Engine Fuels, Petroleum Products and Automotive Inspection Regulation. The Subcommittee had met various times throughout the year either in person or by teleconference. In advance of the Interim Meeting, they distributed their report to the Committee, state Weights and Measures Directors, and other stakeholders for review and comment. Some comments were received during the public hearing and in writing (see Appendix B).

At the CWMA 2008 Annual Meeting a comment was made by an industry representative that refiners cannot meet the minimum vapor pressure requirements referenced in ASTM D5798 (specification for E85). ASTM is aware of this issue and is working on this specification.

At the NEWMA 2008 Annual Meeting there was question on the wording under Section 4.3. The Committee agreed that this section should be in sub-sets for clarification.

Committee Recommendation: Adopt the revised Uniform Fuels and Automotive Lubricants Law as presented in the following text:

Uniform Engine Fuels ~~Petroleum Products~~ and Automotive Lubricants Regulation

as adopted by
The National Conference on Weights and Measures*

1. Background

In 1984, the National Conference on Weights and Measures (NCWM)[1] adopted a Section 2.20. in the Uniform Regulation for the Method of Sale of Commodities requiring that motor fuels containing alcohol be labeled to disclose to the retail purchaser that the fuel contains alcohol. The delegates deemed this action necessary since motor vehicle manufacturers were qualifying their warranties with respect to some gasoline-alcohol blends, motor fuel users were complaining to weights and measures officials about fuel quality and vehicle performance, and ASTM International (ASTM) had not yet finalized quality standards for oxygenated (which includes alcohol-containing) fuels. While a few officials argued weights and measures officials should not cross the line from quantity assurance programs to programs regulating quality, the delegates were persuaded that the issue needed immediate attention.

A Motor Fuels Task Force was appointed in 1984 to develop mechanisms for achieving uniformity in the evaluation and regulation of motor fuels. The Task Force developed the Uniform Motor Fuel Inspection Law (See the ~~Uniform Motor~~ **Uniform Engine Fuels and Automotive Lubricants Inspection** Law section of this handbook) and the Uniform ~~Motor Fuel~~ **Engine Fuel and Automotive Lubricants** Regulation to accompany the law. The Uniform Law required registration and certification of motor fuel as meeting ASTM standards. The regulation defined the ASTM standards to be applied to motor fuel.

In 1992 the NCWM established the Petroleum Subcommittee under the Laws and Regulations Committee. The Subcommittee recommended major revisions to the Regulation that was adopted at the 80th NCWM in 1995. The scope of the regulation was expanded to include all engine fuels, petroleum products, and automotive lubricants; its title was changed accordingly; and the fuel specifications and method of sale sections were revised to address the additional products. Other changes included expansion of the definitions section and addition of sections on retail storage tanks, condemned product, registration of engine fuels designed for special use, and test methods and reproducibility limits.

In 2007 the Petroleum Subcommittee (now referred to as the Fuels and Lubricants Subcommittee) undertook a review of this regulation to update it by eliminating reference to "petroleum products" and to reflect the addition of new engine fuels to the marketplace.

At the 2008 NCWM Interim Meeting the Laws and Regulations Committee changed the Petroleum Subcommittee's name to the Fuels and Lubricants Subcommittee (FALS) in recognition of its work with a wide variety of fuels including petroleum and biofuels.

2. Status of Promulgation

The Uniform Regulation for Engine Fuels~~, Petroleum Products,~~ and Automotive Lubricants was adopted by the NCWM in 1995 **and the latest amendments were proposed in 2008.** The status of state actions with respect to this regulation is shown in the table beginning on page 10.

* *The National Conference on Weights and Measures is supported by the National Institute of Standards and Technology in partial implementation of its statutory responsibility for "cooperation with the states in securing uniformity in weights and measures laws and methods of inspection."*

Uniform Engine Fuels~~, Petroleum Products,~~ and Automotive Lubricants Regulation

Section 1. Definitions

1.1. ASTM International (ASTM). – **the** international voluntary consensus standards organization formed for the development of standards on characteristics and performance of materials, products, systems, and services, and the promotion of related knowledge **(www.astm.org)**.

1.2. Antiknock Index (AKI). – the arithmetic average of the Research Octane Number (RON) and Motor Octane Number (MON): AKI = (RON+MON)/2. This value is called by a variety of names, in addition to antiknock index, including: octane rating, posted octane, (R+M)/2 octane.

1.3. Automatic Transmission Fluid. – a product intended for use in a passenger vehicle, other than a bus, as either a lubricant, coolant, or liquid medium in any type of fluid automatic transmission that contains a torque converter. For the purposes of this regulation, fluids intended for use in continuously variable transmissions are not considered "Automatic Transmission Fluid."

(Added 2004)

1.4. Automotive Fuel Rating. – the automotive fuel rating required under the amended Octane Certification and Posting Rule (or as amended, the Fuel Rating Rule), 16 CFR Part 306. Under this Rule, sellers of liquid automotive fuels, including alternative fuels, must determine, certify, and post an appropriate automotive fuel rating. The automotive fuel rating for gasoline is the antiknock index (octane rating). The automotive fuel rating for alternative liquid fuels consists of the common name of the fuel, along with a disclosure of the amount, expressed as a minimum ~~**percentage by**~~ volume **percent** of the principal component of the fuel. For alternative liquid automotive fuels, a disclosure of other components, expressed as a minimum ~~**percentage by**~~ volume **percent**, may be included, if desired.

1.5. Automotive Gasoline, Automotive Gasoline-Oxygenate Blend. – a type of fuel suitable for use in spark-ignition automobile engines and also commonly used in marine and non-automotive applications.

1.6. Aviation Gasoline. – a type of gasoline suitable for use as a fuel in an aviation spark-ignition internal combustion engine.

1.7. Aviation Turbine Fuel. – a refined middle distillate suitable for use as a fuel in an aviation gas turbine internal combustion engine.

1.8. Base Gasoline. – all components other than ethanol in a blend of gasoline and ethanol.

1.9. Biodiesel. – a fuel comprised of mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats, designated B100.

1.10. Biodiesel Blend. – a fuel comprised of a blend of biodiesel fuel with petroleum-based diesel fuel, designated BXX. In the abbreviation BXX, the XX represents the volume percentage of biodiesel fuel in the blend.

~~**1.11. Cetane Index. approximation of the cetane number of distillate diesel fuel, which does not contain a cetane improver additive, calculated from the density and distillation measurements.**~~

~~**1.12**~~**1.11. Cetane Number.** – a numerical measure of the ignition performance of a diesel fuel obtained by comparing it to reference fuels in a standardized engine test.

~~**1.13.**~~ **1.12. Compressed Natural Gas (CNG).** – natural gas which has been compressed and dispensed into fuel storage containers and is suitable for use as an engine fuel.

~~**1.14.**~~ **1.13. Denatured Fuel Ethanol.** – "ethanol" as defined in Section 1.20.

~~1.15.~~**1.14. Diesel Fuel.** – a refined middle distillate suitable for use as a fuel in a compression-ignition (diesel) internal combustion engine.

~~1.16.~~**1.15. Distillate.** – any product obtained by condensing the vapors given off by boiling petroleum or its products.

~~1.17.~~**1.16. EPA.** – the United States Environmental Protection Agency **(www.epa.gov)**.

~~1.18.~~**1.17. E85 Fuel Ethanol.** – a blend of ethanol and hydrocarbons of which the ethanol portion is nominally 85 to 75 volume percent denatured fuel ethanol.

~~1.19.~~**1.18. Engine Fuel.** – any liquid or gaseous matter used for the generation of power in an internal combustion engine.

~~1.20.~~**1.19. Engine Fuels Designed for Special Use.** – engine fuels designated by the Director as requiring registration. These fuels normally do not have ASTM or other national consensus standards applying to their quality or usability; common special fuels are racing fuels and those intended for agricultural and other off-road applications.

~~1.21.~~**1.20. Ethanol.** – (also known as "Denatured Fuel Ethanol") a nominally anhydrous ethyl alcohol meeting ASTM D4806 standards. It is intended to be blended with gasoline for use as a fuel in a spark-ignition internal combustion engine. The denatured fuel ethanol is first made unfit for drinking by the addition of the **Alcohol and Tobacco Tax and Trade Bureau (TTB) (www.ttb.gov)** ~~**Bureau of Alcohol, Tobacco and Firearms (BATF)**~~ approved substances before blending with gasoline.

~~1.22.~~**1.21. Fuel Oil.** – a refined oil middle distillates, heavy distillates, or residues of refining, or blends of these, suitable for use as a fuel for heating or power generation, the classification of which shall be defined by ASTM D396.

~~1.23.~~**1.22. Gasoline.** – a volatile mixture of liquid hydrocarbons generally containing small amounts of additives suitable for use as a fuel in a spark-ignition internal combustion engine.

~~1.24.~~**1.23. Gasoline-Alcohol Blend.** – a fuel consisting primarily of gasoline and a substantial amount (more than 0.35 mass percent of oxygen, or more than 0.15 mass percent of oxygen if methanol is the only oxygenate) of one or more alcohols.

~~1.25.~~**1.24. Gasoline Gallon Equivalent (GGE).** – gasoline gallon equivalent (GGE) means 2.567 kg (5.660 lb) of natural gas.

~~1.26.~~**1.25. Gasoline Liter Equivalent (GLE).** – gasoline liter equivalent (GLE) means 0.678 kg (1.495 lb) of natural gas.

~~1.27.~~**1.26. Gasoline-Oxygenate Blend.** – a fuel consisting primarily of gasoline along with a substantial amount (more than 0.35 mass percent of oxygen, or more than 0.15 mass percent of oxygen if methanol is the only oxygenate) of one or more oxygenates.

~~1.28.~~**1.27. Gear Oil.** – an oil used to lubricate gears, axles, or some manual transmissions.
(Added 2004)

~~1.29.~~**1.28. Kerosene.** – (or "Kerosine") a refined middle distillate suitable for use as a fuel for heating or illuminating, the classification of which shall be defined by ASTM D3699.

~~1.30.~~**1.29. Lead Substitute.** – an EPA-registered gasoline additive suitable, when added in small amounts to fuel, to reduce or prevent exhaust valve recession (or seat wear) in automotive spark-ignition internal combustion engines designed to operate on leaded fuel.

~~1.31.~~**1.30. Lead Substitute Engine Fuel.** – for labeling purposes, a gasoline or gasoline-oxygenate blend that contains a "lead substitute."

~~1.32.~~**1.31. Leaded.** – for labeling purposes, any gasoline or gasoline-oxygenate blend which contains more than 0.013 g of lead per liter (0.05 g lead per U.S. gal). NOTE: EPA defines leaded fuel as one which contains more than 0.0013 g of phosphorus per liter (0.005 g per U.S. gal), or any fuel to which lead or phosphorus is intentionally added.

~~1.33.~~**1.32. Liquefied Natural Gas (LNG).** – natural gas that has been liquefied at -126.1 °C (-259 °F) and stored in insulated cryogenic tanks for use as an engine fuel.

~~1.34.~~**1.33. Liquefied Petroleum Gas (LPG).** – a mixture of normally gaseous hydrocarbons, predominantly propane, or butane, or both, that has been liquefied by compression or cooling, or both to facilitate storage, transport, and handling.

~~**1.35. Low Sulfur. – low sulfur diesel fuel that meets ASTM D975 (e.g., Grade Low Sulfur No. 1-D or Grade Low Sulfur No. 2-D) standards. Diesel Fuel containing higher amounts of sulfur for off-road use is defined by EPA regulations.**~~

~~1.36.~~**1.34. Low Temperature Operability.** – a condition which allows the uninterrupted operation of a diesel engine through the continuous flow of fuel throughout its fuel delivery system at low temperatures. Fuels with adequate low temperature operability characteristics have the ability to avoid wax precipitation and clogging in fuel filters.

(Added 1998) (Amended 1999)

1.35. Lubricant. – means "oil." (See 1.41 below)

~~1.37.~~**1.36. Lubricity.** – a qualitative term describing the ability of a fluid to affect friction between, and wear to, surfaces in relative motion under load.

(Added 2003)

~~**1.38. M100 Fuel Methanol. – means nominally anhydrous methyl alcohol, generally containing small amounts of additives, suitable for use as a fuel in a compression-ignition internal-combustion engine.**~~

~~1.39.~~**1.37. M85 Fuel Methanol.** – a blend of methanol and hydrocarbons of which the methanol portion is nominally 70 to 85 volume percent.

~~1.40.~~**1.38. Motor Octane Number.** – a numerical indication of a spark-ignition engine fuel's resistance to knock obtained by comparison with reference fuels in a standardized ASTM D2700 Motor Method engine test.

~~1.41.~~**1.39. Motor Oil.** – an oil that reduces friction and wear between the moving parts within a reciprocating internal combustion engine and also serves as a coolant. For the purposes of this regulation, "vehicle motor oil" refers to a motor oil which is intended for use in light- to heavy-duty vehicles including cars, sport utility vehicles, vans, trucks, buses, and off-road farming and construction equipment. For the purposes of this regulation, "recreational motor oil" refers to a motor oil which is intended for use in four-stroke cycle engines used in motorcycles, ATVs, and lawn and garden equipment. For the purposes of this regulation, motor oil also means engine oil.

(Added 2004)

1.40. MTBE. – methyl *tertiary*-butyl ether.

~~1.42.~~**1.41. Oil.** – motor oil, engine oil, and/or gear oil.

(Added 2004)

~~1.43.~~1.42. **Oxygen Content of Gasoline.** – the percentage of oxygen by mass contained in a gasoline.

~~1.44.~~1.43. **Oxygenate.** – an oxygen-containing, ashless, organic compound, such as an alcohol or ether, which can be used as a fuel or fuel supplement.

~~**1.45. Reformulated Gasoline. means a volatile mixture of liquid hydrocarbons and oxygenates meeting the reformulated gasoline requirements of the Clean Air Act Amendments of 1990 and suitable for use as a fuel in a spark-ignition internal combustion engine.**~~

~~1.45.~~1.44. **Reformulated Gasoline *(RFG)*. – a gasoline or gasoline-oxygenate blend certified to meet the specifications and emission reduction requirements established by the Clean Air Act Amendments of 1990, (as amended by the Energy Policy Act of 2005), required to be sold for use in automotive vehicles in extreme and severe ozone non-attainment areas and those areas which opt to require reformulated gasoline.**

(Amended 2008)

~~1.46.~~1.45. **Research Octane Number.** – a numerical indication of a spark-ignition engine fuel's resistance to knock obtained by comparison with reference fuels in a standardized ASTM D2699 Research Method Engine Test.

~~1.47.~~1.46. **SAE. (SAE International)** ~~means the Society of Automotive Engineers~~ a technical organization for engineers, scientists, technicians, and others in positions that cooperate closely in the engineering, design, manufacture, use, and maintainability of self-propelled vehicles.

~~1.48.~~1.47. **Substantially Similar.** – the EPA's "Substantially Similar" rule, Section 211(f)(1) of the Clean Air Act [42 U.S.C. 7545 (f)(1)].

~~1.49.~~1.48. **Thermal Stability.** – the ability of a fuel to resist the thermal stress which is experienced by the fuel when exposed to high temperatures in a fuel delivery system. Such stress can lead to formation of insoluble gums or organic particulates. Insolubles (e.g., gums or organic particulates) can clog fuel filters and contribute to injector deposits.

(Added 1998) (Amended 1999)

~~**1.50. Total Alcohol. means the aggregate total in volume percent of all alcohol contained in any fuel defined in this Chapter.**~~

~~**1.51. Total Oxygenate. means the aggregate total in volume percent of all oxygenates contained in any fuel defined in this Chapter.**~~

~~1.52.~~1.49. **Unleaded.** – **when used** in conjunction with "engine fuel" or "gasoline" means any gasoline or gasoline-oxygenate blend to which no lead or phosphorus compounds have been intentionally added and which contains not more than 0.013 g of lead per liter (0.05 g lead per U.S. gal) and not more than 0.0013 g of phosphorus per liter (0.005 g phosphorus per U.S. gal).

~~1.53.~~1.50. **Wholesale Purchaser Consumer.** – any person who is an ultimate gasoline consumer of fuel methanol, fuel ethanol, diesel fuel, biodiesel, fuel oil, kerosene, aviation turbine fuels, natural gas, compressed natural gas, or liquefied petroleum gas and who purchases or obtains the product from a supplier and receives delivery of that product into a storage tank.

(Added 1998) (Amended 1999)

Section 2. Standard Fuel Specifications~~.~~

2.1. Gasoline and Gasoline-Oxygenate Blends. – (as defined in this regulation) shall meet the following requirements:

2.1.1. ASTM or other requirements. – The most recent version of ASTM D4814, "Standard Specification for Automotive Spark-Ignition Engine Fuel," except that volatility standards for unleaded gasoline blended with

ethanol shall not be more restrictive than those adopted under the rules, regulations, and Clean Air Act waivers of the U.S. Environmental Protection Agency (which includes rules promulgated by the state). Gasoline blended with ethanol shall be blended under any of the following three options:

(a) The base gasoline used in such blends shall meet the requirements of ASTM D4814, or

(b) The blend shall meet the requirements of ASTM D4814, or

(c) The base gasoline used in such blends shall meet all the requirements of ASTM D4814 except distillation, and the blend shall meet the distillation requirements of the ASTM specification.

2.1.2. Blends of gasoline and ethanol shall not exceed the ASTM D4814 vapor pressure standard by more than 1.0 psi.

2.1.3. Minimum Antiknock Index (AKI). – The AKI shall not be less than the AKI posted on the product dispenser or as certified on the invoice, bill of lading, shipping paper, or other documentation;

2.1.4. Minimum Motor Octane Number. – The minimum motor octane number shall not be less than 82 for gasoline with an AKI of 87 or greater;

2.1.5. Minimum Lead Content to Be Termed "Leaded." – Gasoline and gasoline-oxygenate blends sold as "leaded" shall contain a minimum of 0.013 g of lead per liter (0.05 g per U.S. gal);

2.1.6. Lead Substitute Gasoline. – Gasoline and gasoline-oxygenate blends sold as "lead substitute" gasoline shall contain a lead substitute which provides protection against exhaust valve seat recession equivalent to at least 0.026 g of lead per liter (0.10 g per U.S. gal).

2.1.6.1. Documentation of Exhaust Valve Seat Protection. – Upon the request of the Director, the lead substitute additive manufacturer shall provide documentation to the Director that demonstrates that the treatment level recommended by the additive manufacturer provides protection against exhaust valve seat recession equivalent to or better than 0.026 g/L (0.1 g/gal) lead. The Director may review the documentation and approve the lead substitute additive before such additive is blended into gasoline. This documentation shall consist of:

(a) Test results as published in the Federal Register by the EPA Administrator as required in Section 211(f)(2) of the Clean Air Act; or

(b) Until such time as the EPA Administrator develops and publishes a test procedure to determine the additive's effectiveness in reducing valve seat wear, test results and description of the test procedures used in comparing the effectiveness of 0.026 g/L (0.1 g/gal) lead and the recommended treatment level of the lead substitute additive shall be provided.

2.1.7. Blending. – Leaded, lead substitute, and unleaded gasoline-oxygenate blends shall be blended according to the EPA "substantially similar" rule or an EPA waiver for unleaded fuel.

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 through 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 microns as determined by ASTM D6079. If an enforcement jurisdiction's single test of more than 560 microns is determined, a second test shall be conducted. If the average of the two tests is more than 560 microns, the sample does not conform to the requirements of this part.

(Amended 2003)

2.3. Aviation Turbine Fuels. – shall meet the most recent version of ASTM D1655, "Standard Specification for Aviation Turbine Fuels."

2.4. Aviation Gasoline. – shall meet the most recent version of **one of the following, as appropriate:**

(a) ASTM D910 "Standard Specification for Aviation Gasoline," **or**

(b) ASTM D6227 "Standard Specification for Grade 82 Unleaded Aviation Gasoline."

(Amended 2008)

2.5. Fuel Oils. – shall meet the most recent version of ASTM D396, "Standard Specification for Fuel Oils."

2.6. Kerosene (Kerosine). – shall meet the most recent version of ASTM D3699, "Standard Specification for Kerosine."

2.7. Ethanol. – intended for blending with gasoline shall meet the most recent version of ASTM D4806, "Standard Specification for Denatured Fuel Ethanol for Blending with Gasolines for Use as Automotive Spark-Ignition Engine Fuel."

2.8. Liquefied Petroleum (LP) Gases. – shall meet ASTM D1835, "Standard Specification for Liquefied Petroleum (LP) Gases."

NOTE: *Also reference Gas Processors Association 2140, "Liquefied Petroleum Gas Specification and Test Methods."*

2.9. Compressed Natural Gas (CNG). – shall meet the most recent version of SAE J1616, "Recommended Practice for Compressed Natural Gas Vehicle Fuel."

2.10. E85 Fuel Ethanol. – shall meet the most recent version of ASTM D5798, "Standard Specification for Fuel Ethanol (Ed75-Ed85) for Automotive Spark-Ignition Engines."

(Added 1997)

2.11. M85 Fuel Methanol. – shall meet the most recent version of ASTM D5797, "Standard Specification for Fuel Methanol M70-M85 for Automotive Spark Ignition Engines."

(Added 1997)

2.12. Motor Oil. – shall not be sold or distributed for use unless the product conforms to the following specifications:

(a) Performance claims listed on the label shall be evaluated against SAE J183, API 1509 Engine Oil Licensing and Certifications System, or other industry standards as applicable;

(b) The product shall meet its labeled viscosity grade specification as specified in the latest published version of SAE J300;

(c) Any engine oil that is represented as "energy conserving" shall meet the requirements established by the latest revision of SAE J1423.

(Added 2004)

2.13. Products for Use in Lubricating Manual Transmissions, Gears, or Axles. – shall not be sold or distributed for use in lubricating manual transmissions, gears or axles unless the product conforms to the following specifications:

(a) It is labeled with one or more of the service designations found in the latest revision of the SAE Information Report on axle and manual transmission lubricants, SAE J308, and API Publication 1560, and meets all applicable requirements of those designations;

(b) The product shall meet its labeled viscosity grade classification as specified in the latest published version of SAE J306;

(c) The product shall be free from water and suspended matter when tested by means of centrifuge, in accordance with the standard test ASTM D2273.

(Added 2004)

2.14. Products for Use in Lubricating Automatic Transmissions. – Any automatic transmission fluid sold without limitation as to type of transmission for which it is intended shall meet all automotive manufacturers' recommended requirements for transmissions in general use in the state. Automatic transmission fluids that are intended for use only in certain transmissions, as disclosed on the label of its container, shall meet the latest automotive manufacturers' recommended requirements for those transmissions. Adherence to automotive manufacturers' recommended requirements shall be based on tests currently available to the lubricants industry and the state regulatory agency. Any material offered for sale or sold as an additive to automatic transmission fluids shall be compatible with the automatic transmission fluid to which it is added, and shall meet all performance claims as stated on the label. Any manufacturer of any such product sold in this state shall provide, upon request by a duly authorized representative of the Director, documentation of any claims made on their product label.

(Added 2004)

2.15. Biodiesel. – B100 biodiesel intended for blending with diesel fuel shall meet the most recent version of ASTM D6751, Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels.

(Added 2004)

2.16. Biodiesel Blends. – Blends of biodiesel and diesel fuels shall meet the following requirements:

(a) Blends that contain less than or equal to 5 % must meet ASTM D975, Standard Specification for Diesel Fuel Oils;

(b) Blends greater than 5 % biodiesel and that contain less than or equal to 20 % by volume shall meet the most recent edition of ASTM D7467 Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20);

(c) Use of S15 biodiesel is required when blending into S15 low sulfur motor vehicle diesel fuel when the intention is to certify the fuel as S15 grade; and

(d) When blends greater than 20 % are offered for sale, the diesel fuel used in the blend shall meet the most current requirements of ASTM D975, Standard Specification for Diesel Fuel Oils and the biodiesel blend stock shall meet the specifications of 2.15. Biodiesel.

(Added 2004) **(Amended 2008)**

~~**(a) The base diesel fuel shall meet the most current requirements of ASTM D975, Standard Specification for Diesel Fuel Oils;**~~

~~**(b) The biodiesel blend stock shall meet the most current requirements of ASTM D6751, Standard Specification for Biodiesel Fuel (B100) Blend Stock for Distillate Fuels;**~~

~~**(c) Use of S15 biodiesel is required when blending into S15 low sulfur motor vehicle diesel fuel.**~~

(Added 2004) **(Amended 2008)**

Section 3. Classification and Method of Sale of Fuels and Automotive Lubricants

3.1. General Considerations.

3.1.1. Documentation. – When ~~**all**~~ **products regulated by this rule** ~~**gasoline, gasoline-oxygenate blends, reformulated gasoline, M85 and M100 fuel methanol, E85 and E100 fuel ethanol, liquefied petroleum (LP) gases, compressed natural gas, liquefied natural gas, biodiesel, diesel fuel, kerosene, aviation gasoline, aviation turbine fuels, or fuel oils**~~** are sold, an invoice, bill of lading, shipping paper or other documentation must accompany each delivery other than a retail sale. This document must identify the quantity, the name of the product, the particular grade of the product, the applicable automotive fuel rating, and oxygenate type and content (if applicable), the name and address of the seller and buyer, and the date and time of the sale. Documentation must be retained at the retail establishment for a period not less than 1 year.

(Amended 2008)

3.1.2. Retail Dispenser Labeling. – All retail dispensing devices must identify conspicuously the type of product, the particular grade of the product, and the applicable automotive fuel rating.

3.1.3. Grade Name. – The sale of any product under any grade name that indicates to the purchaser that it is of a certain automotive fuel rating or ASTM grade shall not be permitted unless the automotive fuel rating or grade indicated in the grade name is consistent with the value and meets the requirements of Section 2, Standard Fuel Specifications.

3.2. Automotive Gasoline and Automotive Gasoline-Oxygenate Blends.

3.2.1. Posting of Antiknock Index Required. – All automotive gasoline and automotive gasoline-oxygenate blends shall post the antiknock index in accordance with applicable regulations, 16 CFR Part 306 issued pursuant to the Petroleum Marketing Practices Act, as amended.

3.2.2. When the Term "Leaded" may be Used. – The term "leaded" shall only be used when the fuel meets specification requirements of paragraph 2.1.5.

3.2.3. Use of Lead Substitute must be Disclosed. – Each dispensing device from which gasoline or gasoline-oxygenate blends containing a lead substitute is dispensed shall display the following legend: "Contains Lead Substitute." The lettering of this legend shall not be less than ~~**12 mm**~~ **12.7 mm** (½ in) in height and the color of the lettering shall be in definite contrast to the background color to which it is applied.

3.2.4. Nozzle Requirements for Leaded Fuel. – Each dispensing device from which gasoline or gasoline-oxygenate blends that contain lead in amounts sufficient to be considered "leaded" gasoline, or lead substitute engine fuel, is sold shall be equipped with a nozzle spout having a terminal end with an outside diameter of not less than 23.63 mm (0.930 in).

3.2.5. Prohibition of Terms. – It is prohibited to use specific terms to describe a grade of gasoline or gasoline-oxygenate blend unless it meets the minimum antiknock index requirement shown in Table 1.

3.2.6. Method of Retail Sale. – **Type of Oxygenate Must be Disclosed.** – All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as "with" or "containing" (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read "contains ethanol" or "with methyl *tertiary*-butyl ether (MTBE)." The oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase "or other ethers" or alternatively post the phrase "contains MTBE or other ethers." In addition, gasoline-methanol blend fuels containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position in a type at least 12.7 mm (½ in) in height, 1.5 mm ($^1/_{16}$ in) stroke (width of type).

(Amended 1996)

3.2.7. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, on an invoice, bill of lading, shipping paper, or other documentation, a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or, alternatively, use the phrase "contains MTBE or other ethers." In addition, any gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as "with" or "containing" methanol. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the engine fuel before blending.

(Amended 1996)

Table 1. Minimum Antiknock Index Requirements

Term	Minimum Antiknock Index	
	ASTM D4814 Altitude Reduction Areas IV and V	**All Other ASTM D4814 Areas**
Premium, Super, Supreme, High Test	90	91
Midgrade, Plus	87	89
Regular Leaded	86	88
Regular, Unleaded (alone)	85	87
Economy	--	86

(Table 1. Amended 1997)

3.3. Diesel Fuel.

3.3.1. Labeling of Grade Required. – Diesel Fuel shall be identified by grades No. 1-D, ~~**No. 1-D (low sulfur),**~~ No. 2-D, ~~**No. 2-D (low sulfur),**~~ or No. 4-D.~~**– Each retail dispenser of diesel fuel shall be labeled according to the grade being dispensed except the words "low sulfur" are not required.**~~

~~**3.3.2. Location of Label. These labels shall be located on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver's position, in a type at least 12 mm (½ in) in height,**~~

~~1.5 mm (1/16 in) stroke (width of type).~~

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

3.3.3. Delivery Documentation for Premium Diesel. – Before or at the time of delivery of premium diesel fuel, the retailer or the wholesale purchaser consumer shall be provided on an invoice, bill of lading, shipping paper, or other documentation a declaration of all performance properties that qualifies the fuel as premium diesel fuel as required in Section 2.2.1.

(Added 1998) (Amended 1999)

(Amended 2008)

3.4. Aviation Turbine Fuels.

3.4.1. Labeling of Grade Required. – Aviation turbine fuels shall be identified by Jet A, Jet A-1, or Jet B.

3.4.2. NFPA Labeling Requirements also Apply. – Each dispenser or airport fuel truck dispensing aviation turbine fuels shall be labeled in accordance with the most recent edition of National Fire Protection Association (NFPA 407), "Standard for Aircraft Fuel Servicing."

Note: *For example, NFPA 407,* ***2007*** ~~***1990***~~ *Edition: Section* ***4.3.18*** ~~***2-3.18***~~ *Product Identification Signs. Each aircraft fuel servicing vehicle shall have a sign on each side and the rear to indicate the product. The sign shall have letters at least 75 mm (3 in) high of color sharply contrasting with its background for visibility. It shall show the word "FLAMMABLE" and the name of the product carried, such as "JET A," "JET B," "GASOLINE," or "AVGAS." (****NOTE:*** *Refer to the most recent edition of NFPA 407.)*

3.5. Aviation Gasoline.

3.5.1. Labeling of Grade Required. – Aviation gasoline shall be identified by Grade 80, **Grade 91**, Grade 100, Grade 100LL, or Grade 82 UL.

(Amended 2008)

3.5.2. NFPA Labeling Requirements also Apply. – Each dispenser or airport fuel truck dispensing aviation gasoline shall be labeled in accordance with the most recent edition of National Fire Protection Association (NFPA) 407, "Standard for Aircraft Fuel Servicing."

Note: For example*, NFPA 407,* ***2007*** ~~***1990***~~ *Edition: Section* ***4.3.18*** ~~***2-3.18***~~ *Product Identification Signs. Each aircraft fuel servicing vehicle shall have a sign on each side and the rear to indicate the product. The sign shall have letters at least 75 mm (3 in) high of color sharply contrasting with its background for visibility. It shall show the word "FLAMMABLE" and the name of the product carried, such as "JET A," "JET B," "GASOLINE," or "AVGAS." (****NOTE****: Refer to the most recent edition of NFPA 407.)*

3.6. Fuel Oils.

3.6.1. Labeling of Grade Required. – Fuel Oil shall be identified by the grades of No. 1 S500, No. 1 S5000, No. 2 **S500, No. 2 S5000,** No. 4 (Light), No. 4, No. 5 (Light), No. 5 (Heavy), or No. 6.

(Amended 2008)

3.7. Kerosene (Kerosine).

3.7.1. Labeling of Grade Required. – Kerosene shall be identified by the grades No. 1-K or No. 2-K.

3.7.2. Additional Labeling Requirements. – Each retail dispenser of kerosene shall be labeled as 1-K Kerosene or 2-K. In addition, No. 2-K dispensers shall display the following legend:

"Warning – Not Suitable For Use In Unvented Heaters Requiring No. 1-K."

The lettering of this legend shall not be less than 12**.7** mm (½ in) in height by 1.5 mm ($^1/_{16}$ in) stroke; block style letters and the color of lettering shall be in definite contrast to the background color to which it is applied.

3.8. E85 Fuel Ethanol.

3.8.1. How to Identify E85 Fuel Ethanol. – Fuel ethanol shall be identified as E85.

3.8.2. Labeling Requirements.

(a) Fuel ethanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

(b) A label shall be posted which states "For Use in Flexible Fuel Vehicles (FFV) Only" 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). **A label shall be posted which states "Consult Vehicle Manufacturer Fuel Recommendation." and shall not be less than 6 mm ($^1/_4$ 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.**

(Amended 2007 **and 2008)**

3.9. M85 Fuel Methanol.

~~**3.9.1. How Fuel Methanol is to be Identified. Fuel methanol shall be identified by the capital letter M followed by the numerical value volume percentage of methanol.**~~

3.9.1. How to Identify M85 Fuel Methanol. – Fuel Methanol shall be identified as M85.

Example: M85

3.9.2. Retail Dispenser Labeling. – ~~**Each retail dispenser of fuel methanol shall be labeled by the capital letter M followed by the numerical value volume percent and ending with the word "methanol."**~~

(a) Fuel methanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

Example: M85 Methanol

(b) A label shall be posted which states "For Use in Vehicles Capable of Using M85 Only." 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).

~~**3.9.3. Additional Labeling Requirements. Fuel methanol shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.**~~

(Amended 2008)

3.10. Liquefied Petroleum (LP) Gas.

3.10.1. How LPG is to be Identified. – Liquefied petroleum gases shall be identified by grades Commercial Propane, Commercial Butane, Commercial PB Mixtures or Special-Duty Propane (HD5).

3.10.2. Retail Dispenser Labeling. – Each retail dispenser of liquefied petroleum gases shall be labeled as "Commercial Propane," "Commercial Butane," "Commercial PB Mixtures," or "Special-Duty Propane (HD5)."

3.10.3. Additional Labeling Requirements. – Liquefied petroleum gas shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.10.4. NFPA Labeling Requirements also apply. (Refer to the most recent edition of NFPA 58.)

3.11. Compressed Natural Gas.

3.11.1. How Compressed Natural Gas is to be Identified. – For the purposes of this regulation, compressed natural gas shall be identified by the term "Compressed Natural Gas" or "CNG."

3.11.2. Retail Sales of Compressed Natural Gas Sold as a Vehicle Fuel.

3.11.2.1. Method of Retail Sale. – All compressed natural gas kept, offered, or exposed for sale or sold at retail as a vehicle fuel shall be in terms of the gasoline liter equivalent (GLE) or gasoline gallon equivalent (GGE).

3.11.2.2. Retail Dispenser Labeling.

3.11.2.2.1. Identification of Product. – Each retail dispenser of compressed natural gas shall be labeled as "Compressed Natural Gas."

3.11.2.2.2. Conversion Factor. – All retail compressed natural gas dispensers shall be labeled with the conversion factor in terms of kilograms or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement "1 Gasoline Liter Equivalent (GLE) is equal to 0.678 kg of Natural Gas" or "1 Gasoline Gallon Equivalent (GGE) is equal to 5.660 lb of Natural Gas" consistent with the method of sale used.

3.11.2.2.3. Pressure. – CNG is dispensed into vehicle fuel containers with working pressures of 16 574 kPa, 20 684 kPa, or 24 821 kPa. The dispenser shall be labeled 16 574 kPa, 20 684 kPa, or 24 821 kPa corresponding to the pressure of the CNG dispensed by each fueling hose.

3.11.2.2.4. NFPA Labeling. – NFPA Labeling requirements also apply. (Refer to NFPA 52.)

3.11.3. Nozzle Requirements for CNG. – CNG fueling nozzles shall comply with ANSI/AGA/CGA NGV 1.

3.12. Liquefied Natural Gas.

3.12.1. How Liquefied Natural Gas is to be Identified. – For the purposes of this regulation, liquefied natural gas shall be identified by the term "Liquefied Natural Gas" or "LNG."

3.12.2. Labeling of Retail Dispensers of Liquefied Natural Gas Sold as a Vehicle Fuel.

3.12.2.1. Identification of Product. – Each retail dispenser of liquefied natural gas shall be labeled as "Liquefied Natural Gas."

3.12.2.2. Automotive Fuel Rating. – LNG automotive fuel shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.12.2.3. NFPA Labeling. – NFPA Labeling requirements also apply (Refer to NFPA 57).

3.13. Oil.

3.13.1. Labeling of Vehicle Motor Oil.

3.13.1.1. Viscosity. – The label on each container of vehicle motor oil shall contain the viscosity grade classification preceded by the letters "SAE" in accordance with the SAE International's latest version of SAE J300.

3.13.1.2. Intended Use. – The label on each container of vehicle motor oil shall contain a statement of its intended use in accordance with the latest version of SAE J300.

3.13.1.3. Engine Service Category. – The label on each container of vehicle motor oil shall contain the engine service category, or categories, met in letters not less than 3.18 mm ($^1/_8$ in) in height, as defined by the latest version of SAE J183 or API Publication 1509, Engine Oil Licensing and Certification System.

3.13.1.2.1. Exception for Quantities of One Gallon (3.785 L) or Less. – A container of engine vehicle motor oil with a volume of one gallon **(3.785 L)** or less that does not meet an active service category, as defined by the latest version of SAE J183, shall bear a plainly visible cautionary statement in compliance with SAE J183, Appendix A, for obsolete API oil categories.

3.13.2. Labeling of Recreational Motor Oil.

3.13.2.1. Viscosity. – The label on each container of recreational motor oil shall contain the viscosity grade classification preceded by the letters "SAE" in accordance with the SAE International's latest version of SAE J300.

3.13.1.2. Intended Use. – The label on each container of recreational motor oil shall contain a statement of its intended use in accordance with the latest version of SAE J300.

3.13.3. Labeling of Gear Oil.

3.13.2.1. Viscosity. – The label on each container of gear oil shall contain the viscosity grade classification preceded by the letters "SAE" in accordance with the SAE International's latest version of SAE J306 or SAE J300.

3.13.2.1.1. Exception. – Some automotive equipment manufacturers may not specify an SAE viscosity grade requirement for some applications. Gear oils intended to be used only in such applications are not required to contain an SAE viscosity grade on their labels.

3.13.2.2. Service Category. – The label on each container of gear oil shall contain the service category, or categories, met in letters not less than 3.18 mm ($^1/_8$ in) in height, as defined by the latest version of SAE J308.

3.14. Automatic Transmission Fluid.

3.14.1. Labeling. – The label on a container of automatic transmission fluid shall not contain any information that is false or misleading. In addition, each container of automatic transmission fluid shall be labeled with the following:

(a) The brand name;
(b) The name and place of business of the manufacturer, packer, seller, or distributor;
(c) The words "Automatic Transmission Fluid;"
(d) The duty type of classification;
(e) An accurate statement of the quantity of the contents in terms of liquid measure.

3.14.2. Documentation of Claims Made Upon Product Label. – Any manufacturer or packer of any product subject to this article and sold in this state shall provide, upon request of duly authorized representatives of the Director, documentation of any claim made upon their product label.

3.15. Biodiesel and Biodiesel Blends.

3.15.1. Identification of Product. – Biodiesel ~~and Biodiesel Blends~~ shall be identified by ~~the capital letter B followed by the numerical value representing the volume percentage of biodiesel fuel (Examples: B10; B20, B100)~~ the term "Biodiesel" followed 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 ($^1/_4$ 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.

~~3.15.2. Labeling of Retail Dispensers Containing Between More than 5 % and Up to and including 20 % Biodiesel. Each retail dispenser of biodiesel blend containing more than 5 % and up to and including 20 % biodiesel shall be labeled with either:~~

~~3.15.2.1. The capital letter "B" followed by the numerical value representing the volume percentage of biodiesel fuel and ending with "biodiesel blend." (Examples: B10 biodiesel blend; B20 biodiesel blend), or;~~

~~3.15.2.2. The phrase "biodiesel blend between 5 % and 20 %" or similar words.~~

~~3.15.3. Labeling of Retail Dispensers Containing Biodiesel Blend More Than 20 % Biodiesel. Each retail dispenser of biodiesel blend containing more than 20 % biodiesel shall be labeled with the capital letter "B" followed by the numerical value representing the volume percentage of biodiesel fuel and ending with "biodiesel blend." (Example: B60 biodiesel blend).~~

~~3.15.4. Additional Labeling Requirements. The dispenser shall be labeled with "Consult Manufacturer fuel recommendations."~~

3.15.~~5~~3. Documentation for Dispenser Labeling Purposes. – The retailer shall be provided, at the time of delivery of the fuel, with 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.~~6~~4. Exemption. – Biodiesel blends that contain less than or equal to ~~containing~~ 5 % ~~or less~~ biodiesel by volume are exempted from the requirements of ~~Section 3.15~~ Sections 3.15.1., 3.15.2, and 3.15.3 ~~through 3.15.5.~~ when it is sold as "diesel fuel" as required in Section 3.3.

(Added 2005) **(Amended 2008)**

Section 4. Retail Storage Tanks and Dispenser Filters

4.1. Water in Gasoline-Alcohol Blends, Biodiesel, Biodiesel Blends, E85 Fuel Ethanol, Aviation Gasoline, and Aviation Turbine Fuel. – No water ~~or water-alcohol~~ phase greater than 6 mm (¼ in) as determined by an appropriate detection paste **or other acceptable means,** is allowed to accumulate in any tank utilized in the storage of gasoline-alcohol blend, **biodiesel, biodiesel blends, E85 fuel ethanol,** aviation gasoline, and aviation turbine fuel.

(Amended 2008)

4.2. Water in Gasoline, Diesel, Gasoline-Ether, and Other Fuels. – Water shall not exceed ~~50~~ 25 mm (~~2~~1 in) in depth when measured with water indicating paste **or other acceptable means** in any tank utilized in the storage of ~~biodiesel,~~ diesel, gasoline, gasoline-ether blends, and kerosene sold at retail except as required in Section 4.1.

(Amended 2008)

4.3. Dispenser Filters.

4.3.1. Engine Fuel Dispensers.

(a) All gasoline, gasoline-alcohol blends, gasoline-ether blends, E85 fuel ethanol and M85 methanol dispensers shall have 10 micron or smaller nominal pore-sized filter.

(b) All biodiesel, biodiesel blends, diesel and kerosene dispensers shall have a 30 micron or smaller nominal pore-sized filter.

4.3.2. Delivery of Aviation Fuel and Gasoline.

(a) Fuel delivery of aviation turbine fuel into aircraft shall be filtered through a fuel filter/separator conforming to API 1581 Specification and Qualification Procedures for Aviation Jet Fuel Filter/Separators.

(b) Fuel delivery of aviation gasoline into aircraft shall be filtered through a fuel filter/separator conforming to API 1581 Specification and Qualification Procedures for Aviation Jet Fuel Filter/Separators.

(Added 2008)

4.~~3~~4. Product Storage Identification.

4.~~3~~4.1. Fill Connection Labeling. – The fill connection for any **fuel** ~~petroleum~~ product storage tank or vessel supplying engine-fuel devices shall be permanently, plainly, and visibly marked as to the product contained.

(Amended 2008)

4.~~3~~4.2. Declaration of Meaning of Color Code. – When the fill connection device is marked by means of a color code, the color code shall be conspicuously displayed at the place of business.

4.4~~5~~. Volume of Product Information. – Each retail location shall maintain on file a calibration chart or other means of determining the volume of each regulated product in each storage tank and the total capacity of such storage tank(s). This information shall be supplied immediately to the Director.

Section 5. Condemned Product

5.1. Stop-Sale Order at Retail. – A stop-sale order may be issued to retail establishment dealers for fuels failing to meet specifications or when a condition exists that causes product degradation. A release from a stop-sale order will be awarded only after final disposition has been agreed upon by the Director. Confirmation of disposition shall be submitted in writing on form(s) provided by the Director and contain an explanation for the fuel's failure to meet specifications. Upon discovery of fuels failing to meet specifications, meter readings and physical inventory shall be taken and reported in confirmation for disposition. Specific variations or exemptions may be made for fuels designed for special equipment or services and for which it can be demonstrated that the distribution will be restricted to those uses.

5.2. Stop-Sale Order at Terminal or Bulk Plant Facility. – A stop-sale order may be issued when products maintained at terminals or bulk plant facilities fail to meet specifications or when a condition exists that may cause product degradation. The terminal or bulk storage plant shall immediately notify all customers that received those product(s) and make any arrangements necessary to replace or adjust to specifications those product(s). A release from a stop-sale order will be awarded only after final disposition has been agreed upon by the Director. Confirmation of disposition of products shall be made available in writing to the Director. Specific variations or exemptions may be made for fuels used for blending purposes or designed for special equipment or services and for which it can be demonstrated that the distribution will be restricted to those uses.

Section 6. Product Registration

6.1. Engine Fuels Designed for Special Use. – All engine fuels designed for special use that do not meet ASTM specifications or standards addressed in Section 2 shall be registered with the Director on forms prescribed by the Director 30 days prior to when the registrant wishes to engage in sales. The registration form shall include all of the following information:

6.1.1. Identity. – Business name and address(es).

6.1.2. Address. – Mailing address if different from business address.

6.1.3. Business Type. – Type of ownership of the distributor or retail dealer, such as an individual, partnership, association, trust, corporation, or any other legal entity or combination thereof.

6.1.4. Signature. – An authorized signature, title, and date for each registration.

6.1.5. Product Description. – Product brand name and product description.

6.1.6. Product Specification. – A product specification sheet shall be attached.

6.2. Renewal. – Registration is subject to annual renewal.

6.3. Re-registration. – Re-registration is required 30 days prior to any changes in Section 6.1.

6.4. Authority to Deny Registration. – The Director may decline to register any product that actually or by implication would deceive or tend to deceive a purchaser as to the identity or the quality of the engine fuel.

6.5. Transferability. – The registration is not transferable.

Section 7. Test Methods and Reproducibility Limits.

7.1. ASTM Standard Test Methods. – Standard Test Methods referenced for use within the applicable Standard Specification shall be used to determine the specification values for enforcement purposes.

7.1.1. Premium Diesel. – The following test methods shall be used to determine compliance with the premium diesel parameters:

(a) Cetane Number - ASTM D613;

(b) Low Temperature Operability - ASTM D4539 or ASTM D2500 (according to marketing claim);

(c) Thermal Stability - ASTM D6468 (180 min, 150 °C);

(d) Lubricity - ASTM D6079.

(Amended 2003)

7.2. Reproducibility Limits.

7.2.1. AKI Limits. – When determining the antiknock index (AKI) acceptance or rejection of a gasoline sample, the AKI reproducibility limits as outlined in ASTM D4814 Appendix XI shall be acknowledged for enforcement purposes.

7.2.2. Reproducibility. – The reproducibility limits of the standard test method used for each test performed shall be acknowledged for enforcement purposes, except as indicated in **Section 2.2.1, and** Section 7.2.1. **No allowance shall be made for the precision of the test methods for aviation gasoline or aviation turbine fuels.**

(Amended 2008)

7.2.3. SAE viscosity grades for Engine Oils – All values are critical specifications as defined in ASTM D3244. The product shall be considered to be in conformance if the Assigned Test Value (ATV) is within the specification.

(Added 2008)

7.2.3~~3~~4. Dispute Resolution. – In the event of a dispute over a reported test value, the guidelines presented in the most recent version of ASTM D3244, "Standard Practice for Utilization of Test Data to Determine Conformance with Specifications," shall be used to determine the acceptance or rejection of the sample.

7.2.5. Additional Enforcement Action. – The Director may initiate enforcement action in the event that, based upon a statistically significant number of samples, the average test result for products sampled from a particular person is greater than the legal maximum or less than the legal minimum limits (specification value), posted values, certified values, or registered values.

(Added 2008)

237-2 I Revise Section 2.1. Gasoline and Gasoline-Oxygenate Blends

Source: Chairman, Fuels and Lubricants Subcommittee/NIST Technical Advisor

Background: The proposed changes for the current Section 2.1. of the regulation are based on the belief by some members of the Subcommittee that there is ambiguity in the current regulation and a lack of acceptance of the current requirements by some states. Some of the members of the Subcommittee believe the uniform regulation should include a set of enforceable limits that provide consumer protection yet build a bridge to the future predominance of blend stock use.

1. *Ambiguity in the Current Regulation* – Discussions between regulators and industry, both during Fuel and Lubricants Subcommittee meetings and during the course of performing regulatory functions within the jurisdictions, have revealed that the current regulation has varying interpretations. The current regulation provides three options for blending.

   a. Option 1 (***2.1.1.1. The base gasoline used in such blends shall meet the requirements of ASTM D4814***) is generally interpreted to mean that if the base gasoline meets the ASTM requirements, then the blend is exempt from all ASTM volatility control parameters when splash blending occurs downstream with a finished gasoline. Others suggest that, based on the wording, when blending under these conditions, the blend is exempt from any ASTM standards. Still others suggest that the section fails to clearly exempt the

blend from any standards; therefore, they do not feel that this section provides the final blend with any relaxation from the ASTM standards.

b. Option 2 (***2.1.1.2. The blend shall meet the requirements of ASTM D4814***) is unclear to most readers that were not present when the rule was originally drafted. Obviously, a spark ignition engine fuel can certainly meet the ASTM standard and be compliant without question. In actuality, the rule was written to *require* that blends constructed at a refinery using ethanol as a blend stream component meet the ASTM standard.

c. Option 3 (***2.1.1.3. The base gasoline used in such blends shall meet all the requirements of ASTM D4814 except distillation, and the blend shall meet the distillation requirements of the ASTM specification***) is also unclear to many. This section was constructed by the original drafters of the rule to apply to blending with Blend Stock for Oxygenate Blending (BOBs). The original intent was based upon the fact that the blender knows the effect that the ethanol will have on the fuel, and the BOB should be manufactured with refinery stream components that will result in an ASTM-compliant fuel after the addition of the ethanol. Again, many readers do not understand this option and find that it is hard to distinguish from Option 2. The proposed revision combines Option 2 and Option 3 into a clear and concise statement.

2. *Lack of Acceptance by States* – The current model regulation has proven unacceptable to many states. According to a recent survey conducted, eleven states have adopted Section 2.1. into regulation, and approximately five other states have adopted similar versions of this section. Seven states have not adopted any engine fuel quality standards. The remaining twenty-seven states have not adopted this section of the model regulation. This section has been available for states to consider since 1995. Thirteen years later, there remains considerable resistance by states to adopt the current language.

3. *Sets an Enforceable Limit that Provides Minimum Consumer Protection and Builds a Bridge to the Future Predominance of Blend Stock Use* – The proposed revision provides state regulators with limits that will provide at least minimal protection to consumers when ethanol is blended with finished gasoline and removes the ambiguity that was left in the original wording. Major oil companies have asked states for a compromise standard that can be reasonably met when blending finished gasoline with ethanol. This standard is needed now in many markets because ethanol blends are not established, and it is not practical for many reasons to ship blend stock and finished gasoline into those markets. The proposed revisions provide that compromise, while maintaining the ability for regulators to react in the rare event that an abnormal base fuel is imported or entered into a marketplace and the gasoline blended with ethanol results in a blend that possesses unacceptable volatility characteristics that would result in vehicle operability issues. The proposed revision seeks to build a bridge to the time when ethanol blends may become the default fuel in a market place. At such time, it is likely that refiners will provide BOBs to those markets, and the resulting fuel would then be expected to meet ASTM standards. Finally, changes in the ASTM standards since the original regulation was passed also support a change in the model regulation. ASTM now allows a minimum T50 Distillation point of 150 ºF for gasoline in volatility Classes D and E. It is generally accepted that if ethanol were blended with a base gasoline with a T50 of 150 ºF, the final blend could be problematic.

Recommendation: Amend Section 2.1. of the Uniform Engine Fuel, Petroleum Products, and Automotive Lubricants Regulation by replacing the current text with the following:

2.1. Gasoline and Gasoline-Oxygenate Blends. – (as defined in this regulation) shall meet the most recent version of ASTM D4814 "Standard Specification for Automotive Spark Ignition Engine Fuel" except for ethanol blends as provided below and be consistent with state and federal laws and regulations.

2.1.1. When finished gasoline is used as the base gasoline for blending, the base gasoline used in such blends shall meet the requirements of ASTM D4814 and the ethanol shall meet the requirements of ASTM D4806. The finished blend shall meet ASTM D4814 with the following permissible exceptions:

2.1.1.1. The distillation minimum temperature at the 50 volume percent evaporated point shall not be less than 66 ºC (150 ºF).

2.1.1.2. The Minimum Temperature for a Vapor/Liquid Ratio of 20 shall be as follows for the applicable vapor lock protection class:

Class 1 shall be 51.5 °C (125 °F)

Class 2 shall be 49.0 °C (120 °F)

Class 3 shall be 45.0 °C (113 °F)

Class 4 shall be 41.5 °C (107 °F)

Class 5 shall be 37.0 °C (99 °F)

Class 6 shall be 35.0 °C (95 °F)

2.1.1.3. The maximum vapor pressure shall not exceed the D4814 limits by more than 1.0 psi for:

(a) Only 10 % ethanol by volume blends (9 % minimum - 10 % maximum) from June 1 through September 15.

(b) All blends of up to 10 % ethanol by volume from September 16 through May 31.

2.1.2. When blend stock for ethanol blending is used, or when an ethanol blend is created with various refinery streams, the final blend shall meet the requirements of D4814 except that the vapor pressure requirements of 2.1.1.3. are permissible.

2.1.3. Blends of gasoline and ethanol shall contain no more than 10 volume percent ethanol.

Discussion: The Fuel and Lubricants Subcommittee met at the 2007 Interim Meeting in Jacksonville, Florida, to undertake a review of a number of significant issues related to fuel standards. One of their projects was to review and update the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in NIST Handbook 130 and submit a draft revision of the regulation for consideration by the Committee at the 2008 Interim Meeting.

The Subcommittee met at the 2007 NCWM Annual Meeting and continued its work on a number of items including a substantive revision of the fuel ethanol labeling requirement that the NCWM adopted at that meeting. The Subcommittee met again on December 5, 2007, at the ASTM International (ASTM) Meeting in Phoenix, Arizona, and considered proposed amendments to Section 2.1 as shown below, but a consensus agreement could not be reached at that meeting. The Subcommittee held a conference call on January 15, 2008, to complete its work on the draft revisions of the law and regulation and to consider the proposed revisions to Section 2.1. Again, after extensive deliberation a consensus agreement on the proposed revisions to Section 2.1 could not be obtained.

At the 2008 Interim Meeting, comments were made during the open hearings where stakeholders voiced their concerns that this item was not ready to move forward. Stakeholders would like this item to go back to the Fuels and Lubricants Subcommittee for additional work on the language. The L&R Committee voted to make this item Informational and requested that the Fuel and Lubricants Subcommittee reconsider this issue. If the Subcommittee can resolve its differences on the proposal, it can submit amendments to this section as part of the revision to the Engine Fuels and Automotive Lubricants regulation under Item 237-1 above (see Appendix B for written comments received on this item).

This item was sent to the full L&R Committee for consideration at the 2008 Interim Meeting on the recommendation of NIST's Technical Advisor and with the agreement of the Subcommittee Chairman. The section

must be reviewed by the NCWM because the current language may be in conflict with federal fuel waiver provisions.

At the 2008 Annual Meeting, the Committee received one written comment (see Appendix B). This section will continue to remain Informational until additional information is received from the Fuels and Lubricants Subcommittee.

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250 INTERPRETATIONS AND GUIDELINES

250-1 V Amend Handbook 130 Interpretations and Guidelines Section 2.3.2. Guidelines for the Method of Sale of Fresh Fruits and Vegetables

(This item was adopted)

Source: Northeast Weights and Measures Association (NEWMA) (See Item 270-6 in the Report of the 92nd Annual NCWM Meeting in 2006)

Proposal: Amend Handbook 130 Interpretations and Guidelines Section 2.3.2. Fresh Fruits and Vegetables to recognize and support innovation in modern retail food marketing approaches at all forms of outlets, from typical grocery stores to the traditional farm markets.

Background: The method of sale guidelines for the sale of fresh fruits and vegetables that currently appear in Handbook 130 are outdated and in need of revision. The present guidelines do not recognize current retailing practices and are not expansive enough to cover many exotic and unusual fruits and vegetables that are becoming more common in the marketplace. Additionally, the present guidelines do not take into consideration the necessary limitations experienced by retailers at roadside stands and farmers' markets.

The original proposal for this item reflected input from only a single jurisdiction. The Committee was informed that several industry associations requested an opportunity to review and respond to this proposal. The Committee believed there were several factual errors within the classifications of produce provided, and several types of produce still were not covered by the provided proposal. The Committee made this item Developmental so it may be more fully developed with input from jurisdictions throughout the country and from affected industry associations and businesses.

Discussion: At its 2006 Interim Meeting, the CWMA heard a comment that this item should be moved to Informational for a year. The body of the guidelines should be circulated within the CWMA before becoming a Voting item. The WWMA L&R Committee received no comments regarding this item. The Committee chairman encouraged all to provide input on this item to the NCWM L&R Committee.

At the 2007 Interim and Annual Meetings, the Committee carried this item over as Informational to reconsider when comments are received from the regional associations, retailers, and other industries affected by the proposed amendments. The Committee realized the proposed replacement table had previously been omitted from this item. That oversight has been corrected in this report (see next page). At the 2007 Annual Meeting, concerns were raised that permitting quart sales of some fruits and vegetables would not be useful or practical and the Committee should reconsider that provision of the table.

The Committee requested this item be considered at all upcoming regional meetings and that comments be submitted prior to November 1, 2007, for inclusion and review at the Interim Meeting in January 2008.

At the 2008 Interim Meeting, the Committee had not received any comments from the regional meetings. The charts were reviewed at the Interim Meeting and minor modifications were made (i.e., added "grape tomato"). The Committee agreed that this item would be submitted for NCWM adoption at the 2008 Annual Meeting.

At the 2008 Annual Meeting, a state representative recommended adding "suitable dry measure" on the chart. The Committee discussed this and declined the recommendation, since this chart is a guideline.

Recommendation: Adopt the revised Section 2.3.2. Fresh Fruits and Vegetables for inclusion in NIST Handbook 130 – Section VI: NCWM Policy, Interpretations, and Guidelines as presented beginning on the next page.

2.3.2. Fresh Fruits and Vegetables

(Added 1979, Amended 1980, 1982, and **2008**)

This guideline applies to all sales of fruits and vegetables. There are two tables, one for specific commodities and one for general commodity groups. Search the specific list first to find those commodities that either don't fit into any of the general groups or have unique methods of sale. If the item is not listed, find the general group in the second table. The item may be sold by any method of sale marked with an X.

Method of Retail Sale for Fresh Fruits and Vegetables
Specific Commodity

Commodity	Weight	Count	Head or Bunch	Dry Measure (any size)	Dry Measure (1 dry qt or larger)
Artichokes	X	X			
Asparagus	X		X		
Avocados		X			
Bananas	X	X			
Beans (green, yellow, etc.)	X				X
Brussels Sprouts (loose)	X				
Brussels Sprouts (on stalk)			X		
Cherries	X			X	X
Coconuts	X	X			
Corn on the Cob		X			X
Dates	X				
Eggplant	X	X			
Figs	X				
Grapes	X				
Melons (cut in pieces)	X				
Mushrooms (small)	X			X	X
Mushrooms (portobello, large)	X	X			
Okra	X				
Peas	X				X
Peppers (bell and other varieties)	X	X			X
Pineapples	X	X			
Rhubarb	X		X		
Tomatoes (except cherry/grape)	X	X			X

Method of Retail Sale for Fresh Fruits and Vegetables General Commodity Groups					
Commodity	**Weight**	**Count**	**Head or Bunch**	**Dry Measure (any size)**	**Dry Measure (1 dry qt or larger)**
Berries and Cherry/Grape Tomatoes	X			X	
Citrus Fruits (oranges, grapefruits, lemons, etc.)	X	X			X
Edible Bulbs (onions [spring or green], garlic, leeks, etc.)	X	X	X		X
Edible Tubers (Irish potatoes, sweet potatoes, ginger, horseradish, etc.)	X				X
Flower Vegetables (broccoli, cauliflower, Brussels sprouts, etc.)	X		X		
Gourd Vegetables (cucumbers, squash, melons, etc.)	X	X			X
Leaf Vegetables (lettuce, cabbage, celery, etc.)	X		X		
Leaf Vegetables (parsley, herbs, loose greens)	X		X	X	
Pitted Fruits (peaches, plums, prunes, etc.)	X	X			X
Pome Fruits (apples, pears, mangoes, etc.)	X	X			X
Root Vegetables (turnips, carrots, radishes, etc.)	X		X		

Comparison of Current and Proposed Tables

The following comparison was prepared for the NCWM L&R Committee at the request of the Central Weights and Measures Association. It compares the current Guideline for the Method of Sale of Fresh Fruits and Vegetables in Section 2.3.2. of the Interpretations and Guidelines section of NIST Handbook 130 with the changes proposed in Item 270-6. A table which lists the commodities included in the current guideline but which do not appear in the Specific or General Tables is also provided.

Comparison Tables

Key to Tables:

Green rows (dark gray) indicate there is NO change between the current and proposed guideline (i.e., see the row for Artichokes in the Comparison Table).

Yellow rows (light gray) indicate there is a change between the current and proposed guideline (i.e., see "Dry Measure (1 dry qt or larger)" in the header row of the Comparison Table and the cell under the header for Count in the row for "Bananas").

Explanations of the differences or questions to be resolved are provided in the numbered footnotes which are located at the bottom of the table.

Specific Commodity	Weight	Count	Head or Bunch	Dry Measure (any size)	Dry Measure (1 dry qt or larger)[1]
Artichokes	X	X			
Asparagus	X		X		
Avocados		X			
Bananas[2]	X	X[2]			
Beans (green, yellow, etc.)	X				X
Brussels Sprouts (loose)[3]	X[3]				
Brussels Sprouts (on stalk)[4]			X[4]		
Cherries[5, 6]	X			X[6]	X[6]
Coconuts	X	X			
Corn on the Cob		X			X
Dates	X				
Eggplant	X	X			
Figs	X				
Grapes	X				
Melons (cut in pieces)	X				
Mushrooms (small)[6, 7]	X			X[6]	X[6]
Mushrooms (portobello, large)[7]	X	X[7]			
Okra	X				
Peas[8]	X				X[8]
Peppers (bell and other varieties)[9]	X	X			X[9]
Pineapples	X	X			
Rhubarb[10]	X		X[10]		
Tomatoes (except cherry/grape)[11]	X	X[11]			X

[1] This amendment changes the minimum dry measure from 1 peck to 1 dry quart. The equivalents are: one peck = 16 dry pints, 8 dry quarts, ¼ bushel, or 8.810 L.
[2] The current guideline forbids sales of bananas by count (only by weight). However, the NCWM permits individual bananas to be sold under the Ready-to-Eat Food exception in Section 1.12. in the Method of Sale of Commodities Regulation.
[3] The current guideline addresses Brussels sprouts and does not include the "loose" distinction.
[4] This is a new MOS for Brussels sprouts on "stalks" so there is nothing in the current method of sale to compare this with except that the current provision requires Brussels sprouts to be sold by weight.
[5] The reference to Section 4.46. Berry Baskets and Boxes Code in NIST Handbook 44 has been deleted.
[6] If a dry measure of "any size" is ok in column 3, is an X correct in the 4th column which limits sales to 1 dry quart or larger?
[7] This proposal distinguishes mushrooms by size between "small" and "large (portobello)" and introduces the method of sale by count for "large" mushrooms which is not permitted in the current guideline (only by weight or measure).
[8] The current guideline does not allow sales of peas by "dry measure" (only by weight).
[9] The current guideline does not allow sales peppers by "dry measure" (only by weight or count).
[10] The current guideline does not allow sales of rhubarb by "head or bunch" (only by weight).
[11] The current guideline does not allow sales of tomatoes by "count" (only by weight and dry measure).

General Commodity Group[26]	Weight	Count	Head or Bunch	Dry Measure (any size)	Dry Measure (1 dry qt or larger)
Berries[1] and Cherry/Grape Tomatoes	X			X	
Citrus Fruits (oranges[2], grapefruits[3], lemons[4], etc.)	X	X			X[2, 3, 4]
Edible Bulbs (onions[5, 6], garlic[7], leeks[8], etc.)	X	X[7]	X[7]		X[5, 6, 8]
Edible Tubers (Irish potatoes[9], sweet potatoes[10], ginger[11], horseradish[12], etc.)	X				X[9, 10]
Flower Vegetables (broccoli, cauliflower, Brussels sprouts[13], etc.)	X		X		
Gourd Vegetables (cucumbers[14], squash[15], melons[16], etc.)	X	X			X[15]
Leaf Vegetables (lettuce, cabbage[17], celery[18], etc.)	X		X[17, 18]		
Leaf Vegetables (parsley[19], herbs[20], loose greens[21])	X		X[21]	X[19, 21]	
Pitted Fruits (peaches, plums[22], prunes[23], etc.)	X	X[22]			X[22]
Pome Fruits (apples, pears, mangoes[24], etc.)	X	X			X[24]
Root Vegetables (turnips, carrots, radishes[25], etc.)	X		X[25]		

[1] The reference to Section 4.46. Berry Baskets and Boxes Code in NIST Handbook 44 has been deleted.
[2] The current guideline does not allow sales of oranges by "dry measure" (only by weight or count).
[3] The current guideline does not allow sales of grapefruit by "dry measure" (only by weight or count).
[4] The current guideline does not allow sales of lemons by "dry measure" (only by weight or count).
[5] The current guideline does not allow sales of onions by "dry measure" (see 6).
[6] The current guideline allows sales by weight or bunch for "spring or green" onions and sales by "weight" for dry onions.
[7] The current guideline does not permit sales of garlic by "dry measure" (only by weight or count).
[8] The current guideline does not allow sales of leeks by "count" or "dry measure" (only by weight).
[9] The current guideline does not allow sales of Irish potatoes by "dry measure" (only by weight).
[10] The current guideline does not allow sales of sweet potatoes by "dry measure" (only by weight).
[11] The current guideline does not include ginger.
[12] The current guideline does not include horseradish.
[13] Brussels sprouts are also in the Specific Commodity Table as "loose" and "on stalk."
[14] The current guideline does not allow sales of cucumbers by "dry measure" (only by weight or count).
[15] The current guideline does not include squash.
[16] The current guideline does not allow sale of whole melons by "dry measure" (only weight or count).
[17] The current guideline does not allow sales by cabbage by "count" (only by weight).
[18] The current guideline allows sales of celery by weight or count so perhaps the Committee should decide whether or not "head or bunch" or "count" is the most appropriate descriptor.
[19] The current guideline does not allow sales of parsley by "dry measure" (only weight or bunch).
[20] The current guideline does not include herbs.
[21] The current guideline does not allow sales of "Greens (all)" by count or dry measure (only by weight).
[22] The current guideline does not allow sales of plums by count (only by weight or dry measure).
[23] The current guideline does not allow sales of prunes by count or dry measure (only by weight).
[24] The current guideline does not allow sales of mangoes by dry measure (only by weight or count).
[25] The current guideline does not allow sales of radishes by "head or count" (only by weight).
[26] While many of these items may fall under the general categories listed above, it may improve uniformity and simplify the use of the table if all of the commodities were placed in a general category instead of the table, saying for instance, "Edible Tubers, etc."

This table lists the commodities that are in the current method of sale guidelines but which are not specifically identified in the proposed tables.*	
Commodity	**Method of Sale**
Apricots	**Weight**
Beets	**Weight or Bunch**
Cantaloupes	**Weight or Count**
Cranberries	**Weight or Measure**
Currants	**Weight or Measure**
Eggplant	**Weight or Count**
Escarole	**Weight or Bunch**
Kale	**Weight**
Kohlrabi	**Weight**
Limes	**Weight or Count**
Nectarines	**Weight or Count**
Papaya	**Weight or Count**
Parsnips	**Weight**
Persimmons	**Weight or Count**
Pomegranates	**Weight or Count**
Rutabagas	**Weight**
Spinach	**Weight or Bunch**
Tangerines	**Weight or Count**
*While many of these items may fall under the general categories listed above it may improve uniformity and simplify the use of the table if all of these commodities are placed in a general category instead of the table saying, for instance, “Edible Tubers, etc.”	

270 OTHER ITEMS – DEVELOPING ITEMS

INTRODUCTION

The NCWM has established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing items either have not received sufficient review by all parties affected by the proposals or are 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 – Handbook 130 or Handbook 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 develop fully 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 Amend Section 2.2.1. in Handbook 130 Uniform Engine Fuels Regulation – Premium Diesel Lubricity

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

Background: A member of the petroleum industry believed the test and associated tolerances for lubricity on premium diesel specified in Section 2.2.1.(d) 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 meeting the specification will pass the test. Applying an average test as specified in Section 2.2.1.(d) reduced that probability to 80 %.

The Committee received comments from several members of the Premium Diesel Work Group (WG) who did not support the item as presented by the petroleum industry member. WG members believed that the process that led to the current definition was very thorough and complete, and that the premium diesel lubricity requirements were established with a full understanding of their implications. The WG members felt that knowledgeable individuals provided input to the process, which led to the consensus position contained in the current regulation. The work being done by the WG was reported at meetings of ASTM Subcommittee E-2 every six months. The current regulation has been endorsed by the American Petroleum Institute, the Engine Manufacturers Association, and the NCWM.

Prior to the current requirement being adopted, the ASTM Lubricity Task Force conducted a great deal of research on this topic. Based on its research, the ASTM Lubricity Task Force concluded that a limit of 520 µm would meet the requirements of equipment in the field. Since the passage of this model regulation, ASTM included a lubricity requirement for No. 1 and No. 2 diesel fuel effective January 1, 2005. The ASTM requirement is also 520 µm.

WG members reported that when this regulation was written, fuels with adequate lubricity provided a functional benefit to the end user. The WG agreed with the ASTM Lubricity Task Force that 520 µm was the correct limit to set for premium diesel. However, the WG's review process also indicated increased pump wear for fuels with High-Frequency Reciprocating Rig (HFRR) values greater than 560 µm. The current reproducibility value of the HFRR

test method would have placed enforcement well beyond the 560 µm level, essentially allowing fuels with little lubricity protection to be sold as "Premium." The WG believed they could not recommend a premium fuel standard that would permit excessive pump wear. Using the statistical tools provided in ASTM D3244, the WG evaluated an enforcement limit of 560 µm. The statistical tools indicated that a single laboratory reporting the assigned test value would have an enforcement limit of approximately 80 % probability of acceptance, while the average of two separate laboratories reporting the assigned test value would have an enforcement limit of approximately 90 % probability of acceptance. It was agreed that for a premium fuel the average of two test results was the best approach given the current test methods and precision available. Therefore, if a test exceeded 560 µm, then a second test must be run. The average of the two tests must exceed 560 µm before a violation would occur. At the 2005 WWMA meeting, the Fuels and Lubricants Subcommittee agreed the proposal was the best approach at that time, and lacking new information, it continues to hold that position.

Discussion: At the WWMA 2006 Annual Meeting, the WWMA L&R Committee received only one comment regarding this item, acknowledging the ongoing review by the Fuels and Lubricants Subcommittee. 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 Interim Meeting, the CWMA 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 was awaiting the recommendation from the Subcommittee.

During the 2007 Interim Meeting the Committee carried this item over as an Informational item. The Committee sent this proposal to the Subcommittee and requested its recommendation on how to proceed with the issue. The Subcommittee 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 Interim Meeting the Committee carried this item over as a Developing item. This proposal was sent to the Fuel and Lubricants Subcommittee (FALS) for its recommendation on how to proceed with the issue. The FAL Subcommittee suggested this item remain on the agenda as a Developmental item.

At the 2008 Annual Meeting no changes or recommendations were received from FALS. This item will remain Developmental and will await further development from FALS.

Proposal: Amend Section 2.2.1. Premium Diesel Fuel in Handbook 130 Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation. The following reflects the current text as it was modified in 2003.

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 a 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)

For additional information please contact the Fuels and Lubricants Subcommittee, Ron Hayes, Chairman, (573) 751-2922 or ron.hayes@mda.mo.gov by e-mail.

270-2 D Amend Handbook 133 Section 2.3, Moisture Allowances to Provide Clearer Guidance

(See Item 270-7 in the Report of the 92nd Annual NCWM Meeting in 2006)

This item was added to the agenda of the Committee's Work Group (WG) on Moisture Loss (see Table B, Appendix C) following the 2008 NCWM Interim Meeting. Also, see Item 270-3 for an explanation of the WG's role and responsibilities and discussion on this item.

270-3 D Laws and Regulations Committee Work Group (WG) on Moisture Loss

(See Item 270-8 in the Report of the 92nd Annual NCWM Meeting in 2006)

Background: An issue about NIST Handbook 133 raised during the WG discussion was that the established moisture allowances listed in the handbook are not shown in one location in the text. The following table was prepared by NIST and may be considered for possible future inclusion in the handbook at the next WG meeting. The new Table 1.3 Moisture Allowances would bring all of the Moisture Allowance information together in one location in HB 133. A sample of a USDA Seal of Inspection was provided because NIST frequently receives inquiries from field officials asking what the USDA seal looks like.

Table 1.3 Moisture Allowances		
If you are verifying the 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 that bear a USDA seal of inspection:	**The Moisture Allowance is:**	 One example of a USDA Seal of Inspection. Seals may vary by product.
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 hotdogs	2.5 %	
Bacon, fresh sausage, and luncheon meats	0 %	If there is no free-flowing liquid or absorbent materials in contact with the product and the package is clean of clinging material.

Discussion: At the 2007 NCWM Interim Meeting, the Committee created a WG to undertake a review of a number of moisture loss and other issues relating to NIST Handbook 133 "Checking the Net Contents of Packaged Goods." NIST recommended the NCWM L&R Committee retain responsibility for this project instead of creating a task force that would entail additional travel and meeting expenses for all parties. The Board of Directors and the Committee agreed with that proposal because a large portion of this project can be accomplished using e-mail and teleconferences to reduce costs. The Committee also noted the number of items on the agenda has declined, making time available during the Committee's work sessions to address this project. If additional meetings are needed, they will be scheduled to coincide with the regional meetings to reduce travel and other costs. Another justification for this approach was that it allowed regional representatives on the Committee to develop a greater understanding of moisture loss and enabled them to better explain the subject matter to their constituents. Participation in this effort is open to all interested parties.

The first WG meeting took place at the 2007 Annual Meeting on Sunday, July 8, 2007, following the Committee's regular work session. The first major subject of discussion was the determination of tare using gel-soaker pads. The participants agreed that information on the appropriate test procedures for using gel soaker pads should be distributed to weights and measures officials and industry following the NCWM Annual Meeting. NIST agreed to publish an article in the upcoming edition of WMD's newsletter. A discussion of that issue is contained in Item 1 of Appendix C attached to this report. The group developed a formal work plan and addressed additional items listed in Appendix C as time allowed.

The Moisture Loss Work Group (WG) met at the 2008 Interim Meeting. There was limited time for discussion, so it was decided that no changes to NIST Handbook 133 would be recommended at this time. There were 25 representatives from state and local weights and measures programs, packagers, and other stakeholders in attendance. This was the first formal meeting of the WG. There was an extensive discussion of the goals, objectives, and effort, and a review of the history of the NCWM's efforts to address moisture loss issues. After a lengthy discussion, it was agreed that there is a need to develop informational materials to explain the average and individual package requirements and moisture allowances in NIST Handbook 133 so that handbook users can

understand how to effectively apply the statistical allowances and moisture loss adjustments when conducting package inspections. Also identified was the need to provide an explanation of federal net quantity of contents requirements. It was agreed that NIST WMD would draft a set of graphics to describe how the Sample Error Limit (SEL), Moisture Allowance, and other corrections are determined in NIST Handbook 133. NIST WMD will also prepare a compilation of laws and terms related to net quantity of contents verification for use by the WG in providing guidance to users of NIST Handbook 133 on allowing reasonable variations.

At the 2008 Annual Meeting the Moisture Loss WG met to review an animated PowerPoint presentation provided by Kenneth Butcher. This presentation explained the statistical requirement and moisture allowances of NIST Handbook 133. The WG provided input on the presentation. NIST will make revisions to the current presentation and, once finalized, it will be posted on the NCWM and NIST WMD websites for use in training and/or self study.

This WG will develop a draft guideline on small lot testing for use by inspectors and administrators. The WG will also develop guidelines for determining moisture loss allowances for products that are not listed in Handbook 133. The WG felt this additional information would be useful.

To participate in this WG, contact Lisa Warfield at (301) 975-3308, e-mail: lisa.warfield@nist.gov or Ken Butcher at (301) 975-4859, e-mail: kbutcher@nist.gov.

270-4 D Fuels and Lubricants Subcommittee (FALS) (Formerly the Petroleum Subcommittee)

At the 2008 NCWM Interim Meeting the Committee changed the name of the Petroleum Subcommittee to the Fuels and Lubricants Subcommittee (FALS).

Background: The Subcommittee had previously met on January 24, 2007, at the 2007 NCWM Interim Meeting to undertake a review of a number of significant issues related to fuel standards. Its first project was to carry out a major review and update of the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in Handbook 130. The Subcommittee also met at the 2007 Annual Meeting and continued its work on a number of items, in addition to preparing a major revision of the Fuel Ethanol Labeling requirement in Item 232-2.

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

At the ASTM International meetings on December 5, 2007, in Phoenix, Arizona, the Subcommittee met to finalize its work on a number of projects that included a revision of the Uniform Engine Fuels Law and Regulation. A teleconference was held immediately prior to the 2008 Interim Meeting.

Discussion: At the 2008 Interim Meeting, the Subcommittee prepared and submitted a major revision of this regulation for consideration by the Committee. The Subcommittee also conducted a review of the Engine Fuels, Petroleum Products, and Automotive Lubricants Law and will prepare suggested changes for this Uniform Law as well (see Item 223-1). This item was reviewed at the 2008 Annual Meeting and remains Developmental.

If you would like to participate in this work contact Ron Hayes, Chairperson, Fuels and Lubricants Subcommittee at (573) 751-2922, e-mail: ron.hayes@mda.mo.gov or Ken Butcher at (301) 975-4859, e-mail: kbutcher@nist.gov.

270-5 D Pelletized Ice Cream

Background: At the 2008 open hearings, Cary Frye from the International Ice Cream Association (IICA) gave a briefing on behalf of industry on pelletized ice cream. Ms. Frye gave a briefing on the product, standard of identity, test method procedures and several other key points. She informed the conference that additional assistance would be required from the Food and Drug Administration (FDA) (see Appendix D: Letter from IICA to FDA, dated July 10, 2008). Once FDA has addressed the issues and concerns, NIST will host a second meeting at NIST in Gaithersburg, Maryland, to follow up and seek resolution on the outstanding concerns. NIST will send out a meeting announcement to all state Directors and all other interested parties via the list server.

The NIST Weights and Measures Division submitted to the Committee detailed minutes pertaining to the June 27, 2008, meeting held at NIST in Gaithersburg, Maryland, concerning issues and concerns about the pelletized ice cream product. The minutes (submitted below) provide great detail of the current issue, background information, representatives and manufacturers, method of sale, and test method procedure.

To: State Weights and Measures Directors, NCWM Laws and Regulations Committee and Other Interested Parties

On June 27, 2008 a meeting was held at NIST in Gaithersburg, Maryland to discuss issues related to the sale of packaged Pelletized Ice Cream (an attendance list is attached). The participants included State and local officials from Maryland, New York and Pennsylvania (including a representative of the NCWM L&R Committee), officials from the Food and Drug Administration, two producers of pelletized ice cream and a representative of the International Dairy Foods Association (International Ice Cream Association). The International Dairy Foods Association (IDFA), based in Washington, DC, represents the nation's dairy manufacturing and marketing industries and their suppliers. IDFA is composed of three constituent organizations: the Milk Industry Foundation (MIF), the National Cheese Institute (NCI) and the International Ice Cream Association (IICA). IDFA's 220 dairy processing members run more than 600 plants, and range from large multi-national organizations to single-plant companies. Together they represent more than 85 % of the milk, cultured products, cheese and frozen desserts produced and marketed in the United States. IICA's members that manufacture and sell pelletized ice cream product are: Dippin' Dots, Unilever/Good Humor Breyers, Kemps, and MolliCoolz. Carol Hockert, Chief of the NIST Weights and Measures Division, Lisa Warfield, David Sefcik, Elizabeth Gentry and Ken Butcher from NIST also attended.

Background Information

Pelletized ice cream is a unique and novel product that entered the market in 1988 with Dippin' Dots, which was predominantly sold in food service venues direct to consumers. Packaged pelletized ice cream entered the retail marketplace about 2 years ago. A suggested definition for 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. As with other types of ice cream, the pellets are produced in several flavors and they are frequently mixed with pieces of cookies, brownies or dough and other inclusions. 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, stabilizer and flavoring. 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. By itself, the density of pelletized ice cream is higher than other ice creams because the product contains much less air than regular ice cream. It was noted that using the 4.5 pound density in the FDA's standard of identity is not an effective tool for determining the accuracy of fluid measure because, due to the higher density of pelletized ice cream, a package could easily meet the weight requirement and still not contain the fluid measure declared on the label. Because density variations occur when inclusions are added to packages of pelletized ice cream and, because the inclusions (e.g., cookie bits) themselves vary in size and weight, using gravimetric testing to verify the declared volume of a sample may not be practical. At least two manufacturers label their packages by net weight and the others label their packages in terms of fluid measure. The manufacturers that label their packages by fluid measure include the air surrounding the pellets in their net quantity of contents statement. At least four of the five known producers of pelletized ice cream are currently selling their packaged product in retail stores and their producing facilities are located in California, Florida, Kentucky and Minnesota. At least one other manufacturer sells this product from bulk as a ready-to-eat food in mall kiosks, sports stadiums and other venues.

Pelletized ice cream products in the market are currently labeled by both weight and volume as follows:

Dippin' Dots - Weight (Dippin' Dots Pouches and product for export), and Volume (Orblets and bulk food service)

Kemps/Hood - Volume (Itty Bits)

Good Humor – Breyer's/Unilever - Weight (Popsicle Shots)

MolliCoolz - Weight (MolliCoolz)

Pelletized Ice Cream must be sold by Fluid Volume

The International Ice Cream Association (IICA) reported that there was a consensus among the manufacturers that pelletized ice cream should be labeled and sold on the basis of fluid volume in accordance with Subsection 1.7.1. Factory Packaged Ice Cream and Similar Frozen Products in the Method of Sale of Commodities Regulation in NIST Handbook 130. That Subsection reads "Ice cream, ice milk, frozen yogurt and similar products shall be kept, offered, or exposed for sale or sold in terms of fluid volume." FDA officials at the meeting agreed with industry's recommendation. When a food is frozen and it is sold and consumed in a frozen state, the declaration must express the volume at the frozen temperature. FDA regulations also permit fluid ounces to be used when "there is a firmly established general consumer usage and trade custom of declaring the contents of a …solid, semisolid, or viscous product by fluid measure." For ice cream there is a firmly established consumer usage and trade custom of selling ice cream and similar frozen products by volume. (See below for regulatory references.)

Volumetric Test Method and Air Measurement Issues

Once it was agreed that the appropriate method of sale for pelletized ice cream is by fluid volume, discussion moved to whether or not the air surrounding the beads is to be included as part of the fluid declaration. The IICA again reported that there was a consensus among the manufacturers that the air surrounding the beads should not be included as part of the fluid volume of the ice cream ("air-excluded.") To enforce the "air-excluded" standard, the water displacement method for ice cream novelties in Section 3.12. could be used if appropriate modifications were made to ensure the ice cream pellets can be completely and properly submerged. Some states and industry have tried alternative head-space methods and have substituted glycerin for water in the displacement procedures with some limited success. Pelletized ice cream can melt quickly but some states have reported that their tests indicate that with careful handling and strict temperature regulation of the water, the melting can be limited. Reducing melting is crucial to volume determinations because FDA requires that the volume of ice cream be determined while in a frozen state. After ice cream melts, it cannot be refrozen and tested because any air that the product contained is lost. There is also a need to develop a practical means to keep the pellets immersed in the test fluid so that their volume can be accurately determined. One approach which shows promise is to place the beads in a weighted nylon mesh bag (the volume displaced by the bag and weight are deducted). The IICA reported that in testing pelletized ice cream with added inclusions such as cookie pieces, cookie dough or brownies caused inaccurate results due to water absorption by the inclusions. But more testing and a collaborative study are needed before any one test method can be proven to provide reliable results. The group discussed the possibility of using screening tools or audit type tests to reduce destructive testing and to reduce the need to have inspectors collect samples and transport them to a testing laboratory

It was during this discussion a potential problem with the "air-excluded" net content declaration surfaced. For nutritional labeling purposes, manufacturers must also state the serving size in volume using household measures such as "tablespoon" or "cup" in the nutrition facts panel. Because the air will have to be subtracted from the total volume of the ice cream on the net content label, a consumer who were to measure out the total number of household ½-cup measures of ice cream (with air) would find a greater number of servings than what would be calculated by dividing the total net contents by 4 fl oz. The difference between the two volumes with or without air could be as much as 50 %. While this may not be a significant issue for individual serving size containers, it could be a problem when pelletized ice cream is sold in multiple serving containers. The potential problem is that consumers

might be confused or misled by the apparent discrepancies in the declarations. Several suggestions were offered to address the potential problem such as having the manufacturer provide special label information explaining the reason for the difference in volumes, but it became clear during the discussion that this issue would have to be formally submitted to the FDA nutritional labeling experts for resolution. The FDA representatives who attended the meeting were experts in package labeling and standards of identity but could not respond to questions on nutritional labeling. They asked that a written request be submitted to FDA requesting a prompt interpretation of its regulations. IDFA agreed that it would draft and send a request for interpretation to FDA before the NCWM Annual Meeting.

If FDA requires an "air-included" standard (i.e., the air surrounding the pellets is included in the fluid volume of the ice cream), the volume of the ice cream declared in the net quantity statement and the nutritional label serving size would be in approximate agreement. A test procedure to verify the volume of ice cream sold on this basis would be simpler to develop and verify than the water displacement method in Handbook 133. This test could be as simple as pouring the pelletized ice cream into a chilled cylinder and then taking a direct reading of the volume from the graduations on the cylinder. The suitability of the test equipment in either test would be crucial so that the combined uncertainties of the calibrated test equipment and the uncertainty of the test method do not exceed 1/6 of the Maximum Allowable Variation.

The IDFA representative will send a letter to FDA requesting an interpretation of its regulations in regard to whether the air is to be included in the volume of the ice cream and how industry will be expected to provide nutritional information on packages. Once FDA issues a response, IDFA will collaborate with state weights and measures officials and NIST to develop the appropriate test procedures. At this point, NIST will host a second meeting of weights and measures officials, industry and the FDA to move forward on the next steps needed. Once the industry receives notice from FDA on how they will have to package and label pelletized ice cream, the pelletized ice cream manufacturers will need a reasonable period of time to make the necessary changes to packaging for declaration of the net contents in fluid volume (from weight to volume or from volume of product with "air-included" to "air-excluded.") This will include package redesign, and the ability to use up existing inventory of packaging and product in storage and in the marketplace. Because the shelf life of ice cream can range from 12 to over 18 months, inventories of product may be extensive. IICA asked that during this time period of determining the proper net content declaration and measurement tool if weights and measures officials could consider using regulatory enforcement discretion for pelletized ice cream products.

This report was sent to all state Weights and Measures Officials and other interested parties. It will be presented to the Laws and Regulations Committee at the National Conference of Weights and Measures during its 93rd Annual Meeting in Burlington, Vermont – July 13 to 17, 2008.

References:
NIST Handbook 130 - 2008 Edition - Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality – Uniform Regulation for the Method of Sale of Commodities pages 104-105.

1.6. Fluid Milk Products. *– All fluid milk products, including but not limited to milk, lowfat.*

1.7. Other Milk Products. *– Cottage cheese, cottage cheese products, and other milk products that are solid, semi solid, viscous, or a mixture of solid and liquid, as defined in the Pasteurized Milk Ordinance of the U.S. Public Health Service, as amended in 1965, shall be sold in terms of weight.*

1.7.1. Factory Packaged Ice Cream and Similar Frozen Products. *– Ice cream, ice milk, frozen yogurt, and similar products shall be kept, offered, or exposed for sale or sold in terms of fluid volume.*

CFR TITLE 21 – FOOD AND DRUGS *Section 101.105 Declaration of net quantity of contents when exempt.*

(a) The principal display panel of a food in package form shall bear a declaration of the net quantity of contents. This shall be expressed in the terms of weight, measure, numerical count, or a combination of numerical count and weight or measure. The statement shall be in terms of fluid measure if the food is liquid, or in terms of weight if the food is solid, semisolid, or viscous, or a mixture of solid and liquid; except that such statement may be in terms of dry measure if the food is a fresh fruit, fresh vegetable, or other dry commodity that is customarily sold by dry measure. 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. Whenever the Commissioner determines that an existing practice of declaring net quantity of contents by weight, measure, numerical count, or a combination in the case of a specific packaged food does not facilitate value comparisons by consumers and offers opportunity for consumer confusion, he will by regulation designate the appropriate term or terms to be used for such commodity.

To participate in the work on pelletized ice cream, please contact Lisa Warfield at NIST at lisa.warfield@nist.gov or at (301) 975-3308 or Cary P. Frye at the International Dairy Foods Association at cfrye@idfa.org or at (202) 220-3543.

Vicky Dempsey, Chairperson, Montgomery County, Ohio

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Stephen Benjamin, North Carolina
Joe Benavides, Texas
John Gaccione, Westchester County, New York

Ron Hayes, Missouri, Chairman of the Fuel and Lubricants Subcommittee

Pete O'Bryan, Foster Farms, Associate Member Representative
Doug Hutchinson, Canada, Technical Advisor
Ken Butcher, NIST, Technical Advisor
Lisa Warfield, NIST, Technical Advisor

Laws and Regulations Committee

Appendix A

Automatic Temperature Compensation Presentation and Letters

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- Letters Submitted to the NCWM Conference Concerning Automatic Temperature Compensation A12

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Statement for the Record
Annual Meeting of the National Conference on Weights and Measures

Laws and Regulations Committee

July 14, 2008, Burlington, Vermont.

Madame Chairman and Members of the NCWM:

My name is Holly Alfano, representing NATSO, a trade association representing more than 1000 truck stops and travel plazas. Thank you for the opportunity to speak today.

I thank you for the many hours you have spent deliberating on the issue of ATC, and I encourage you to continue your careful deliberations. Consumers here in the United States are fortunate—even with the recent run up in fuel prices – to enjoy some of the lowest fuel prices among all of the industrialized nations. Consumers have an expectation of low prices, and any actions that are taken which affect fuel prices will be studied by them with a magnifying glass.

I have a presentation that contains a lot of numbers that explain how fuel is priced both at wholesale and retail—and I will be happy to run through it with anyone here who has questions. But retail fuel pricing is not rocket science; it is simple accounting. A retailer calculates the costs of a load of fuel and passes them on, factoring in the competitive marketplace and hopefully a margin that will allow him to stay in business. As you will see from reviewing the scenarios in the presentation, hot days or cold days make no difference. Costs are factored into pricing.

The recent run-up in fuel prices has seriously impacted independent fuel retailers. Their credit lines are maxed out, with rapidly escalating fuel prices seriously straining their cash flow. Credit card fees and other costs of doing business are cutting into margins like never before—and many retailers are on the verge of bankruptcy. The adoption of an expensive new technology such as ATC—that has no proven consumer benefit—will simply eliminate some of the retailers from the marketplace. They will not be able to afford to upgrade their equipment in the current business environment of shrinking margins and declining volume.

Please carefully evaluate the proposals for implementation of ATC. A continued examination of the facts will reveal that this ATC has no merit or consumer benefit. Thank you for your careful deliberation on this issue.

Holly Alfano
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Fuel Transactions

from Rack to Retail

Holly Alfano, NATSO

From Rack to Retail

- Jobber sends tank truck driver to "rack" to pick up product for retail location – "Bob's Truckstop"
- Truck pulls up to terminal rack for 7800 gallons of diesel of ULSD
- Meter at rack shows that truck receives 7800 gallons of ULSD

From rack to retail on a cool day

- Supplier produces invoice for fuel
- **Net billing terms calculate value of fuel based on density and temperature**
- Supplier invoice –
  Net billing terms based on
  - 55.8 degrees F, 36.4 gravity
    7815 net gallons X $2.597650 =
    $20,300.63 invoice cost of load

Transportation Costs

- Transportation Costs:
- Trucker bills for hauling
  7800 gallons x 2.5 cents/gallon =
  $195
- Trucker delivers 7800 gallons into Bob's UST

From rack to retail

- How many gallons are received by retailer Bob?
  - 7800 (Bob may lose a few gallons due to shrinkage, evaporation, fuel at bottom of truck, etc.)

At the retail location

- Bob now must price the fuel he received
- He has 7800 gallons to sell; it cost him $20,300 + $195 for freight for a total of $20,495
- Per unit cost of goods

  $20,495/7800=

  $2.62756/gallon

How does Bob price his fuel?

- Unit Cost of goods – $2.63/gallon
- Needs margin to cover rent/loan payment, costs of running dispensing equipment, labor costs, credit card and fuel card transaction costs
- Bob has some aggressive competitors and Bob can't afford to lose business
  - Competition is a key factor in retail pricing of fuel

Another (warmer) day….

- Truck goes to terminal, pulls 8000 gallons (as metered)
- **Net billing terms calculate value of fuel based on density and temperature**

Supplier invoice, net billing terms are based on:

- 66.3 degrees F, 33.8 gravity

  7987 net gallons X $3.411800 = $27,250.05 (invoice cost of load)

Transportation Cost

- Trucker bills for hauling 8000 gallons at 2.5 cents/gallon =
  - $200.00
  - Trucker delivers 8000 gallons to Bob's Truckstop

Back at Bob's Truckstop

- Bob has received 8000 gallons at a cost of $27,250.05 + 200 = $27,450
- Cost of goods:
  $27,450 / 8000=
  $3.400625 per gallon
- Bob checks his competition, calculates his street price to cover his costs and hopefully make a margin to stay in business

Myths & Misinformation

- **MYTH:** Sometimes the oil companies give retailers free gallons (when it's warm); other times (when it's cold) they charge for gallons retailers don't receive
  - Reality: Net billing is simply a calculation to account for the value of the fuel sold based on temperature and density at the time of sale
  - Texas vs. Minnesota- If this myth were true, why would anyone operate a truck stop or gas station in Minnesota?

Myths & Misinformation

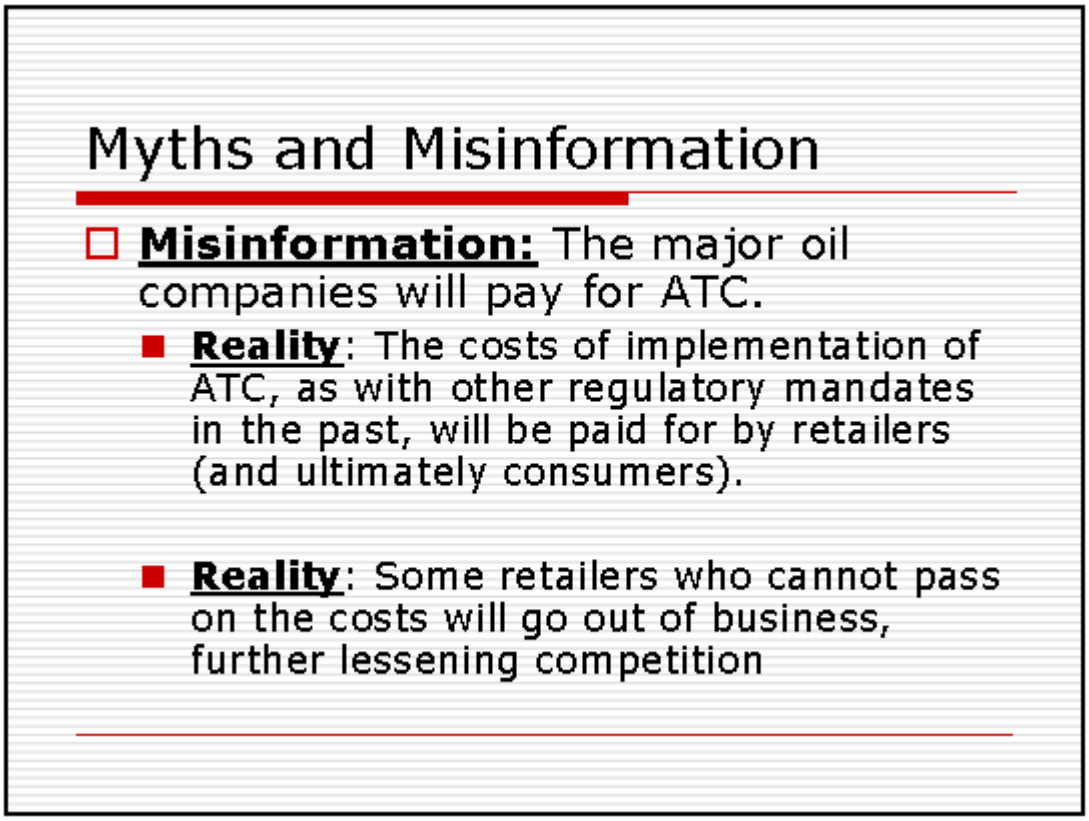
- **Myth:** Tank temperatures should be compared with the 60 degree standard
- **Reality**: Wrong! The retailer was billed for and paid for fuel from the terminal that reflected the temperature at the time it was picked up at the rack. Tank temperatures should be compared with terminal temperatures since the pricing factors in temperature and density values.

Myths and Misinformation

- **Misinformation:** Retailers are collecting taxes they are not paying to the government.
- **Reality:** Retailers DO NOT collect excise taxes; they are collected and paid at the wholesale level.
- **Reality**: Retailers buy loads of fuel, the costs of which (including taxes) are calculated into retail pricing.

Myths and Misinformation

- **Myth:** The major oil companies control retailers (and the universe as we know it)
  - Reality: Around 95 percent of fuel retailers and independently owned and operated


Myths and Misinformation
Misinformation: The major oil companies will pay for ATC.
Reality: The costs of implementation of ATC, as with other regulatory mandates in the past, will be paid for by retailers (and ultimately consumers).
Reality: Some retailers who cannot pass on the costs will go out of business, further lessening competition

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Chairperson
National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Re: Automatic Temperature Compensation

Dear Chairperson Cardin:

The Oklahoma Trucking Association (OTA) represents more than 450 companies that are involved and/or affiliated with the trucking industry in Oklahoma. As Executive Director of the OTA, I am writing to provide comments on the issue of Automatic Temperature Compensation (ATC) and its potential impact upon our members who are major consumers of diesel fuel. The ATC is a very serious matter to the OTA because of its impact and potential ramifications on our member companies.

OTA and its members realize and appreciate that the retail fuel industry is very competitive, with gas stations and truckstops competing fiercely to attract additional business. A fuel retailer prices fuel to cover the cost of the bulk fuel purchased and a reasonable return on its investment. In pricing diesel fuel, the retailer also must consider the prices that neighboring stations are charging, since a difference of as little as one penny per gallon could result in a gain or loss of business. In this competitive environment, inventory expansion and shrinkage must be accounted for in the retail price of diesel fuel, and any impact of temperature variances is eliminated through competitive pricing.

Because we believe that the marketplace already accounts for any temperature variation, we oppose both permissive and mandatory automatic temperature compensation.

<continued>

In the case of permissive temperature control, we are in opposition to this practice because it could undermine fair trade and transparency in the retail marketplace. The use of temperature compensation equipment by an unknown portion of the retail fuel providers would greatly complicate our members' ability to determine the most economical place to refuel. Compensating and non-compensating retailers, whether located across the highway from one another or across a state border, would no longer be selling comparable volumes of product, making it impossible to make an educated purchasing decision.

We also oppose mandatory automatic temperature control because of the impact that we believe such a mandate would have on our trucking members and fuel distributors. We recognize that any significant mandatory equipment investment by fuel distributors must be passed on to consumers. In the case of the installation of automatic temperature compensation devices this would translate into an estimated cost of $2,000/pump. The net result of this mandate would be higher diesel prices for our member companies toward addressing a problem that we does not believe exist nor is justifies this level of investment..

Please feel free to share our comments at the upcoming meeting of your organization. Also, please contact me at (405) 843-9488 if you have any questions regarding this letter.

Sincerely,



Dan Case
Executive Director
Oklahoma Trucking Association

BOB ANTHONY
Commissioner

JEFF CLOUD
Commissioner

JIM ROTH
Commissioner

OKLAHOMA CORPORATION COMMISSION
PETROLEUM STORAGE TANK DIVISION
(405) 521-4683 FAX: (405) 521-4945

JIM THORPE BUILDING, ROOM 238 • PO BOX 52000 • OKLAHOMA CITY, OK 73152-2000

January 24, 2008

Ms. Judy Cardin, Chairman
The National Conference on Weights and Measures
15245 Shady Grove Road, Suite 130
Rockville, MD 20850

Re: Automatic Temperature Compensation: Opposition to Permissive or Mandatory ATC Requirements

Dear Chairman Cardin:

We are writing to you on behalf of the Oklahoma Corporation Commission, The Oklahoma Petroleum Marketers Association and the retail facility owners in the state of Oklahoma. To ensure fair competition, cost effective distribution of fuel and equitable treatment of consumers in addressing the issue of temperature variation in the retail sale of gasoline and diesel in the state of Oklahoma, the Oklahoma Corporation Commission requests that this letter be included as part of the record for the NCWM Interim Meeting to be held January 27-30, 2008. If this requirement is enforced it would put about 50% of our facilities out of business.

Thank you for taking the time to read our letter.

Sincerely,

Butch Jeffers, Manager
Compliance and Inspection
Oklahoma Corporation Commission
Petroleum Storage Tank Division

BJ:sa

NCPCM
North Carolina Petroleum & Convenience Marketers
Fueling North Carolina's Future

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January 24, 2008

Ms. Vicky Dempsey, Chair
Laws and Regulations Committee
The National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Re: Proposed changes to Handbook 130 Method of Sale Regulation - Automatic Temperature Compensation for Petroleum Products

Dear Ms. Dempsey:

Thank you for the opportunity to present comments to your Committee on this issue. The North Carolina Petroleum and Convenience Marketers represent more than 400 members in the retail petroleum marketing business. Our members strive to supply high quality fuels at competitive prices to the motoring public.

We are an industry dominated by small independent operators functioning in perhaps one of the most highly regulated industries in the country. Less than three per cent of the stores selling motor fuels are operated by the five major oil companies yet the list of state and federal agencies with oversight of our industry seems endless. Agriculture & Consumer Services (fuel quality & method of sale), DOT (transportation & hazmat), EPA (water & air quality, UST), Homeland Security, Insurance (Building & Fire Code), IRS (tax collection), Labor, OSHA and the list goes on. Compliance with the myriad of laws and regulations is not easy or inexpensive. And the impact of any new regulation impacts one of the most valuable commodities in public commerce, the price of fuel for transportation, heating and energy generation.

In spite of all of the above, the industry is one of the most price competitive there is. We post our price in three foot tall numbers on signs outside of their stores. No other commodity does that. This has generated a motoring public that is more price sensitive on this product than any other in the nation. A penny or two difference in price between competitors can mean gaining or losing a sale where marginal differences in cost decide whether a company is profitable or shows a loss for the month. Our point is that any decision to mandate or permit ATC at retail is costly to retail operators and their customers and must not be made without some objective cost benefit analysis. We sincerely hope that a study being considered by the General Accounting Office (GAO) will offer some concrete cost/benefit numbers. We encourage the NCWM to wait for the GAO study before acting on ATC. We feel recommendations urging moves to temperature compensation at all retail or just on high volume dispensers are based on educated speculation more than a detailed study of temperature of fuels across

the impacted areas, the turnover rates for fueling facilities impact on temperature, a cost/benefit analysis to the motoring public, seasonal impacts on the perceived problem, alternative recommendations that may address any discrepancies found (i.e. adjustment at rack, regional increases in the reference temperature, etc.), etc. The rush to insure that consumers get the correct amount of fuel could actually adversely impact consumers (which it is touted as designed to protect) negating any argument that this is a consumer driven need when in actuality it is a desire to implement costly and unnecessary equipment upgrades for the sake of a more accurate measure that satisfies the scientific definition of accurate while ignoring the practical impact of a practical function.

In North Carolina we have already seen a drop off in the number of motor fuel outlets in rural areas due to required EPA underground storage tank upgrades. The cost to upgrade/replace tanks and piping and add expensive leak detection equipment was just too much to justify with the low profit margins on motor fuel. Many operators that did upgrade and keep their stores open may still be paying off loans obtained to perform the upgrade work and can not afford another round of costly equipment upgrades. Our association is concerned that a mandated or phased in rule would be difficult to implement due to our ability to obtain the equipment upgrades. Could a move to ATC possibly result in an equipment shortage?

An area that we have heard very little about is how ATC would impact the state agencies responsible for enforcing these requirements. Everything we HAVE heard leads us to believe that inspections and testing will take longer and will require expensive new testing apparatus. Where will the funding come from for this? Since states are not willing or able to raise taxes for ANY new programs, we can only anticipate higher fees on the retail petroleum marketing sector to pay for the new inspection and testing programs resulting from a move to ATC.

Obviously there are many questions yet to be answered. We urge you and your committee to be patient and wait for more information beginning with the GAO study before rushing forward with a recommendation on implementing ATC. The current method of sale has served the American motoring public cost efficiently. While higher prices do exacerbate any gains or losses that temperature impacts have in this area, educated review and information on impacts, costs, equipment availability, etc. are the key. Until definitive evidence nationwide can be gathered and reviewed we encourage the Committee to leave the issue alone.

Sincerely,

Gary F. Harris
Executive Director

Douglas E. Howey
Government & Regulatory Affairs Director

Cc: Mr. Roger Macey
Mr. Stephen Benjamin
Mr. Joe Benavides
Mr. John Gaccione

PETROLEUM MARKETERS ASSOCIATION OF AMERICA

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January 23, 2008

Ms. Judy Cardin & NCWM Officials
Chairman
The National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Re: Automatic Temperature Compensation

Dear Chairman Cardin:

PMAA is a national federation of 46 state and regional trade associations who collectively represent 8,000 independent petroleum marketing companies. These marketing companies own 60,000 gas stations, convenience stores, and truck stops. They also supply fuel to an additional 40,000 retail fuel locations independently owned and operated. Additionally PMAA represents all heating oil dealers in the U.S. as well.

We appreciate your effort to examine the issue of Automatic Temperature Compensation (ATC) at retail. PMAA urges the NCWM to oppose any resolution that would either permit or require ATC equipment at retail fueling locations.

As you may be aware, Congressman Bart Gordon (D-Tenn.), Chairman of the House Science and Technology Committee, recently issued a letter requesting that the U.S. Government Accountability Office (GAO) assess several factors associated with the installation of ATC. The purpose of Chairman Gordon's letter is to obtain much needed data on the impact that ATC will have on consumers. Involving GAO in the issue is especially important in light of the decision by the National Academy of Sciences to withhold the completion of the ATC study originally requested of them due to budgetary concerns. The scope of the requested GAO study is outlined in the attached letter.

You may also be aware that the California legislature enacted a law that requires a comprehensive study of the ATC issue. This study will focus on geographic temperature variances, available temperature compensating technologies and a cost-benefit analysis to determine whether fuel temperature compensation is needed. The California law was supported by the California Independent Oil Marketers Association (CIOMA), a member of PMAA. The results of the California study are due by the end of 2008.

PMAA believes that it is critical for the NCWM to fully understand the implications of such a drastic change in the way fuel is sold at retail in the United States. The studies referenced above will provide NCWM members with the data necessary to make an informed decision on the use of ATC. In the absence of this data, it is unlikely that the NCWM will be able to evaluate ultimate costs and benefits to the consumer from ATC. Without this important information, we may find that consumers are disadvantaged by the use of ATC.

It is very important that all stakeholders seek out the facts on this issue instead of relying merely on unverified and unsubstantiated data that has been distributed by some groups in this debate. We do not agree with the assertion that fuel temperatures directly indicate any losses or gains *to the consumer*. We believe that only a comprehensive scientific and economic study can establish such facts and we urge the NCWM to assist the GAO in the prompt completion of its study.

PMAA is opposed to both the permissive and/or mandatory use of ATC devices at the retail level at this time. Under permissive temperature compensation, few retailers will be likely to install the equipment, unless there is a perception by retailers that somehow those costs can be recouped in the marketplace. Permissive temperature compensation will create ambiguity and lead to unequal cost and volume delivery standards from location-to-location.

Retail petroleum distribution is one of the most competitive industries in the United States. Few industries compete on the basis of one penny per gallon and advertise their prices on signs that are visible to consumers from the highway. Inventory expansion or shrinkage is factored into the price per gallon, and the impact of temperature variances on the quantity of fuel available for sale should be eliminated through competitive pricing. For example, assume a retailer sells fuel in a cold climate and will lose 10 gallons per bulk shipment as a result of product shrinkage. This retailer would be expected to price its product in a manner to cover the cost of the

bulk fuel it purchased, the shrinkage in inventory, and a reasonable return on its investment. Similarly, a retailer that sells fuel in a warm climate may gain an extra 10 gallons per bulk delivery.

This retailer also is expected to price his product in a manner to cover the cost of the fuel purchased in bulk with a reasonable return on investment. The retailer may then recognize that it could undercut the price of fuel sold at the neighboring station due to product expansion, and would be expected to lower the price per gallon to attract additional business. The competing station may also lower its price to remain competitive. Robust competition may ensure that any product expansion or shrinkage will be accounted for and passed on to the consumer as the retailer competitively prices the fuel.

We also believe that mandatory ATC will disadvantage the consumer, as the substantial costs associated with installing and maintaining ATC equipment will simply must be passed on to the consumer. With only pennies per gallon in retail fuel margins, retailers simply cannot absorb the costs associated with installation of ATC equipment, as well as the expected increased state inspection costs that will be passed on to the retail community, and ultimately, the consumer.

PMAA would like to emphasize that our members are mostly small businesses. It should be noted that the large integrated oil companies only own and operate fewer than 5 percent of the nation's retail outlets. Imposing new costs on small business must be carefully considered and fully justified before adopted.

Sincerely,

Dan Gilligan
President

APMA Arizona Petroleum Marketers Association

January 23, 2008

Ms. Judy Cardin & NCWM Delegates
National Conference on Weights & Measures
15245 Shady Grove Road
Suite 130
Rockville MD 20850

Dear Chairman Cardin & NCWM Delegates:

I am writing on behalf of the Arizona Petroleum Marketers Association (APMA), a non-profit trade association representing petroleum marketers throughout Arizona. Our members are primarily small family-owned businesses directly marketing petroleum products through over 850 retail locations throughout the state. APMA members serve a variety of customers including retail consumers, agriculture, construction, public and private business fleets, local government fleets, school districts, hospitals and emergency vehicles.

APMA requests that this letter be entered into the official record for the NCWM Interim meeting taking place in Albuquerque January 27-30, 2008. APMA continues to be opposed to any NCWM resolution that would allow for permissive and/or mandatory ATC equipment at retail because it will likely harm Arizona consumers by increasing gasoline prices.

Gasoline retailers currently sell fuel by the gallon with a gallon of fuel containing 231 cubic inches—retailers are obeying the law when selling fuel in this manner. If ATC becomes law and requires a retailer to sell a gallon containing 235 cubic inches, it would follow that the price of that gallon is going to be more expensive. In other words, if ATC requires a retailer to dispense "larger" gallons, then per-gallon prices are going to rise not decline for consumers. It is quite ironic that the states which would be required to dispense "larger" gallons are the same states where W&M officials are the loudest proponents of ATC--those "larger" gallons are ultimately going to result in higher prices for consumers.

Installing ATC will primarily be on the backs of small retailers. In Arizona, 93% of all retail is independently owned—not owned by a refining company. This means that the cost to install ATC is not going to be paid for by "Big Oil." APMA has repeatedly asked manufacturers and local distributors to provide pricing information for retrofitting and/or

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replacing existing retail dispensers with ATC dispensers. We have not received specific costs for the Arizona market. However, based on equipment sold in Canada, we can estimate that retrofits range in cost from $2,000-$3,500 per dispenser. For pumps where retrofits cannot correct, new ATC dispensers would range from $20,000-$25,000 each. With over 2,000 retail outlets in Arizona, of which 40% are in rural outlying areas, the cost to those independent rural businesses alone would be over $20 million dollars. The figure increases to over $30 million when you include the additional 60% of retail found in larger urban areas. Additional hidden costs of labor and breaking concrete will only add to the retailer's financial burden. Forcing retailers to pay thousands of dollars to install ATC equipment that may result in higher prices for their consumers threatens their ability to even remain in business. Traditionally, less retailers in business means less competition which also harms consumers.

Over the past year at NCWM meetings, delegates have also advocated that ATC equipment offers a more accurate way to measure the energy content in a gallon of gasoline—so that consumers will receive the same energy from a gallon of gasoline regardless of the temperature. However, additional factors affect the energy content of fuel—including the grade of crude oil used, the refining process as well as the percent of ethanol in the fuel. Many states, including Arizona require the use of various "boutique fuels" for air quality purposes which affect the energy content of fuel, arguably more so than the temperature. With the recent federal mandates for the use of renewable fuels like E-85 and biodiesel, how will NCWM handle the use of ATC for these various fuel formulations?

APMA believes that requiring either permissive and/or mandatory ATC equipment at retail will only end up harming the very consumers that Weights & Measures is supposed to protect—resulting in higher gas prices and less independent small petroleum retailers. Again, APMA urges the NCWM to oppose any resolutions that would permit or require ATC equipment at retail fueling sites.

Sincerely,

Andrea Martincic
Executive Director

APMA* P.O. Box 93426* Phoenix AZ* 85070* (480) 460-1561* FAX (480) 460-9016

CWPMA
Colorado • Wyoming
Petroleum Marketers Association • Convenience Store Association

January 22, 2008

Via e-mail: judy.cardin@wisconsin.gov

Judy Cardin, Chairperson
National Conference on Weights and Measures
15245 Shady Grove Road , Suite 130
Rockville, MD 20850

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Executive Director
Mark Larson

Dear Chairwoman Cardin,

The Colorado-Wyoming Petroleum Marketers Association/Convenience Store Association opposes the development of a permissive or mandatory standard for temperature compensation of motor fuel at the retail level. The 400 plus petroleum marketer and associate member companies ask that this letter be incorporated in to the record of the interim meeting of the National Conference on Weights & Measures (NCWM), scheduled for January 27-30, 2008 in Albuquerque, N.M.

As an association representing small business fuel retailers, we and other petroleum retailing groups have attempted to provide factual information for the NCWM, to aid the groups in their decision making process. The implementation of ATC at the retail level will have a major impact on consumers, as it will change the way fuel has been measured in the U.S. for the last 100 years. Before embarking on such a major change, it is important to have factual information about the impact of such a change.

We have supported and encouraged efforts to get an independent body to investigate and gather information on the merits of ATC. We are encouraged to learn that the Government Accountability Office (GAO) has embarked on a study to provide the NCWM with this much-needed information. Though we have no way of predicting the outcome of this study, we have confidence in this unbiased, independent approach of the GAO. We recognize that factual information about the effects of ATC is needed and we are hopeful that the NCWM shares our concern about the need for this information before moving forward with this major change in the way fuel is measured and sold.

Unfortunately, some groups claiming to represent consumers are not interested in factual information. They continue to pressure NCWM, through a variety of tactics, to move forward with ATC without waiting for the facts. Perhaps some of these groups are interested in aggressively pushing the NCWM to adopt a standard for ATC because they are involved in litigation and they believe that if NCWM adopts a standard for ATC, somehow that will boost the chances of success with this litigation. While it is inappropriate to speculate about what the motivations of these various "consumer" groups may be, it is important to point out that they have engaged in a repeated effort to distort and mislead both the public and the NCWM on the issues surrounding ATC.

As one example, the "Foundation for Taxpayer and Consumer Rights" (FTCR) and its subgroup, "OilWatchDog.org" have repeatedly spread false claims on the internet, attempting to suggest impropriety not only on the part of petroleum groups but also of the NCWM. They have repeatedly suggested that oil companies sponsor NCWM events, implying that NCWM representative votes would be or could be influenced for the cost of a dinner or a cocktail. The fact is that there have been no sponsorships of any kind involving the petroleum industry and NCWM. These baseless and deliberate distortions should leave the NCWM representatives questioning the motives of these groups.

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It is ironic that FTCR and OilWatchDog should raise these issues, as neither group is willing to provide specific details on their own funding. Harvey Rosenfield, founder of FTCR, is known to represent trial lawyer interests and has received hundreds of thousands of dollars in legal fees as a result of some of FTCR's efforts. For example, it has been reported that FTCR founder Harvey Rosenfield received more than $570,000 in legal fees from the insurance rate rollback in California that FTCR pursued. It was also reported that Allstate Insurance agreed to donate $5 million to a non-profit foundation following an agreement with Rosenfield over a suit he had filed against the company. Rosenfield used that money to set up the Consumer Education Foundation, which pays him an annual salary of $100,000. He also received $100,000 from FTCR to serve as the group's executive director, until he resigns. Moreover, he continues to provide legal representation for the group, collecting $150,000 in 2004 and $167,757 in 2005, according to published reports.

A second misrepresentation involves the Owner Operator Independent Drivers Association (OOIDA), which has claimed that "Big Oil" (the major oil companies) owns, operates or controls any where form 25 to 60 percent of retail stations in the U.S. In fact, the major oil companies own less than 10 percent of retail motor fuels locations. They are owned, operated and controlled by small business retailers. OOIDA and others seem to want to convince the public and NCWM that implementation of ATC will be paid for by major oil companies, when in fact the costs will be paid by retailers, and most likely, passed on to consumers.

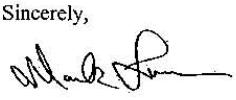
As NCWM has heard from many petroleum retailers, implementation of ATC will be very costly for the industry. The costs of ATC equipment are estimated to be between $1,500 and $2,000 per dispenser. Margins from the sale of motor fuel are very slim, and sometimes non-existent, which is the reason why retailers have come to rely on other profit centers such as fountain drinks, sandwiches, etc., in order to survive. Because of these slim margins on motor fuel, it is very likely that the costs of implementation of ATC will be passed on to consumers. Before such a radical change in fuel measurement is imposed on the motoring public, we strongly encourage NCWM to gather information about whether there is any benefit to consumers.

It has been suggested that implementation of ATC is a more accurate way to measure fuel since it is believed that expansion of fuel due to temperatures above 60 degrees delivers less energy content per tank. Unfortunately, temperature is only one factor affecting energy content. There are many other variables, including whether the fuel has been blended with ethanol or biodiesel, which deliver significantly less energy per gallon than conventional motor fuels. As you know, Congress has dramatically expanded the national renewable fuels mandate with the passage of the recent energy bill. It will require that 36 billion gallons of biofuels be blended in to our nation's fuel supply over the next few years. It is misleading to the public to suggest that ATC will guarantee that every gallon of fuel delivers equal energy content. Given the fact that over the next few years, a growing percentage of our nation's fuel supply will be blended with biofuels in varying amounts, the energy content from tank to tank, station to station, state to state, will vary.

Finally, the NCWM must recognize that the consumer community is not unanimously in support of ATC. The American Trucking Associations, representing the nation's largest consumers of diesel fuel, oppose both mandatory and permissive temperature compensation. They support national uniformity of fuel measurement, and recognize that the costs of implementation of ATC are disproportionate to any benefit that may be derived by consumers.

On behalf of the Colorado-Wyoming Petroleum Marketers Association/Convenience Store Association, we encourage NCWM to oppose development of a mandatory or permissive standard for ATC.

Sincerely,



Mark Larson
Executive Director

PMCA
of Kansas

January 21, 2008

Ms. Judy Cardin
Chairman
The National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Re: Automatic Temperature Compensation; Opposition to Permissive or Mandatory ATC Requirements

Dear Chairman Cardin:

On behalf of the members of the Petroleum Marketers and Convenience Store Association of Kansas, a trade association representing 300 petroleum marketers and convenience store retailers, we thank you for the opportunity to comment on Automatic Temperature Compensation (ATC) and request that our comments be included as part of the record for the NCWM interim meeting taking place January 27-30, 2008.

We appreciate your effort to examine ATC and your consideration of the views of stakeholders in the debate. PMCA urges the NCWM to oppose any resolution that would permit or require either permissive or mandatory automatic temperature compensation equipment at retail fueling locations. Adopting the ATC standard would create confusion not only for the retailer but the consumer as well. A sign that reads "ATC fuel sold here" would have little meaning to the average consumer, but if forced to pay more at the pump to comply with ATC, the additional cost would definitely get their attention.

While science demonstrates that gasoline and diesel fuel expand slightly under higher temperatures and shrink under cooler temperatures, retailers can only sell the actual number of gallons they receive at the terminal and factor their pricing based on the price paid for the load of fuel. Any expansion or shrinkage of fuel is accounted for in the cost of goods and factored into the retailer's pricing.

The cost of installing ATC equipment is a very significant factor to consider in this debate. The cost of retrofitting an electronic pump is estimated to be$1,800- $2,300 per pump, an overall cost to the industry of $2 - $3 billion. This expense of retrofitting and replacing existing fuel dispensers would increase the retailer's cost of goods sold, and this increased cost ultimately would be passed on to the consumer -- all for a new method of fuel measurement with no proven consumer benefit. Kansas, being a rural state, has a mix of both electronic and mechanical pumps. We estimate that 40-50% of the pumps in Kansas are mechanical pumps. The cost of retrofitting fuel dispensers in rural areas with sparse population cannot be recouped. There simply aren't enough customers to pay for it.

With the introduction of renewable fuels into the marketplace, fuel retailers are looking for affordable alternatives to add the new products at their facilities. The temperature of renewable fuels when introduced to fossil fuel has not been discussed in great detail. All states are looking for ways to increase the throughput of renewable fuels. The added cost to the infrastructure is definitely a consideration. An additional cost to implement ATC over and above biofuels retrofitting costs, will add more financial

Petroleum Marketers and Convenience Store Association of Kansas
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strain to already strapped fuel retailers. A retailer could forgo retrofitting for renewable fuels if ATC is implemented.

Motor fuel distributors and retailers nationwide have been bombarded with unfunded federal mandates. Regulations such as: Spill Prevention Control and Countermeasure, new CDL requirements for truck drivers, clean air (stage 1 vapor recovery) and operator training for underground storage tanks are all very recent regulations that potentially could force small business owners to close their facilities because they can't justify the cost to retrofit a facility or train employees on the new regulations. The cost to implement even one of these regulations is a serious consideration for small businesses. In Kansas, distributors and retailers have made tough decisions the past 4-5 years, and in many cases the decision to "close the door" has been the most viable. The consumers in rural America are the biggest losers when a retail fueling location shuts down. In many cases, they could face a 15-20 mile drive to find gas for a car or lawn mower. Adding the cost of ATC to the list of "additional regulations" could have dire consequences for many Kansas retailers. As an example, the 1998 mandatory upgrades of USTs left an indelible print on rural Kansas. Faced with the cost of replacing underground storage tanks to comply with the new regulations, many small "Mom and Pop" retailers were forced to close their doors due to the cost. Many rural communities are still dealing with the loss of a fueling source or the absence of a competitive marketplace.

Regulations required by state and federal agencies always come with a cost. Most of the time consumers are unaware of what a new regulation may cost to implement, but they are very aware of the cost of the product if it is increased even minimally. There is no doubt that retailers, if forced to implement ATC, will pass the cost on to the consumer. Who will educate the consumer about ATC? Will the labeling of ATC mean anything to the average consumer?

Kansas Weights and Measures officials have endorsed the permissive standard for ATC as have those in some other states. PMCA opposes permissive ATC. If permissive ATC is adopted, it will be a standard for the "haves and have nots," or the retailers that can afford to retrofit for ATC and those who cannot. It would be a blood bath in Kansas. Taking the permissive approach to ATC is the easy way out for Weights and Measures agencies. Why? Because states adopt NIST Handbook 44 differently; some states adopt HB 44 automatically, some states opt out of some provisions of HB 44, some states adopt HB 44 legislatively and others don't adopt HB 44 at all. Allowing some states to adopt different standards of measurement will confuse the consumer and wreak havoc with retailers.

Obviously, there is a key question that needs to be answered: does the cost of ATC to the retailer justify the benefit to the consumer? I am thankful that Congressman Bart Gordon (D-Tenn.), Chairman of the House Science and Technology Committee, has taken an active role to determine the benefits of ATC. His request to the U.S. Government Accountability Office (GAO) for assistance to determine whether fuel temperature compensation is needed should be a valuable tool for NCWM in your deliberations.

I look forward to seeing you in January at the meeting and thank you for your willingness to distribute our comments to the committee.

Sincerely,

Thomas M. Palace
Executive Director
PMCA of Kansas

AL'S CORNER OIL CO
HWY 71 NORTH
CARROLL IOWA 51401
PHONE 712-673-2723
E-MAIL al_corner@win-4-u.net

January 17 2008
Ms. Judy Cardin Chairman
The National Conference on Weights and Measures
15245 Shady Grove Road Suite 130
Rockville, MD 20850
Re: Opposition to Automatic Temperature Compensation
Dear Chairman Cardin:

I am writing to you as the part owner of Al's Corner Oil Co. with 25 locations in Cities with 10,000 people to towns with 200 people. I would like to request that this letter be included as part of the record for the NCWM Interim Meeting, taking place January 27-30, 2008.

I would first like to thank the National Conference for the time and effort you have taken to examine the issue of Automatic Temperature Compensation (ATC) at retail. I strongly encourage the NCWM to oppose both a permissive or mandatory change to retail motor fuel distribution through the use of ATC.

For over 73 years our company has serviced our retail customer base by delivering 231 cubic inches of fuel per gallon to our customers. Our customers have reason to be confident that they receive an accurate volume of fuel for their dollar. Before a wholesale change is made to the way I deliver fuel to my patrons I urge the NCWM to accumulate all of the facts regarding ATC. It is our understanding that studies are being conducted by the U.S. Government Accountability Office as well as the California Legislature. I encourage the NCWM to await the results of these studies before moving ATC any further towards a final vote on implementation. ATC will greatly affect competition, small business owners, employees, and communities. I urge you to gather all of the facts and consequences regarding ATC before imposing costly changes to both consumers and retailers.

Our company operates 25 convenience stores. Contrary to information conveyed by proponents of ATC our stores are not owned by a major oil company. We are an independent owner and operator and have been doing business that way for 78 years. Our father started this business in 1935 and my brother and I took over in 1978 continuing to operate under the same principles. When our patrons come to our stores to buy fuel they equate the prices displayed on our street sign and dispensers with a gallon of fuel. Our patrons can be assured that they are going to receive 231 cubic inches of fuel per gallon from our dispensers. Moving to ATC will create an enormous amount of confusion for our customers as well as our employees. Ultimately, it is our employees who will be tasked with explaining why a 5 gallon purchase did not fill the customer's 5 gallon container.

For the reasons listed in this letter I ask that the NCWM oppose any implementation of ATC under either a permissive or mandatory standard.
I would like to thank you for including this statement in the hearing record for the NCWM January 2008 Interim Meeting. Thank you for allowing statements to be submitted to the record and ensuring that all affected parties have the opportunity to be heard on this important issue.

Sincerely,

Rollin Tiefenthaler
Al's Corner Oil Co.
President

SIO
Southern Iowa Oil
PO Box 147
Corydon, IA 50060

January 17, 2008

Chairman Judy Cardin
National Conference on Weights and Measures

Re: Opposition to Automatic Temperature Compensation

Dear Chairman Cardin:

We are writing to you as a family owned business for over 60 years located in rural southern Iowa who operate two convenience stores & bulk delivery to farmers. We would like to request that this letter be included as part of the record for the NCWM Interim Meeting, taking place January 27-30, 2008.

First, we want to thank the National Conference for the time and effort they have taken to examine the issue of ATC at retail. We strongly encourage the NCWM to oppose both a permissive or mandatory change to retail motor fuel distribution through the use of ATC.

Our customers have reason to be confident that they receive an accurate volume of fuel for their dollar. Before a wholesale change is made to the way we deliver fuel to our customers we urge the NCWM to accumulate all of the facts regarding ATC. It is our understanding that studies are being conducted by the US Government Accountability Office as well as the California Legislature. We encourage the NCWM to await the results of these studies before moving ATC any further towards a final vote on implementation. ATC will greatly affect competition, small business owners, employees and communities imposing costly changes to both consumers and retailer.

Contrary to information conveyed by proponents of ATC our stores are not owned by a major oil company. Moving to ATC will create an enormous amount of confusion for our customers as well as our employees. Ultimately, it is our employees who will be tasked with explaining why a 5 gallon purchase did not fill the customer's 5 gallon container.

For the reasons listed in this letter we ask that the NCWM oppose any implementation of ATC under either a permissive or mandatory standard.

We would like to thank you for including this statement in the hearing record for the NCWM January 2008 Interim Meeting. Thank you for allowing statements to be submitted to the record and ensuring that all affected parties have the opportunity to be heard on this important issue.

Sincerely,

Russ Danielsen, President
Barb Danielsen, Vice President

Harold Dickey Oil Corp.
401 East 4th Street
Packwood, Iowa 52580

Written Statement for Submission to Record
National Conference on Weights and Measures
NCWM Interim Meeting in Albuquerque, New Mexico,
January 27-30, 2008

January 17, 2008
Ms. Judy Cardin, Chairman
The National Conference on Weights and Measures
15245 Shady Grove Road, Suite 130
Rockville, MD 20850

Re: Opposition to Automatic Temperature Compensation

Dear Chairman Cardin:

I am writing to you as the owner of Harold Dickey Oil Corp, with locations in Packwood, Iowa and Mount Pleasant, Iowa. I would like to request that this letter be included as part of the record for the NCWM Interim Meeting, taking place January 27-30, 2008. I would first like to thank the National Conference for the time and effort you have taken to examine the issue of Automatic Temperature Compensation (ATC) at retail. I strongly encourage the NCWM to oppose both a permissive or mandatory change to retail motor fuel distribution through the use of ATC.

For over 59 years my company has serviced our retail customer base by delivering 231 cubic inches of fuel per gallon to our customers. Our customers have reason to be confident that they receive an accurate volume of fuel for their dollar. Before a wholesale change is made to the way I deliver fuel to my patrons I urge the NCWM to accumulate all of the facts regarding ATC. It is our understanding that studies are being conducted by the U.S. Government Accountability Office as well as the California Legislature. I encourage the NCWM to await the results of these studies before moving ATC any further towards a final vote on implementation. ATC will greatly affect competition, small business owners, employees, and communities. I urge you to gather all of the facts and consequences regarding ATC before imposing costly changes to both consumers and retailers.

My company operates two stores. Contrary to information conveyed by proponents of ATC my store is not owned by a major oil company. I am an independent owner and operator and have been doing business that way for 59 years.

When my patrons come to my store to buy fuel they equate the prices displayed on my street sign and dispensers with a gallon of fuel. My patrons can be assured that they are going to receive 231 cubic inches of fuel per gallon from my dispensers. Moving to ATC will create an enormous amount of confusion for my customers as well as my employees. Ultimately, it is my employees who will be tasked with explaining why a 5 gallon purchase did not fill the customer's 5 gallon container.

For the reasons listed in this letter I ask that the NCWM oppose any implementation of ATC under either a permissive or mandatory standard.

I would like to thank you for including this statement in the hearing record for the NCWM January 2008 Interim Meeting. Thank you for allowing statements to be submitted to the record and ensuring that all affected parties have the opportunity to be heard on this important issue

Sincerely,

Dave Dickey
President
Harold Dickey Oil Corp.

McCollough Bros. Service, Inc.
700 Superior Street
Webster City, IA 50595
515-832-2353

January 17, 2008

Ms. Judy Cardin, Chairperson
The National Conference on Weights and Measures
15245 Shady Grove Road, Suite 130
Rockville, MD 20850

Re: Opposition to Automatic Temperature Compensation

Dear Chairperson Cardin:

I am writing to you as the owner of McCollough Bros. Service, Inc. located at Webster City. I would like to request that this letter be included as part of the record for the NCWM Interim Meeting, taking place January 27-30, 2008.

I would first like to thank the National Conference for the time and effort you have taken to examine the issue of Automatic Temperature Compensation (ATC) at retail. I strongly encourage the NCWM to oppose both a permissive or mandatory change to retail motor fuel distribution through the use of ATC. For over 48 years my company has serviced our retail customer base by delivering 231 cubic inches of fuel per gallon to our customers. Our customers have reason to be confident that they receive an accurate volume of fuel for their dollar. Before a wholesale change is made to the way I deliver fuel to my patrons I urge the NCWM to accumulate all of the facts regarding ATC. It is our understanding that studies are being conducted by the U.S. Government Accountability Office as well as the California Legislature. I encourage the NCWM to await the results of these studies before moving ATC any further towards a final vote on implementation. ATC will greatly affect competition, small business owners, employees, and communities. I urge you to gather all of the facts and consequences regarding ATC before imposing costly changes to both consumers and retailers.

My company operates one store. Contrary to information conveyed by proponents of ATC my store is not owned by a major oil company. I am an independent owner and operator and have been doing business that way for 48 years.

When my patrons come to my store to buy fuel they equate the prices displayed on my street sign and dispensers with a gallon of fuel. My patrons can be assured that they are going to receive 231 cubic inches of fuel per gallon from my dispensers. Moving to ATC will create an enormous amount of confusion for my customers as well as my employees. Ultimately, it is my employees who will be tasked with explaining why a 5 gallon purchase did not fill the customer's 5 gallon container.

For the reasons listed in this letter I ask that the NCWM oppose any implementation of ATC under either a permissive or mandatory standard.

I would like to thank you for including this statement in the hearing record for the NCWM January 2008 Interim Meeting. Thank you for allowing statements to be submitted to the record and ensuring that all affected parties have the opportunity to be heard on this important issue.

Sincerely,

Don McCollough

McCollough Bros. Service, Inc.



January 22, 2008

Judy Cardin
Chairperson
National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Re: Automatic Temperature Compensation

Dear Chairperson Cardin:

On behalf of the Colorado Motor Carriers Association, representing almost 600 companies that are involved or affiliated with trucking in Colorado, I am writing to provide comments on the issue of Automatic Temperature Compensation ("ATC") and its potential impact upon our members who are major consumers of diesel fuel. As the state organization representing the trucking industry in Colorado, CMCA views this matter very seriously because of its impact and potential ramifications on our member companies.

CMCA and its members realize and appreciate that the retail fuel industry is very competitive, with gas stations and truckstops competing fiercely to attract additional business. A fuel retailer prices fuel to cover the cost of the bulk fuel purchased and a reasonable return on its investment. In pricing diesel fuel, the retailer also must consider the prices that neighboring stations are charging, since a difference of as little as one penny per gallon could result in a gain or loss of business. In this competitive environment, inventory expansion and shrinkage must be accounted for in the retail price of diesel fuel, and any impact of temperature variances is eliminated through competitive pricing.

Because we believe that the marketplace already accounts for any temperature variation, we oppose both permissive and mandatory automatic temperature compensation.

In the case of permissive temperature control we are in opposition to this practice oppose because it could undermine fair trade and transparency in the retail marketplace. The use of temperature compensation equipment by an unknown portion of the retail fuel providers would greatly complicate our members' ability to determine the most economical place to refuel. Compensating and non-compensating retailers, whether located across the highway

from one another or across a state border, would no longer be selling comparable volumes of product, making it impossible to make an educated purchasing decision.

We also oppose mandatory automatic temperature control because of the impact that we believe such a mandate would have on our trucking members and fuel distributors. We recognize that any significant mandatory equipment investment by fuel distributors must be passed on to consumers. In the case of the installation of automatic temperature compensation devices this would translate into an estimated cost of $2,000/pump. The net result of this mandate would be higher diesel prices for our member companies toward addressing a problem that we does not believe exist nor is justifies this level of investment..

Please feel free to share our comments at the upcoming meeting of your organization. Also, please contact me at 303-433-3375 Ext. 102, if you have any questions regarding this letter.

Sincerely,
Gregory D. Fulton
President
Colorado Motor Carriers Association

1737 King Street
Suite 200
Alexandria, VA 22314
(703) 549-2100

January 17, 2008

Ms. Judy Cardin, Chair
National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

RE: Automatic Temperature Correction- NCWM Interim Meeting 2008

Dear Chairman Cardin:

As the National Conference on Weights and Measures (NCWM) continues its examination of whether automatic temperature compensation (ATC) should be permitted or required for fuel retailers, NATSO wishes to commend the NCWM for its efforts to consider the views of all stakeholders in the debate. On behalf of NATSO, I thank you for the opportunity to comment on this issue and request that you include this letter in the record of the NCWM interim meeting of January 27-30, 2008.

NATSO is a national trade association representing over 1,000 travel plazas and truckstops nationwide. Truckstops and travel plazas sell 75-80 percent of the total volume of diesel fuel sold in the United States. A typical travel plaza or truckstop sells gasoline, diesel fuel, lubricants and additives; operates fast food and/or full-service restaurants; sells convenience items; offers free extended-stay parking; and might offer truck repair and a host of other services. By 2010, interchange-based businesses will employ over two million Americans and generate nearly $200 billion in annual sales. Most NATSO members are located within close proximity of the National Highway System.

NATSO opposes any change in the method of sale or measurement of motor fuel for retailers. The adoption of an ATC standard will create a major shift in how fuel is dispensed and marketed at a huge cost to retailers with no proven consumer benefit. Because retail gasoline and diesel margins are razor thin, costs of the installation of new ATC systems will most likely be passed on to consumers.

There is no evidence that implementation of ATC will result in lower fuel prices, as retail fuel margins in the U.S. already are extremely low. As you know, the retail motor fuel industry is intensely competitive and retailers compete based on a penny per gallon. In fact, consumers in the U.S. enjoy among the lowest gasoline and diesel prices in the world, according to the U.S. Department of Energy's Energy Information Administration.[1] In spite of these facts, allegations have been made that somehow retailers are profiting from temperature variations. While science demonstrates that gasoline and diesel expand slightly under higher temperatures and shrink under cooler temperatures, retailers can only sell the physical number of gallons they receive, and factor their pricing based on the price paid for the load of fuel to their supplier. Any expansion or shrinkage of fuel is accounted for in the cost of goods and factored into the retailer's pricing.

We cannot overstate the challenges that fuel retailers – most of whom are small businesses – face in earning any profit from the sale of motor fuels. The allegations that somehow the retailers of motor fuels are profiting from a tiny expansion of gasoline and diesel are outrageous given the competitive nature of the retail motor fuels industry. Few retailers can survive if they consistently price their gasoline or diesel higher than their competitors, and retailers conduct daily price surveys of their competitors to ensure they don't out price the market. Frequently retailers jockey for market share and "gas wars" break out, where retailers actually sell below their cost for a period of time to avoid losing market share to their competitors. Because of the intense competition, many retailers have found it is impossible to run their businesses with the profits made from motor fuels, and thus have come to rely on other profit centers, such as convenience stores and fast food service in order to survive.

The costs of installing ATC equipment is a very significant factor to weigh in this debate. The cost of retrofitting an electronic pump is estimated to be $2,000 per pump, while the cost of replacing a mechanical pump would be $15,000 - $20,000 per pump, an overall cost to the industry of $3 billion to $4 billion. This expense of retrofitting and replacing existing fuel dispensers would increase the retailers' cost of goods sold and this increased cost ultimately would be passed on to the consumer for a new method of fuel measurement with no proven consumer benefits.

[1] http://www.eia.doe.gov/emeu/international/gas1.html

The proponents of ATC, claiming to represent consumer groups, have focused their entire argument on the fact that when temperatures are warmer, gasoline expands and delivers less energy content per gallon. Their credibility is called into question as they fail to acknowledge that in cooler temperatures, gasoline and diesel shrink and deliver slightly more energy content per gallon. It appears that they choose to ignore the fact that winter causes shrinkage of fuel and that in cooler climates, consumers gain energy over the course of a year. While NATSO disputes that any variation in temperature results in a significant loss or gain, any variations in volume due to temperature are accounted for in the pricing of fuel and passed on to the consumer. However, we believe it is worth pointing out that the strategy of promoting ATC by focusing on the effects of only warmer temperatures is unfair and misleading. If proponents of ATC represent consumer groups, wouldn't they be interested in considering all of the facts in the interest of consumers, rather than only those that support their position? In fact, the groups promoting ATC do not represent the majority of consumers. As you are aware, the American Trucking Associations, which represents the largest consumer group of diesel fuel, opposes both mandatory and permissive ATC.

It has been suggested that due to expansion of fuel at warmer temperatures, consumers receive less energy from a gallon of gasoline. However, automatic fuel temperature compensation **will not** ensure that consumers receive uniform energy content per gallon. Fuel temperature is only one of many factors affecting the energy content of fuel. Renewable fuels such as biodiesel and ethanol have far greater impact on the energy content of fuel. It is disingenuous and inaccurate to suggest to consumers that the adoption of an ATC standard will equalize the energy content of fuel.

Many representatives within the NCWM advocate a permissive standard under the rationale that it will give retailers the option of installation of ATC devices. NATSO opposes adoption of a permissive ATC standard, and we encourage the NCWM to consider the importance of uniformity of fuel measurement across the U.S. Consumers rely on a highly transparent marketplace and are accustomed to being able to readily determine fuel prices from signs posted that are visible from great distances. Allowing different standards of measurement from location to location will only make it more difficult for consumers to make purchasing decisions.

NATSO was disappointed to learn that the National Academy of Sciences (NAS) has chosen not to pursue the congressionally requested study of this issue. So, as an alternative, Congressman Bart Gordon (D-TN), Chairman of the House Science and Technology Committee, has issued a new request for greater study of this issue. Chairman Gordon has asked the U.S. Government Accountability Office (GAO) to embark on a study to determine how ATC equipment at the retail level affects the states, retailers and consumers. NATSO strongly supports the effort to obtain more

data on the impact of ATC before adopting a standard that could be very costly for retailers and their customers.

We offer ongoing assistance to the NCWM in their efforts to research ATC. NATSO appreciates this opportunity to comment for the January 2008 NCWM Interim hearing record. Please do not hesitate to contact me should you have any questions or need additional information.

Sincerely,

Holly Alfano
Vice President, Government Affairs



January 14, 2008

Judy Cardin
Chairman
National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Via e-mail: ***judy.cardin@wisconsin.gov***

Re: Automatic Temperature Compensation

Dear Chairman Cardin:

The American Trucking Associations, Inc.[1] ("ATA") is writing to provide comments on the issue of Automatic Temperature Compensation ("ATC") and its potential impact upon consumers of diesel fuel. As the national representative of the trucking industry, ATA is interested in matters affecting the purchase and sale of diesel fuel, including the manner in which diesel fuel is dispensed at retail refueling stations.

The trucking industry is a vital component of our national economy. In 2006, trucks transported nearly 11 billion tons of freight domestically, representing 69 percent of all freight transportation tonnage. The trucking industry accounts for 84 percent of all freight revenues and exclusively serves the freight needs of over 80 percent of all communities in the United States.

Diesel fuel is the lifeblood of the trucking industry. For most motor carriers, fuel is the second-largest operating expense after labor. For this reason, our members are keenly interested in any initiative that could impact diesel fuel prices.

For more than a year, ATA has closely followed the debate over ATC. Early on, ATA adopted a position opposing temperature compensation on a ***permissive basis,*** concluding that permissive temperature compensation would disadvantage diesel fuel consumers. Permissive temperature compensation leaves the decision regarding whether to install temperature compensation equipment to the fuel retailer's discretion. A permissive temperature compensation regulatory environment could allow retailers to manipulate the system by installing temperature compensation equipment where the average temperature

[1] ATA is a united federation of motor carriers, state trucking associations, and national trucking conferences created to promote and protect the interests of the trucking industry. Directly and through its affiliated organizations, ATA encompasses over 37,000 companies and every type and class of motor carrier operation.

of the fuel dispensed is below 60 degrees and refrain from such installations where the average temperature of the fuel dispensed is above 60 degrees.

Perhaps most important, permissive temperature compensation could undermine fair trade and transparency in the retail marketplace. Many trucking companies rely upon daily price surveys to determine where and how much fuel to purchase at given points along a truck route. Other trucking companies rely on advertised price to determine where to refuel. The use of temperature compensation equipment by an unknown portion of the retail fuel providers will greatly complicate our members' ability to determine the most economical place to refuel. Compensating and non-compensating retailers, whether located across the street from one another or across a state border, would no longer be selling comparable volumes of product, making it impossible to make an educated purchasing decision.

It took ATA a longer period of time to formulate a position on mandatory ATC. After analyzing the issue and considering its impact upon consumers of diesel fuel, ***ATA has decided to oppose mandatory ATC.*** The rationale underlying this decision is discussed in more detail below.

ATA and its members recognize that the retail motor fuels industry is highly competitive, with gas stations and truckstops competing fiercely to attract additional business on the basis of a penny per gallon. A fuel retailer prices fuel to cover the cost of the bulk fuel purchased and a reasonable return on its investment. In pricing diesel fuel, the retailer also must consider the prices that neighboring stations are charging, since a difference of as little as one penny per gallon could result in a substantial gain or loss of business. In this competitive environment, inventory expansion and shrinkage must be accounted for in the retail price of diesel fuel, and any impact of temperature variances is eliminated through competitive pricing.

We are concerned that consumers such as the trucking industry will bear the cost of installing temperature compensation devices on fuel dispensers. The cost of retrofitting a retail fuel pump is estimated to be $2,000 per pump. The expense of retrofitting or replacing existing fuel pumps would increase the retailers' cost of goods sold and we expect that this increased cost ultimately would be passed on to the consumer. For this reason, ATA is concerned that the installation of ATC devices is a solution that may be more expensive than the problem it is trying to address.

ATA does not believe that ATC technology will ensure that every gallon yields the same energy content. There are far more variables affecting the energy content of fuel other than temperature. Ideally the price of fuel would be adjusted for its energy content (*i.e.*, BTU value), so that consumers could make a fully informed choice when purchasing fuel. BTU reductions from various renewable blends (*e.g.*, ethanol and biodiesel), have a much greater impact upon energy content than temperature.

Finally, we would like to suggest that the NCWM consider the importance of a uniform method of sale for motor fuels nationwide. In a single day, a trucker can travel through

several states and time zones. We believe it would be detrimental to our industry if various states each adopt their own systems for measuring motor fuel, with some opting for ATC, possibly others adopting methods that measure BTUs, and others continuing traditional systems of fuel measurement. We believe it is important to maintain the pricing transparency in today's marketplace that is so beneficial to fuel consumers and the trucking industry. Therefore, we would recommend that the NCWM consider new language that prohibits states from adopting ATC at the retail level. This action would ensure a unified method of sale of motor fuels throughout the United States.

We regret that we will be unable to join you at your interim meeting later this month. Unfortunately, ATA's annual Winter Leadership conference is scheduled for the same dates. We appreciate your willingness to distribute these comments and make known that the largest consumers of diesel fuel – those that would be most impacted by a change in which diesel fuel is dispensed – oppose efforts to permit or require the use of ATC at the retail level. Should you or any of the other NCWM members have questions concerning the trucking industry's opposition to ATC, please contact me at (703) 838-1910.

Respectfully submitted,



Richard Moskowitz
Vice President & Regulatory Affairs Counsel

cc: National Conference of Weights and Measures Officials

AK
Doug Deiman
Alaska Div of Measurement Standards/CVE
12050 Industry Way, Bldg. O
Anchorage, AK 99515
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AL
Steadman Hollis
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PO Box 3336
Montgomery AL 36109-0336
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AR
Tom Pugh
Arkansas Bureau of Standards
4608 West 61st Street
Little Rock AR 72209
tom.pugh@aspb.ar.gov

TOMA TENNESSEE OIL MARKETERS ASSOCIATION

January 3, 2008

Ms. Judy Cardin, Chairman
National Conference on Weights and Measures
15245 Shady Grove Road, Suite 130
Rockville, MD 20850

Dear Chairman Cardin:

This letter is being written on behalf of fuel marketers and convenience store owners in Tennessee, and we request that it be included as part of the record for the NCWM Interim Meeting, taking place in Albuquerque, NM, January 27-30, 2008. The Tennessee Oil Marketers Association is a state trade association representing independent petroleum marketers who have both wholesale and retail accounts. We appreciate the opportunity to submit comments on the proposal to change to automatic temperature compensation (ATC) for delivery of fuel at retail.

Stated on the National Council on Weights and Measures' web site, the NCWM's purpose: "Applying uniform weights and measures standards to commercial transaction is one of the most important supports to a strong national economy. The positive outcomes are numerous: uniformity fosters good will, minimizes trade barriers to interstate commerce...." A proposal to change to permissive language that would allow states to make their own decisions on the way fuel is sold does not "protect equity in the marketplace."

Our industry feels that it is very important for our customers to be assured they are receiving fuel in a well-understood, consistent, and effective manner. Preserving competition in the retail distribution of fuel is critical to assuring fair treatment of consumers. In our opinion, it is unreasonable to change a method of delivery that has been effective, understood and consistent throughout the country without a great deal of facts to support such a change.

In a competitive market, which the retail gasoline business is, prices already reflect the seasonal variation in energy output per gallon that changing temperatures bring. So what really matters to a consumer when buying a gallon of gas isn't knowing the energy output in relation to other temperatures, but in relation to nearby stations. If a consumer can be sure that the gallon of gasoline he's buying a one station is the same amount as the gallon of gas he can buy down the street, he can make an informed decision about where he wants to fill up.

We are also concerned that the ATC proposal is not taking into account all the new biofuels that are currently coming into the market. We question if enough study has been done on the effect of temperature compensation at retail on varying ethanol blends and biodiesel blends. We realize that the issue of ATC has been examined for quite some time, but these fuels are fairly new in the retail marketplace; it's been over twenty years since ethanol was sold in any amount and ATC was not addressed at that time.

Following is information from Tennessee in regard to the financial impact a change to ATC would cause:

Dispensers are generally replaced every ten to fifteen years, depending on usage, or as long as they are supportive of their branded programs or can be upgraded. Older dispensers are moved and used a lower volume stations. Based primarily on the number of hoses, dispensers cost anywhere from $4,000.00 to

P. O. Box 101334 • Nashville, TN 37224 • 615-242-4377
430 Enos Reed Drive • Nashville, TN 37210
FAX 615-254-8117 • E-Mail: TNOMA@toma.org

$15,000.00. At these prices, marketers don't make a habit of replacing dispensers unless they are damaged beyond repair or parts become obsolete. We understand the cost of retrofitting dispensers that can be retrofitted for ATC would be about $2,000.00 per dispenser.

There are about four billion gallons of gasoline and diesel fuel sold each year in Tennessee at 4,713 retail outlets from approximately 85,000 dispensers. Assuming that every single dispenser could be retrofitted for ATC, the cost to Tennessee retailers would be $170,000,000.00. Older dispensers would have to be tested to determine if they could be retrofitted...another expense. And if dispensers have to be replaced, the cost would soar into the billions of dollars.

Proponents of ATC say changing the method of sale will save consumers a lot of money. On the contrary, it will cost consumers because Tennessee retailers can't possibly sustain the cost of implementing ATC, with its immediate expense, without raising the price of fuel. Retailers see only a few pennies per gallon in their fuel margins and cannot absorb the costs associated with installation of ATC equipment without passing along those costs to the consumer. It's not "big oil" who own and operate 95% of the retail outlets in the United States; rather, it's independent retailers, many of whom are small family-owned businesses.

NCWM needs to make sure the facts on the ATC issue are examined even more closely, instead of relying on unverified and unsubstantiated data that has been distributed by certain groups in the debate. Perhaps NCWM can assist the U. S. Government Accountability Office in its study, due to be completed in July, 2008, which should be an unbiased comprehensive scientific and economic study.

The Tennessee Oil Marketers Association opposes both the permissive and/or mandatory use of ATC devices at the retail level at this time. Permissive temperature compensation leads to ambiguity and inconsistency. Mandatory temperature compensation leads to higher costs for retailers, and ultimately, for higher fuel costs for consumers.

Thank you, in advance, for including this letter in the hearing record for the NCWM January, 2008, Interim Meeting. We appreciate your allowing our Association to submit this for the record, and for working to ensure that all parties affected by ATC are heard on this issue.

Sincerely,

Marylee A Booth

Marylee A. Booth
Executive Director

Partnership for Uniform Marketing Practices

Written Statement for Submission to Record
National Conference on Weights and Measures
NCWM Interim Meeting in Albuquerque, New Mexico, January 27-30, 2008

January 15, 2008

Ms. Judy Cardin
Chairman
The National Conference on Weights and Measures
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

Re: Automatic Temperature Compensation; Opposition to Permissive or Mandatory ATC Requirements

Dear Chairman Cardin:

We are writing to you on behalf of the "Partnership for Uniform Marketing Practices' (P.U.M.P.), a coalition of trade and consumer associations who have joined together to ensure fair competition, cost effective distribution of fuel and equitable treatment of consumers in addressing the issue of temperature variation in the retail sale of gasoline and diesel fuels. P.U.M.P. requests that this letter be included as part of the record for the NCWM Interim Meeting, taking place January 27-30, 2008.

We appreciate your effort to examine the issue of Automatic Temperature Compensation (ATC) at retail. The P.U.M.P. Coalition urges the NCWM to oppose any resolution that would either permit or require ATC equipment at retail fueling locations.

As you may be aware, Congressman Bart Gordon (D-Tenn.), Chairman of the House Science and Technology Committee, recently issued a letter requesting that the U.S. Government Accountability Office (GAO) assess several factors associated with the installation of ATC. The purpose of Chairman Gordon's letter is to obtain much needed data on the impact that ATC will have on consumers. The scope of the requested GAO study is outlined in the attached letter.

You may also be aware that the California legislature enacted a law that requires a comprehensive study of the ATC issue. This study is focusing on geographic temperature variances, available temperature compensating technologies and a cost-benefit analysis to determine whether fuel temperature compensation is needed. The California law was

supported by the California Independent Oil Marketers Association (CIOMA), a founding P.U.M.P member, the California Trucking Association and AAA. The results of the California study are due by the end of 2008. The study is underway and the first meeting of the study advisory committee is scheduled for Thursday, January 24, 2008. A fuel temperature analysis by the state Division of Measurement Standards is scheduled for completion in March/April, 2008.

The P.U.M.P. Coalition believes that it is critical for the NCWM to fully understand the implications of a drastic change in the way fuel is sold at retail in the United States. The studies referenced above will provide NCWM members with the data necessary to make an informed decision on the use of ATC. In the absence of this data, it is unlikely that the NCWM will be able to evaluate ultimate costs and benefits to the consumer from ATC, nor will they know if ATC requirements are cost-effective. Without this important information, we may find that consumers are disadvantaged by the use of ATC.

The coalition is interested in establishing the facts on this issue instead of relying merely on unverified, statistically questionable and unsubstantiated data that has been distributed by some groups in this debate. We do not agree with the assertion that fuel temperatures directly indicate any losses or gains *to the consumer*. We believe that only a comprehensive scientific and economic study can establish such facts and we urge the NCWM to assist the GAO in the prompt completion of its study.

P.U.M.P. members oppose both the permissive and/or mandatory use of ATC devices at the retail level at this time. Under permissive temperature compensation, few retailers will be likely to install the equipment, unless there is a perception by retailers that somehow those costs can be recouped in the marketplace. Permissive temperature compensation will create ambiguity and lead to unequal cost and volume delivery standards from location-to-location.

Retail petroleum distribution is one of the most competitive industries in the United States. Few industries compete on the basis of one penny per gallon and advertise their prices on signs that are visible to consumers from the convenience of the driver's seat. Inventory expansion or shrinkage is factored into the price per gallon, and the impact of temperature variances on the quantity of fuel available for sale should be eliminated through competitive pricing. For example, assume a retailer sells fuel in a cold climate and will lose 10 gallons per bulk shipment as a result of product shrinkage. This retailer would be expected to price its product in a manner to cover the cost of the bulk fuel it purchased, the shrinkage in inventory, and a reasonable return on its investment. Similarly, a retailer that sells fuel in a warm climate may gain an extra 10 gallons per bulk delivery. This retailer also is expected to price his product in a manner to cover the cost of the fuel purchased in bulk with a reasonable return on investment. The retailer may then recognize that it could undercut the price of fuel sold at the neighboring station due to product expansion, and would be expected to lower the price per gallon to attract additional business. The competing station may also lower its price to remain competitive. Robust competition may ensure that any product expansion or shrinkage

will be accounted for and passed on to the consumer as the retailer competitively prices the fuel.

We also believe that mandatory ATC will disadvantage the consumer, as the substantial costs associated with installing and maintaining ATC equipment will, and simply must, be passed on to the consumer. With only pennies per gallon available in retail fuel margins (and much of that passed on in credit card transaction costs) retailers simply cannot absorb the costs associated with installation of ATC equipment, as well as the expected increased state inspection costs that will be passed on to the consumer.

The P.U.M.P. Coalition would like to make clear that this issue is not "big oil versus the truck driver/consumer." In fact, the large integrated oil companies only own and operate fewer than 5 percent of the nation's retail outlets. Instead, this issue directly affects the independent petroleum retailing community, many of whom are small family-owned businesses.

In advance, we thank you for including our statement in the hearing record for the NCWM January 2008 Interim Meeting. Thank you for allowing the coalition to submit this statement for the record and for working to ensure that all affected parties are heard thoroughly on this important issue.

Sincerely,

The Partnership for Uniform Marketing Practices (P.U.M.P.) Coalition

(Please see the undersigned coalition members)

American Trucking Associations (ATA)

Arizona Petroleum Marketers Association (APMA)

Arkansas Oil Marketers Association, Inc. (AOMA)

California Independent Oil Marketers Association (CIOMA)

Colorado Petroleum Marketers and Convenience Store Association (CWPMA)

Empire State Petroleum Association (ESPA – NY)

Florida Petroleum Marketers & Convenience Store Association, Inc. (FPMA)

Fuel Merchants Association of New Jersey

Illinois Association of Convenience Stores/Illinois Petroleum Marketers Association

Indiana Petroleum Marketers and Convenience Store Association, Inc. (IPCA)

Kentucky Petroleum Marketers Association (KPMA)

Michigan Petroleum Association/Michigan Association of Convenience Stores (MPAPACS)

Mid-Atlantic Petroleum Distributors Association

Minnesota Petroleum Marketers Association (MPM)

Mississippi Petroleum Marketers & Convenience Stores Association (MPMCSA)

Missouri Petroleum Marketers and Convenience Store Association (MPCA)

Montana Petroleum Marketers & Convenience Store Association

National Association of Convenience Stores (NACS)

National Association of Shell Marketers (NASM)

National Tank Truck Carriers, Inc. (NTTC)

NATSO, Inc., Representing America's Travel Plazas and Truckstops

Nebraska Petroleum Marketers & Convenience Store Association (NPCA)

Nevada Petroleum Marketers & Convenience Store Association (NPM & CSA)

New Jersey Fuel Merchants Association (NJFMA)

New Mexico Petroleum Marketers Association

Ohio Petroleum Marketers & Convenience Store Association (OPMCA)

Oklahoma Petroleum Marketers & Convenience Store Association (OPMCA)

Petroleum & Convenience Marketers of Alabama (P&CMA)

Petroleum Marketers & Convenience Stores of Iowa (PMCI)

Petroleum Marketers and Convenience Store Association of Kansas (PMCA)

Petroleum Marketers Association of America (PMAA)

Service Station Dealers of America and Allied Trades (SSDA-AT)

Society of Independent Gasoline Marketers (SIGMA)

South Carolina Petroleum Marketers Association (SCPMA)

South Dakota Petroleum & Propane Marketers Association/

South Dakota Association of Convenience Stores SDP2MA-SDACS)

Tennessee Oil Marketers Association (TOMA)

Texas Petroleum Marketers & Convenience Store Association (TPMCSA)

Utah Petroleum Marketers & Retailers Association

Vermont Fuel Dealers Association (VFDA)

Virginia Petroleum, Convenience and Grocery Association (VPCGA)

Western Petroleum Marketers Association (WPMA)

West Virginia Oil Marketers and Grocers Association (OMEGA)

Wisconsin Petroleum Marketers & Convenience Store Association (WPMCA)

GAO
Accountability * Integrity * Reliability
United States Government Accountability Office
Washington, DC 20548

RECEIVED
JAN 11 2007
COMMITTEE ON SCIENCE
& TECHNOLOGY

December 20, 2007

The Honorable Bart Gordon
Chairman, Committee on Science and Technology
House of Representatives

Dear Mr. Chairman:

Thank you for your letter of November 1, 2007, asking the Government Accountability Office to review issues concerning the impact of temperature variations on fuel distribution.

GAO accepts your request as work that is within the scope of its authority. As discussed with Mr. Louis Finkel, GAO will initiate an engagement as soon as staff with the required skills are available. Your request has been assigned to Mr. Robert Robinson, Managing Director, Natural Resources and the Environment. After the team has conducted some preliminary work, they will again contact Mr. Finkel to discuss options for helping meet your needs. As applicable, we will also be in contact with the cognizant Inspector General's office to ensure that we are not duplicating efforts. If an issue arises during this coordination, we will consult with you regarding its resolution.

If you have any questions, please contact Mr. Robinson at 202-512-3841 or Ms. Rosa Harris, Assistant Director for Congressional Relations, on my staff at 202-512-9492.

Sincerely yours,

Gloria L. Jarmon
Managing Director for
Congressional Relations

Ref: CCAR 08-0161

this issue is key to many I wanted to make sure.
Thanks -
Rob

Robert DeRubeis, Program Manager
Michigan Dept. of Agriculture
Weights and Measures
517-655-8202, ext. 312

Return-Path: <griffin@mpamacs.org>
MIME-Version: 1.0
Content-Type: multipart/mixed;
boundary="----_=_NextPart_002_01C856B0.A7D44B80"
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Date: Mon, 14 Jan 2008 07:23:12 -0600
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From: "Mark Griffin" <griffin@mpamacs.org>
To: "Robert DeRubeis" <derubeisr@michigan.gov>
Reply-To: <griffin@mpamacs.org>

Robert,

On a few occasions at the NCWM regional meetings, some state WM officials complained that they did not receive industry position papers prior to the meeting. We certainly do not want this to be an issue at the NCWM national interim meeting in Albuquerque.

Currently there will be about 20-25 industry reps planning on attending the ABQ meeting. I will not be able to attend, due to other commitments here at home. However, if there are any Michigan WM officials attending, could you forward this information to them?

Thanks for helping get these documents distributed.

Mark

Mark A. Griffin

MPA/MACS

7521 Westshire #200

Lansing, MI 48917

griffin@mpamacs.org

(517) 622-3530

(517) 622-3420 fax

ATC Attachment #1.pdf

ATC Attachment #2.pdf

MUCH OF THE TEMPERATURE COMPENSATION DEBATE IS THE RESULT OF A MISUNDERSTANDING REGARDING THE DIFFERENCE BETWEEN HOW THE PRICES OF GASOLINE AND DIESEL FUEL CHARGED TO A MARKETER MAY BE CALCULATED AND THE VOLUMES WHICH ARE ACTUALLY DELIVERED TO A MARKETER AND THEREAFTER TO RETAIL MOTOR FUEL OUTLETS

During recent conversations relating to the Automatic Temperature Compensation (ATC) debate, it has become evident that much of that debate is the result of a misunderstanding regarding the difference between: 1) how motor fuels may be priced to wholesale customers acquiring these products at the "rack," and 2) the actual physical volumes which are delivered to those customers in the context of a particular transaction. The simple reality is that no one delivers or receives "net (temperature corrected) gallons." The only thing that is physically delivered and received is "gross (non-temperature corrected) gallons." Consequently, in physical terms, there is no difference between what the marketer receives, transports, delivers to its retail outlet and sells to the consumer.

As the attached documents demonstrate, a supplier may determine the amount which a customer owes for a load of gasoline based upon the number of net gallons attributed to the transaction. (see invoice-- Attachment 1). The number of net gallons is determined by taking the amount of gross gallons actually delivered and adjusting it, pursuant to a formula, to establish the number of gallons which would have been delivered had the temperature of the product actually been 60 degrees Fahrenheit.(see bill of lading -- Attachment 2; see also common carrier invoice -- Attachment 3). However, the supplier clearly recognizes that the number of gallons actually delivered to the customer was different than the number of net gallons used to generate the bill for that volume of product. Whether the number of gross gallons actually received by the customer is larger or smaller than the number of net gallons used to bill the customer, will be dependent upon whether the temperature of the fuel is greater or less than 60 degrees Fahrenheit. Net gallons is simply a factor in the equation which results in the price charged to that customer.

Those who claim that marketers who purchase a number of net gallons and sell a number of gross gallons have, in effect, obtained and sold gallons for which they did not pay are ignoring some very obvious facts. First, as reflected on the documentation, the seller knows precisely how many physical gallons were delivered to a customer, yet establishes the amount which the customer owes to the seller based upon a smaller number of gallons. Both parties to the transaction agree that the customer has stolen nothing from the seller. Both parties also agree that the seller is not an altruist, simply giving away gallons of motor fuel -- remember these sellers are very profitable enterprises, an achievement not usually attributed to the commercially inept. As a consequence, it is clear that "net gallons" is not a term describing the number of physical gallons transferred in a transaction, but rather a mechanism by which sellers calculate the price they will charge for that physical volume, i.e., a price term of the contract.

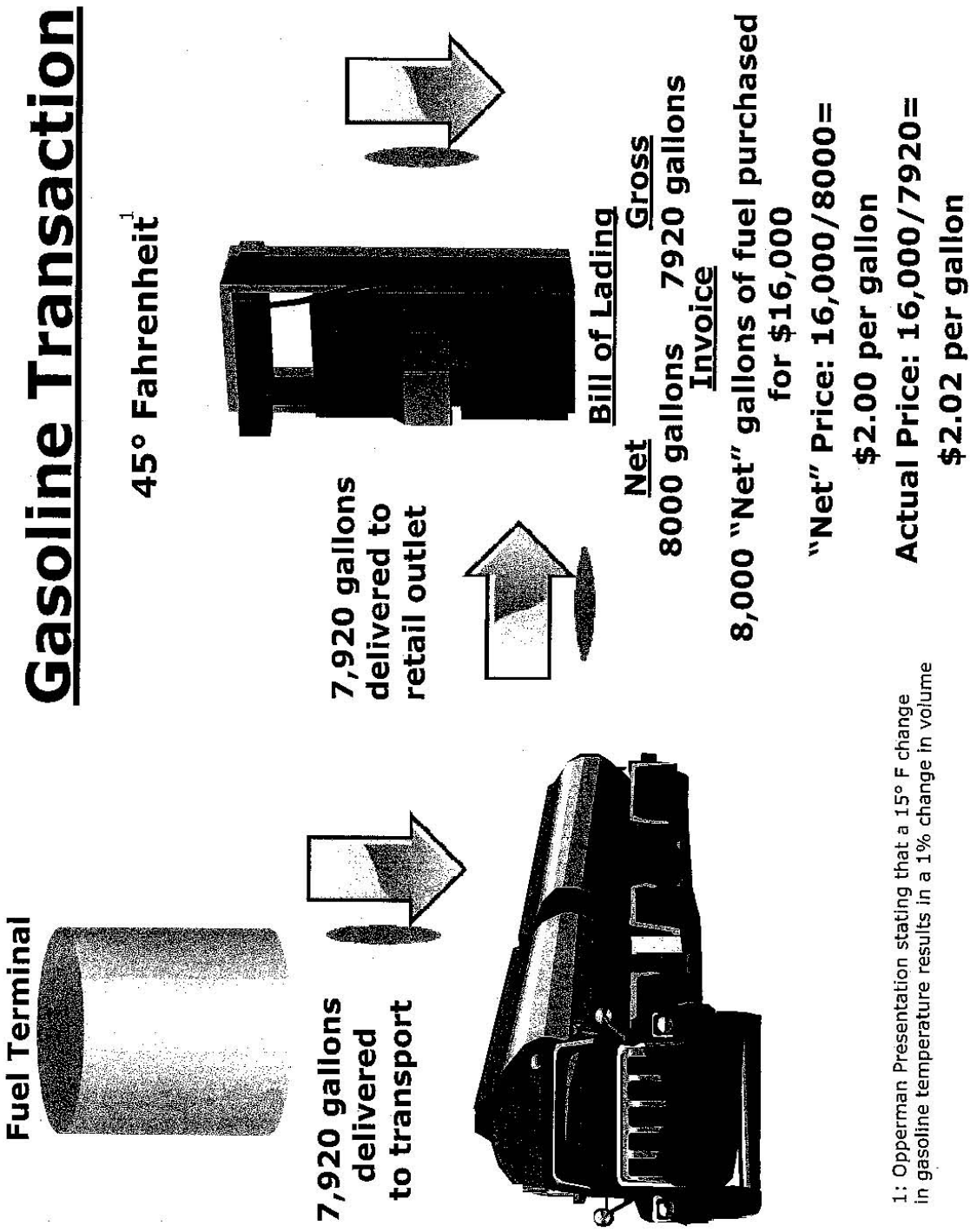
In short, there are no free gallons, missing gallons, or gallons of which consumers have been cheated. Those who believe in those types of gallons are deluding themselves and others.

PRINCIPLES AND REALITIES RELATED TO RETAIL MOTOR FUEL PRICING

Over the past several months, there has been considerable controversy over certain wholesale price terms, such as "net" gallons, and the affect of such terms on retail prices for motor fuel.. Specifically, some allege that different wholesale price terms, if different from the terms imposed on retail sales, can result in the retailer's ability to cheat the consumer of product or money. These allegations ignore the most important single reality relevant to retail motor fuel prices: changes in wholesale prices, while having a definite affect on retail market prices over a period of time, have little if any direct connection to retail prices on a day-to-day basis.

In economic terms, retailers of motor fuel are "price takers." The price that any such particular retailer can achieve is severely limited by prevailing market prices in that retailer's relevant geographic market. Specifically, price takers are generally unable to raise, on a unilateral basis, the price of the product they are selling. The proof of this proposition with respect to fuel retailers is the significant fluctuations in retailers' per gallon profit at anyone time. Specifically, over a period of weeks a retailer's per unit profit can swing from a negative number to very substantial per unit profit and back to breakeven levels. If fuel retailers were "price setters" as opposed to "price takers" then they would quite literally never be required to incur sustained periods of loss.

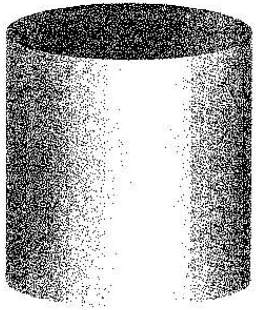
Simply stated, retail price levels in a particular market for a particular fuel are established by competitive market forces. Those prices reflect the inclusion over time of all costs (product and other) as well as all savings. Immediate changes in cost, such as rapid increases in wholesale costs or decreases in such costs, are rarely transmitted in real time to the retail market. Lower cost retailers restrain retail price increases sought by higher cost competitors as these different competitors struggle for share of market. Only when an entire market has absorbed higher costs or enjoyed lower costs do retail prices move to any real extent. Thus, the concept that a fluctuation in cost per unit as small as that which would result from changes in product temperature would move a market is inconceivable. All such costs are included in the market's overall process of establishing price levels. There is no immediate correlation on a "one-to-one" basis of increases or decreases in a retailer's daily cost of product acquisition and its retail price at that particular moment. All such costs, and all ultimate profits, are recovered or achieved over time.


Gasoline Transaction
45° Fahrenheit[1]
Fuel Terminal
7,920 gallons delivered to transport
7,920 gallons delivered to retail outlet
Bill of Lading
Gross
Net
8000 gallons 7920 gallons
Invoice
8,000 "Net" gallons of fuel purchased for $16,000
"Net" Price: 16,000/8000= $2.00 per gallon
Actual Price: 16,000/7920= $2.02 per gallon
1: Opperman Presentation stating that a 15° F change in gasoline temperature results in a 1% change in volume

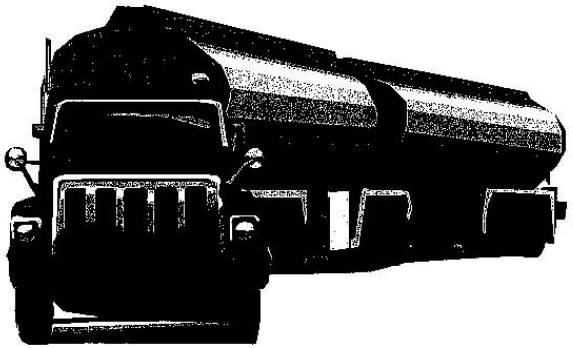
Gasoline Transaction

75° Fahrenheit[1]

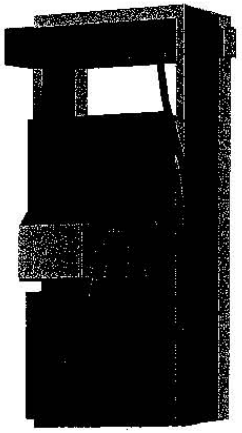
Fuel Terminal



8,080 gallons delivered to transport



8,080 gallons delivered to retail outlet



Bill of Lading

Net	Gross
8000 gallons	8080 gallons

Invoice

8,000 "Net" gallons of fuel purchased for $16,000

"Net" Price: 16,000/8000= $2.00 per gallon

Actual Price: 16,000/8080= $1.98 per gallon

1: Opperman Presentation stating that a 15° F change in gasoline temperature results in a 1% change in volume

Attachment 1

Vendor Name - Invoice - 046365
Date - 8/08/07 Due - 8/17/07
Gross - $17,319.02 Disc - $.00 Net - $17,319.02
Edi File - I000075855 Image - A000335360

Seller's address
Shipped from
TPSI/DORAVILLE, GA (PIEDMONT)
12374
2836 WOODWIN ROAD
DORAVILLE GA 30360

Remit to

Bill to
Ship to

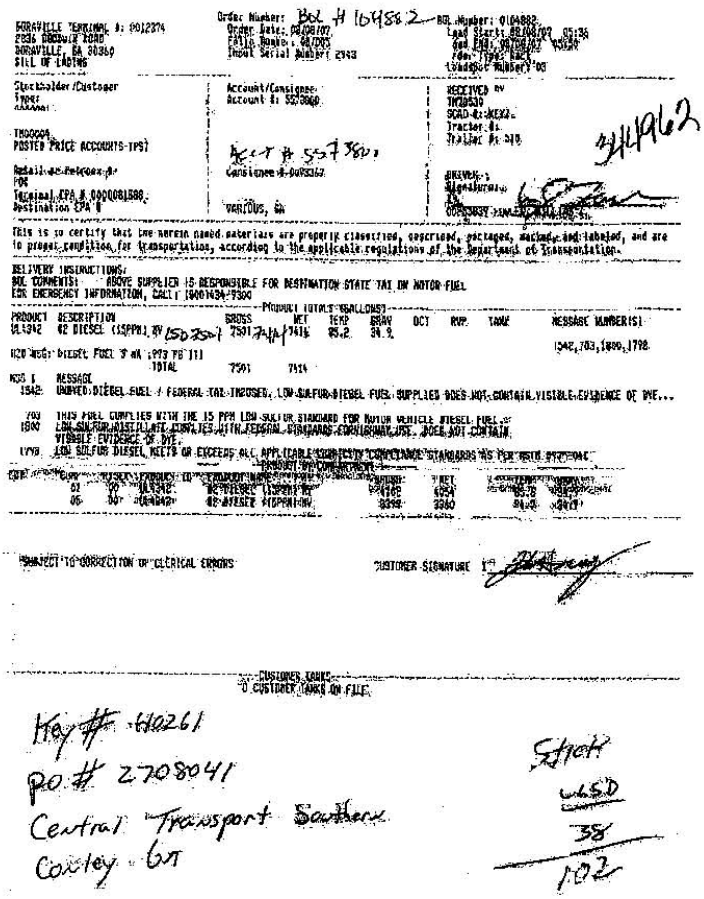
"Rack" VARIOUS GA 00001 5000

Bol 104882	#2 DF ON-HWY ULTRA LO-SUL					Delivered 8/08/07	
#2 DF ON-HWY ULTRA LO-SUL				KEYJ		Tmp	Grv
Gross 0	Net 0	Billed	7,414	2.0908000		15,501.19	
FET DIESEL FUEL			FD		0000	1,801.60	
OIL SPILL			SF		2000	8.82	
FET LUST TAX			FL		0000	7.41	
FET DIESEL FUEL			FD		0000	1,801.60	
OIL SPILL			SF		2000	8.82	
FET LUST TAX			FL		0000	7.41	

Bol 104882	#2 DF ON-HWY ULTRA LO-SUL					Delivered 8/08/07	
#2 DF ON-HWY ULTRA LO-SUL				KEYJ		Tmp	Grv
Gross 0	Net 0	Billed	7,414	2.0908000		15,501.19	
FET DIESEL FUEL			FD		0000	1,801.60	
OIL SPILL			SF		2000	8.82	
FET LUST TAX			FL		0000	7.41	
FET DIESEL FUEL			FD		0000	1,801.60	
OIL SPILL			SF		2000	8.82	
FET LUST TAX			FL		0000	7.41	

MA 104882
MA 104882

Attachment 2



Order Number: BOL # 164582 BOL Number: 0164882

DORAVILLE TERMINAL #: 9012374
2536 DECKER ROAD
DORAVILLE, GA 30360
STILL OF EARTHS

Load Start: 08/08/07 05:36
Load End: 08/08/07 [illegible]
Ship Type: BACK
Shipper Number: 05

Stockholder/Customer
Type:
Channel:

TH00004
POSTED PRICE ACCOUNTS-TPS)

Retail-ex-Refinery-B-
FOB
Terminal CPA # 0000081588
Destination CPA #

Account/Consignee:
Account #: 557380

Acct # 557380

Consignee #: 0005162

VARIOUS, GA

RECEIVED BY
TH00530
SCAC-#: MEXG
Tractor #:
Trailer #: 518

4/4/962

DRIVER:
Signature:
PRINT:
CONSIGNEE SIGNATURE:

This is to certify that the herein named materials are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation, according to the applicable regulations of the Department of Transportation.

DELIVERY INSTRUCTIONS:
BOL COMMENTS: ABOVE SUPPLIER IS RESPONSIBLE FOR DESTINATION STATE TAX ON MOTOR FUEL
FOR EMERGENCY INFORMATION, CALL: (800)424-9300

Product Totals (GALLONS)

PRODUCT	DESCRIPTION	GROSS	NET	TEMP	BSAW	OCT	RVP	TANK	MESSAGE NUMBER(S)
01L942	#2 DIESEL (ISPPR) RV	7501	7414	65.2	34.9				1542,703,1800,1798

H20 Msg: DIESEL FUEL 5 mX ;PPB PB II

	TOTAL	7501	7414

MSG # MESSAGE
1542 UNDYED DIESEL FUEL / FEDERAL TAX IMPOSED. LOW SULFUR DIESEL FUEL SUPPLIES DOES NOT CONTAIN VISIBLE EVIDENCE OF DYE...

703 THIS FUEL COMPLIES WITH THE 15 PPM LOW SULFUR STANDARD FOR Motor VEHICLE DIESEL FUEL.
1800 LOW SULFUR DIESEL FUEL NOT COMPLIES WITH FEDERAL STANDARDS CONSUMER USE. DOES NOT CONTAIN VISIBLE EVIDENCE OF DYE.
1798 LOW SULFUR DIESEL MEETS OR EXCEEDS ALL APPLICABLE SPECIFICATIONS CONTAINED IN ASTM D975 FOR NO.2 DIESEL

Product Information

CODE	GRADE	PRODUCT ID	PRODUCT NAME	API	FLASH	POUR
	02	ULSDTC	DYED ULSD (ISPPR) RV	34.9	125	-20
	05	DY	DYE MARKER	00.0	0000	0000

SUBJECT TO CORRECTION OF CLERICAL ERRORS

CUSTOMER SIGNATURE

CUSTOMER COPY
CUSTOMER COPY ON FILE

Key # 40261
PO # 2708041
Central Transport Southern
Conley GA

Stitch
ULSD
38
102

Attachment 3

INVOICE DATE: 8/10/2007
FROM: **PETROLEUM TRANSPORT, LLC**

INVOICE NO. 40261
DUE DATE: 8/18/2007

CUSTOMER:

BOL: 104882
BOL2:
BOL3:
BOL4:

Date	BOL	Origin	Consignee	Product	Quantity	Rate	Amount
8/8/2007	104882	DORAVILLE	CENTRAL TRANSPORT SOUT	DSL	7501	0.017	$127.52
PO No.2708041			1200 MASON DIXON LANE, CONLEY, GA				
				F	127.52	0.24	$30.60
						Total:	$158.12

If total payment does not equal invoice total,note discrepancy by Bill Of Lading
This invoice is due and payable within 10 days of invoice date.
**** Please return one copy of invoice with payment ****

Appendix B

Letters Submitted to the NCWM Conference Concerning Engine Fuels, Petroleum Products and Automotive Lubricants

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From: "Tina, Ken or Holly Butcher" <tkhbutcher@comcast.net>
To: <lisa.warfield@nist.gov>
Date: Thu, 24 Jan 2008 17:14:32 -0500
X-Mailer: Microsoft Office Outlook 12.0
Thread-Index: AcheoDH1RauU0uZBQXqwdt+cXMg2awAGS0qAAAdHC/A=
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X-PP-SpamDetails: rule=spampolicy2_spam policy=spampolicy2 score=100 spamscore=100 ipscore=0 phishscore=0 bulkscore=0 adultscore=0 classifier=spam adjust=0 reason=mlx engine=3.1.0-0708230000 definitions=main-0801240110
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X-NIST-MailScanner: Found to be clean
X-NIST-MailScanner-From: tkhbutcher@comcast.net
X-NIST-MailScanner-Information:

From: Gibbs, Lew (LMGI) [mailto:LMGI@chevron.com]
Sent: Thursday, January 24, 2008 2:15 PM
To: Ken Butcher; Mahesh.Albuquerque@state.co.us; ross.andersen@agmkt.state.ny.us; rodica.baranescu@nav-international.com; steve.benjamin@ncmail.net; bbonazza@charter.net; jonelle.brent@illinois.gov; corr@admworld.com; phdepriest@marathonpetroleum.com; k.w.gardner@exxonmobil.com; dgilligan@pmaa.org; dharvey@citgo.com; Hayes, Ron; mherman697@aol.com; randy.jennings@state.tn.us; DJohannes@cdfa.ca.gov; kellyp@apl.org; rlleisenring@sunocoinc.com; mcgetrje@bp.com; KMoore@ethanolrfa.org; hnewsome@ftc.gov; Nikanjam, Manuch (MNIK); julie.quinn@state.mn.us; rreynolds-dai@earthlink.net; alex.schuettenberg@conocophillips.com; dscott@biodiesel.org; eshapiro@autoalliance.org; cwilliam@agr.state.ga.us; Hayes, Ron; Eric Hamilton (Florida)
Cc: Vicky Dempsey; Hayes, Ron; Roger Macey; Joe Benavides; jpg4@westchestergov.com; Steve Benjamin; Newsome, Hampton; hutchinson.doug@ic.gc.ca; Linda Bernetich; Beth Palys; Carol.Hockert@nist.gov; tkhbutcher@comcast.net
Subject: RE: Petroleum Subcommittee Items - Addendum to L&R Agenda in NCWM Pub 15 for Interim Meeting

Ken,

Thank you for sending the material and asking for us to review it. I have reviewed the material that you sent and have the following comments:

Uniform Law

Page 2

223-1 Revision of the Engine Fuels, Petroleum Products and Automotive Lubricants Inspection Law

Source: Petroleum Subcommittee

Comment: I thought the Petroleum Subcommittee changed its name to the Fuels and Lubricants Subcommittee.

Page 4

Section 1. Purpose

There should be uniform requirements for ~~engine~~ fuels, ~~petroleum products~~ **non-engine fuels**, and automotive lubricants among the States. This Act provides for the establishment of quality specifications for these products.

Comment: "engine" should not be struck out as it is required with the use of "non-engine fuels" and there still is the definition "**3.1. Engine Fuel.**" in the law.

Uniform Regulation

Page 12

1.42. MTBE. – means methyl tertiary butyl ether.

Comment: To be consistent with ASTM D5983 it should be shown as "methyl *tertiary*-butyl ether."

Page 19

3.9.2. Retail Dispenser Labeling. - ~~Each retail dispenser of fuel methanol shall be labeled by the capital letter M followed by the numerical value volume percent and ending with the word "methanol."~~

a. Fuel methanol shall be labeled with its automotive fuel rating in accordance with 16 CoFR Part 306.

Comment: There is a typographical error. It should be "16 CRF Part 306." Also, why under E85 is it spelled out as "16 Code of Federal Regulations Part 306"? Everywhere else uses 16 CFR Part 306. Shouldn't it all be consistent?

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4.3 Dispenser Filters. - All gasoline, gasoline-alcohol blends, gasoline-ether blends, biodiesel, biodiesel blends, diesel, E85 fuel ethanol, M85 methanol, and kerosene dispensers shall have a 10 micron or smaller pore sized filter.

Comment: To be consistent with ASTM D4814, insert "nominal" between "smaller" and "pore" because the other filter terminology is "absolute" which is very expensive.

Section 2.1. "Gasoline and Gasoline-Oxygenate Blends"

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Comment: The introduction discussion for this section while it points out that consensus was not reached, it does not indicate what differences of opinion that the subcommittee members had with the various sections of the proposed wording. To be complete, this should be provided to people who have to decide on what action to take. We all can't be at the meeting to present our views, nor will all people making decisions be present to hear the comments.

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50 volume percent evaporated

10 % ethanol by volume blends (9 % minimum – 10 % maximum)

10 % ethanol by volume

10 volume percent ethanol.

A search of all of the regulation showed:

a minimum percentage by volume

nominally 85 to 75 volume percent denatured fuel ethanol.

nominally 70 to 85 volume percent.

5 % or less biodiesel by volume

the volume percent biodiesel

Comment: The way "volume percent" or "percent by volume" is handled should be consistent throughout section 2.1 and actually throughout the law and regulation.

If you have any questions, please let me know.

Lew Gibbs, Chevron Fellow
Senior Consulting Engineer
Fuels Technology Team
Product Technology
Chevron Products Company
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From: Ken Butcher [mailto:stanley@nist.gov]
Sent: Thursday, January 24, 2008 7:46 AM
To: Mahesh.Albuquerque@state.co.us; ross.andersen@agmkt.state.ny.us; rodica.baranescu@nav-international.com; steve.benjamin@ncmail.net; bbonazza@charter.net; jonelle.brent@illinois.gov; corr@admworld.com; phdepriest@marathonpetroleum.com; k.w.gardner@exxonmobil.com; Gibbs, Lew (LMGI); dgilligan@pmaa.org; dharvey@citgo.com; 'Hayes, Ron'; mherman697@aol.com; randy.jennings@state.tn.us; DJohannes@cdfa.ca.gov; kellyp@api.org; rileisenring@sunocoinc.com; mcgetrje@bp.com; KMoore@ethanolrfa.org; hnewsome@ftc.gov; Nikanjam, Manuch (MNIK); julie.quinn@state.mn.us; rreynolds-dai@earthlink.net; alex.schuettenberg@conocophillips.com; dscott@biodiesel.org; eshapiro@autoalliance.org; cwilliam@agr.state.ga.us; 'Hayes, Ron'; 'Eric Hamilton (Florida)'
Cc: 'Vicky Dempsey'; 'Hayes, Ron'; 'Roger Macey'; 'Joe Benavides'; jpg4@westchestergov.com; 'Steve Benjamin'; 'Newsome, Hampton'; hutchinson.doug@ic.gc.ca; 'Linda Bernetich'; Beth Palys; Carol.Hockert@nist.gov; tkhbutcher@comcast.net
Subject: Petroleum Subcommittee Items - Addendum to L&R Agenda in NCWM Pub 15 for Interim Meeting

Members of Petroleum Subcommittee/NCWM L&R Committee

Attached for your review and comment is a compilation of three-items from the NCWM Petroleum Subcommittee that will be added to the L&R Committee's Agenda at the Interim Meeting in Albuquerque, New Mexico next week. A public hearing on the three proposals will be held by the L&R Committee during the Monday session.

Included is Agenda Item 223-1 which describes the proposed revisions to the Engine Fuels, Petroleum Products and Automotive Lubricants Inspection Law" and agenda Item 237-1 which describes proposed amendments to the Uniform Engine Fuels, Petroleum Products and Automotive Lubricants Inspection Regulation. The third Agenda Item is 237-2 which includes proposed revisions to Section 2.1 "Gasoline and Gasoline-Oxygenate Blends" that will be taken up as a separate proposal to amend the regulation by the L&R Committee. This item is being considered by the L&R Committee because the Petroleum Subcommittee could not agree on the proposed revisions after considering a variety of recommendations at its meetings and during a conference call last week.

This document is also being distributed to the state directors and other interested parties over the NIST State Director Listserver.

NIST is reproducing the document so that printed copies will be available at the Interim Meeting.

Kenneth S. Butcher
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January 25, 2008

Kenneth S. Butcher
Group Leader
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Dear Mr. Butcher:

NCWM Interim Laws & Regulation (L & R) 1/28/08 Committee Conference Agenda Item 237-2 "Gasoline and Gasoline Oxygenate Blends"

BP appreciates the urgency, the time and effort you and the Petroleum Products Subcommittee chaired by Ron Hayes are placing on amending NIST Handbook 130, Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation, Section 2.1 on Gasoline and Gasoline-Oxygenate Blends. The Energy Independence and Security Act of 2007 has certainly created an immediate need for additional ethanol blending in the U.S. Today, BP is one of the largest blenders of ethanol in the U.S. and a significant supplier of ethanol blended gasoline across the United States. BP is committed to the widespread use of renewable fuels in a manner that does not jeopardize supply, reliability, cost, or customer satisfaction. BP offers the following comments for your consideration in response to your proposed amendments to Section 2.1 (Agenda Item 237-2).

1) Proposed Section 2.1.2 presents an **inconsistent set of requirements** for a finished gasoline to be used as the base gasoline for ethanol blending versus a blend stock to be used for ethanol blending. When finished gasoline is used, the blended fuel has a proposed T 50 min of 150 F, a relaxed T V/L = 20 and 1.0 psi RVP relief. When a blend stock is used, only the 1.0 psi RVP relief is granted. This proposal would result in inconsistent requirements for the same ethanol-blended fuel.

2) Proposed Section 2.1.2 results in **an unenforceability of requirements at retail**. How will an inspector know if a retail sample has been blended with a finished gasoline versus a blend stock and decide which set of criteria to apply?

If the Bill of Lading for each delivery was required to stipulate which hydrocarbon in the blend was used, the inspector could check the bill of lading. This in turn raises another question. Could the two different blends be mixed at retail? If mixing is allowed, the inspector has a problem in applying the applicable requirements. If mixing isn't allowed and the bill of lading contains a description of the blend, the inspector would know which set of criteria to apply. But now the proposed regulation would be defining Bill-of-Lading requirements and supply constraints.

3) In Section 2.1.1.2 the **T V/L = 20 offsets have no technical performance justification.** These offsets are merely typical suppression of T V/L =20 with blending ethanol. Neither ASTM nor CRC have any vehicle hot-start data to justify these limits.

4) Overall, the entire Section 2.1 shows a serious **lack of consensus** -- At the July 2007 Salt Lake City meeting, there were four options for ethanol blend conformance that were discussed and written up. Option 1 was to keep the current status quo, supported by no reported problems by Midwestern states that have adopted the current NIST Handbook 130 "base or blended" approach. Option 2 was to align Handbook 130 with the federal requirements for the summertime 1.0 psi RVP relief for ethanol blends. Option 3 required base gasoline for ethanol blends to have 170 F temperature for the T 50 min specification, ethanol blends to have a 150 F T 50 min, and aligned Handbook 130 with the federal requirements for the summertime 1.0 psi RVP relief for ethanol blends (option 2). Option 4 was similar to option 3 but added T V/L = 20 offsets for ethanol blends.

At the December 2007 Phoenix meeting there was minimal discussion on the four options from the July 2007 meeting and no new proposal presented. On Sunday evening 1/13/08 a new proposal was forwarded by Chairman Ron Hayes and discussed on a Tuesday 1/15/08 conference call. As discussed above the new proposal has an **inconsistent** set of requirements for a finished gasoline to be used as the base gasoline for ethanol blending versus a blend stock to be used for ethanol blending. Additionally, the new proposal appears to be **unenforceable at retail**. It was agreed during the conference call, that there was **NO CONSENSUS** on the new proposal.

We believe it is pre-mature to go to L & R with a proposal that has not been vetted by the energy companies that will be supplying the fuel. BP requests that Agenda Item 237-2 which includes proposed revisions to Section 2.1 be classified as "developmental" and that the Petroleum Subcommittee be allowed to come to a consensus. The current approach in Handbook 130 has worked for over ten years. We agree that NIST Handbook 130 needs to be aligned with the summertime Federal RVP requirements (option 2), but we feel that any other non-consensus changes are premature. BP will continue to work with the Petroleum Subcommittee to reach consensus.

Thank you for considering our comments on this important proposal for gasoline model regulations. Please call Jim McGetrick at 630-420-4579 or Dr. Jim Simnick at 630-420-5936 if you have comments or questions.

Sincerely,

Jim McGetrick

Dr. Jim Simnick

STATE OF MISSOURI

FACSIMILE TRANSMITTAL

DATE: 01/31/2008

TO:
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FROM:
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RE

SPECIAL INSTRUCTIONS / REMARKS
Here are Michigan's and Bob Reynolds comments

TOTAL NO. OF PAGES (Including this one)

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MO 999-9012N (3-96)

To: NCWM L&R Committee

From: Michigan Dept. of Agriculture Motor Fuels Quality Program

Date: January 29, 2008

RE: Comments on Items 237-1 and 237-2

Comments on 237-1

- 3.8 should contain language that indicates that E85 is not for general automotive use and that it should be used only in vehicles capable of using E85.
- M85 and E85 labeling should be consistent.
- 7.2.5 as written limits the jurisdiction's enforcement ability. If our understanding is correct, the purpose of 7.2.5 is to provide a mechanism for quality enforcement that prevents the manufacturer from taking advantage of testing tolerances. However, the section is entitled "When Enforcement Action May Be Taken" which implies that enforcement action may only be taken under these circumstances. If the purpose is to limit the enforcement ability of the jurisdiction, we could not support the proposal. If the purpose is to preclude manufacturers from taking advantage of testing tolerances, the language needs to be changed to make that intent clear and to continue to allow jurisdictions to set their own enforcement procedures in other situations.

Comments on 237-2

- The table of values listed in 2.1.1.2 are based on an ASTM proposal for ethanol blends that has not been accepted at this time and has not even been balloted.
- The issue of EPA volatility waivers for 10% ethanol blends is better addressed through ASTM
- 2.1.3 states that blends of ethanol shall contain no more than 10 volume percent ethanol. This statement precludes the market reality that E85 is sold in Michigan and other states. The language of this section should address that reality.
- 2.1.1.3.b. needs to have a lower limit for when regulators will allow the relaxed standard. We want to provide retailers with the flexibility to use ethanol when it makes sense for their business, but we want to prevent marketers from using small amounts of ethanol in order to obtain the waiver.

National Conference on Weights and Measures

Interim Meeting

Albuquerque, NM

January 2008

Comments on Proposed Revisions to Section 2. Standard Fuel Specification in the Uniform Fuels and Automotive Lubricants Regulation

Comments Submitted by:
Robert E. Reynolds
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South Bend IN 46628
Phone: 574-233-7344
Email: rreynolds-dai@earthlink.net

Introduction:

Both Downstream Alternatives, Inc. (DAI) and the Renewable Fuels Association (RFA) have traditionally supported the current wording in NIST Handbook 130 pertaining to gasoline ethanol blends. In short, the wording currently contained in Handbook 130's Uniform Fuels and Automotive Lubricants Regulation – Section 2. Standard Fuel Specifications provides 3 different manners in which ethanol can be added to gasoline. The most important of these is the one that allows ethanol, meeting ASTM D 4806, to be blended into gasoline, meeting ASTM D 4814, without further volatility requirements other than being no more than 1.0 psi higher in vapor pressure. In the industry this is commonly referred to as the "base fuel plus" approach. Many Midwestern states have followed this approach which has resulted in widespread ethanol blending in their states, hence our support for this approach.

Background:

As ethanol blending has started expanding outside of its Midwest base (and RFG Markets) some state regulators have indicated they view the "base fuel plus" approach as problematic. The two reasons most often sighted are:

(a) There is no specific property limit to enforce T_{50} on the finished blend thereby necessitating tracing back to the base fuel.

(b) It provides no lower boundary on T_{50}.

While DAI and the RFA recognizes that the "base fuel plus" approach provide for the greatest blender flexibility and most widespread blending of ethanol, we recognize that the regulatory community also has issues with which they must deal. For instance, as we have expanded into new markets such as Tennessee, Georgia, North Carolina and

Alabama, we have supported approaches very similar to the proposed revisions because we believe it strikes a reasonable balance between providing volatility adjustments for the ethanol blender while addressing the regulators concerns.

The Petroleum Subcommittee has met several times (both in person and via conference calls) and has been unable to reach complete consensus due to the varying interests of the diverse group of stakeholders involved. We believe that the proposed wording represents the best compromise that maybe reached, and as such, we are supporting the proposed revisions.

Informational:

There are, however, a few informational items I would like to cover. First, some of the ethanol industry's customers my oppose the revisions because it will require more planning and testing than the "base fuel plus" approach. I believe most feel they will meet the requirements nearly all of the time (blending to conventional gasoline) but they cannot be sure without additional tests.

A second concern is Section 2.1.2 where a blendstock such as a CBOB is used. There are no TV/L or T_{50} adjustments for these fuels. This is really consistent with the current handbook wording but some in the petroleum industry believe these fuels should receive the same relaxed standards afforded base gasoline. The two primary concerns are loss of fuel volume and logistical blending issues.

Loss of Fuel Volume: Every gallon of ethanol added to the gasoline pool represents about 78,000 btu. However, if TV/L and T_{50} adjustments must be made it is usually necessary to reject up to 2V% light-ends with a btu value of ~ 90,000 btu. So if these adjustments are required, you are removing 18,000 btu for every 78,000 added, resulting in a net gain of only 60,000 btu gallon reducing a 70% energy gain to 53%. Given the historically high prices of gasoline, ethanol has an opportunity to add to supplies and reduce costs. However, not as much supply is added, nor is the cost reduction as great, when TV/L and T_{50} adjustments are required. We are not taking a position on this issue but acknowledge that it does exist.

Logistical Blending Issues: Many regulators feel that if the fuel is a CBOB it is already a non fungible, specially formulated, grade and therefore needs no special allowances on T_{50} or TV/L. There is one scenario where this may not hold true. In many markets both hydrocarbon only gasoline and ethanol blends co exist. To use a CBOB, what many refiners do, or will prefer to do, is use a 84.5 octane sub octane (or CBOB) and a premium grade to make a full slate of all hydrocarbon products by proportionally blending these hydrocarbons to make regular, midgrade and premium. Similarly they can add 10V% ethanol to the 84.5 octane product to make a regular grade ethanol blend and then also proportionally blend the premium grade to make midgrade and premium. In this scenario not all blends would likely meet the requirements for T_{50} and TV/L.

Today about 50% of all gasoline sold is an ethanol blend. With the new RFS in the 2007 Energy Independence and Security Act, ethanol blends should approach 90% market share by 2012. At this point it would be a non-issue and it is likely that ASTM would revise specifications to reflect this. In short, Section 2.1.2 will be workable in

2012 but could result in some issues prior to that date. For this reason, although we will support the proposed revisions as written, we would also support delaying Section 2.1.2 wording to take effect at a later date should such an approach be considered.

We would also like to acknowledge certain concerns of the auto manufacturers. In particular, the Auto Alliance has concerns about lowering the TV/L of Vapor Lock Protection Class 3. They have also expressed concern about applying more lenient standards at higher elevations. None the less, the Alliance supported moving forward with the proposed revisions believing they were an improvement on the current wording. However, these issues should be noted in any final report as topics requiring additional study, data, and possible future action.

Summary:

In summary, both DAI and RFA support the proposed amendments while recognizing there may still be concerns on the part of some stakeholders. However, we believe the wording is a reasonably balanced compromise. Finally, we would like to express our appreciation to all the petroleum subcommittee members for the time they devoted to this effort. In particular, we applaud Ron Hayes and Randy Jennings for their leadership in trying to guide the diverse group of stakeholders through what, at times, were some contentious issues.

NCWM Interim Meeting
January 27-30, 2008

NCWM Interim Laws & Regulations Committee Conference Agenda Item 237-2
"Gasoline and Gasoline Oxygenate Blends"

My name is Phillip DePriest and I am the Product Quality Manager for Marathon Petroleum Company. Marathon is the nation's fifth-largest crude oil refiner and also one of the nation's largest blenders of ethanol. In 2007, Marathon blended over 600 million gallons of ethanol, which translates to more than six billion gallons of E10 or 10 volume% blends sold into the marketplace … or something on the order of 300-400 million consumer refuelings.

The proposed change to Section 2.1 is a classic case of an attempt to fix something that is not broken. Marathon has extensive experience, covering nearly two decades in all climates and temperatures, marketing ethanol-blended fuels following the current provisions of Section 2.1. Not once has Marathon experienced an incident suggesting these provisions provide insufficient consumer protection. There simply has not been a demonstrated need for change.

The second paragraph of the introduction to this agenda item indicates the section must be reviewed because the current language may be in conflict with Federal law. Federal law simply limits the Ethanol blend volume to between 9-10% in the summer season to qualify for the 1 psi Vapor Pressure waiver. Although it might be helpful to reinforce this provision in Section 2.1.2, it is certainly not a requirement to restate Federal regulations in Handbook 130. Blenders of Ethanol must follow all applicable regulations, not just those imposed by the state.

Secondly, there is no technical basis for the changes that are being proposed. It is unquestionably inappropriate to make haphazard changes to product specifications that can translate to increased manufacturing and distribution costs without providing demonstrated need and commensurate benefit to the consumer.

As Marathon's Product Quality Manager, I am an advocate for the consumer just as you all are, and I support fair and substantiated limits and specifications. But consumer advocacy means doing what is right and being able to defend that your actions are indeed in the best interest of the consumer. Marathon has nothing to gain from putting a product into the marketplace that will not perform as consumers expect. Imposing product specifications without first establishing technical merit is simply irresponsible for any regulatory authority

Thirdly, the discussion in the introduction of this agenda item on the ambiguity of the current regulation does not bring clarity to whatever confusion may exist with some stakeholders. There are substantially different opinions on what the terms "finished gasoline" and "blend stock" mean.

Fourthly, states that have adopted the current provisions of Section 2.1 are typically those where ethanol blending has flourished, whereas states that have not may be lagging behind. If appropriate accommodations are not made to the volatility properties of gasoline-ethanol blends, such as those afforded by the current provisions of Section 2.1, then it may not be possible for refiner/marketers to economically or logistically offer ethanol blended products in the marketplace. The Energy Independence and Security Act of 2007 has brought about the requirement for substantially increased amounts of ethanol blending, which has made adoption of appropriate regulatory accommodations, again, such as those afforded by the current provisions of Section 2.1, a critical issue for state authorities.

Lastly, members of the Petroleum Subcommittee were no where near consensus on this proposal and many vehemently reject it, including myself. There is a great deal of work that remains to resolve differing viewpoints and develop a recommendation for only those changes that provide value to the consumer. Therefore, it is recommended this proposal be moved to "Developmental."

The members of the Petroleum Subcommittee would also benefit from having an established protocol for the advancement of proposals to the L&R Committee, as it was nothing short of a surprise that this item was even put on the agenda for consideration.

Thank you for your thoughtful consideration.

Respectfully submitted,

Phillip H. DePriest
Product Quality Manager
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Appendix C

L&R Committee Work Group on Moisture Loss

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***NOTE:** The following documents could not be included in this publication because they are only available in Adobe PDF format; NIST will provide copies on request. Please contact Lisa Warfield at (301) 975-3308 or at lisa.warfield@nist.gov or Ken Butcher at (301) 975-4859 or at kbutcher@nist.gov.

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

Moisture Loss and Other Issues for Consideration by the NCWM Laws and Regulations Committee and the Board of Directors

INTRODUCTION

The Weights and Measures Division (WMD) prepared this document in 2007 at the request of NCWM Chairman Mike Cleary to detail several moisture loss and other package inspection issues to be studied under this project with the goal of developing recommendations for amendments to NIST Handbook 133 (HB 133) in 2008. There are four items listed below and most of the resource material is included to enable this document to serve as an agenda and comprehensive resource. The WMD provided this outline for consideration by the NCWM L&R Committee, the Board of Directors, and other interested parties with the goal of developing a consensus on whether or not there was sufficient justification to study the issues described below.

Item 1. Gel Soaker Pads

Several weights and measures officials are concerned that HB 133 does not provide adequate guidance on how to verify the net weight declaration on packages where "gel soaker pads" are used in the package to absorb moisture.

Based on information that the WMD has received, this discussion paper is provided as a technical examination of the use of "gel type" soaker pads when determining net weight. Gel soaker pads contain granules of a highly absorbent compound that soak up fluid and retain it so efficiently that the "usual" methods of drying (pressure, wiping, and air) do not allow the re-creation of "Used Dry Tare." According to two manufacturers, "gel-based soaker pads" can absorb up to 50 times their original weights in fluid compared to "cellulose-based fluff pulp" which absorbs only two to four times its weight (see http://**www.thermasorb.com** and http://**www.stockhausen-inc.com**). Gel-type soaker pads are used by industry to: (1) extend shelf life; thus, reducing repackaging costs, (2) reduce bacterial growth, and (3) improve the "presentation of packages" by absorbing blood and fluid; eliminating free flowing liquid in the package.

Inspection problems with this type of tare arise when officials attempt to verify net weight declarations on packages which have been wrapped and labeled at a location other than where the commodity is inspected/tested since officials have no access to "unused dry tare." Some officials report that it is impossible to dry these types of soaker pads using traditional drying procedures and have even attempted to use microwave ovens to establish "used dry tare." WMD discourages the use of microwave ovens or other extreme drying methods for drying tare materials because (1) unused "dry" tare materials have a natural moisture content which cannot be reestablished using most heating methods (e.g., for gel-pads this could be 5 % or more); (2) the intensity/power of microwave ovens varies substantially from device to device so, given the range of variability, it would be impossible to suggest a power setting or heating time that could be considered reasonable, repeatable, and safe; and (3) a more practical concern is that an official could overheat tare material and damage the microwave or cause even more serious problems such as the possibility of fire.

WMD solicits recommendations and comments from all concerned who have interest in this topic. Please consider possible solutions to allow accurate measurement practices that permit officials to safely recreate "used dry tare" for net weight verification on products using "gel-type" material.

WMD believes the requirements of HB 133 are written broadly enough to apply to all types of tare materials including those which are "gel based." Under the definition of "Used Dry Tare" officials use air drying, washing, scraping, pressure, or other techniques which can involve more than normal household procedures but do not go so far as to include laboratory procedures such as oven drying. The field test procedures in HB 133 were developed to provide uniform procedures to enable officials to dry out "used" tare to recreate as close as possible the weight of "unused tare material" that the packager used. When a packager uses a tare material that does not permit the recreation of unused dry tare (and the official does not have access to "unused dry tare" material or to readily

accessible reliable information on tare), the official is limited to drying at least two samples of the tare material as best he can using the procedures described by the handbook; he then can use an average tare to determine a net weight. If the packages are then found to be underweight, the packer must be permitted to provide information on whether or not the average tare value used by the official was reasonable or provide other information to the official to defend the net weight claims on the label. Since this is really the same opportunity any packer of any type of tare material has available to him, WMD believes the current guidance in HB 133 is adequate.

A test procedure in HB 133 is necessary to ensure weights and measures can continue to maintain marketplace surveillance to ensure equity and fair competition while still recognizing reasonable moisture loss or gain as required under both federal and state laws and regulations. The relevant sections describing the tare definition and determination procedures from fourth edition of HB 133 (2005) are shown below:

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.

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.

NIST Handbook 133 is available online at http://ts.nist.gov/WeightsAndMeasures/h1334-05.cfm.

Item 2. Moisture Loss Guidance in NIST Handbook 133

The three items shown below were taken from the L&R Report of the 2004 89th NCWM Annual Meeting Proceedings and later agendas including an item from the Committee's 2007 Interim Meeting agenda. The Committee withdrew two of these items in 2004 and asked NIST to review the moisture loss sections of HB 133, revise them to improve their readability, and, where appropriate, add additional information or clarifications.

NIST conducted the promised review but found there were several suggestions contained in these two items. A few of the suggestions raised substantive questions about what needs to be added to HB 133 and which questions would be the most useful or practical for field officials. NIST believes that responding to some of the suggestions or questions could lead to extensive revisions to the handbook. This level of discussion will take considerable time and effort for the Committee, and WMD would like to ensure everyone has a full understanding of the concerns and agrees to the necessity for change so time and resources will not be wasted. The Committee should review these sections and identify what information administrators need versus what information field officials need to perform their duties.

270-7 Amend NIST Handbook 133 Section 2.3. Moisture Allowances to Provide Clearer Guidance
(This Item was added to the agenda of the WG on Moisture Loss following the 2007 Interim Meeting)

Source: Northeast Weights and Measures Association (NEWMA)

Proposal: Amend NIST Handbook 133 (HB 133) Section 2.3, Moisture Allowances (pages 17 through 19 of Handbook 133) to provide clearer guidance.

Background: The issue of moisture loss is complex. Handbook 133 currently provides specific guidance on the determination and application of moisture allowances for only a limited number of commodities. Concerns have been raised that this guidance is confusing and difficult to understand, particularly with regard to when moisture loss is applied (i.e., at the time of inspection or subsequent to the inspection). Requests have been received to reword this section to make it easier to understand and apply.

In addition, HB 133 provides little guidance on the determination and application of moisture allowances for commodities other than those specifically listed. Weights and measures jurisdictions across the country have been struggling with how to properly handle moisture loss during packaging inspections and need more definite guidance on this issue.

The Committee did not believe it had the time or expertise to address properly the issue of moisture loss within the structure of the NCWM. The Committee decided to request activation of a NIST Moisture Loss WG to establish more effective and extensive guidance to the NCWM regarding the proper determination and application of moisture loss.

Discussion of this Item by the WWMA: The WWMA L&R Committee heard that a meeting was tentatively planned for November 2006; the meeting was delayed to allow time for everyone to identify and agree on the issues to be addressed by the group to ensure that expectations for the meeting results were clear. The Weights and Measures Division (WMD) agreed to fund the travel and attendance of one NCWM representative. Leading issues included providing additional guidance in HB 133 regarding the determination and application of appropriate moisture loss allowances in package inspections, with noted examples including how to address gel soaker pads in poultry/meat packages, as well as how to determine moisture allowances for pasta, rice, and other commodities for which no established moisture loss allowances exist. Additionally, guidance regarding application of moisture loss allowances at the point-of-pack needed to be addressed.

An industry representative urged involvement in the meeting and ensuing work on HB 133 amendments from the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA) to ensure input and consensus from all relevant agencies. He further emphasized the need to review and consolidate all decisions and directives from any and all court rulings regarding moisture loss issues. Factors to be considered in determining and applying appropriate moisture loss allowances and influences upon such losses included commodity stability limits and varying environmental conditions at packing plants such as relative humidity and constant temperature rooms maintained at different temperature levels. The industry representative also urged that guidance be provided to industry members regarding the types of data needed to be tracked and provided by packers/manufacturers in addressing moisture allowance determinations.

Discussion of this Item by the CWMA at its 2006 Interim Meeting: A comment was heard from industry that this needs to be addressed in order for businesses to be competitive. The USDA and FDA need to be involved in the development of this item. A meeting was tentatively scheduled for November prior to the NCWM Interim Meeting. There was general agreement that in order for this meeting to be effective, the USDA and FDA must be present. Comments were heard in support of using the New York proposal to correct the error in HB 133.

Item 3. WMD Package Inspection and Moisture Loss Guidance Letter – Withdrawn

WMD believed there was some useful information for weights and measures officials and industry contained in the 2005 Memorandum that WMD issued to state weights and measures officials and other interested parties, entitled "Verifying the Net Contents of Packaged Goods and Recommended Procedures for Moisture Allowances." WMD withdrew the memorandum at the request of Kraft Foods which detailed a number of concerns about the guidance contained in the WMD communication. The Kraft Foods letter, dated January 31, 2006, was prepared by Steven Steinborn of Hogan and Hartson. WMD recommended the committee review both documents to resolve the corporation's concerns where possible and determine if any information in the WMD letter can be revised and republished to assist weights and measures officials in dealing with net quantity of contents. The WMD memorandum and Kraft's letter are presented in Reference Section II below.

Item 4. WMD Suggestions

a. Seek Greater Recognition of NIST Handbook 133 by FDA and other Federal Agencies.

WMD would like to avoid frequent amendments to HB 133 because, unlike NIST Handbook 44, it is not widely adopted automatically. Many jurisdictions adopt new versions of HB 133 using their Administrative Procedures Acts. Another consideration is that the USDA adopts versions of the handbook which then preempts other versions from being used to verify the net quantity of packages put up under that agency's supervision. In the past, WMD found that several jurisdictions used the wrong edition of HB 133 to take action against USDA-inspected products simply because they used a newer version of the handbook than had been adopted by the USDA. WMD believes that USDA adoption gives a strong endorsement and recognition to the handbook. WMD also believes the fourth edition of HB 133, whose core elements have been in use by the states since 1994, should be recognized by the FDA and all other agencies to eliminate any uncertainty over its use by the states. Perhaps it is time the NCWM consider petitioning the FDA to provide some type of formal recognition of the handbook. WMD believes that establishing a 5-year review cycle for HB 133 may be one way to ensure it is acceptable to other agencies, which will help avoid the confusion over which edition is currently in effect.

b. Create a new supplement or website to NIST Handbook 133 which would provide useful information to administrators, field officials and industry.

WMD would like to explore the possibility and usefulness of creating a new publication or website called NIST Handbook 133-1 which would provide supplementary information and guidance on net quantity of contents testing and moisture loss for administrators and industry. The publication or website would be "informative;" thus, it would not include regulatory requirements. Instead, it would be used to provide additional guidance and more examples than can be included in HB 133 itself. Such a publication or website could also be used to provide complete full-size copies of the various inspection forms and worksheets contained in HB 133 and other useful tools developed by jurisdictions. The publication or website could also include a variety of other information related to net contents verification and random sampling and could include appropriate information from federal regulations and policies as well as frequently asked questions (FAQs). Currently in NIST Handbook 130 (HB 130) Interpretations and Guidelines there are sections related to moisture loss, point-of-pack inspections and administrative procedures which may not be well known or readily accessible. These could be updated and moved to the new publication or website.

For example:

2.2.5. Lot, Shipment, or Delivery
2.5.6. Guidelines for NCWM Resolution of Requests for Recognition of Moisture Loss in Other Packaged Products
2.6.10. Model Guidelines for the Administrative Review Process
2.6.11. Good Quantity Control Practices
2.6.12. Point-of-Pack Inspection Guidelines

These documents are shown below in Reference Section I.

Another example of the type of package information which could be included in a publication or website for reference purposes is the following report on a meeting held at NIST in 2005 to address concerns over packer supplied tare values.

NIST Weights and Measures Today
November 2005
Report of Meeting on Tare

On November 2, 2005, the Laws and Metric Group at NIST hosted a meeting to discuss ways to improve the communication of tare information between packers and retailers when meat products are packaged at a plant, but weighed and labeled at the retail store. Representatives from the meat

packing industry, the retail food industry, and several weights and measures agencies attended the meeting.

The Problem

There is a fundamental change occurring in the retail food marketplace. Retail food stores are shifting from having in-store meat cutters to purchasing already-packaged meat from an outside plant. The supplying plant provides the retail store with packaged meat (including tray, soakers, and overwrap), and the store is then responsible for weighing and labeling the package. In order to weigh and label these products properly, the retail store needs to know the weight of the packaging materials used by the plant (i.e., the tare weight). While this may sound simple and straightforward, it is not.

Retailers

Many retail food chains manage their tare weights from a central location. Tares are maintained at the central or regional office and downloaded to the individual stores on a routine basis. While individual stores may have the ability to override the tare provided in a download (e.g., when an official from weights and measures informs them that they are using an incorrect tare), this correction will be erased when the next download occurs. Several retail food chains believe that the centralized management of tare information is critical to the overall success of their meat departments. With little cutting and packaging being done at the retail level, stores rarely have experienced, professional staff in their meat departments. Without significant expertise at the store level, food retailers are reluctant to leave decisions regarding the use and amount of tare to individual store management.

Weights and Measures Officials

When weights and measures officials find inaccuracies in tares being used, often these inaccuracies are not being communicated to the food retailer's central or regional offices. If the food retailer's central or regional office is not informed that a tare value is inaccurate, then the tare value will not get changed in the next download. While some retail food chains require their store managers to submit copies of inspection reports to the central or regional office, many do not. Some chains leave that decision to the discretion of the individual store managers. Individual store managers may be reluctant to forward disparaging information about their store's performance to the central or regional office. As a result, when weights and measures officials find an inaccurate tare being used in a store and only notify store management of the correction necessary, that information may not be communicated to the people who really need to know—the people at the central or regional office who set the tare values for the entire chain of stores.

Packers

The weight of tare materials used at a meat packing plant varies regularly. Whenever the plant changes suppliers, whether it is suppliers providing soakers, trays, or overwrap, the tare must be reevaluated and changed. Whenever suppliers change the materials used in their products, the tare must be reevaluated and changed. Most meat packers monitor tare continuously and regularly make small adjustments to ensure their packages are accurate. While tare information is routinely shared with retailers, it is difficult to ensure that the correct tare goes on the correct package. Packers may ship individual packages from several different production lots (lots which may have been packaged using different tare materials) in a single shipment to a retailer's warehouse. The retailer's warehouse then further breaks up these package groups to distribute packages to individual stores. Even if accurate tare information for all packages is provided to the retailer's central or regional office, the retailer has difficulty using this information effectively since not all packages of the same product at the same location will necessarily have the same tare. In addition, new tare information provided to a retailer may only apply to packages still in the retailer's warehouse (and not those presently in the store). This means retailers must coordinate the updating of tare data with the placement of new packages on the store shelves.

Is There a Solution?

The question remains: How do you effectively ensure that the tare information for a particular package "travels" with the package from the point of production to the final retail destination? One suggestion has been to print tare information directly on individual packages. However, packers and retailers all agree that printing tare information on packages, shipping cases, or shipping invoice forms would not be effective. Packers order packaging materials and shipping containers months in advance and at that point could only guess as to what amount of tare would need to be preprinted on these materials. In addition, if tare information were provided on individual packages, shipping cases, or shipping invoices, that information would only be available at the retail store and would never reach the retailer's central or regional office in time to be included in the next download. Most retail food chains do not want individual stores making independent decisions about what tares to use.

Ultimately, the key will be for packers and retailers to communicate more frequently and more effectively. To that end, the American Meat Institute (AMI) has agreed to contact other trade associations representing the retail and meat packing industries to ask for their help in reiterating to their members the importance of accurate net weight labeling at retail. AMI will encourage their packer and processor members to communicate tare values to retail customers whenever changes in tare values occur.

How Can Weights and Measures Officials Help?

Weights and measures agencies can help by sending copies of test reports (especially from failed inspections) to the corporate or regional office of the retailer. While ideally the corporate or regional office will receive this information from the retail store, retailers at this meeting stressed they would rather receive duplicate reports (from the weights and measures agency and the store) than none at all. Retailers consider it absolutely critical that weights and measures officials contact, communicate, and work with the corporate and regional offices early and often. Retailers specifically asked that weights and measures agencies not wait for problems to escalate before they get the corporate or regional offices involved. Weights and measures officials should conduct package inspections in full compliance with NIST Handbook 133 (HB 133). Inspectors are encouraged to properly clean tare materials during inspections to avoid imposing tares larger than they should be.

According to HB 133, Used Dry Tare is "tare material that has been air dried, or dried in some manner to simulate the unused tare weight." Before adding this definition to HB 133, members of the NCWM and NIST did extensive testing to compare the weights of Unused Dry Tare (which the packer uses), and Used Dry Tare (which the inspector uses). If Used Dry Tare is dried and cleaned properly, its weight should not vary significantly from the Unused Dry Tare weight. In addition, NIST strongly discourages the use of microwave ovens when drying tare materials, particularly soaker pads. Past tests have shown that excessive heating of soaker pads and other tare materials can significantly alter their weight, and even start a fire as some officials have learned.

Following the 2007 Annual Meeting NIST WMD published the following article in its quarterly newsletter to provide additional guidance to officials on how to provide moisture allowances for packges.

MOISTURE LOSS AND GEL SOAKER PADS—WHAT DO I DO?
Tom Coleman

Weights and Measures Today – September 2007 – Volume 10 Number 3, Page 4

Moisture loss is the loss of weight or volume after packaging. Packaged products (e.g., cookies, granulated sugar), however, may gain as well as lose moisture. The amount of loss or gain depends on many factors including but not limited to the nature of the product, packaging material, length of time "offered for sale," environmental conditions, and many other

combinations of "similar" circumstances. Loss of weight may include solvent evaporation and natural juices—not just the loss of water. Tare determinations can be very simple or a major concern depending on the type of tare material and the weight consistency of that substance. Unused dry tare (when available and applicable) may be the easiest of the tares to determine. Gel soaker pads may not be seen and tested as often, however they may prove to be equally basic. NIST Handbook 133 "Checking the Net Contents of Packaged Goods" provides the following guideline for all tare determinations:

"Tare material 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." Except for aerosol or other pressurized packages, open the sample packages, empty, clean, and dry the tare material as appropriate for the packaging material. When testing packaged product using gel soaker pads, three types of tare may be used. Used dry tare – used dry tare is 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. 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 procedures may be modified by using samples of the packaging material if available in the store. Wet tare – if wet tare is used, follow the procedures described in the used dry tare section above, except make no effort to dry the tare material. The following six steps apply when gravimetrically testing any type of packaged product:

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. If, when following these steps using either unused dry tare, used dry tare, or wet tare, the product is found to contain less than the quantity represented, or if there is a violation of the maximum allowable variation (MAV) requirement, provide a copy of the test results to the appropriate store authority. Once this has been accomplished, the "field" test is complete. If upon receipt of the "official" test report the manufacturer wishes to contest the inspection results based on the "loss or gain of moisture," official notification shall be directed to the appropriate weights and measures administrator for consideration/verification.

   ***If testing flour, dry pet food or USDA packages of fresh poultry, franks, hotdogs, bacon, fresh sausage, and luncheon meats, specific instructions are provided in NIST Handbook 133, moisture allowances, page 17. 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.

If you have any questions or need additional information regarding moisture loss, please contact Lisa Warfield at (301) 975-3308 or at lisa.warfield@nist.gov or Ken Butcher at (301) 975-4859 or at kbutcher@nist.gov.

REFERENCE SECTION I – EXCERPTS FROM THE INTERPRETATIONS AND GUIDELINES SECTION OF NIST HANDBOOK 130

The following are currently in NIST Handbook 130 (HB 130) Interpretations and Guidelines

2.2.5. Lot, Shipment, or Delivery

(L&R, 1981, p. 95)

Policy

The requirements for the average package net contents to meet or exceed the labeled declaration may be applied to production lots, shipments, or deliveries. Shipments or deliveries are smaller collections of packages than production lots that may or may not consist of mixed lot codes.

Emphasis in inspection activities should be placed on warehouse and in-plant testing without neglecting retail consumer protection.

Background

The Committee heard a petition from the California Brewers Association to define a lot as:

> "A selection of containers under one roof produced by a single company of the same size, type and style, manufactured or packed under similar conditions with a minimum number to be equivalent to one production line shift."

The intention of the petition is to focus Weights and Measures enforcement on production lots as opposed to small collections of packages on retail shelves, because the production lot is under the control of the packager.

An alternative proposal was made that would require mingling of lot and date codes in package inspection at warehouse locations.

The Committee has reviewed the proposals in light of Section 7.6. and Section 12.1. of the Uniform Packaging and Labeling Regulation which refers to "shipment, delivery, or lot." If the petition is approved, the terms "shipment" and "delivery" would have to be dropped from this Uniform Regulation.

The Committee recognizes the inherent value of in-plant and warehouse inspection and is of the opinion that, wherever possible, such inspections should be carried out. At the same time, the Committee recognizes the need for the state and local weights and measures officials to protect the consumer at the level where the ultimate sale is made. Therefore, the Committee recommends no change to the Uniform Regulation.

The Committee looks forward to the work of the Special Study Group on Enforcement Uniformity of the NCWM which will be exploring the mechanisms that might be instituted to make in-plant inspection workable.

2.5.6. Guidelines for NCWM Resolution of Requests for Recognition of Moisture Loss in Other Packaged Products

(Exec, 1988, p. 94)

The Task Force on Commodity Requirements limited its work to only a few product categories, using these categories as models for addressing moisture loss. The gray-area concept is the result of this work.

Recognizing several candidates for future work in moisture loss, the Task Force recommends that the following guidelines for moisture loss be followed as far as possible by any industry requesting consideration:

1. There should be reasonable uniformity in the moisture content of the product category. For example, since pet food has final moisture contents ranging from very moist to very dry, some subcategorization of pet food needs to be defined by industry before the NCWM study of the issue.

2. The predominant type of moisture loss (whether into the atmosphere or into the packaging materials) must be specified.

3. Different types of packaging might make it necessary to subcategorize the product. For example, pasta is packaged in cardboard, in polyethylene, or other packaging more impervious to moisture loss. The industry should define the domain of packaging materials to be considered.

4. "Real-world" data is needed on the product as found in the retail marketing chain—not just laboratory moisture-loss data.

5. The industry requesting consideration of moisture loss for its product should collect data on an industry-wide basis (rather than from only one or two companies).

   Information concerning the relative fractions of imported and domestically produced product should be available, for example, in order to assess the feasibility of interacting with the manufacturer on specific problem lots.

6. Moisture loss may occur either:
   - during manufacturing or
   - during distribution.

   Data will be needed to show the relative proportion of moisture loss in these different locations since moisture loss is permitted only under good distribution practices. Geographical and seasonal variations may apply.

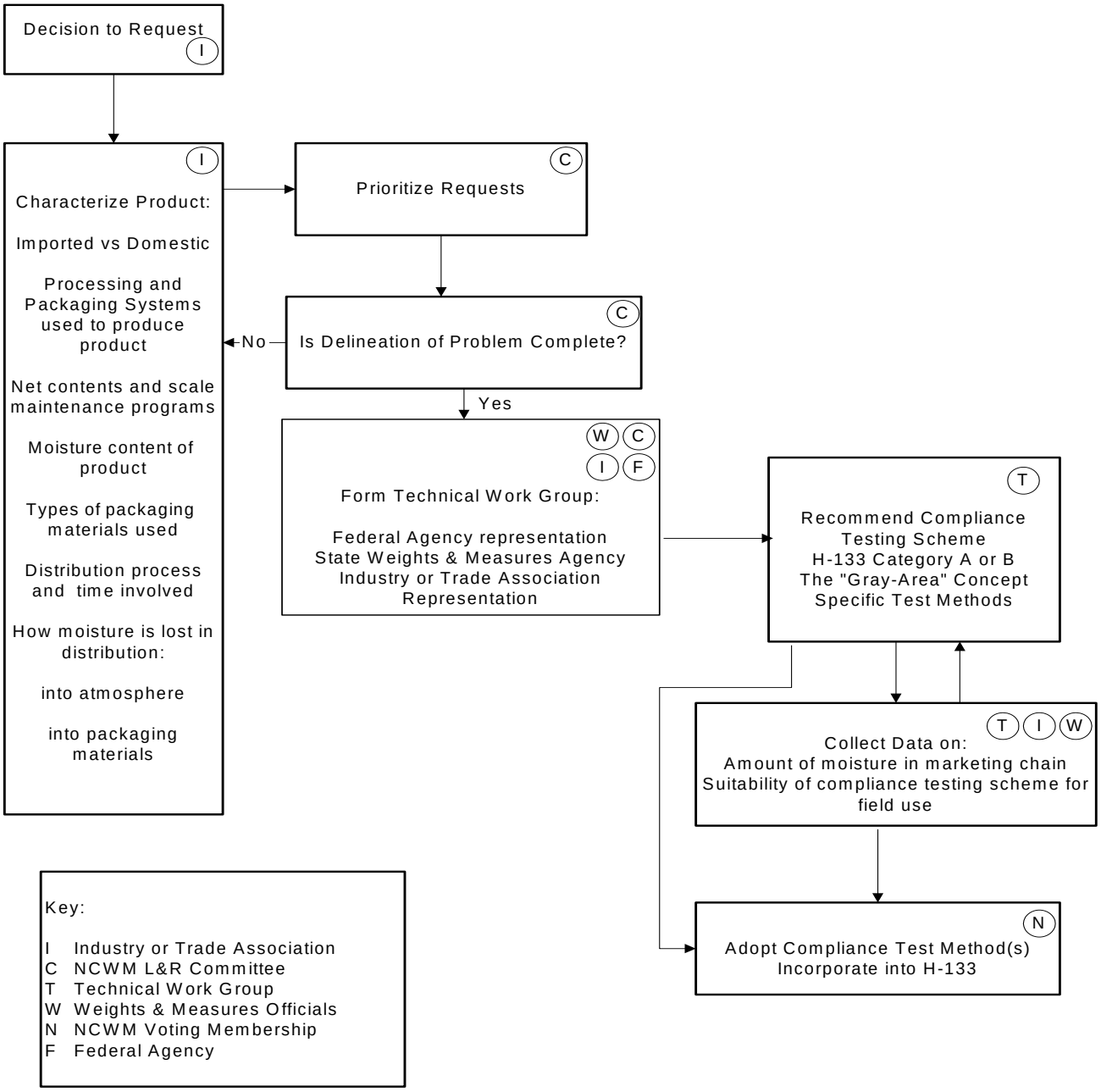
7. A description of the processing and packaging methods in use in the industry will be of great value, as will a description of the distribution system and time for manufacturing and distribution. A description of the existing net quantity control programs in place should be given, together with information on how compliance with Handbook 133 is obtained. A description of maintenance and inspection procedures for the scales should be provided, together with information on suitability of equipment and other measurements under Handbook 44.

8. A description of federal and local agency jurisdiction and test should be given, as well as any regulatory history with respect to moisture loss and short weight. Has weights and measures enforcement generated the request? What efforts have addressed the moisture loss issue prior to approaching the NCWM? Are the appropriate federal agencies aware of the industry's request to the NCWM?

9. The industry should propose the type of compliance system and/or moisture determination methodology to be used. The compliance scheme, if it contains industry data components, should be susceptible to verification (examples: USDA net weight tests for meat; exchange of samples with millers for flour) and should state what the companies will do to provide data to field inspection agencies in an ongoing fashion (as the gray-area approach requires). If in-plant testing is to be combined with field testing, who is to do such testing, and how is this to be accomplished? It should be possible to incorporate the proposed testing scheme into Handbook 133 to be used with Category A or B sampling plans.

When all the preliminary information recommended above has been collected, a field test of the proposed compliance scheme should be conducted by weights and measures enforcement officials to prove its viability. See the plan diagrammed on the next page.

Plan For NCWM Resolution of Individual Requests For Recognition of Moisture Loss



2.6.10. Model Guidelines for the Administrative Review Process

Purpose
These guidelines are provided to assist weights and measures programs in establishing an administrative review process. They are not intended to be the only process an agency may use nor are they intended to supersede any agency's existing process. Before implementing ANY process, it should be approved by legal counsel.

These guidelines ensure that persons affected by "inspection findings" (e.g., price misrepresentations or shortweight packages), or who are deprived of the use of their property (devices or packages placed under "stop" or "off-sale" order), are provided a timely-independent review of the action. The process enables affected persons to provide evidence which could be relevant in determining whether the enforcement action was proper. The purpose of the process is to ensure that a person's ability to conduct business is not hindered by improper enforcement actions. This process is independent of any other action (e.g., administrative penalties, prosecutions, etc.) that may be taken by the enforcement agency.

Background
In the course of their work, weights and measures officials take enforcement actions that may prohibit the use of devices or the sale of packaged goods (e.g., "stop-sale" or "off-sale" orders for packages and "stop-use" or "condemnation" tags issued on devices). Improper actions (e.g., not following prescribed test procedures, enforcing labeling requirements on exempted packages, or incorrectly citing someone for a "violation") place the official and the jurisdiction in the position of being liable for the action if it is found that the action was "illegal." In some cases, weights and measures jurisdictions could be ordered to pay monetary damages to compensate the affected party for the improper action.

This process is one way to provide affected persons an opportunity to present evidence which may be relevant in determining whether the order or finding has been properly made to an independent party. The procedure enables business operators to obtain an independent review of orders or findings so that actions affecting their business can be evaluated administratively instead of through litigation. This ensures timely review, which is essential because of the impact that such actions may have on the ability of a business to operate and in cases where perishable products may be lost.

Review Provisions
Parties affected by enforcement actions must be given the opportunity to appeal enforcement actions.

Inspectors are the primary contacts with regulated firms and thus are in the best position to ensure that the enforcement actions taken are "proper." "Proper" means that inspections are conducted (1) within the scope of the authority granted by law, (2) according to recognized investigative or testing procedures and standards, and (3) that enforcement actions are lawful. The burden for proving that actions are proper falls on the weights and measures program, not on regulated firms.

Weights and measures officials are law enforcement officers; therefore, they have the responsibility to exercise their authority within the "due process" provisions of the U.S. Constitution. As weights and measure programs carry out their enforcement responsibilities in the future, more and more challenges to their actions and authority will occur. It is in the best interest of any program to establish strict operational procedures and standards of conduct to prevent the occurrence of improper actions that may place the jurisdiction in an untenable position in a court challenge of an enforcement action. The foundation for ensuring proper actions is training, clear and concise requirements, and adoption of and adherence to uniform test procedures and legal procedures.

Prior to taking enforcement actions, the inspector should recheck test results and determine that the information on which the action will be taken is accurate.

Inspections shall be conducted with the understanding that the findings will be clearly and plainly documented and reviewed with the store's representative.

During the review of the findings, the firm's representative may provide information which must be used by the inspector to resolve the problems and concerns before enforcement actions are taken. In some cases, the provided

information may not persuade the inspector to forego the action. In some cases the inspector and business representative may not understand the circumstances surrounding the violations, or there may be a conflict between the parties that they cannot resolve. In other cases, the owner or manufacturer may not learn that an enforcement action has occurred until long after the inspector leaves the establishment.

Steps:

1. Provide a framework that will help in resolving most of these situations where "due process" is of concern. Make sure that the responsible party (e.g., as declared on the package label) is notified of violations and receives copies of inspection reports. Establish standard operating procedures to assure the affected party of timely access to a representative of the weights and measures program so that the firm can provide the relevant information or obtain clarification of legal requirements.

2. Make the process as simple and convenient as possible. Especially in distant or rural areas where there are no local offices, the review should be conducted by a supervisor of the official taking the action if agreed to by the person filing the request for review.

3. The process should include notice that the firm can seek review at a higher level in the weights and measures program or an independent review by a third party. The following procedures are recommended:

   (a) Any owner, distributor, packager, or retailer of a device ordered out of service, or item or commodity ordered "off-sale," or inspection finding (e.g., a price misrepresentation or a shortweight lot of packages) shall be entitled to a timely review of such order, to a prompt, impartial, administrative review of such off-sale order or finding.

   A notice of the right to administrative review should be included on all orders or reports of findings or violations and should be communicated to the responsible firm (e.g., person or firm identified on the product label):

   (b) The administrative review shall be conducted by an independent party designated by the Director or before an independent hearing officer appointed by the Department. The officer shall not be a person responsible for weights and measures administration or enforcement.

   (c) No fees should be imposed for the administrative review process.

> Sample Notice
>
> You have the right to Administrative Review of this order or finding. To obtain a review, contact the Director of Weights and Measures by telephone or send a written request (either postmarked, faxed, or hand delivered) to:
>
> (Name, Address or Fax Number of the Director or other Designated Official)
>
> Your request should reference any information that you believe supports the withdrawal or modification of the order or finding.

   (d) The firm responsible for the product or the retailer may introduce any record or other relevant evidence.

For example:

(i) Commodities subject to the off-sale action or other findings were produced, processed, packaged, priced, or labeled in accordance with applicable laws, regulations or requirements.

(ii) Devices subject to the "stop-use" order or "condemnation" were maintained in accordance with applicable laws, regulations or requirements.

(iii) Prescribed test procedures or sampling plans were not followed by the inspector.

(iv) Mitigating circumstances existed which should be considered.

(e) The reviewer must consider the inspector's report, findings, and actions as well as any evidence introduced by the owner, distributor, packager, or retailer as part of the review process.

(f) The reviewer must provide a timely written recommendation following review unless additional time is agreed to by the department and the petitioner.

(g) The reviewer may recommend to the Department that an order be upheld, withdrawn or modified. If justified the reviewer may recommend other action including a reinspection of the device or commodity based upon information presented during the review.

(h) All actions should be documented and all parties advised in writing of the results of the review. The report of action should be detailed in that it provides the reasons for the decision.

2.6.11. Good Quantity Control Practices

Good Quantity Control Practices means that the plant managers should take all reasonable precautions to ensure the following quantity control standards or their equivalent are met:

1. A formal quantity control function is in place with authority to review production processes and records, investigate possible errors, and approve, control, or reject lots.

2. Adequate facilities (e.g., equipment, standards and work areas) for conducting quantity control functions are provided and maintained.

3. A quantity control program (e.g., a system of statistical process control) is in place and maintained.

4. Sampling is conducted at a frequency appropriate to the product process to ensure that the data obtained is representative of the production lot.

5. Production records are maintained to provide a history of the filling and net content labeling of the product.

6. Each "production lot" contains on the average the labeled quantity and the number of packages exceeding the specified maximum allowable variation (MAV) value in the inspection sample shall be no more than permitted in Tables 2-1 and 2-2 in NIST Handbook 133.

7. Packaging practices are appropriate for specific products and measurement procedures (e.g., quantity sampling, density and tare determinations) and guidelines for recording and maintaining test results are documented.

8. Personnel responsible for quantity control follow written work instructions and are competent to perform their duties (e.g., background, education, experience and training). Training is conducted at sufficient intervals to ensure good practices.

9. Recognized procedures are used for the selection, maintenance, adjustment, and testing of filling equipment to insure proper fill control.

10. Weighing and measuring devices are suitable for their intended purpose, and measurement standards are suitable and traceable to national standards. This includes a system of equipment maintenance and calibration to include recordkeeping procedures.

11. Controls over automated data systems and software used in quantity control ensure that information is accessible, but changeable only by authorized personnel.

12. Tare materials are monitored for variation. Label changes are controlled to ensure net quantity matches labeled declaration.

2.6.12. Point-of-Pack Inspection Guidelines

A. Weights and Measures Officials' Responsibilities

1. Conduct inspections during hours when the plant is normally open for business. Open the inspection by making contact with the plant manager or authorized representative (e.g., the quality assurance manager or the production manager).

2. Present the proper credentials and explain the reason for the visit (e.g., routine or follow-up inspection or consumer complaint, etc.).

3. Request access to quantity measurement equipment in the packing room, moisture testing equipment in the laboratory or in the packing room, and product packed on premise or stored in warehouse areas.

4. Obtain permission from a plant representative prior to using a tape recorder or a camera.

5. Conduct inspection-related activities in a professional and appropriate manner and, if possible, work in an area that will not interfere with normal activities of the establishment.

6. Abide by all the safety and sanitary requirements of the establishment and clean the work area upon completion of the inspection/test. Return borrowed equipment and materials.

7. To close the inspection, recheck inspection reports in detail and ascertain that all information is complete and correct.

8. Sample questions and tasks for Inspectors:

   a. Inside Buildings and Equipment:

      (i) Is all filling and associated equipment in good repair?

      (ii) Are net content measurement devices suitable for the purpose being used?

      (iii) Are standards used by the firm to verify device accuracy traceable to NIST?

   b. Packing Room Inspection:

      (i) Observe if the program for net quantity of content control in the packing room is actually being carried out.

      (ii) Ensure that the weighing systems are suitable and tare determination procedures are adequate. If there are questions regarding tare determination, weigh a representative number of tare and/or filled packages.

(iii) For products labeled and filled by volume and then checked by weight, ensure that proper density is used.

c. Warehouse Inspection:

If an inspection is conducted:

(i) Select lot(s) to be evaluated.

(ii) Determine the number of samples to be inspected. Use the appropriate sampling plan as described in NIST Handbook 133.

(iii) Randomly select the number of samples or use a mutually agreed on plan for selecting the samples.

(iv) Determine the average net quantity of the sample and use the standard deviation factor to compute the Sample Error Limit (SEL) to evaluate the lot.

(v) Look for individual values that exceed the applicable Maximum Allowable Variation as found in NIST Handbook 133.

(vi) Apply moisture allowances, if applicable.

(vii) Review the general condition of the warehouse relevant to package integrity, good quantity control, and distribution practices.

(viii) Prepare an inspection report to detail findings and actions.

9. Close the inspection – Review findings with Plant Representative.

After the inspection, meet with the management representative to discuss inspection findings and observations. Provide additional information as needed (e.g., information on laws and regulations or explanations of test procedures used in the inspection). Be informative, courteous and responsive. If problems/violations are found during the inspection/test, bring them to the attention of the appropriate person.

B. Plant Management Responsibilities

1. Recognize that inspectors are enforcing a federal, state or local law.

2. Assist the official in conducting inspection activities in a timely and efficient manner.

3. During the initial conference with the inspector, find out whether the inspection is routine, a follow-up, or the result of a consumer complaint. If a complaint, obtain as much information as possible concerning the nature of the complaint, allowing for an appropriate response.

4. The plant manager, quality assurance manager, or any designated representative should accompany the inspector.

5. Plant personnel should take note of the inspector's comments during the inspection and prepare a detailed write-up as soon as the inspection is completed.

6. When an official presents an inspection report, discuss the observations and, if possible, provide explanations for any changes deemed necessary as a result of the inspection/test.

Plant Management: Information that must be shared with the inspector.

1. Establishment name and address.

2. Type of firm and information on related firms or applicable information (e.g., sub-contractor, servant or agent).

3. General description and location of shipping and storage areas where packaged goods intended for distribution are stored.

4. Commodities manufactured by or stored at the facility.

5. Names of responsible plant officials.

Plant Management: Information that may be shared with the inspector.

1. Simple flow sheet of the filling process with appropriate net content control checkpoints.

2. Weighing or measuring device maintenance and calibration test records.

3. Type of quantity control tests and methods used.

4. Net content control charts for any lot, shipment, or delivery in question or lots which have previously been cited.

5. Method of date coding the product to include code interpretation.

6. Laboratory reports showing the moisture analysis of the products which are in question or have been previously cited.

7. Product volume of lot sizes or related information.

8. Distribution records related to any problem lots including names of customers.

REFERENCE SECTION II – OTHER MOISTURE LOSS GUIDANCE AND RELATED DOCUMENTS

This section contains the text from a WMD memorandum to state weights and measures directors and other interested parties and a letter from Kraft General Foods stating the reasons justifying a withdrawal of the WMD memorandum.

A. Text from the WMD Memorandum that was issued on January 1, 2006

Memorandum for State Weights and Measures Directors and Other Interested Parties

Subject: Verifying the Net Contents of Packaged Goods and Recommended Procedures for Moisture Allowances

This memo supersedes the April 3, 1995, memorandum from the Weights and Measures Division (WMD) 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.

I am revising the earlier correspondence primarily in response to the National Conference on Weights and Measures' (NCWM) adoption of the fourth edition (January 2005) of the National Institute of Standards and Technology's Handbook 133 "Checking the Net Contents of Packaged Goods" (Handbook 133). Recent inquiries from State officials on the status of package inspection programs that test products subject to Food and Drug Administration (FDA) jurisdiction have further prompted a response. This memorandum describes guidance provided by FDA. Since 1985 that agency has advised NIST that Handbook 133 has <u>not</u> been in conflict with that agency's practices enforcing net quantity of content on packaged foods.

I. Recommendations for Verifying the Net Quantity of Contents of Packages Subject to FDA Jurisdiction

WMD recommends that weights and measures officials use the fourth edition of Handbook 133 (January 2005) for all products <u>except</u> those subject to regulation by the U.S. Department of Agriculture (USDA), which has adopted the third edition of Handbook 133 and its 4th Supplement.[1] NIST recently learned that the USDA may adopt the 2005 edition of Handbook 133 in the near future. These publications are available on the Internet.[2]

The Category A Sampling Plans in Handbook 133 provide a statistically valid sampling scheme and sample correction factors to enable you to determine if a sample passes or fails a test with a confidence level of at least 97 %. The test methods prescribed for foods are consistent with those used by the FDA.[3]

Weights and measures officials must apply both the "average" and "individual package" requirements in Handbook 133 to the packages they inspect because Federal and State laws and regulations relating to net quantity of content require officials to allow reasonable variations (both plus and minus errors in net contents) from the labeled net contents. By applying both requirements, officials avoid the appearance

[1] See 9CFR317.19 and 9CFR381.121b for the applicable meat and poultry regulations.

[2] The 3rd Edition and 4th Supplement required by USDA and the January 2005 4th Edition of Handbook 133 are free at **http://ts.nist.gov/WeightsAndMeasures/h1334-05.cfm** on the Internet.

[3] Historically, the FDA has used enforcement procedures based on a 95 % confidence level that findings of underfill are accurate. The Category A Sampling Plans in the fourth edition of Handbook 133 are based on an approximate 97 % confidence level that the findings are accurate; therefore, these plans should be acceptable to use in testing packages under FDA jurisdiction.

they are imposing a "minimum" net content system[4] while providing a high level of protection for consumers and ensuring fair competition in the marketplace.

Weights and Measures Officials should continue to test packages at retail and should consider Section 1.1. of Handbook 133 before taking enforcement action on small inspection lots of package:

> 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, practical means for State, county and city 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.

It is important to realize that the Category A Sampling Plans in Handbook 133, while statistically valid, may fail lots that contain the labeled net quantity of content approximately three times out of 100 tests. By basing enforcement actions on samples from multiple lots of the same product from the same manufacturer tested at different locations, you will have a better indication of whether or not an enforcement action is necessary. When a lot fails an inspection, NIST recommends you contact the manufacturer to obtain quantity control records and other production information on the lot to assist in your decision process. To ensure due process, we encourage jurisdictions to follow the NCWM's Section 2.6.10. Model Guidelines for the Administrative Review Process in NIST Handbook 130 "Uniform Laws and Regulations in the area of legal metrology…." (Those guidelines are shown below this memorandum) for reference but, your agency's general counsel may of course have you follow other procedures. When following up on possible violations with manufacturers, recognize they are required under Federal and State laws or regulations to follow current good manufacturing practices. The NCWM has also adopted guidelines in Section 2.6.11. on "Good Quantity Control Practices" that officials can use as a tool to assess quantity control systems. (These are provided below).

Weights and Measures officials should conduct inspections at the point of pack whenever possible so they will have access to larger lots of packages and can also assess the packager's entire packaging system. The NCWM adopted guidelines in Section 2.6.12. on "point-of-pack inspections" to help officials conduct these inspections, (See below this memorandum).

We encourage jurisdictions to collaborate on conducting marketplace surveys to determine the level of compliance of commodity groups (e.g., store-packed random weight items, mulch, polyethylene sheeting, flour, milk, soft drinks, animal food, etc.) and to work together to follow up on possible problems at the point-of-pack where the packaging plant or distribution point is located in a jurisdiction other than where the packages failed to pass a test. The State of California conducts a wide variety of marketplace surveys which can serve as model for other states to follow. NIST encourages all states to follow the example set by California's Division of Measurement Standards for monitoring compliance in the all areas of weights

[4] Under a "minimum" net content system (these systems are common in European countries), no package in a sample may contain less than the net quantity of contents stated on the package label.

and measures enforcement. NIST will provide assist to states who want to conduct or collaborate in surveys...

Ensure that all samples are selected randomly. The statistical reliability of the sampling plans is valid only when the sample has been randomly selected from the inspection lot.

To be consistent with FDA inspection activities, utilize used dry tare when taking enforcement actions. The handbook permits unused dry tare to be used to conduct audits and to verify net weights of packages put up in retail stores.

Apply the average and individual package requirements to products tested at any point in distribution. Over the last ten years several jurisdictions have contacted WMD concerning industry claims that States can only take action on production lots. FDA advises that there are no provisions in the Federal Food, Drug, and Cosmetic Act or its legislative history that support this claim. Another issue that WMD has been asked about is the claim that the FDA has a "1 %" tolerance that States must permit. FDA advises that they have a policy for their field compliance staff to use in determining whether or not to request enforcement actions by the U.S. Justice Department. The only purpose for the policy is for FDA to prioritize agency resources, not to set a limit for State enforcement actions. The FDA also reports that it did not establish this policy as a statistical allowance or tolerance that could be easily abused by an unscrupulous packager.

Allow for reasonable moisture loss.

The following Federal regulation preempts any State or local requirement that is not identical:

21 CFR § 101.105

> (q) The declaration of net quantity of contents shall express an accurate statement of the quantity of contents of the package. 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. Variations from stated quantity of contents shall not be unreasonably large.

State and local jurisdictions must allow reasonable variations in net contents caused by the loss or gain of moisture in food products that occurs during good distribution practice. If not, a jurisdiction may be questioned if enforcement action is taken against the product. The moisture loss issue has challenged weights and measures officials and industry since the Federal Food, Drug, and Cosmetic Act allowing for moisture loss was passed more than 75 years ago. However, the fact that FDA has not adopted specific moisture allowances is not justification for not making reasonable allowances for moisture loss.

The NCWM has adopted moisture allowances (also called "gray areas") for flour, dry pet food, chicken, and hot dogs. Under the "gray area" concept, any food found short in excess of the allowance is subject to enforcement action. If the product is found short, but within the allowance, the official would take additional steps (such as comparing the moisture content of a sample from the lot to the time-of-pack moisture content provided by the packer) to determine if the product is short because of underweighing at the time of pack, or if the shortage is due to "reasonable" moisture loss that occurred during distribution. WMD recommends that officials use the following guidelines with the "gray area" approach to allow reasonable moisture loss for the listed foods.

WMD only recommends moisture allowances. It is the individual jurisdiction's responsibility to make the final decision concerning appropriate moisture allowances. Final decisions should be made after considering moisture loss data provided by the packager.

II. Recommended Moisture Allowances for Some Foods

WMD has consulted with State and local weights and measures agencies and affected industries on moisture loss problems associated with hygroscopic foods. The following moisture allowances, beyond those already

addressed by the NCWM, are recommended. WMD used data from the FDA's Quantity of Contents Compendium as the major source for the numerical values for gray area recommendations. Moisture loss has been identified with flour, pasta, rice, cheese and cheese products, dried fruits and vegetables, fresh and frozen fruits and vegetables, coffee beans, and bakery products. Of all of these commodities, the extent of moisture loss variations is greatest for flour and pasta. Very little current data are available for many other commodities. However, WMD 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. If a recommended allowance is perceived as too lenient, weights and measures agencies may prevent abuses of the allowance through inspections at the point of pack. Allowances if too lenient provide are a disadvantage for firms with products in competition with packers where point-of-pack inspections may not be possible; consequently, such firms may wish to provide information to WMD so that we can recommend a more stringent allowance. Where allowances are too stringent, firms may also provide information justifying a more appropriate allowance. WMD suggests that firms desiring such an allowance be encouraged to work closely with the NCWM in view of its experience in this area. Even though the process of developing moisture allowances is time-consuming, affected firms will be provided some relief during the interim period if State and local agencies implement the following recommendations:

III. Moisture Allowances at Point of Pack

WMD recommends that moisture allowances at the point of pack not be made for packages taken immediately off the production line. However, regulatory officials may often encounter product at the point of pack that has been stored by the packer prior to shipment to other locations. In the past, moisture allowances have not been recognized in tests until the food is "introduced into interstate commerce;" however, since many manufacturers store the product for extended periods at the packing location, moisture loss should be recognized. It is recognized that moisture loss is a natural phenomenon that is not controlled or delayed by any specific schedule, and WMD recommends that, at some point during such storage, allowances be permitted for moisture loss. But, considering the multiplicity of foods, differences in packing materials, and the various environmental factors that affect moisture loss, it would be impossible for WMD to determine moisture loss that occurs on the packaging line or in the first few hours or days following the packaging of any one product type, let alone the tens of thousands of products that might be inspected at the point of pack. Certainly, some products begin to lose moisture immediately after packaging, but there must be some definitive guidance provided for weights and measures officials and industry.

This problem is not unique to the United States where we are trying to encourage State and local officials to focus more on point-of-pack inspections. WMD is aware that point-of-pack inspections are one of the primary tools used in European countries to control net contents in packaged goods. We have learned that in some of these countries officials make no allowance for moisture loss within the first 7 days of the date of pack for some products. As this is the only documented guidance on the issue available, WMD recommends that States consider a similar approach until other guidance on this issue is available. This will provide packers and officials with guidance on when moisture loss allowances must be applied and will enable officials to conduct inspections at point of pack to ensure that packers are not taking advantage of recognized allowances for moisture loss. To minimize the possibility of moisture loss considerations, officials should inspect the most recently packed items.

In 1995 WMD received comments on the 7-day recommendation from the Food Industry Weights and Measures Task Force (Task Force) of the Grocery Manufacturers of America. The Task Force was concerned the 7-day period was not reasonable because the data submitted to the NCWM to develop the gray areas for flour, dry pet food, and other products clearly showed that some products lose as much as 0.5 % to 1 % of their weight due to moisture loss in the first few days of packing. WMD acknowledged the industry's concerns about the 7-day period but believed then and now that the concerns can be addressed without dropping the recommendation. WMD believes it is crucial to have specific guidelines on moisture loss for use in point-of-pack inspections.

WMD recommends an exception to the 7-day period if the packer can provide daily moisture loss data collected using the following procedures. We have developed the following guidelines in collaboration with industry for packers to use the results of the short-term moisture loss studies at the point of pack. To be acceptable, the data

must be computed using the average moisture loss determined on a daily basis (e.g., the weight of each package in each of the sample control lots is determined every day for 7 days) in environmental conditions similar to those that exist when the product is being inspected. For example, an inspector visits a pet food plant in Ohio in the middle of July to conduct a point-of-pack inspection. If the product tested had been packaged 5 days before the inspection and is found underweight; the moisture loss data must reflect the loss that would occur in July not January. At least three sample control lots, consisting of at least 48 randomly selected packages, must be used to develop the moisture loss data. Each sample lot must be stored under the same conditions that are typical for the product (e.g., if the product is typically placed in a sealed case on a pallet and shrink wrapped, the sample lots must be stored under the same conditions. Moisture loss data obtained by removing the individual packages from the shipping case and storing them in a laboratory would not be acceptable). The three-sample control lots must be placed at various locations in the storage site. The average moisture loss value must be computed from the three-sample control lots with a 95 % prediction interval.

Since point-of-pack inspections are not routinely done in most jurisdictions at this time, there will be many situations where packers may not have "acceptable" moisture loss data for a particular product found to be underweight at the time of a point-of-pack inspection. In these cases, WMD recommends the packer be allowed to conduct a study using the criteria specified above. This data could then be provided to the weights and measures official for use in making a final determination whether or not moisture loss caused the product to be underweight. One benefit of this approach is that the moisture loss study can be conducted within a few days of the inspector finding the inspection lot underweight so the test will more closely reflect the environmental conditions under which the original inspection lot was subject.

A similar recommendation is included for fresh bakery products weighed within 1 day following the end of the day of pack (in this case the moisture loss data would have to be based on the amount of moisture lost on an hourly basis under the same conditions listed above for the 7-day period). WMD will provide technical assistance on request to any jurisdiction to resolve these individual moisture loss cases by working with you and the packer and will seek FDA assistance in resolving these situations.

IV. Recommended Moisture Allowances for Use at Point of Pack and Testing at Any Other Location

Provide the following allowances for moisture loss (expressed as a percentage of the labeled net quantity of contents):

1. No allowance for moisture loss should be made if:

   (a) A food, other than a fresh bakery product, while stored by the packer, is weighed within 7 days following the end of the day of pack, except when the packer provides acceptable (see note below) documentation of the moisture loss for the product in storage at the point-of-pack, or

   (b) A fresh bakery product, while stored by the packer, is weighed within 1 day following the end of the day of pack, except when the packer provides acceptable (see note below) documentation of the moisture loss for the product in storage at the point of pack, or

   (c) The food is not subject to moisture loss, or

   (d) The food is packaged in an air-/moisture-tight container (e.g., cans, glass bottles, enclosed in paraffin, etc).

2. Allow 1 % for the following foods: frozen fruits and frozen vegetables, and fresh baked breads, buns, rolls and muffins.

3. Allow 3 % for the following foods: flour, dry pet food, pasta, rice, cheese and cheese products, dried fruits and vegetables, fresh fruits and vegetables, coffee beans, and bakery products other than fresh baked breads, buns, rolls and muffins.

Note for Moisture Allowances at Point of Pack: The data must be computed using the average moisture loss determined on a daily basis (e.g., the weight of each package in each of the sample control lots is determined every day for 7 days) in environmental conditions similar to those that exist when the product is being inspected. For example, an inspector visits a pet food plant in Ohio in the middle of July to conduct a point-of-pack inspection. If the product tested had been packaged 5 days before the inspection and is found underweight; the moisture loss data must reflect the loss that would occur in July, not January. At least three sample control lots consisting of at least 48 randomly selected packages must be used to develop the moisture loss data. Each sample lot must be stored under the same conditions that are typical for the product (e.g., if the product is typically placed in a sealed case on a pallet and shrink wrapped, the sample lots must be stored under the same conditions. Moisture loss data obtained by removing the individual packages from the shipping case and storing them in a laboratory would not be acceptable). The three-sample control lots must be placed at various locations in the storage site. The average moisture loss value must be computed from the three-sample control lots with a 95 % prediction interval. If the packer does not provide the information, no additional moisture allowance should be permitted.

V. Moisture Loss for Products Not Listed in NIST Handbook 133

When officials test product for which no moisture loss guidance has been provided NIST can provide technical assistance. In the past NIST has published recommended moisture allowances for use at all locations including Point-of-Pack. If moisture loss studies are required, NIST will assist in the completion of such studies. If studies are a necessity, they should be a collaborative effort 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.

The amount of moisture lost from a package is a function of many factors not the least of which is the product itself (e.g., moisture content), packaging, storage conditions (e.g., temperature, humidity, 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 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 Section 2.5.6. in the Interpretation and Guideline Section regarding "Resolution for Requests for Recognition of Moisture Loss in Other Packaged Products." NIST WMD has worked and will continue to work extensively with the NCWM, The Laws and Regulations Committee, and industry to develop protocol for determining moisture allowances that can serve as models for future studies. 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.

In some cases, manufacturers can and may provide valid moisture loss data for officials to consider in lieu of conducting studies. In cases like this, WMD will provide assistance to determine if the information is complete or if further documentation is required. For example, a major producer of bar soap has provided moisture loss evidence for consideration by officials to determine what, if any, moisture loss could be expected to occur; in some cases, this information has proven to be accurate as a result avoiding the need for national data collection.

Moisture loss or gain is a critical consideration for any net content enforcement effort and one that, in most cases, cannot be addressed by a field official. If moisture loss issues are to be deliberated, it is the regulatory official's responsibility to resolve the packers concern utilizing available resources and due process procedures.

To fulfill this obligation officials 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. 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.

VI. Background Information on Federal Preemption

In the previous memorandum, we reported that FDA was expected to adopt regulations identical to those contained in the 4th Supplement of the third edition of Handbook 133 adopted by the NCWM in 1994. The FDA published proposed regulations regarding net quantity of contents test procedures for packaged food under its jurisdiction in the March 4, 1997, issue (62 FR 9826) of the *Federal Register*. FDA subsequently withdrew that proposal on November 26, 2004 (69 FR 68831). FDA based the withdrawal on the need to reduce its regulatory backlog and focus its resources on current public health issues. The withdrawal did not speak to the merits of the proposal. Based on the experience reported since the adoption of the substantive revisions in 1994, WMD believes that the latest edition of Handbook 133 provides the basis for nationally uniform test methods and other requirements consistent with the requirements in federal laws relating to net quantity of contents. Therefore, WMD recommends that state and local authorities test products according to the procedures outlined in the latest edition of Handbook 133 unless future FDA guidance or regulations specify otherwise. Moreover, it is extremely important that state and local jurisdictions continue to provide regulatory oversight so businesses can compete in a fair marketplace and consumers can depend on the representations of quantity upon which they make purchasing decisions.

a. Federal Preemption under the Nutrition Labeling and Education Act (NLEA) of 1990

The NLEA was signed into law on November 8, 1990, to amend Title 21 Section 343 of the Federal Food, Drug, and Cosmetic Act (FDCA). The Act requires nutrition labeling on foods and regulates health claims about food nutrients to help consumers select a more healthful diet. Under the Act, State and local laws not "identical" to corresponding FDA requirements are preempted. According to regulations under FDA [21 CFR Part 100.1 (c)(4)], the phrase "not identical" does not refer to the specific words in the requirement. Instead it means that the state or local requirement directly or indirectly imposes obligations or contains provisions that (1) are not imposed by or contained in an FDA requirement, or (2) differ from those specifically imposed by or contained in an FDA requirement or implementing regulation.

The preemption ensures uniformity in labeling requirements and prohibits non-uniform State and local laws, regulations, formal and informal policies, and other enforcement practices that prevent firms from conducting efficient and cost-effective business in all 50 States. Congress recognized that even though federal requirements may preempt more restrictive state requirements in certain instances, the net benefits from national uniformity in these aspects of the food label outweigh any loss in consumer protection that may occur as a result.

The ultimate goal of the NLEA is uniformity in laws, regulations, and test procedures—a goal shared by the NCWM and NIST alike. Under NLEA, state and local labeling requirements must be identical to many of the regulations promulgated under the Federal Food, Drug and Cosmetic Act, as amended by the NLEA, in Title 21 – Code of Federal Regulations, Parts 100 to 169 (current edition). Jurisdictions may continue to enforce state or local regulations on foods where there is no federal requirement and continue to enforce existing state and local laws if they are "identical" to FDA regulations.

b. Defining what is "Identical"

Federal preemption of the net quantity of contents regulations and test procedures occurred on November 8, 1991. On that date, state and local regulations on quantity of contents (e.g., net quantity of contents regulations, sampling plans, and test procedures) were preempted under the NLEA if they were not "identical" to federal requirements. The question is, "What is 'identical'?" Both state and FDA regulations require packers to express an "accurate" statement of the quantity of contents of packaged food while permitting "reasonable" variations. The most common questions WMD receives are "do the test

procedures used by the states and FDA provide identical results" (e.g., do the sampling plans have equal confidence levels, and are the products weighed or measured using recognized procedures) and "are the criteria for defining reasonable variations (e.g., the values of maximum allowable variations, the sample correction factors, and allowances for moisture loss) consistent with those used by FDA?"

FDA's test procedures are based on those contained in "Official Methods of Analysis" of the Association of Official Analytical Chemists International (AOAC). Based on information provided by FDA, WMD believes the test procedures contained in the fourth edition of Handbook 133 are identical to the AOAC procedures. If officials implement the recommendations in this memo, they should be using test procedures equivalent to FDA's.

c. Preemption Extends Beyond Food Packages Introduced into Interstate Commerce

Federal courts have ruled that the FDA has jurisdiction over all food products made from ingredients shipped in interstate commerce, regardless of the amount of the ingredient present, even though the finished product has not moved in interstate commerce. Products that have not entered interstate commerce (e.g., bakery products offered for sale in the food store where they are baked and packaged) that are made of ingredients shipped in interstate commerce to the store are subject to the Food, Drug, and Cosmetic Act and, therefore, should only be tested according to the following recommendations in this memorandum until final regulations are adopted by the FDA.

This memorandum is not legal advice. You are encouraged you to review this memo with your State Attorney General or staff attorney before implementing any policy on these issues or before you take enforcement action against a product that falls under FDA or other federal jurisdiction.

Training and Technical Support

WMD is committed to supporting state and local jurisdictions in their package inspection programs by providing technical assistance and training classes on Handbook 133. If you need assistance, please contact Lisa Warfield at (301) 975-3308 or by e-mail at lisa.warfied@nist.gov.

NOTICE

The following documents could not be included in this publication because they are only available in Adobe PDF format. They are available from NIST upon request. Please contact Kenneth Butcher at (301) 975-4859 or at kenneth.butcher@nist.gov or Lisa Warfield at (301) 975-3308 or at lisa.warfield@nist.gov to obtain copies.

B. Letter from Kraft Foods Requesting that NIST Withdraw Letter on Moisture Loss

C. Chapter 3 from the Third Edition of NIST Handbook 133 and 4th Supplement 1994

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Appendix D

Letter Submitted from the International Ice Cream Association to the Food and Drug Administration

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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

Report of the Specifications and Tolerances Committee

Carol Fulmer, Chairman
Director of Weights and Measures
South Carolina Department of Agriculture

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 93rd 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 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 entirety.

This report contains recommendations to amend National Institute of Standards and Technology (NIST) Handbook 44, 2008 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	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	Grain Analyzer Sector	OEM	Original Equipment Manufacturer
GMM	Grain Moisture Meters	Pub 14	NCWM Publication 14
GPMA	Gasoline Pump Manufacturers Association	RMFD	Retail Motor-Fuel Dispenser
HB 44	NIST Handbook 44	SI	International System of Units
HB 130	NIST Handbook 130	SMA	Scale Manufacturers Association
LMD	Liquid-Measuring Device	SWMA	Southern Weights and Measures Association
LPG	Liquefied Petroleum Gas	WG	Work Group
MDMD	Multiple Dimension Measuring Devices	WMD	NIST Weights and Measures Division
MFM	Mass Flow Meter	WS	NTETC Weighing Sector
MMA	Meter Manufacturers Association	WWMA	Western Weights and Measures Association
MS	NTETC Measuring Sector	USNWG	NIST/OIML U.S. National Working Group
NCWM	National Conference on Weights and Measures, Inc.	VTM	Vehicle-tank Meters

"Handbook 44" (HB 44) means the 2008 Edition of NIST Handbook 44 "Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices"

"Handbook 130" (HB 130) means the 2008 Edition of NIST Handbook 130 "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	
300 (Consent Calendar)	38	0	33	0	Passed
310-4	24	13	19	15	Returned to Committee
320-5	37	1	27	1	Passed
300 (Report in its Entirety Voice Vote)	All Yeas	No Nays	All Yeas	No Nays	Passed

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. Access to Calibration and Configuration Adjustments, and G-S.8.2. Automatic or Semi-automatic Calibration Mechanism.

Source: Southern Weights and Measures Association (SWMA)

Recommendation: Amend General Code paragraph G-S.8. 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.*
[Nonretroactive as of January 1, 1990]

~~**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 **2008**)

Add new General Code paragraphs G-S.8.1. and G-S.8.3., and renumber previous G-S.8.1. to G-S.8.2. as follows:

G-S.8.1. Access To Calibration and Configuration Adjustments. – A device shall be so designed that:

(a) The application of the physical security seal automatically disables the access, including external and remote access, to the calibration and configuration mode, or

(b) The calibration and configuration adjustments, including external and remote access, are protected by an approved audit trail, and in addition:

- ***The device shall 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***

- ***The device shall 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, 2009)

(Added 200X)

G-S.8.~~1~~2. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. – *A change to any metrological parameter (calibration or configuration) of any weighing or measuring element shall be individually identified.*
[Nonretroactive as of January 1, 2010]

Note: For devices that utilize an electronic form of sealing, in addition to the requirements in **G-S.8.~~1~~2.,** any appropriate audit trail requirements in an applicable specific device code also apply. Examples of identification of a change to the metrological parameters of a weighing or measuring element include, but are not limited to**:**

(1) a broken, missing, or replaced physical seal on an individual weighing, measuring, or indicating element or active junction box;

(2) a change in a calibration factor or configuration setting for each weighing or measuring element;

(3) a display of the date of calibration or configuration event for each weighing or measuring element; or

(4) counters indicating the number of calibration and/or configuration events for each weighing or measuring element.

(Added 2007)

G-S.8.3. Automatic or Semi-automatic Calibration Mechanism. – 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 1993)

Background/Discussion: 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. The SWMA heard comments that manufacturers can incorporate into a device ways to indicate a device is in the calibration mode other than having an enunciator or other indication. Manufacturers also believe any changes to the requirements need to be nonretroactive. The SWMA S&T Committee agreed and modified the original proposal as shown above. The SWMA agreed to forward the modified proposal to the NCWM S&T Committee with a recommendation that it be a Voting item on the Committee's agenda.

At the 2008 Interim Meeting, the Committee and the Meter Manufacturers Association (MMA) supported the proposal as presented. The Scale Manufacturers Association (SMA) recommended that, "The device shall provide an indication that it is in the setup mode." The Committee received a comment that as written the requirement that the device automatically exit the configuration mode after 60 minutes would not allow for a shorter time frame.

The Committee reviewed the comments received during the open hearing and discussed the alternate proposals provided by WMD and SMA. The Committee agreed that if a device designed for commercial applications is capable of being "sealed" with 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 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 the open hearing.

The changes to the original proposal make a distinction between configuring a device to either enable or disable external or remote access to the calibration and configuration modes and taking the device out of a normal mode of operation and putting it into a special mode of operation where adjustments are made to calibration and configuration parameters. In other words, if the internal position of a switch or jumper enables external access to the calibration and configuration modes, the device will operate normally until an operator takes action such as entering a pass code, depressing and holding down a specific key, or uses other means to enter a special operating mode to make adjustments to calibration and configuration parameters. The Committee also believed that an indication for the adjustment mode of operation is only necessary for devices with approved category 1, 2, or 3 audit trails and that it not be operable in normal weighing or measuring operation.

The revised proposal states that:

- In the case of a device with a physical security seal, the application of the seal means that the external or remote access that enables the calibration and configuration modes is automatically disabled.

– In the case where a device has an approved audit trail, the device would be required to clearly and continuously indicate on the display (and printed if equipped with a printer) that it is in a calibration mode and not the normal operating mode.

The Committee did not include the proposed time limits for devices to remain in the calibration/configuration mode because suitable times are different for different types of devices. For example, a 15 kg scale is likely to need less time to adjust than a vehicle scale or wholesale meter. The Committee is also aware of NTEP evaluation procedures that require indications and recorded representations (while in the adjustment mode) be either clearly identified as being in the calibration or configuration adjustment mode by means of words, symbols, codes, or that metrological indications cannot be interpreted as valid measurements. The Committee decided to present the amended proposal as shown in the recommendation for a vote at the Annual Meeting.

The Committee received the report of the SMA's 2008 spring meeting. The SMA supported the need for clarification of G-S.8. and stated that paragraph G-S.8.1. part (a) in the above recommendation changed the original intent of the physical security seal and the wording of part (b) could be accomplished by changing the following wording to replace the current recommendation:

G-S.8.1. Access To Calibration and Configuration Adjustments. – A device shall be so designed that access to calibration and configuration mode shall be protected by an approved category 1, 2, or 3 method of sealing, and shall clearly indicate to the operator when in this mode.

The Committee agreed with comments from the CWMA, NEWMA, and the NTEP participating laboratories 2008 spring meeting reports to delete the words "category 1, 2, or 3," and add language that the device shall clearly and continuously indicate and print, if equipped with a printer, that the calibration and configuration adjustment mode is enabled or that the device shall not operate while in this mode or shall not display a usable quantity value. NEWMA recommended that this item be made Iinformational to allow more time for the NCWM and other interested parties to review and analyze the alternate proposals from the CWMA and SMA.

At the 2008 Annual Meeting, the Committee heard comments from WMD which noted that the alternate language submitted by SMA would require that ***all*** devices in the calibration mode provide indications to the operator. This would encompass mechanical and electronic, and devices that use category 1 physical seals. Additionally, WMD believes that a device does not need an indication that 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. WMD suggested that the committee amend the recommendation to address some of the concerns noted by the CWMA, NTEP participating laboratories, and WMD since the 2008 Interim Meeting.

The Committee agreed with the comments from the CWMA, and WMD and amended paragraph G-S.8.1. as shown in the recommendations to:

- delete the references to the sealing categories of device,
- 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 this mode.

Just prior to the voting session, it was noted that the revised language in G-S.8.1.(a) had been inadvertently changed, and that it could be interpreted to mean that the physical seal itself disabled access to the adjustment mechanisms instead of simply preventing access to the mechanism. Consequently, the Committee changed the status of the item from Voting to Informational. The Committee believes 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. and will submit the following revised language for G-S.8.1. to the regional weights and measures associations for further review and consideration.

G-S.8.1. Access To Calibration and Configuration Adjustments. – A device shall be so designed that access to calibration and configuration modes, including external and remote access, are only permitted when:

(a) The application of the physical security seal shall ensure that the access to the calibration and configuration modes is disabled, or

(b) The calibration and configuration adjustments are protected by an approved audit trail, and 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, 2009)

(Added 200X)

310-2 I Appendix D – Definition of Electronic Devices, Software-Based

Source: Carryover Item from 2008. This item originated from the NTETC Software Sector and first appeared on the Committee's 2007 Agenda as Developing Item Part 1, Item 2 and was placed on the Committee's Interim Agenda as Item 320-2 and was then returned back to Item 360-2 Developing Items in the Committee's Interim Report to the NCWM.

Recommendation: Add a new definition and cross-reference term to Appendix D in HB 44 for "Electronic devices, software-based" as follows:

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.

Background/Discussion: During the NTETC Software Sector discussion on marking requirements and G-S.1.1. Location of Identification Information, 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 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).

At the 2008 Interim Meeting, the SMA supported the intent of the item, but stated that it is premature to place these definitions in HB 44. The SMA recommended that the status of the item be changed to Developing on the S&T Committee Agenda. The Committee agreed to move Item 310-2 of the 2008 S&T Committee Interim Agenda and assign Developing status as 360-2 Part 1, Item 2.

At the 2008 Annual Meeting, the Committee heard comments from the former NTETC Software Sector Chairman indicating that the Sector had completed its review of this item and could not develop it any further. The Chairman requested that the Committee consider moving the item from the Developmental section of the agenda and at least make it an Information item on the Committee's agenda to facilitate discussion and comment on the proposed language.

The Software Sector has indicated that it has completed its work on the item and noted that sufficient information (including specific proposed language) was included in the submission to enable action by the Committee;

consequently, the Committee agreed to change the status of the item from Developmental to Informational and will forward the item to the regional weights and measures associations.

310-3 V G-A.1. and Appendix D – Definition of Equipment

(This item was adopted.)

Source: Carryover Item 310-1B. (This item originated from the 2007 Committee during discussion on agenda Item 310-1A General Code, paragraph G-S.2. Facilitation of Fraud.)

Recommendation: Modify G-A.1.(a) and add a new definition to Appendix D in HB 44 for "equipment" as follows:

G-A.1. Commercial and Law-Enforcement Equipment. – These specifications, tolerances, and other technical requirements apply as follows:

(a) To commercial weighing and measuring equipment; that is, to weights and measures and weighing and measuring devices commercially used or employed in establishing the size, quantity, extent, area, **composition (limited to meat and poultry), constituent value (limited to grain),** or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of weight or measure.

(Amended 2008)

Appendix D

equipment, commercial. Weights, measures, and weighing and measuring devices, instruments, elements, and systems or portion thereof, used or employed in establishing the measurement or in computing any basic charge or payment for services rendered on the basis of weight or measure. As used in this definition, measurement includes the determination of size, quantity, value, extent, area, composition (limited to meat and poultry), constituent value (limited to grain), or measurement of quantities, things, produce, or articles for distribution or consumption, purchased, offered, or submitted for sale, hire, or award. [1.10, 2.20, 2.21, 2.22, 2.24, 3.30, 3.31, 3.32, 3.33, 3.34, 3.35, 3.38, 4.40, 5.51, 5.56.(a), 5.56.(b), 5.57, 5.58, 5.59]

commercial equipment, See equipment

Background/Discussion: During the Committee's 2007 discussion of agenda Item 310-1 Facilitation of Fraud, the Committee agreed there was a need to define the term "equipment." The Committee believed the proposed definition will help prevent misinterpretation of the term as used in paragraph G-S.2. and several other HB 44 codes. The proposed definition is intended to clarify which parts or portions of a device or system must comply with applicable specifications, tolerances, and other technical requirements in HB 44. The Committee recommended the proposed definition be carried over to allow sufficient time for a review of the proposed definition.

For additional background information, refer to the Committee's 2007 Interim and Annual Reports.

At its 2007 Annual Meeting, the WWMA supported the intent of the proposal. The WWMA recommended the proposed language be split into two sentences and recommended the proposal move forward as a Voting item on the NCWM S&T Committee Agenda.

The CWMA and NEWMA supported the intent of the proposal, agreed with the changes to the proposed definition recommended by the WWMA, and recommend the proposal move forward as a Voting item on the NCWM S&T Committee Agenda.

At the 2008 Interim Meeting, the Committee heard no opposition to the item. The Committee received a recommendation to modify G-A.1. to: (1) add the words "composition, constituent value" to include the

measurements provided by Near-Infrared Grain Analyzers and Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices, and (2) to modify the definition of "equipment" to include law enforcement and statistical information collection devices. The Committee modified the proposal as shown above and agreed to present it for a vote at the NCWM Annual Meeting.

At the 2008 Annual Meeting, the Committee agreed with the reports of the CWMA and NEWMA 2008 spring meetings that stated that the words "composition" and "constituent" need better definitions to make sure that the additional words do not broaden the scope of HB 44. The Committee also agreed with a suggestion from the Grain Inspection, Packers, and Stockyards Administration (GIPSA) to include the words "meat and poultry" to limit the scope of "composition." The Committee believed that the word "grain" should also be added to limit the scope of "constituent value" and amended the proposal to read as shown in the Committee's recommendation.

310-4 V G-N.3. Verification of Testing Standards

(This item did not pass or fail; therefore, it returns to the Committee.)

Note: This item was originally addressed under Item 330-2 in the Committee's 2008 Interim Agenda. As a result of deliberations (see "Background/Discussion" below) at the 2008 Interim Meeting, the Committee decided to delete Item 330-2 and to address the issue in this new Item 310-4, which proposes adding a paragraph to the General Code to designate general requirements for all field standards. At the 2008 NCWM Annual Meeting, the Committee decided (as a result of comments received following the Interim Meeting) to reinstate Item 330-2 (which proposes an addition to the Liquid-Measuring Devices Code to specify pour and drain times for measuring device test standards) as an Information item; the Committee's rationale for this decision is outlined in Item 330-2 of this report. Note, however, that the Committee retained Item 310-4 and presented that item as a Voting item at the Annual Meeting.

Source: Central Weights and Measures Association (CWMA)

Recommendation: Add the following paragraph G-N.3. to the General Code:

G-N.3. – Verification (Testing) Standards. – Field standards used in verifying weighing and measuring devices shall comply with the most current requirements of NIST Handbook 105 Series standards (or other suitable and designated standards) or the accuracy requirements expressed in Fundamental Considerations, Paragraph 3.2. (i.e., one-third of the smallest tolerance applied).

(Added 2008)

Delete corresponding paragraphs in the Scales Code, Automatic Bulk Weighing Systems Code, and the Automatic Weighing Systems Code as follows:

Scales Code:

~~**N.2. Verification (Testing) Standards. – Field standard weights used in verifying weighing devices shall comply with requirements of NIST Handbook 105-Series standards (or other suitable and designated standards) or the tolerances expressed in Fundamental Considerations, Paragraph 3.2. (i.e., one-third of the smallest tolerance applied).**~~

~~**(Amended 1986)**~~

Automatic Bulk Weighing Systems Code:

~~**N.2. Verification (Testing) Standards. – Standard weights and masses used in verifying weighing devices shall comply with requirements of NIST Handbook 105-1 (Class F) or the tolerances expressed in Appendix A, Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).**~~

Automatic Weighing Systems Code:

~~**N.1.3. Verification (Testing) Standards. – Field standard weights shall comply with requirements of NIST Handbook 105-1 (Class F) or the tolerances expressed in Fundamental Considerations, Paragraph 3.2. (i.e., one-third of the smallest tolerance applied).**~~

Background/Discussion: This item was originally presented as Item 330-2 on the Committee's 2008 Interim Agenda. The item was moved to Item 310-4. The Committee considered the following proposal from the CWMA to add a new paragraph N.4.6.:

N.4.6. Pour and Drain Times for Hand-held Test Measures – Hand-held test measures require a 30-second (± 5 seconds) pour followed by a 10-second drain, with the measure held at a 10- to 15-degree angle from vertical.

(Added 200X)

The CWMA noted that HB 44 does not address pour or drain times for 5 gal test measures used to test retail motor-fuel devices. However, the pour and drain time reqirements are in HB 112 Examination Procedure Outline Numbers 21 and 22 for Retail Motor-fuel Dispensers in Test Notes paragraph 2. They are also referenced in NIST HB 105-3 Specifications and Tolerances for Graduated Neck-Type Volumetric Field Standards Section 7. Test Methods and References.

Metrology labs are not routinely requiring that hand-held (5 gal) test measures be labeled with this information when the information is missing. Additionally, many hand-held test measures used by service agents and agencies do not specify drain times. Service agents, as a result, are using incorrect pour and drain times.

At the 2008 Interim Meeting, the Committee agreed that rather than putting a requirement in HB 44 stipulating pour and drain times for provers and test measures, it is preferable to reference the requirements in NIST Handbook 105-3 as follows:

N.4.6. Verification (Testing) Standards. – Field standard provers and test measures used in verifying measuring devices shall comply with requirements of, and used in accordance with, NIST Handbook 105-3 standards (or other suitable and designated standards) and the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).

(Added 2008)

The Committee noted that the NIST 105 series handbooks are already referenced in Appendix A – Fundamental Considerations of HB 44. The Committee also noted that pour and drain times are referenced in NIST HB 112 EPOs and are referenced in NIST training materials and training presented by NIST. The Committee questioned whether a lack of uniformity in the application of Handbook 105-3 criteria is sufficient technical justification for including requirements in HB 44. However, the Committee acknowledged the concerns raised by some jurisdictions regarding the need for service companies to apply proper drain times and discussed alternative approaches to assist those jurisdictions and to emphasize the need to follow Handbook 105 series criteria.

In its review of the issue, the Committee noted that several of the weighing devices codes in HB 44 already include similar paragraphs referencing requirements for test standards. Since the application of Handbook 105 criteria is universal to all devices covered by HB 44, as referenced in the Fundamental Considerations, the Committee believes that including a paragraph in the Notes section of the General Code to reference the Handbook 105 series is more efficient than including references in each specific code. Consequently, the Committee developed a proposal to add a new paragraph G-N.3. Verification (Testing) Standards to the General Code and delete corresponding Notes paragraphs currently in the Scales Code, Automatic Bulk-Weighing Systems Code, and the Automatic Weighing Systems Code as outlined in the recommendation above. The Committee agreed to present this item for a vote.

In its spring 2008 report, the CWMA S&T Committee indicated that it heard comments that field inspectors may not carry the NIST HB 105 series. Comments were also heard that the proposed item be code specific to eliminate any

confusion. The CWMA S&T Committee recommended that the item be included only in specific LMD code and not in the General Code.

In their spring 2008 report, NEWMA stated that some of the 105 series are out of date and that before this item is adopted, the series should be brought up to date. An example was made of 105-1 where OIML class F1/F2 is not recognized even though weights of that class are commonly used to test class II scales in the United States. NEWMA further stated that this should remain a Developing item while the 105 series is being updated by NIST.

The SMA stated that it supported this item at its 2008 spring meeting.

The Committee received comments from WMD indicating that, since pour and drain times are published in the EPOs and taught in WMD training, a reference to the 105 series in the General Code is more appropriate; particularly since NIST Handbook 105-3 Section 4.5.10.1 requires the marking of drain and delivery times on handheld test measures. With regard to concerns about update intervals for a particular 105 series handbook, WMD pointed out that the 105 series are already referenced in the Fundamental Considerations and have been for some time, and periods during which a handbook is being updated have apparently not posed any significant problems in the past. WMD also raised a concern over whether a trend for inclusion of references such as this in many individual codes might ultimately discourage the inspector and service company from referencing the Fundamental Considerations where other important information about necessary equipment and practices are found.

At the 2008 NCWM Annual Meeting, the Committee agreed that the proposed change to the General Code should remain as a Voting item since the language will provide guidance for device codes that do not specify the suitability and use of standards in the specific codes. The Committee also amended the proposal to address the concerns about the references to the term "tolerance" by changing the reference to the term "tolerances" to the words "accuracy requirements."

The Committee heard comments during the open hearing that specific hand-held test measure user requirements are still needed in the LMD Code for weights and measures officials and service agents. Therefore, the Committee recommends that language originally submitted by the CWMA be reinstated in the Committee's report as an Iinformation item on the agenda.

320 SCALES

320-1 V S.1.1.1.(b) Digital Indicating Elements

(This item was adopted.)

Source: Carryover Item 320-2. (This item originated from the NTETC WS and first appeared on the Committee's 2007 agenda.)

Recommendation: Amend S.1.1.1.(b) Digital Indicating Elements as follows:

S.1.1.1. Digital Indicating Elements.

(a) A digital zero indication shall represent a balance condition that is within ± ½ the value of the scale division.

(b) A digital indicating device shall either automatically maintain a "center-of-zero" condition to ± ¼ scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero balance condition to ± ¼ of a scale division or less. ***A "center-of-zero" indication may operate when zero is indicated for gross or net mode(s).***
[Nonretroactive as of January 1, 1993]

(Amended 1992 **and 2008**)

Background/Discussion: This proposal was originally intended to clarify that the center-of-zero indicator may be operable when a zero condition exists in the net weight mode. At the 2007 NCWM Annual Meeting, the Committee heard testimony from the CWMA**,** NEWMA, and SMA stating that this item in the 2007 Interim Agenda had changed from the original intent (to verify that center-of-zero could be operable in the net mode) to include additional language which significantly altered the requirement. For example, using "and" instead of "or" at the end of paragraph S.1.1.1.(a), makes both requirements mandatory in both (a) and (b) of S.1.1.1. If "or" is used instead of "and," then this proposal lowered the current requirement of ½ e to ¼ e. The SMA further stated the proposal was not consistent with Canadian and OIML requirements because proposed paragraph (a) added a dual requirement for the "center-of-zero" indication. Therefore, the CWMA, NEWMA, and SMA recommended the status of the proposal be changed to Informational to allow time for further consideration.

At its 2007 Annual Meeting, the WS reviewed this item and agreed to support the WMD language as recommended in the 2007 NCWM S&T Committee Final Report on Agenda Item 320-2.

At their fall 2007 meetings, the CWMA and WWMA S&T Committees heard unanimous support for this proposal and agreed with the alternative language written by WMD. The CWMA and WWMA recommended the proposal incorporating the WMD alternate language as shown above move forward as a Voting item on the NCWM S&T Committee Agenda.

NEWMA believes the scale should not indicate a "center-of-zero" indication if the scale is displaying a negative weight when the tare object is removed from the load-receiving element after tare has been taken. Therefore, at its 2007 Interim Meeting, NEWMA supported the intent of this proposal but submitted an alternate note for paragraph S.1.1.1. as follows:

> **Note: The "center-of-zero" indication may also work when zero is indicated in either the gross or net mode.**

During the 2008 NCWM Interim Meeting, the Committee heard support for the intent of the proposal and for the NEWMA recommendation to clarify that the center-of-zero indication is only applicable when there is an indication of zero (gross load zero or net load zero with an object on the scale). NIST WMD agreed with NEWMA since the NEWMA recommendation is consistent with the language in the 2007 Edition of NCWM Publication 14 Digital Electronic Scales Section 41. Zero Indication and OIML R 76-1 Metrological and Technical requirements for Nonautomatic Weighing Instruments clause 4.5.5. WMD suggested that the proposed sentence be added to the end of paragraph S.1.1. since a "stand-alone" note is not justified.

The Committee agreed with comments during the open hearing and the recommendations from NEWMA and WMD and made this item a Voting item in its Interim Report. The Committee received no opposition to the item prior to or at the 2008 Annual Meeting.

For additional background information, refer to the Committee's 2007 Final Report.

320-2 V S.1.2.1. Weight Units, S.2.3. Tare, and T.N.2.1. General

(This item was adopted.)

Source: Carryover Item 320-3. (This item originated from the NTETC WS and first appeared on the Committee's 2007 agenda.)

Recommendation: Add a new note to paragraph S.1.2.1. and amend paragraphs S.2.3. and T.N.2.1. as follows:

> ***S.1.2.1. Weight Units.*** *– Except for postal scales, a digital-indicating scale shall indicate weight values using only a single unit of measure. Weight values shall be presented in a decimal format with the value of the scale division expressed as 1, 2, or 5, or a decimal multiple or sub-multiple of 1, 2, or 5.*
>
> ***Note: The requirement that the value of the scale division be expressed only as 1, 2, or 5, or a decimal multiple or submultiple of only 1, 2, or 5 does not apply to net weight indications and recorded***

representations that are calculated from gross and tare weight indications where the scale division of the gross weight is different from the scale division of the tare weight(s) on multi-interval or multiple range scales. For example, a multiple range or multi-interval scale may indicate and record tare weights in a lower weighing range (WR) or weighing segment (WS), gross weights in the higher weighing range or weighing segment, and net weights as follows:

55 kg	*Gross Weight*	*(WR2 d = 5 kg)*	*10.05 lb*	*Gross Weight*	*(WS2 d = 0.05 lb)*
– 4 kg	*Tare Weight*	*(WR1 d = 2 kg)*	*– 0.06 lb*	*Tare Weight*	*(WS1 d = 0.02 lb)*
= 51 kg	*Net Weight*	*(Mathematically Correct)*	*= 9.99 lb*	*Net Weight*	*(Mathematically Correct)*

(Note added 2008)
[Nonretroactive as of January 1, 1989]

(Added 1987) **(Amended 2008)**

S.2.3. Tare. – *On any scale (except a monorail scale equipped with digital indications* ***and multi-interval scales or multiple range scales when the value of tare is determined in a lower weighing range or weighing segment)****, the value of the tare division shall be equal to the value of the scale division.** The tare mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. *A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.**

*[**Note**: On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination]**
*[*Nonretroactive as of January 1, 1983]*

(Amended 1985 **and 2008**)

T.N.2.1. General. – The tolerance values are positive (+) and negative (-) with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare zero reference **(zero net indication)**; the tolerance values apply to **the net weight indication for any possible tare load using** certified test loads~~only~~.

(Amended 200X)

Discussion: In 2006 the NTETC WS formed a Tare WG to review existing tare requirements and make recommendations as to how tare was to operate on a single range scale, a multiple range scale, and a multi-interval scale. The WG was also asked to develop, where necessary, recommendations for changes to NCWM Publication 14, HB 44, and HB 130, and to provide guidance to the WS on related type evaluation requirements.

This proposal, which was developed by the Tare WG and supported by the WS, adds a new note to paragraph S.1.2.1. The note recognizes display and printing of net weight values in divisions other than the scale division used in the display of gross weight, resulting in a more accurate net weight determination. The proposed changes to S.1.2.1. requires that paragraph S.2.3. Tare also be amended as shown in the above proposal to avoid a conflict with the changes to paragraph S.1.2.1. Additionally, the Tare WG recommended changes to paragraph T.N.2.1. to clarify that tolerances in Table 6 also apply to net weight indications.

The Tare WG developed a corresponding proposal for the Automatic Weighing Systems Code to clarify the appropriate scale division values and the application of tolerances to tare weights for those devices (see S&T Item 324-1).

During the 2007 NCWM Annual Meeting, the Committee heard comments from the CWMA and NEWMA supporting this item with recommendations to change the word "value" to "division" and incorporate the SWMA recommendation to modify paragraph S.2.3.

NEWMA pointed out that the proposed amendment to S.1.2.1. appeared to be permissive and not a requirement. NEWMA asked if the intent was to prohibit multi-interval and multiple range scales from rounding and indicating calculated net weights in scale divisions to only 1, 2, or 5 when appropriate or was rounding the scale divisions still

allowed. The WMD representative to the NCWM Tare WG stated that the intent was for the language to be permissive because there are a significant number of devices in the marketplace with an NTEP CC that round the tare values before calculating net weights.

The Committee made several modifications to the proposal to:

- clarify the examples in the proposed note to paragraph S.1.2.1.,
- change the words "scale value" to "scale division" to be consistent with the terminology currently used in HB 44, and
- clarify that the SWMA proposed modification to the language in S.2.3. for an exception for multi-interval and multiple range scales only applies to the requirement that the value of tare shall be equal to the value of the scale division.

At its 2007 Annual Meeting, the WS reviewed the amended proposal and stated that the examples in the language carried over from the 2007 NCWM Annual Meeting did not provide enough information, such as the capacities of the weighing ranges or segments and the values of "d" for each weighing range or segment. Additionally, it was agreed that the second example should have a net value that is different from the first example.

At its 2007 Annual Meeting, the WWMA S&T Committee heard from the NTETC WS and SMA which supported the intent of this item. The WWMA recommended that the example be amended by changing the second paragraph of the note and by adding sample equations.

The CWMA and NEWMA agreed with the fall 2007 WS and WWMA recommendation. Additionally, the CWMA and WWMA recommend that this proposal move forward as a Voting item on the NCWM S&T Committee Agenda.

During the 2008 NCWM Interim Meeting, Ross Andersen, New York, commented that the proposal is different from what is currently permitted in Publication 14 in that the tare values for multi-interval and multiple range scales are rounded, indicated, and recorded to the nearest value of the net weight division if the net weight is in a higher weighing range or segment. Additionally, he noted that the proposal is also inconsistent with OIML R 76 since the value of the net weight division is expressed only as 1, 2, or 5. The NIST technical advisor responded that the Tare WG considered the differences between Pub 14 and OIML R 76. The Tare WG believes that the current tare requirements in Pub 14 forces tare in a lower range or segment to round up or down to the nearest division. In some cases, tare will be rounded to zero. This proposal increases the accuracy of the net weight calculated by the difference in the actual gross and tare values without introducing errors due to rounding tare and net weights to a larger d value when the gross weight is in a higher range or segment.

It should be noted that OIML R 76 is different from what is permitted in this proposal. OIML R 76 requires that printed weighing results be rounded to the nearest scale division of the actual weighing range or segment of each gross, tare and net result and permits a 1 d error in the calculation of net due to rounding. R 76 clause 4.6.12 "Examples of indications of weighing results" footnote 4 states:

> [4)] The displayed and printed weighing results (gross, tare weighing, net) shall be rounded each to the actual e (d). The e can be different depending on the actual weighing range or the actual partial weighing range, so a deviation of 1 x e (d) may be possible between the gross weighing result and the calculation of net and tare values.

The Tare WG concluded that neither of the current requirements in Publication 14 and R 76 were acceptable and recommended that the most accurate method to determine net weights is to perform an accurate mathematical calculation between the actual gross and net weights and to not require the net weight to comply with the requirement that it be expressed only as 1, 2, or 5.

The Committee heard support from the SMA for the proposal. The Committee believes that the alternate language submitted by WMD more clearly states the original intent of the proposal by deleting the second paragraph in the note and amending the examples submitted by the WWMA as shown in the above proposal. Don Onwiler commented that the NTEP laboratories have been discussing this issue for quite some time. Some of the NTEP labs believe that the tare should always round up to the favor of the customer. But that argument does not take into

account applications where the customer is selling product to the scale owner, in which case rounding tare up is always against the customer. Don added that this proposal is a compromise that results in a more accurate net weight determination and that he is in support of the proposal and commends the work of the Tare WG to resolve this issue.

At the 2008 Annual Meeting, the Committee agreed with comments from the SMA, the CWMA, and NEWMA to include the word "segment" in paragraph S.2.3., and amended the proposal as shown in the above recommendation.

For additional background information, refer to the Committee's 2007 Annual Report.

320-3 W S.1.7. Capacity Indication, Weight Ranges, and Units Weights

(This item was withdrawn.)

Source: National Type Evaluation Technical Committee Weighing Sector

Recommendation: Modify paragraph S.1.7. as follows:

S.1.7. Capacity Indication, Weight Ranges, and Unit Weights.

(a) Gross Capacity. An indicating or recording element shall not display nor record any values when the total platform load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity.

(b) *Capacity Indication. Electronic computing scales (excluding postal scales and weight classifiers) shall neither display nor record a gross or net weight in excess of scale capacity plus 9 d.*
[Nonretroactive as of January 1, 1993]

(c) Flashing weight values are not acceptable as an overload indication.

The total value of weight ranges and of unit weights in effect or in place at any time shall automatically be accounted for on the reading face and on any recorded representation.

This requirement does not apply to: (1) single-revolution dial scales, (2) multi-revolution dial scales not equipped with unit weights, (3) scales equipped with two or more weighbeams, nor (4) devices that indicate mathematically derived totalized values.

(Amended 1990, 1992, ~~and~~ 1995 **and 200X**)

Background/Discussion: During its review and discussion of the Tare WG recommendation, the WS reviewed a comment from the WG that paragraph S.1.7. should be amended to include a statement that flashing weight values are not an acceptable indication of over capacity. The Tare WG made this recommendation to the Sector while developing a new paragraph that limits tare operating range to the capacity of a scale. This language has been in NCWM Publication 14 as early as its 2nd Edition (1989) and was added when NTEP applicants submitted scales using flashing weight values to indicate an over-capacity condition since flashing weights could be written down and used for commercial weight determinations. The WS agreed with the Tare WG recommendation and requested that appropriate language, as shown above, be developed by the NIST technical advisor and submitted to the NCWM S&T Committee.

During the 2008 NCWM Interim Meeting, the SMA stated that they oppose this item and believe that the current wording in subparagraphs S.1.7. (a) and (b) sufficiently addresses the issue. The SMA added that the recommendation to add a new subparagraph (c) would lead to an open list of possible unacceptable designs (solutions). WMD agreed with the SMA and stated that the language in Publication 14 is an appropriate interpretation of S.1.7. (a) and (b). Additionally, Publication 14 could be clarified to state that the scale shall not display any measurement value when the capacity exceeds 105 % of the nominal capacity (9 d for computing scales).

The Committee agreed with the comments and noted that a flashing weight can be interpreted as a valid weight and, therefore, any indication of weight value shall not be displayed nor recorded when the total platform load is in excess of 105 % of scale capacity. Consequently, the Committee withdrew this proposal from the agenda in its Interim Report.

320-4 V S.2.1.5. Initial Zero-Setting Mechanism

(This item was adopted.)

Source: National Type Evaluation Technical Committee Weighing Sector

Recommendation: Amend NIST Handbook 44, Section 2.20. Scales Code, paragraph S.2.1.5. as follows:

S.2.1.5. Initial Zero-Setting Mechanism. – ~~(a)~~ Scales of accuracy Classes I, II, and III may be equipped with an initial zero-setting device.

(**a~~b~~**) For **weighing, load-receiving, and indicating elements in the same housing or covered on the same CC.** An initial zero-setting mechanism shall not zero a load in excess of 20 % of the maximum capacity of the scale unless tests show that the scale meets all applicable tolerances for any amount of initial load compensated by this device within the specified range.

(b) ***For indicating elements not permanently attached to weighing and load-receiving elements covered on a separate CC, the maximum initial zero-setting mechanism range of electronic indicators shall not exceed 20 % of the configured capacity.***
[Nonretroactive as of January 1, 2009]

(Added 2008)

(Added 1990) **(Amended 2008)**

Background/Discussion: This item first appeared on the NTETC WS agenda in 2004. The Sector noted that Scales Code paragraph S.2.1.5. was clear about the requirements for Initial Zero-Setting Mechanism (IZSM) for complete scales. However, it did not address the requirements for separable weighing and indicating elements. Electronic indicating elements have been submitted to NTEP with an IZSM of 100 % of the configured capacity of the indicator. NTEP can easily test to verify IZSM requirements on these elements. However, the problem occurred when the separable load-receiving element (with a CC) was not tested for IZSM and was interfaced with an indicating element that had been tested for IZSM.

If the IZSM on the indicating element was configured to zero off 100 % of the scale capacity and then interfaced with a load-receiving element that had not been tested for IZSM, the load-receiving element could be inadvertently loaded to 200 % of its designed capacity even though it indicated only 100 % capacity. This would likely result in inaccurate weight determinations and/or damage to the scale.

NTEP only evaluates load-receiving elements up to 105 % of the capacity requested by the applicant and marked on the device. All Class I, II, and III separable weighing/load-receiving elements with NTEP CC's have not been submitted or tested with an IZSM feature unless the submission was to be treated as a complete scale with a specific indicating element. Therefore, there is a possibility that many load-receiving elements consisting of only load-cell support structures may not comply with an indicating element configured with IZSM enabled.

The WS believes that weighing, load-receiving, and indicating elements that are type evaluated together and listed on a single CC can be tested with an IZSM up to 100 % to assure compatibility between the indicating and weighing/load-receiving elements. Separable weighing/load-receiving elements are typically not tested for IZSM since the IZSM is a feature of the indicating element. The Sector considered and agreed that the 20 % limitation was an appropriate value for IZSM in developing the proposal to amend HB 44 paragraph S.2.1.5. based on OIML R 76 [Technical requirements for a self- or semi-self-indicating instrument paragraph 4.5.1. Maximum Effect (of IZSM), WELMEC 2-1 Guide for Testing Indicators] and Canadian requirements (LG-15.04 IZSM Range-Maximum Range of Initial Zero-Setting Mechanism).

At its 2007 Annual Meeting, the WWMA S&T Committee heard comments questioning why Class III L scales are not included in this proposal. A comment was also received to amend the proposal in subparagraph (c) to state that the IZSM "shall not exceed" 20 %. The WWMA S&T Committee agreed with the second comment and recommended amending the proposal as follows:

S.2.1.5. Initial Zero-Setting Mechanism.

(c) ***For indicating elements not permanently attached to weighing and load-receiving elements covered on a separate CC, the maximum initial zero-setting mechanism range shall not exceed 20 % of the configured capacity.***

The WWMA agreed with the intent of the proposal and recommended this proposal, with modifications as shown above, become a Voting item, and that additional research be conducted before the Interim Meeting to determine why Class III L scales were omitted from the existing language in HB 44. (**Technical Advisor's Note:** The 1990 NCWM Annual Report of the S&T Committee Agenda Item 320-1 stated that the Committee believed IZSM was not appropriate or necessary on vehicle scales or other Class III L scales.)

At its 2007 Interim Meeting, the CWMA agreed with the WWMA comment and recommendation.

During the 2008 NCWM Interim Meeting, the Committee heard unanimous support of the item and agreed with the WWMA comments to change the proposed phrase "***must be limited to 20 %***" to "***shall not exceed 20 %***" as shown in the recommendation above. The Committee made the proposal a Voting item.

At the 2008 Annual Meeting, the Committee agreed with a suggestion to eliminate the reference to railway track scales in the third paragraph in the background/discussion section of this item since IZSM has never been applicable to Class III L scales. The Committee subsequently amended the referenced paragraph in its Interim Report for the Final Report. The Committee also agreed to recommend 2009 as the nonretroactive date.

320-5 V S.2.4. Level-Indicating Means and S.2.4.1. Vehicle On-Board Weighing Systems

(This item was adopted.)

Source: Western Weights and Measures Association

Recommendation: Amend paragraphs S.2.4. and S.2.4.1. as follows:

S.2.4. Level-Indicating Means. – Except for portable wheel-load weighers and portable axle-load scales, a portable scale shall be equipped with level-indicating means if its weighing performance is changed by an amount greater than the appropriate acceptance tolerance when it is **tilted up to and including 5 % rise over run in any direction from a level position and rebalanced.** ~~**moved from a level position and rebalanced in a position that is out of level in any upright direction by 5 % (approximately three degrees).**~~ The level-indicating means shall be readable without removing any scale parts requiring a tool.

[This requirement is nonretroactive as of January 1, 1986, for prescription, jewelers', and dairy-product-test scales, and scales marked I and II.]

[Note: Portable wheel-load weighers and portable axle-load scales shall be accurate when **tilted up to and including 5 % rise over run in any direction from a level position and rebalanced.** ~~**placed out of level up to and including 5 % (approximately three degrees).**~~]

(Amended 1991 **and 2008**)

S.2.4.1. Vehicle On-Board Weighing Systems. – A vehicle on-board weighing system shall operate within tolerance when the weighing system is **tilted up to and including 5 % rise over run in any direction from a level position and rebalanced.** ~~**out of level up to three degrees or 5 %.**~~ If the accuracy of the system is affected by out-of-level conditions normal to the use of the device, the system shall be

equipped with an out-of-level sensor that inhibits the weighing operation when the system is out of level to the extent that the accuracy limits are exceeded.

(Added 1992) **(Amended 2008)**

Background/Discussion: The WWMA received a proposal from a manufacturer to amend paragraph S.2.4. to clearly state that the 5 % is referring to slope or grade based on flat plane (180 degrees). The submitter stated that existing language in HB 44 paragraph S.2.4. was confusing and that several individuals in the weighing industry have said that 5 % refers to 5 % of 90 degrees, which would make the approved angle 4.5 degrees. As a result, these manufacturers market their devices as being NTEP certified for 4.5 degrees out-of-level.

During its 2007 open hearings, the WWMA S&T Committee heard comments from the NTETC WS and a weights and measures consultant stating that they believe there is not a problem with existing language. However, additional comments from device manufacturers indicate confusion about the difference between the 5 % requirements and the parenthetical "approximately 3 degrees." The NIST technical advisor noted the "degree" equivalent is used in international recommendations. One scale manufacturer, noting that the limits in HB 44 are not equivalent, stated that an NTEP CC had been issued stating the device complies with out-of level conditions at "5 %" or "3 degrees."

To more clearly state the specification in NIST HB 44, and because 5 % does not correspond exactly with 3 degrees, the WWMA agreed to forward the proposal to NCWM S&T Committee as a Voting item.

At its 2007 Interim Meeting, the CWMA agreed that the language for "Level Indicating Means" could be clarified in HB 44 and agreed that the 5 % inferred a grade or slope and that the existing language did not explicitly state this. Additionally, the CWMA recommended that the phrase in parentheses "(approximately three degrees)" remain in paragraph S.2.4. as shown below. The CWMA further recommended this proposal, as revised by the CWMA, move forward as a Voting item on the NCWM S&T Committee Agenda.

At its 2007 Annual Meeting the SWMA heard support from one manufacturer for the proposal as submitted. Another manufacturer recommended removing the word "approximately" from the parentheses in the fourth line of S.2.4. The SWMA modified S.2.4. accordingly and recommended that the item move forward as a Voting item on the NCWM S&T Committee Agenda.

During the 2008 NCWM Interim Meeting, the Committee heard support for the intent of this item and comments recommending that the reference to "in any upright direction" not be deleted from paragraph S.2.4. and added to paragraph S.2.4.1. WMD commented that the language in HB 44 does not need clarification and that the problem has adequately been addressed by the NTETC WS in their recommendation to clarify the requirements and test procedures in Publication 14. WMD added that if the Committee believes that clarification in the referenced paragraphs is needed, then the SMA recommendation to delete references to "approximately three degrees" would be a reasonable alternative since it does not change the current requirements and is consistent with OIML R 76. The Committee agreed with the justification to clarify the current language in HB 44 and the suggestions from the SMA. Therefore, the Committee decided to present the amended proposal as shown in their Interim Report for a vote at the Annual Meeting.

At their 2008 spring meetings, the CWMA and NEWMA supported the item as originally recommended in the Committee's Interim Report.

At the 2008 Annual Meeting, the Committee heard comments that the proposed language in Publication 16 was more confusing than the existing language in HB 44. The Committee reviewed a similar requirement from Measurement Canada during their deliberations on this item. Based on its review, the Committee amended the proposal as shown in the above recommendation and presented it for a vote.

320-6 I S.2.1.6. Combined Zero-Tare ("0/T") Key, S.2.3. Value of Tare Indication and Recorded Representations, S.2.4, Preset Tare Mechanism, Appendix D; Definitions for Tare Mechanism, Gross Weight Value, Net Weight, Net Weight Value, Tare, and Tare Weight Value

Source: Carryover Item 320-9. (This item originated from the NTETC WS and first appeared on the Committee's 2007 agenda.)

Recommendation: (NOTE: This item was considered jointly with item 324-2.) This recommendation clarifies the 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) as outlined in the recommendation below by:

1. Modifying the definition for "tare mechanism" and adding new definitions for "gross weight value," "net weight," "net weight value," "tare," "tare-balancing mechanism," "tare-weighing mechanism," "preset tare," "preset tare mechanism," and "tare weight value" to Appendix D.
2. Delete paragraph 2.1.6. and adding a new paragraph S.2.3.6.
3. Modifying paragraphs S.2.3. and S.2.3.1. and adding new paragraphs S.2.3.1.2. and S.2.3.1.3.; S.2.3.2. through S.2.3.8. and S.2.4. through S.2.4.1. to provide new requirements for tare accuracy, operating range, and visibility.

Amend the following definition for "tare mechanism:"

tare mechanism. A **tare-balancing and tare-weighing** mechanism (including a tare bar) designed for determining or balancing out the weight of packaging material, containers, vehicles, or other materials that are not intended to be included in net weight determinations **and for setting the net indication to zero when the tare object is on the load-receiving element (See also "preset tare," "tare-weighing mechanism" and "tare-balancing mechanism").**

Notes:

1. **Reducing the weighing range for net loads is known as subtractive tare (e.g., Net Weight + Tare Weight ≤ Gross Weight Capacity).**
2. **Increasing the weighing range for gross loads without altering the weighing range for net loads on mechanical scales is known as additive tare (e.g., a tare bar on a mechanical scale with a beam indicator where Net Weight + Tare Weight ≥ Gross Weight Capacity).**

The tare mechanism may function as:

1. **a non-automatic mechanism (load balanced or weighed by an operator),**
2. **a semi-automatic mechanism (load balanced or weighed automatically following a single manual command), or**
3. **an automatic mechanism where the load is balanced or weighed automatically without the intervention of an operator. An automatic tare mechanism is only suitable for indirect sales to the customer (e.g., prepackaging scales).**

[2.20**, 2.24**]

(Amended 200X)

Add the following new definitions to Appendix D:

gross weight value. Indication or recorded representation of the weight of a load on a weighing device, with no tare mechanism in operation. [2.20, 2.24]

(Added 200X)

net weight (net mass). The weight of a commodity excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service. For example, the service of shipping includes the weight of packing materials. [2.20, 2.24]

(Added 200X)

net weight value. Indication or recorded representation of the weight of a load placed on a weighing device after the operation of a tare mechanism. [2.20, 2.24]

(Added 200X)

preset tare. A numerical value, representing a weight that is entered into a weighing device (e.g., keyboard, recalling from stored data, or entered through an interface) and is intended to be applied to weighings without determining individual tares.

(Added 200X)

preset tare mechanism. A part of a weighing system for subtracting a preset tare value from a gross or net weight value and indicating the result of the calculation as a net weight. The weighing range for net loads is reduced accordingly.

Types of preset tare mechanisms include:

- **keyboard tare. The operation of keys on a keyboard with a typical 10-key keyboard with values 0 through 9, by the pushing of a key numbered 5, the value 5 is entered as a tare value. For example, pressing the 0 then 5 key enters 0.05 as the tare value on a scale where d = 0.01.**

- **digital tare. By the repeated operation of a particular key, tare values are entered in amounts equal to the value of a scale division. For example, on a 25 lb x 0.01 lb scale, each time a specifically marked key is depressed, a tare is entered equal to 0.01 lb. If that key were depressed five times, the tare value would be equal to 0.05 lb.**

- **programmable tare. Preset (predetermined) tare values that are stored in memory for multiple transactions. They may be part of the product information on PLU (product look-up), preset product, or tare keys.**

- **stored tare. Preset (predetermined) tare values that are stored in memory for multiple transactions and are used predominately in vehicle scale applications.**

- **percentage tare. A preset tare value, expressed as a percentage (i.e., 5.6 %), that represents the percentage of tare material compared to the gross or net weight of the commodity. A percentage tare is one form of proportional tare.**

- **proportional tare. A preset tare value, automatically calculated by the scale, proportional to the gross weight indicated by the scale. A proportional tare can be a percentage tare or a fixed tare value relative to a range of gross weights (i.e., a 10 g tare for gross weights between 0 kg and 2 kg, a 20 g tare for gross weights between 2 kg and 4 kg, etc.). A proportional tare is, therefore, not limited to being a percentage tare.**

[2.20, 2.24]

(Added 200X)

tare. The weight of packaging material, containers, vehicles, or other materials that are not intended to be part of the commodity included in net weight determinations. [2.20, 2.24]

(Added 200X)

tare-balancing mechanism. A tare mechanism with an indication that tare has been taken either semiautomatically or automatically and without an indication of the tare value (weight) when the instrument is loaded. A negative net weight is assumed to be the tare value when the weighing instrument is unloaded. [2.20, 2.24]

(Added 200X)

tare-weighing mechanism. A tare-balancing mechanism that stores the tare value that has been taken either semiautomatically or automatically and is capable of displaying (continuously or upon command) or printing the value whether or not the instrument is loaded. [2.20, 2.24]

(Added 200X)

tare weight value. The weight value of a load determined by a tare mechanism. [2.20, 2.24]

(Added 200X)

Delete paragraph S.2.1.6. as follows (See proposed paragraph S.2.3.6.):

~~**S.2.1.6. Combined Zero-Tare ("0/T") Key. – Scales not intended to be used in direct sales applications may be equipped with a combined zero and tare function key, provided that the device is clearly marked as to how the key functions. The device must also be clearly marked on or adjacent to the weight display with the statement "Not for Direct Sales."**~~

~~**(Added 1998)**~~

Amend paragraph S.2.3. and S.2.3.1. as follows:

S.2. Design of Balance, Tare, Level, Damping, and Arresting Mechanisms.

S.2.3. Tare: ~~*On any scale (except a monorail scale equipped with digital indications), the value of the tare division shall be equal to the value of the scale division.**~~ The tare-weighing and tare-balancing mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. *A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.**

(Amended 1985 **and 200X**)

*[**Note**: On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination.]**
*[*Nonretroactive as of January 1, 1983]*

S.2.3.1. Scale Interval (Division) and Capacity. *On any scale (except a monorail scale equipped with digital indications and multi-interval scales when the value of tare is determined in a lower weighing segment), the value of the tare-weighing division shall be equal to the value of the scale division for any given load and shall not be operable above its maximum capacity.*
[Nonretroactive as of January 1, 1983]

(Added 200X)

~~**S.2.3.1.1.**~~ **Monorail Scales Equipped with Digital Indications. –** On a static monorail weighing system equipped with digital indications, means shall be provided for setting any tare value of less than 5 % of the scale capacity to within 0.02 % of scale capacity. On a dynamic monorail weighing system, means shall be provided to automatically maintain this condition.

(Amended 1999)

S.2.3.1.2. Multi-interval Scales. – On multi-interval scales, the tare capacity is limited to the capacity of the first weighing segment and the value of the tare division shall be equal to the value of the scale division from the first weighing segment.

(Added 200X)

S.2.3.1.3. Multiple Range Scales. – On multiple range scales, the tare capacity may be operable in the greater weighing ranges if it is possible to switch to a greater weighing range

with a load on the scale. The value of the tare division shall be equal to the value of the scale division from the weighing range where the tare was determined.

(Added 200X)

Add new paragraphs S.2.3.2. through S.2.3.8. as follows:

S.2.3.2. Accuracy. – A tare-weighing or -balancing mechanism shall permit setting the net indication to zero with an accuracy equal to or better than:

± 0.25 d for electronic weighing devices and any weighing device with an analog indication, and

± 0.5 d for mechanical weighing devices with a digital indication (e.g., weighbeams with only notched poises and no sliding poises).

On a multi-interval scale, d shall be replaced by d_1 (division value of the first weighing segment).

(Added 200X)

S.2.3.3. Visibility of Operation. – Operation of the tare mechanism shall be visibly indicated on the instrument. In the case of instruments with digital indications, this shall be done by marking the indicated net value with the word "NET" or the symbol "N". "NET" may be displayed as "NET", "Net" or "net". If a scale is equipped with an indicator that allows the gross value to be displayed temporarily while a tare mechanism is in operation, the "NET" symbol shall disappear while the gross value is displayed.

(Added 200X)

S.2.3.4. Subtractive Tare Mechanism. – After any tare operation and while tare is in effect, an indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity after tare has been taken.

(Added 200X)

S.2.3.5. Semi-automatic or Automatic* Tare-Balancing or Tare-Weighing Mechanisms. – These mechanisms shall be operable or accessible only by a tool outside of and separate from this mechanism or they shall be enclosed in a cabinet, or they shall be operable only when the indication is stable within:

(a) ± 3 scale divisions for scales of more than 2000 kg (5000 lb) capacity in service prior to January 1, 1981, and for all axle-load, railway track, and vehicle scales; or

(b) ± 1 scale division for all other scales.

*** Automatic tare mechanisms are not permitted for direct sales to the public.**

(Added 200X)

S.2.3.6. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key). – Scales not intended to be used in direct sales to the public may be equipped with a combined zero and tare function key, provided the device is clearly marked as to how the key functions. If the semi-automatic zero-setting mechanism and the semi-automatic tare-balancing mechanism are operated by the same key, the following apply at any load:

(a) After zero/tare setting, the effect of accuracy of the zero setting shall be not more than ± 0.25 d.

(b) A "center-of-zero" condition shall either automatically be maintained to ± 0.25 scale division or less or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero-balance condition to ± 0.25 scale division or less.

(c) A zero-tracking mechanism, if equipped, shall operate only when:

- **the indication is at zero, or at a negative net value equivalent to gross zero, and**
- **the weight indication is stable.**

(d) The scale must also be clearly marked on or adjacent to the weight display with the statement "Not for Direct Sales."

(Added 200X)

S.2.3.7. Consecutive Tare Operations. – Repeated operation of a tare mechanism (including preset tare) is permitted for single transactions with one gross, one net, and multiple tare values. If more than one tare mechanism is operative at the same time, tare weight values shall be clearly designated (identified) with either "T" for tare or "PT" for preset tare as appropriate when indicated or printed.

(Added 200X)

S.2.3.8. Indication and Printing of Weighing Results.

(a) Gross weight values may be printed without any designation or by using a complete word or symbol. For a designation by a symbol, only uppercase "G" is permitted.

(b) If only net weight values are printed without corresponding gross or tare values, they may be printed without any designation or by using a complete word or symbol. The complete word "Net" or symbol "N" shall be used to designate a net weight as shown in S.2.3.3. Visibility of Operation. This applies also where semi-automatic zero-setting and semi-automatic tare balancing are initiated by the same key.

(c) Gross, net, or tare values determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range.

(d) If net weight values are printed together with the corresponding gross and/or tare values, the net and tare values shall be identified at least by the corresponding symbols "N" and "T" or by complete words using all upper-case letters, all lower-case letters, or a combination of upper- and lower-case letters.

(e) If net weight values and tare values determined by different tare mechanisms are printed separately for single transactions with multiple gross, tare, and net values, they shall be suitably identified (e.g., vehicle sequentially loaded with mixed commodities).

(Added 200X)

Add new paragraphs S.2.4. and S.2.4.1. as follows:

S.2.4. Preset Tare Mechanism, Operation. – In addition to the provisions of paragraphs S.2.3. Tare and S.2.3.1. Scale Interval, a preset tare mechanism may be operated together with one or more tare devices provided:

(a) the preset tare mechanism complies with paragraph S.2.3.7. Consecutive Tare Operations, and

(b) the preset tare operation cannot be modified or cancelled as long as any tare mechanism operated after the preset tare operation is still in use,

(c) the preset tare associated with a price look-up (PLU) shall be automatically cancelled at the same time a PLU is cancelled, and

(d) the preset tare values are designated by the symbol "PT"; however, it is permitted to replace the symbol "PT" with complete words.

A preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., part of the product look-up information).

(Added 200X)

S.2.4.1. Indication of Operation. – It shall be possible to temporarily indicate the preset tare value (e.g., pressing a tare display button or by indicating a negative net weight with no load on the load-receiving element). In addition to the provisions of paragraph S.2.3.8. Indication and Printing of Weighing Results, the calculated net value is printed and at least the preset tare value is printed, with the exception of:

(a) a Class II or a Class III instrument with a maximum capacity not greater than 100 kg (200 lb) used in direct sales to the public,

(b) price computing scales, and

(c) nonautomatic weigh/price labeling scales.

(Added 200X)

Background/Discussion: This WS proposal is one of several proposed modifications to HB 44 requirements intended to clarify the acceptable tare features already recognized for use in commercial applications. Scales Code requirements do not include sufficiently detailed language to identify all types of tare, define how tare features must operate, or specify the net and tare values a scale must indicate and record. Current HB 44 requirements that address tare include paragraphs S.2.1.6. Combined Zero-Tare ("0/T") Key; S.2.3. Tare; S.2.3.1. Monorail Scales Equipped with Digital Indications; and T.N.2.1. General (Tolerances).

The WS developed criteria used to type evaluate tare features based on General Code paragraph G-S.2. Facilitation of Fraud and other requirements that apply to indicating and recording elements and recorded representations. NTEP laboratories find it has become increasingly difficult to base compliance decisions solely on paragraph G-S.2. because the general nature of the language results in multiple interpretations. Type evaluation criteria are published in NCWM Publication 14; however, this document is not in wide distribution in the weights and measures community. Additionally, only a limited number of weights and measures officials, device manufacturers, and device owners and operators are regular participants in WS meetings where tare evaluation criteria are developed and discussed. It is difficult for parties responsible for the design, use, and test of the tare feature to interpret and apply technical requirements published in Publication 14. This results in differing interpretations of HB 44 requirements.

In 2006 the NTETC WS formed a Tare WG to review existing tare requirements and make recommendations as to how tare should operate on a single range scale, a multiple range scale, and a multi-interval scale. The WG was asked to develop, where necessary, recommendations for changes to Publication 14, HB 44, and HB 130 and to provide guidance to the WS on type evaluation requirements.

The WG developed proposals to amend HB 44 requirements to:

a. ensure a tare feature operates in a manner that increases the accuracy of net weight determinations,
b. state clearly what information and values are permitted and required for indicated and recorded representations of net weight and tare weight, and
c. identify the types (e.g., semiautomatic and stored) of tare weight values determined at the time objects are weighed or tare weight values are determined prior to the time objects are weighed.

At its 2007 Annual Meeting, the WS reviewed the final recommendation of the Tare WG and recommended that the NIST technical advisor submit a number of Tare WG recommendations to the weights and measures regional association and the NCWM S&T committees.

At that meeting, the WS stated that the Tare WG had completed its work. The Sector agreed that most of the proposed language is currently verified in Publication 14 with G-S.2. Facilitation of Fraud, S.2.1.6. Combined Zero/Tare (0/T) Key, and S.2.3 Tare listed as the HB 44 code references. The WG did not change any existing HB 44 tare requirements but recommended an amended definition for "tare mechanism." The Sector agreed with the WG that the proposed items for calculated weights and the identification of preset tare weights go beyond what is currently evaluated by NTEP and recommended these items be split into separate proposals on the NCWM S&T agenda.

At their fall 2007 meetings, the WWMA and SWMA heard support from the NTETC WS and SMA to put forth the new NTETC WS version of the proposal. The WWMA agreed that the additional definitions would clarify tare-related terms. It also agreed that the Tare WG's suggested changes would further harmonize NIST HB 44 with the latest version of R 76. Therefore, the WWMA and SWMA recommended the proposal, with the additions from the Tare WG, move forward as a Voting item on the NCWM S&T Committee Agenda.

At its 2007 Interim Meeting, the CWMA agreed that tare needs to be further defined in HB 44. The CWMA recommended the proposal be broken up into several parts in order to provide better clarification. The CWMA and NEWMA recommended this proposal be moved to Developmental until it can be divided into more manageable sections.

During the 2008 NCWM Interim Meeting, the Committee heard support for the intent of this item. In response to questions from the audience, the Committee clarified the term "additive tare" by providing an example of a mechanical scale with an ungraduated tare bar that does not reduce the net capacity of the scale. Additionally, the NIST Technical Advisor stated that the Tare WG did not believe that a definition for "additive tare" was needed since both subtractive tare and additive tare are described within the proposal to amend the definition of "tare mechanism." The Committee considered the recommendations from the CWMA and NEWMA to split this item into more manageable sections. However, the Committee could not find a way to effectively split the proposal since the requirements in the proposal are interrelated.

During the Committee discussions on this item, the following clarifications for "consecutive tare operations" and "transactions using different tare mechanisms" were provided by Mettler Toledo.

> **"Consecutive tare operations"** in proposed paragraph S.2.3.7. are described as a single transaction with one gross, one net, and multiple tare values. Examples include but are not limited to:
>
> (1) The sales of wrapped candy sold in bulk where a metrological tare (weighed) for a bag and a preset (percentage) tare for the candy wrappers are used to determine the net weight of the candy,
>
> (2) The loading of a vehicle with bins of products (where the preset tare weight for the bins were predetermined). If indicated and/or printed, the representation of tare would include the value of the metrological tare (T) and the summed values of the preset tare (PT).
>
> **"Net weight values and tare values determined by different tare mechanisms"** in proposed paragraph 2.3.8.(e) includes single transactions with multiple gross, tare, and net determinations. For example, an unloaded vehicle would first be weighed to determine tare, loaded with a commodity, and reweighed to determine the gross weight and the net weight for that commodity. The vehicle would then be loaded with a different commodity and reweighed to determine a new gross weight. The second gross weight would be used to calculate the net weight of the second commodity by taking the difference between the second "tare" weight (gross weight of the first commodity) and the second gross weight (total weight of unloaded vehicle and both commodities).

Based on the clarifications, the Committee amended proposed paragraphs S.2.3.7. and S.2.3.8.(e) in this item. The Committee also moved the language from the originally proposed paragraph S.2.3. in its Interim Agenda to

paragraph S.2.3.1. to group together the language referring to scale intervals. The Committee also deleted the originally proposed subparagraphs S.2.3.9 (f) and (g) (Note: S.3.9. was renumbered to S.2.3.8. in the above proposal). Since the language for "calculated net weights," was not fully developed or understood by the Committee, the Committee recommended that the subject of calculated net weights be submitted as a separate proposal for future consideration. Additionally, the Committee amended the proposed paragraph S.2.4.2. to remove requirements already stated in paragraph S.2.3.8. and deleted the "Note" since it addresses scales with a "0/T key" that are already marked with the statement "Not for Direct Sales" in the current HB 44 and the above proposed paragraph S.2.3.6.

At the 2008 Interim Meeting, the Committee did not receive any comments opposing this proposal and made this a Voting item in its Interim Report.

At their 2008 spring meetings, the SMA, the CWMA and NEWMA, opposed this as a Voting item and recommended that the item be made Informational to allow for further development and evaluation. The rationale for this position was that the proposal was significantly amended from the language in the recommendation appearing in the 2008 Interim Agenda and that there were some questions regarding some of the definitions and how they are to be applied.

The CWMA also recommended that this should be split into two sections and that the Weighing Sector should consider doing a practical review of the language using one or more devices.

NEWMA also recommend that this item be posted on the NCWM website and appropriate list servers along with a summary of how this item would appear in HB 44 if adopted.

The Committee agreed with the comments that this item needs additional time for review and analysis and that the item be given Iinformation status. The Committee also recommends that the NIST technical advisor develop a 1-2 hour technical presentation on the proposed tare requirements that will be available to the regional weights and measures associations and the NTETC Weighing Sector and posted on the WMD and NCWM websites.

For additional background information, refer to the Committee's 2007 Annual Report.

320-7 I T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation and T.N.4.7. Creep Recovery for Load Cells During Type Evaluation

Source: SMA Load Cell Manufacturers

Background: The Committee received a "priority" request to add a proposal as a Voting item to the Committee's agenda. The request to add the item as a Voting item was not approved according to criteria in HB 44 Introduction Section H (c) Exceptions to Policy for Submission of Items to a Committee Agenda; Submission of Priority Items. However, the Committee agreed to discuss this item during the Annual Meeting. As a result of these discussions, the Committee added this item to its list of carryover items as an Information item and recommended that the NIST Technical Advisor work with the submitter of the item to develop a proposal to amend Table T.N.4.6. and add a table for designating loading and unloading times for consideration by the regional weights and measures associations.

321 BELT-CONVEYOR SCALE SYSTEMS

321-1 V N.2.3. Minimum Test Load

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Proposal: Amend NIST HB 44, Section 2.21. Belt Conveyor Scales (BCS) Systems Code, paragraph N.2.3. as follows:

N.2.3. Minimum Test Load. – Except for applications where a normal weighment is less than 10 minutes, t~~T~~he minimum test load shall not be less than the largest of the following values.

(a) 800 scale divisions,

(b) the load obtained at maximum flow rate in one revolution of the belt, or

(c) at least 10 minutes of operation.

For applications where a normal weighment is less than 10 minutes (e.g., belt-conveyor scale systems used exclusively to issue net weights for material conveyed by individual vehicles, and railway track cars) the minimum test load shall be the normal weighment that also complies with (a) and (b).

The official with statutory authority may determine that a smaller minimum totalized load down to 2 % of the load totalized in 1 hour at the maximum flow rate may be used for subsequent tests, provided that:

1. the smaller minimum totalized load is greater than the quantities specified in (a) and (b), and

2. consecutive official testing with the minimum totalized loads described in N.2.3. (a), (b), or (c) and the smaller minimum test load has been conducted that demonstrates the system complies with applicable tolerances for repeatability, acceptance, and maintenance.

(Added 2004) **(Amended 2008)**

Background/Discussion: In 2004 NIST HB 44 paragraph N.2. Conditions of Test. was amended, and the minimum totalized load (MTL) requirements were amended and renumbered to N.2.3. Since 10 minutes of operation in N.3.2.(c) typically results in a test load larger than (a) or (b), the 10 minutes MTL is used for most BCS installations. Additionally, the words "or a normal weighment" were deleted from MTL requirements; the words were no longer needed since language was developed to allow a smaller material test load provided the scale demonstrated compliance with BCS tolerances with the MTL and the smaller test load.

As a result of deleting the words "or a normal weighment," it has been reported that the revised MTL requirements are not suitable for BCS installations that issue individual weights for vehicles and railcars. This is due to limitations of the installation and uncertainties in determining the net weights of several vehicles or railcars to compare material test results of the 10 minutes MTL with the alternate test load of "2 % of the load totalized in 1 hour."

The restoration of the words "or a normal weighment" allows operation of such BCS systems used exclusively to issue net weights for material conveyed by individual vehicles and railway track cars, provided the systems comply with tolerance and repeatability requirements. It should be noted that the 10-minute test could still be used on installations that do not need to start and stop product flow to continuously fill and issue a totalized weight for several vehicles or railcars (unit trains).

At its 2007 Annual Meeting, the WWMA heard comments from a BCS manufacturer in support of the proposal and, consequently, recommended this proposal move forward as a Voting item on the NCWM S&T Committee Agenda.

During the 2008 Interim Meeting, the Committee heard comments from Bill Ripka, Thermo Fisher Scientific, supporting the proposal. The Committee agreed to present the proposal for a vote at the Annual Meeting.

At its February 2008 meeting, the NW&SA WG on BCS reviewed the proceedings from the Committee's 2008 Interim Report. This led to discussion regarding the comparison and alignment of the recommendation in the Interim Report to similar requirements in OIML R 50 – "Continuous totalizing automatic weighing instruments (belt weighers)" Section 2.5. Minimum Test Load. The WG believes the statement "at least 10 minutes of operation" should be removed and could be brought into alignment with OIML R 50 use of 2 % load in one hour at maximum

flow rate. Additionally, the test load listed in OIML R 50 must be understood as the minimum amount needed for a materials test and is based on the systems maximum flow rate. However, this recommendation was too large of a change to the proposal. Recognizing the urgency of the proposed language, the WG decided to submit their recommendation to align the MTL requirements with R 50 at a later time. The WG recommended changing the proposed language in paragraph N.2.3. to clarify that the minimum test load for applications when the normal weighment is less than 10 minutes still indicate at least 800 scale divisions or one belt revolution.

At its 2008 spring meeting, the CWMA S&T Committee supported the item as written in the Interim Report and recommended that the item move forward to a vote.

At the 2008 Annual Meeting, the Committee heard comments that the proposed language in the Interim Report appeared to indicate that BCS systems would issue weights for the individual vehicles or railway cars. The Committee agreed that the intent was for the belt-conveyor scale system to issue "net weights" for materials conveyed by vehicles and railway track cars. The Committee also agreed with the NW&SA WG recommendation to make the exception for applications for small normal weighments. Consequently, the Committee amended the proposal to read as shown in the recommendation above.

321-2 V UR.2.2.(n) Belt Alignment

(This item was adopted.)

Source: Carryover Item 321-1. (This item originated from the SWMA and first appeared on the Committee's 2007 agenda.)

Recommendation: Modify paragraph UR.2.2.(n) as follows:

UR.2.2. Conveyor Installation

(n) Belt Alignment. – The belt shall not extend beyond the edge of the **outermost roller of any carry side (top)** roller in any area of the conveyor **nor touch the conveyor structure on the return (bottom) side of the conveyor**.

(Amended 1998 **and 2008**)

Background/Discussion: During the 2006 NCWM Interim Meeting, the Committee considered the recommendations from the NCWM review panel and the comments from industry regarding this proposal. The review panel indicated the proposal should have included national data that demonstrated a need for modifying paragraph UR.2.2. and should be a Developing item until such data are provided. At that time, one representative from the belt-conveyor scale service industry indicated there are too many factors that influence belt tracking to ensure a belt is centered at all times. The service representative recommended that the belt should not extend beyond the edge of the idler roller in any area of the conveyor on the carrying side or touch holding brackets on the return side to reduce any detrimental effects on accuracy. Industry representatives indicated the design of idlers and scales are such that the belt is not intended to stay in the exact center. Industry also indicated there was no mechanism available to monitor the belt's tracking 24 hours a day, 7 days a week. Industry requested specifications for what constituted either "center" or an acceptable "range of center" for belt tracking. Although the 2005 SWMA reported the proposal was ready for national consideration, the Committee agreed it was more appropriate to make the proposal a Developing item until there was some clear indication that belt alignment could be tracked for maintenance and accuracy purposes.

During the 2007 NCWM Annual Meeting, the Committee heard testimony that a work group of the NW&SA was addressing this item. The NW&SA, in a letter dated July 31, 2007, submitted a recommendation to the Committee for consideration during the 2008 NCWM Interim Meeting.

In that letter, the NW&SA WG stated there was insufficient evidence of the effect of small lateral movement of the belt to establish a valid requirement narrower than the edge of the idler roller on belt-conveyor scale systems other than the short conveyors used by the original submitter. The WG added that no practical devices were available to measure such lateral alignment changes and recommended the language added to the original proposal above be

withdrawn. However, the WG made the recommendation to modify UR.2.2.(n) to include language to clarify that the belt shall not come into contact with any part of the conveyor structure.

At its 2007 Annual Meeting, the WWMA discussed the letter from the NW&SA and heard from a belt-conveyor scale manufacturer supporting the recommendation from the NW&SA WG because it provided guidance for the user to better maintain the zero condition of the scale and helped prevent damage to the belt. As a result, the WWMA recommended that the NW&SA WG version of UR.2.2. move forward as a Voting item on the NCWM S&T Committee Agenda.

At its 2007 Annual Meeting, the SWMA heard that Montana and the WWMA support the position and alternate proposal from the NW&SA. The SWMA recommended that the NCWM S&T Committee present the alternate proposal shown above and move forward as a Voting item on the NCWM S&T Committee Agenda.

During the 2008 NCWM Interim Meeting, the Committee heard from Bill Ripka, Thermo Fisher Scientific, who supported the intent of the July 31, 2008, alternate proposal, but noted that the language needed some additional refining. The NIST Technical Advisor reported on a letter submitted by the WG on October 19, 2007, that addressed Mr. Ripka's concerns that revised their proposal to clarify that the belt shall not extend beyond the edge of the outermost roller (i.e., wing roller) of the idler since idlers typically include more than one roller. The Committee agreed with the comments and the revised recommendation in that letter and agreed to present the amended proposal as shown in the recommendation for a vote at the Annual Meeting.

At the 2008 Annual Meeting, the Committee reviewed comments from the BSC WG and the CWMA supporting the amended proposal as a Voting item as shown in the Committee's recommendation.

For additional background information, refer to the Committee's 2007 Annual Report.

324 AUTOMATIC WEIGHING SYSTEMS

324-1 V S.1.2. Value of Division Units and T.2.1. General

(This item was adopted.)

Source: Carryover Item 324-1 (This item originated from the NTETC WS and first appeared on the Committee's 2007 agenda.)

Recommendation: Add a new note to paragraph S.1.2. and amend paragraph T.2.1. as follows:

S.1.2. Value of Division Units. – The value of a division d expressed in a unit of weight shall be equal to:

(a) 1, 2, or 5; or

(b) a decimal multiple or submultiple of 1, 2, or 5.

Note: The requirement that the value of the scale division be expressed only as 1, 2, or 5, or a decimal multiple or submultiple of only 1, 2, or 5 does not apply to net weight indications and recorded representations that are calculated from gross and tare weight indications where the scale division of the gross weight is different from the scale division of the tare weight(s) on multi-interval or multiple range scales. For example, a multiple range or multi-interval scale may indicate and record tare weights in a lower weighing range (WR) or weighing segment (WS), gross weights in the higher weighing range or weighing segment, and net weights as follows:

55 kg	Gross Weight	(WR2 d = 5 kg)	10.05 lb	Gross Weight	(WSR2 d = 0.05 lb)
– 4 kg	Tare Weight	(WR1 d = 2 kg)	– 0.06 lb	Tare Weight	(WS1 d = 0.02 lb)
= 51 kg	Net Weight	(Mathematically Correct)	= 9.99 lb	Net Weight	(Mathematically Correct)

(Note Added 2008)

S.2.2. Tare. – On any automatic weighing system ***(except for multi-interval scales or multiple range scales when the value of tare is determined in a lower range or segment),*** the value of the tare division shall be equal to the value of the scale division. The tare mechanism shall operate only in a backward direction (i.e., in a direction of underregistration) with respect to the zero-load balance condition of the automatic weighing system. A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.

Note: On a computing automatic weighing system, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require that a transaction or lot run be completed.

(Amended 2004 and **2008**)

T.2.1. General. – The tolerance values are positive (+) and negative (-) with the weighing device adjusted to zero at no load. When tare is in use, the tolerance values are applied from the tare zero reference **(zero net indication)**; the tolerance values apply to **the net weight indication for any possible tare load using** certified test loads~~only~~.

(Amended 2008)

Background/Discussion: During the 2007 NCWM Annual Meeting, the Committee heard comments from the CWMA and NEWMA supporting this item with recommendations to change the word "value" to "division" and incorporate the SWMA recommendation to modify paragraph S.2.2.

NEWMA pointed out that the proposed change to paragraph S.2.1. appeared to be permissive and not a requirement and asked if the intent was to prohibit multi-interval and multiple range scales from rounding and indicating calculated net weights in scale divisions to only 1, 2, or 5 or was rounding the scale divisions to only 1, 2, or 5 still allowed. The WMD representative to the NCWM Tare WG stated that the intent was for the language to be permissive because there are a significant number of devices with NTEP CCs in the marketplace that round the tare values before calculating net weights.

The Committee made several modifications to the proposal to:

- clarify the examples in the proposed note to paragraph S.1.2., and
- clarify that SWMA's proposed modification to the language in paragraph S.2.2. for an exception for multi-interval and multiple range scales only applied to the requirement that the value of tare shall be equal the value of the scale division.

The Committee agreed that the words "scale value" should be changed to "scale division" to be consistent with the terminology currently used in HB 44 and recommended the NIST technical advisor forward the amended proposal to the Tare WG and WS for their consideration and comment.

At their fall 2007 meetings, the CWMA, NTETC WS, and WWMA supported this item.

At the 2008 Interim Meeting, the Committee agreed to submit the proposal as amended by WMD for a vote at the Annual Meeting.

At the 2008 Annual Meeting, the Committee agreed with comments from the SMA, the CWMA, and NEWMA to include the word "segment" in paragraph S.2.3., and to submit the proposal as shown in the above recommendation for a vote.

See additional comments and recommendations from Agenda Item 320-2. For additional background information, refer to the Committee's 2007 Annual Report.

324-2 I S.2.2. Value of Tare Indication and Recorded Representations and S.2.3. Preset Tare Mechanism

Source: Carryover Item 324-2. (This item originated from S&T Committee and first appeared on the Committee's 2007 agenda.)

Recommendation: (NOTE: This item will be considered jointly with Item 320-6.) This recommendation clarifies the requirements for tare by modifying paragraph S.2.2. and adding new paragraphs S.2.2.1. through S.2.2.8. and S.2.3 through 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).

Amend paragraph S.2.2. as follows:

S.2.2. Tare. The tare**-weighing and tare-balancing** mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.

[**Note**: On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination.]

(Amended 2004 **and 200X**)

Add new paragraphs S.2.2.1. through S.2.2.8. as follows:

S.2.2.1. Scale Interval (Division) and Capacity. – On any scale (except multi-interval scales when the value of tare is determined in the first weighing segment), the value of the tare division shall be equal to the value of the scale division for any given load and shall not operate above its maximum capacity.

S.2.2.1.1. Multi-interval Scales. – On multi-interval scales, the tare capacity is limited to the capacity of the first weighing segment and the value of the tare division shall be equal to the value of the scale division from the first weighing segment.

S.2.2.1.2. Multiple Range Scales. – On multiple range scales, the value of the tare division shall be equal to the value of the scale division from the weighing range where the tare was determined.

(Added 200X)

S.2.2.2. Accuracy. – A tare-weighing or tare-balancing mechanism shall permit setting the net indication to zero with an accuracy equal to or better than:

(a) ± 0.25 d for electronic weighing devices and any weighing device with an analog indication, and

(b) ± 0.5 d for mechanical weighing devices with a digital indication (e.g., weighbeams with only notched poises and no sliding poises).

On a multi-interval scale, d shall be replaced by d_1 (division value of the first weighing segment).

(Added 200X)

S.2.2.3. Visibility of Operation. – Operation of the tare mechanism shall be visibly indicated on the instrument. In the case of instruments with digital indications, this shall be done by marking the indicated net value with the word "NET" or the symbol "N". "NET" may be displayed as "NET", "Net" or "net". If a scale is equipped with an indicator that allows the gross value to be displayed temporarily while a tare mechanism is in operation, the "NET" symbol shall disappear while the gross value is displayed.

(Added 200X)

S.2.2.4. Subtractive Tare Mechanism. – After any tare operation and while subtractive tare is in effect, an indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity after tare has been taken.

(Added 200X)

S.2.2.5. Semi-automatic or Automatic Tare* Balancing or Weighing Mechanisms. – These mechanisms shall be operable or accessible only by a tool outside of and separate from this mechanism or it shall be enclosed in a cabinet, or it shall be operable only when the indication is stable within:

(a) ± 3 scale divisions for scales of more than 2000 kg (5000 lb) capacity in service prior to January 1, 1981, and for all axle-load, railway track, and vehicle scales; or

(b) ± 1 scale division for all other scales.

*** Automatic tare mechanisms are not permitted for direct sales to the public.**

(Added 200X)

S.2.2.6. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key). – Automatic weighing systems may be equipped with a combined zero and tare function key. If the semi-automatic zero-setting mechanism and the semi-automatic tare-balancing mechanism are operated by the same key, the following apply at any load:

(a) After zero/tare setting the effect of accuracy of the zero setting shall be not more than ± 0.25 d.

(b) A "center-of-zero" condition shall either automatically be maintained to ± 0.25 scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero-balance condition to ± 0.25 scale division or less.

(c) A zero-tracking mechanism, if equipped, shall operate only when:

(1) the indication is at zero, or at a negative net value equivalent to gross zero, and
(2) the weight indication is stable.

(d) The scale must also be clearly marked on or adjacent to the weight display with the statement "Not for Direct Sales."

(Added 200X)

S.2.2.7. Consecutive Tare Operations. – Repeated operation of a tare mechanism (including preset tare) is permitted for single transactions with one gross, one net, and multiple tare values. If more than one tare mechanism is operative at the same time, tare weight values shall be clearly designated (identified) with either "T" for tare or "PT" for preset tare as appropriate when indicated or printed.

(Added 200X)

S.2.2.8. Indication and Printing of Weighing Results.

(a) Gross weight values may be printed without any designation or by using a complete word or symbol. For a designation by a symbol, only uppercase "G" is permitted.

(b) If only net weight values are printed without corresponding gross or tare values, they may be printed without any designation or by using a complete word or symbol. The complete word (as shown in S.2.2.3. Visibility of Operation.) or symbol "N" shall be used to designate a net weight. This applies also where semi-automatic zero-setting and semi-automatic tare balancing are initiated by the same key.

(c) Gross, net, or tare values determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range.

(d) If net weight values are printed together with the corresponding gross and/or tare values, the net and tare values shall be identified at least by the corresponding symbols "N" and "T" or by complete words using all upper-case letters, all lower-case letters, or a combination of upper- and lower-case letters.

(e) If net weight values and tare values determined by different tare mechanisms are printed separately for single transactions with multiple gross, tare, and net values, they shall be suitably identified (e.g., vehicle sequentially loaded with mixed commodities).

(Added 200X)

Add new paragraphs S.2.3. and S.2.3.1. as follows:

S.2.3. Preset Tare Mechanism, Operation. – In addition to the provisions of paragraphs S.2.2. Tare and S.2.2.1. Scale Interval, a preset tare may be operated together with one or more tare devices provided:

(a) the preset tare mechanism complies with paragraph S.2.2.7. Consecutive Tare Operations., and

(b) the preset tare operation cannot be modified or cancelled as long as any tare mechanism operated after the preset tare operation is still in use,

(c) the preset tare associated with a price look-up (PLU) shall be automatically cancelled at the same time a PLU is cancelled, and

(d) the preset tare values are designated by the symbol "PT"; however, it is permitted to replace the symbol "PT" with complete words.

A preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., part of the product look-up information).

S.2.3.1. Indication of Operation. – It shall be possible to temporarily indicate the preset tare value (e.g., pressing a tare display button or a negative net weight indication with no load on the load-receiving element). Additionally, paragraph S.2.2.8. Indication and Printing of Weighing Results. applies accordingly, provided the calculated net value is printed and at least the preset tare value is printed, with the exception of:

(a) a Class II or a Class III automatic weighing system with a maximum capacity not greater than 100 kg (200 lb) used in direct sales to the public, and

(b) automatic weigh/price labeling systems.

(Added 200X)

Background/Discussion: At the 2007 Interim Meeting, the Committee agreed that for procedural reasons a separate corresponding proposal should have appeared on its 2007 S&T agenda in Section 324 for Automatic Weighing Systems. Therefore, the Committee developed a separate proposal for automatic weighing systems that now appears in this agenda item. The Committee recommended that new S&T Item 324-2, along with a corresponding proposal to apply these definitions to devices that fall under the Scales Code S&T Item 320-6, be discussed and considered jointly during all deliberations and Voting procedures. In the interest of brevity, the Committee placed all recommendations, discussion, and background information for this proposal in S&T Item 320-6 because the proposed definitions apply to both applications; this ensures both proposals are addressed collectively.

At their fall 2007 meetings, the CWMA, NTETC WS, and the WWMA supported this item.

At the 2008 Interim Meeting, the Committee did not receive any comments opposing this proposal and made this a Voting item in their Interim Report.

At their 2008 spring meetings, the SMA, the CWMA and NEWMA, opposed this as a Voting item and recommended that the item be made Informational to allow for further development and evaluation. The rationale for this position was that the proposal was significantly amended from the language in the recommendation appearing in the 2008 Interim Agenda and there were some questions regarding some of the definitions and how they are intended to be applied.

The CWMA also recommended that this should be split into two sections and that the Weighing Sector should consider doing a practical review of the language using one or more devices.

NEWMA also recommend that this item be posted on the NCWM website and appropriate list servers along with a summary of how this item would appear in HB 44 if adopted.

The Committee agreed with the comments that this item needs additional time for review and analysis and that the item be given Information status. The Committee also recommends that the NIST technical advisor develop a 1 to 2 hour technical presentation on the proposed tare requirements that will be available to the regional weights and measures associations and the NTETC Weighing Sector and posted on the WMD and NCWM websites.

See additional comments and recommendations from Agenda Item 320-6.

330 LIQUID-MEASURING DEVICES

330-1 I Temperature Compensation for Liquid-Measuring Devices Code

Source: Carryover Item 330-4. (This item originated from the NCWM S&T Committee and first appeared on the Committee's 2007 Agenda.)

Recommendation: The Committee is considering a proposal to make the following modifications to Section 3.30. Liquid-Measuring Devices (LMD) Code to recognize temperature compensation for retail devices as follows:

> ***S.1.6.8. Recorded Representations from Devices with Temperature Compensation. – Receipts issued from devices or systems with automatic temperature compensation must include a statement that the volume of the product has been adjusted to the volume in liters at 15.56 °C for liters or the volume in gallons at 60 °F for gallons.***
> ***[Nonretroactive as of January 1, 200X]***
> **(Added 200X)**
>
> **S.1.6.~~8~~9. Lubricant Devices, Travel of Indicator.** – The indicator shall move at least 2.5 cm (1 in) in relation to the graduations, if provided, for a delivery of 0.5 L (1 pt).

S.2.6. Temperature Determination ~~– Wholesale Devices~~. *– For test purposes, means shall be provided to determine the temperature of the liquid either:*

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.
[Nonretroactive as of January 1, 1985]
(Added 1984) (Amended 1986 **and 200X**)

S.2.7. ~~Wholesale~~Devices Equipped with Automatic Temperature Compensators.

S.2.7.1. Automatic Temperature Compensation. – A device may be equipped with an automatic means for ~~adjusting~~**conversion of** the indication and registration of the measured volume of product to the volume at 15**.56** °C **for liters or** ~~(~~60 °F~~)~~ **for gallons.**

S.2.7.2. Display of Net and Gross Quantity. – A device equipped with active automatic temperature compensation shall indicate or record, both the gross (uncompensated) and net (compensated) volume for testing purposes. It is not necessary that both net and gross volume be displayed simultaneously.
[Nonretroactive as of January 1, 200X]

S.2.7.3. Display of Temperature. – For test purposes, on a device equipped with active automatic temperature compensation, means shall be provided to indicate or record the temperature determined by the system sensor to an accuracy of 0.2 °F.
[Nonretroactive as of January 1, 200X]

S.2.7.~~2~~4. Provision for Deactivating. – On a device **or system** equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of ~~gallons~~**liters** compensated to 15**.56** °C **or gallons compensated to** ~~(~~60 °F~~)~~, provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate, ~~and record if it is equipped to~~**or** record, in terms of the uncompensated volume.

(Amended 1972 **and 200X**)

S.2.7.~~3~~5. Provision for Sealing Automatic Temperature-Compensating Systems. – Provision shall be made for applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment **that detrimentally affects the metrological integrity of the device** may be made to the system without breaking the seal **or automatically providing a record (e.g., audit trail) of the action**.

(Amended 200X)

S.2.7.5.1. Provision for Sealing the Temperature Sensor. – Provision shall be made for applying security seals in such a manner that the temperature sensor cannot be removed or disabled without breaking the seal or providing a record (e.g., audit trail) of the action.
[Nonretroactive as of January 1, 200X]

S.2.7.4.6. Temperature Determination with Automatic Temperature-Compensation. – For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.

(Amended 1987)

S.4.3.~~2.~~ Temperature Compensation. – If a device **or system** is equipped with ***active*** automatic temperature compensation, the primary indicating elements, recording elements, ~~or~~**and** recorded representation shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15**.56** °C **for liters or** ~~(~~60 °F~~)~~ **for gallons.**

(Amended 200X)

S.4.~~3~~4. Wholesale Devices, Discharge Rates. – A wholesale device shall be marked to show its designed maximum and minimum discharge rates. However, the minimum discharge rate shall not exceed 20 % of the maximum discharge rate.

S.4.45. Retail Devices.

S.4.45.1. Discharge Rates. *– On a retail device with a designed maximum discharge rate of 115 L (30 gal) per minute or greater, the maximum and minimum discharge rates shall be marked in accordance with S.4.4.2. The marked minimum discharge rate shall not exceed 20 % of the marked maximum discharge rate.*
[Nonretroactive as of January 1, 1985]
(Added 1984) (Amended 2003)

Example: With a marked maximum discharge rate of 230 L/min (60 gal/min), the marked minimum discharge rate shall be 45 L/min (12 gal/min) or less (e.g., 40 L/min (10 gal/min) is acceptable). A marked minimum discharge rate greater than 45 L/min (12 gal/min) (e.g., 60 L/min (15 gal/min) is not acceptable.

S.4.45.2. Location of Marking Information; Retail Motor-Fuel Dispensers. *– The marking information required in the General Code, paragraph G-S.1. Identification shall appear as follows:*

N.4.1.1. ~~Wholesale~~ Devices Equipped with Automatic Temperature-Compensating Systems. – On ~~**wholesale**~~ devices equipped with **active** automatic temperature-compensating-systems, normal tests shall be conducted:

(a) by comparing the **net (**compensated**)** volume indicated or recorded to the actual delivered volume ~~**corrected**~~ **adjusted** to 15**.56** °C **for liters or ~~(~~60 °F~~)~~ for gallons, and**

(b) ~~**with the temperature-compensating system deactivated,**~~ comparing the **gross (**uncompensated**)** volume indicated or recorded to the actual delivered volume. **(For some devices this may require that the temperature compensator be deactivated.)**

The first test shall be performed with the automatic temperature-compensating system operating in the "as found" condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.
(Amended 1987 **and 200X**)

N.5. Change in Product Temperature ~~Correction on Wholesale Devices~~. – ~~**Corrections**~~ **Adjustments** shall be made for any changes in volume resulting from the differences in liquid temperatures between time of passage through the meter and time of volumetric determination in the prover **or test measure**. When adjustments are necessary, appropriate petroleum measurement tables ~~**should**~~ **shall** be used.
(Amended 1974 **and 200X**)

UR.3.6. Temperature Compensation.

UR.3.6.1. Automatic.

UR.3.6.1.1. ~~When to be~~ Use~~d~~ of Automatic Temperature Compensation. – If a device is equipped with ~~**a mechanical**~~ **active a**utomatic temperature ~~**compensator**~~ **compensation**, it shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated device, without the written approval of the ~~**responsible**~~ weights and measures jurisdiction **with statutory authority over the device**.
[**Note**: This requirement does not specify the method of sale for product measured through a meter.]
(Amended 1989 **and 200X**)

UR.3.6.1.2. Recorded Representations (Invoices, Receipts, and Bills of Lading).

(a) A**n** ~~**written**~~ invoice based on a reading of a device **or recorded representation issued by a device or system** that is equipped with an **active** automatic temperature compensator shall

show that the volume delivered has been adjusted to the volume at 15**.56** °C **for liters or** (60 °F) **for gallons and decimal subdivisions or fractional equivalents thereof.**

(b) The invoice issued from an electronic wholesale device equipped with an automatic temperature-compensating system shall also indicate: (1) the API gravity, specific gravity or coefficient of expansion for the product; (2) product temperature; and (3) gross reading.

(Amended 1987 **and 200X)**

UR.3.6.1.3. Temperature Determination. – Means for determining the temperature of measured liquid in an automatic temperature-compensating system shall be so designed and located that, in any "usual and customary" use of the system, the resulting indications and/or recorded representations are within applicable tolerances.

(Added 200X)

UR.3.6.4. Temperature-Compensated Sale. – All sales of products, when the quantity is determined by an approved measuring system with temperature compensation, shall be in terms of the liter at 15.56 °C or the U.S. gallon of 231 in^3 at 60 °F.

(Added 200X)

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. In response to these concerns and to encourage uniformity in applications where temperature compensation is being used, the Committee developed this proposal to provide design and performance requirements and testing criteria for retail metering systems that incorporate temperature compensation capability. The Committee was also concerned that if the current L&R Committee-proposed language for the Method of Sale of Commodities in NIST HB 130 is adopted, retail motor-fuel devices could be placed in service with no guidelines in NIST HB 44 for type approval and field testing. The L&R-proposed language would permit the temperature-compensated sale of petroleum products at all levels of distribution.

At the 2007 Interim Meeting, the L&R Committee moved forward with a Method of Sale proposal containing permissive language for retail sales of petroleum products using automatic temperature compensation (see L&R Item 232-1). Although the Committee recognized this S&T item was still not fully developed, it felt it could resolve the remaining issues in time for the NCWM Annual Meeting in July 2007; therefore, the Committee unanimously voted to make this item a "priority" Voting item as described in Section H of the Introduction of HB 44. The Committee did this because it felt strongly that, if the L&R item passed, it was very important to have a corresponding S&T item that provided HB 44 guidance as described above. Following the Committee vote, the Committee chairman went before the NCWM Board of Directors (BOD) for its input. The BOD instructed the Committee to make this an Information item. Irrespective of the concerns about the timing of adoption of language in HB 130, the Committee, after further deliberation, concurred with the BOD and added the proposal to its agenda as an Information item. The BOD further informed the Committee of its plan to form a steering committee to provide guidance and give support to both the S&T and L&R Committees on temperature compensation issues. The Committee noted that it looked forward to working with the steering committee on this important issue.

The Committee acknowledged that the item was still in development and identified the following issues to be resolved:

Recorded Representations (S.1.6.7.): What, if any, abbreviations are acceptable for devices equipped with ATC (e.g., gal at 60 ºF)?

API Gravity: How should the API gravity be entered in the device and what API gravity should the inspector use during a test? Should an average API gravity be used (national or state)? The Committee will work on gathering API data in order to resolve this issue.

Difference between Net and Gross (T.4.): Is the current tolerance of 0.1 % (electronic) appropriate for field-testing of retail devices with ATC? Will maintaining our current tolerances mean taking extra drafts to obtain a stable temperature? The Committee will work on gathering data concerning temperature measurement.

The Committee indicated that it would continue work on this item and seek input from the regions and other interested parties in the weights and measures community.

At its 2007 Annual Meeting, the WWMA did not receive any opposition or comments relating to the technical requirements in this proposal and, therefore, it supported the proposal as a Voting item. However, the WWMA recommended that the NCWM S&T Committee consider adopting the ATC Steering Committee recommendation to use the U.S. reference temperature of 60 °F and direct conversion to SI units (15.56 °C). The WWMA S&T Committee noted that the 15 °C SI equivalent was already used in NIST Handbook 44 and that the reference temperature should be used consistently throughout the HB 44 where appropriate.

At its 2007 Interim Meeting, the CWMA S&T Committee received comments concerning the availability of API tables for SI units. The CWMA recognized that 15.56 °C is the exact conversion for 60 °F. While, the CWMA agreed with the ATC Steering Committee that 60 °F should be the reference temperature in HB 44 for dispensers measuring in gallons, the CWMA believed that 15 °C should be the reference temperature for dispensers measuring in liters since it is the international standard and is referenced in other sections of HB 44. The CWMA recommended this item remain Informational while further information becomes available from the ATC Steering Committee and L&R Committee.

At its 2007 Interim Meeting, NEWMA received a proposal from the State of New York to add proving equations to Handbook 44 based on equations found in OIML R 120 Section 4.7 Calculation of meter error and forwarded it to the NCWM S&T Committee for consideration.

At its 2007 Annual Meeting, the SWMA received a comment from an official that a dispenser should not print a statement that the volume of the product has been adjusted to the volume in liters at 15 ºC or the volume in gallons at 60 ºF when ATC is not activated. The official also believed the allowance for a record of action in proposed S.2.7.5. should be performed automatically by the device and recorded in the audit trail. A manufacturer stated that the print statement currently comes from information provided by the inside control console, not from the dispenser. The SWMA S&T Committee agreed to forward the comments to the NCWM S&T Committee for consideration.

At the 2008 Interim Meeting, the Committee received comments that the proposed paragraphs S.2.7.2., S.2.7.3., S.4.3., and UR.3.6.4. should be modified to apply only to devices with an active temperature compensation feature along with a recommendation that the word "should" in the last sentence in N.5. relating to the use of petroleum measurement tables be changed to "shall." The Committee also heard that based on the recommendation of the Automatic Temperature Compensation Steering Committee, the reference to 15 °C should be changed to 15.56 °C where appropriate throughout the proposal. The Committee agreed with all the comments and modified the proposal as shown above.

The Committee further heard that Handbook 44 was not the appropriate place to add the proving equations based on OIML R 120 Section 4.7 as recommended in a proposal submitted by NEWMA. The statement of scope in OIML R 120 states that the document specifies the characteristics of standard capacity measures and describes the methods by which measuring systems for liquids other than water are tested in order to verify that they comply with the relevant metrological requirements in OIML R 117 Measuring systems for liquids other than water. The sections of R 120 relevant to characteristics of standard capacity measures are more similar to the requirements in NIST Handbook 105-3. The sections of R 120 relating to test methods more resemble the recommendations for various devices in NIST Handbook 112 *Examination Procedure Outlines for Commercial Weighing and Measuring Devices*. The Committee also agreed that Handbook 44 was not the place to include the proving equations noting that no other metering codes in the handbook had similar equations and they had not been seen as necessary in the past. The Committee believes that a more appropriate place for proving equations would be in the appropriate Examination Procedure Outline (EPO) in NIST Handbook 112. If NEWMA believes that proving equations will substantially benefit weights and measures officials, it will consider recommending that they be added as an example of one method for determining meter error in the appropriate EPOs.

The Committee also heard a request from an official to move the item forward in order to provide a mechanism for evaluation of dispensers with ATC. The official believed that ATC dispensers will be installed in their jurisdiction in the near future.

The Committee acknowledged the need for uniform technical criteria for devices equipped with ATC, particularly in jurisdictions where this equipment is or soon will be installed. With the changes made by the Committee in the recommendation above, the Committee believes the proposal is substantially complete. Consequently, after considerable deliberations at the 2008 Interim Meeting, the Committee agreed to designate 310-1 as a Voting item on its agenda for the 2008 Annual Meeting. A key factor in reaching this decision is the Conference policy that allows for an item listed as a Voting item on the agenda in Publication 16 to be changed to a lesser status of Informational, but does not allow an Information item to be moved up to Voting status unless the Conference agrees that the item meets the criteria to be considered an emergency issue. The process would still allow minor changes to be made to the recommendation based on input received between the Interim and the Annual Meetings.

In its spring 2008 meeting report, the CWMA S&T Committee stated that it heard comments that this item should not move forward for a vote at this time due to the lack of a method of sale regulation. The report also noted that some jurisdictions adopt NIST HB 44 in its entirety and do not have a law that prohibits ATC, and inclusion of ATC criteria in this case could make ATC permissible.

NEWMA reported discussing this item at length during its spring 2008 meeting. Initially it was suggested that this item go back to Informational status but an attendee suggested that it should either be withdrawn or put up for a vote. Another attendee suggested making this item Informational until the report on ATC from the California Energy Commission is released. NEWMA submitted the following concerns and recommended that the item remain Informational:

- A statement similar to the one in the VTM code which addresses states that prohibit ATC by state law should appear in the text of this item.
- One member referenced the 1978 S&T Committee report which discussed a cost benefit consideration and the desire that the S&T and L&R move forward in unison. The membership generally agreed with these points.
- NEWMA continues to believe that it is appropriate to place in HB 44 reference calculations for determining volume at 60 ºF. It is also appropriate to reference the specific API tables including version and date. Placing this information in publications such as EPO's would have no legal standing if we were challenged in the future.

The Committee received input from WMD noting that there are jurisdictions who have reported they are being faced with regulating dispensers with ATC. The language in this proposal will provide those jurisdictions with uniform specifications, test notes, and user requirements.

At the 2008 NCWM Annual Meeting, the Committee heard numerous comments on the proposed changes to include specifications, test procedures, and user requirements for devices equipped with automatic temperature compensation systems.

Comments/questions were raised about specific items in the proposed language, including:

- The term "active" is not used consistently in all references to "automatic temperature compensation." For example, it appears in paragraph S.2.7.2., but it does not appear in paragraph S.1.6.8.
- There is a reference to the accuracy requirements for the temperature sensor in paragraph S.2.7.3.; however, there is not a requirement specifying the division size of the temperature sensor.
- Should a corresponding reference to the accuracy requirements for the temperature sensor be included in the "Tolerances" section of the code?
- Is there an expectation that there will be a field test of the temperature sensor? If so, there is not a corresponding test note to indicate this, nor is it clear how the test will be done in the field.
- A user requirement is needed to specify that, if a single business offers product for sale on the basis of a temperature compensated volume, all devices in that business shall be equipped with automatic temperature

compensating systems. [Note: During the Committee's work discussions, it was noted that Canada permitted a phase-in period based on product or product grades.]

- There is concern about using 15.56 ºC rather than 15 ºC. In addition to being different from use in international arenas, including Canada, the bulk of the devices in the field, including the retail motor fuel dispensers and the temperature standards used by field officials, do not have the capability to display temperature to two decimal places.
- Devices currently in the field may not have the capability to automatically sense when the device is or is not in the automatic temperature compensating mode with respect to the requirement to identify volumes as "corrected" volumes on printed indications.
- Although a corresponding paragraph already appears in Section 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices Code, the language in paragraph UR.3.6.1.3. needs clarification.

The Committee asks that the NCWM Automatic Temperature Compensation Steering Committee assist in addressing these issues and encourages interested parties to submit comments to the Steering Committee or provide additional comments to the S&T Committee.

The Committee heard numerous comments encouraging the Committee to delay a vote on this item while the corresponding method of sale and related requirements are being further developed by the Laws and Regulations Committee and while other studies in the community are being completed. Comments were also received that cost-benefit analysis of equipment implementation needs to be considered.

Although the Committee did hear opposition to moving forward on this item, the Committee also heard comments in support of moving the item forward for a vote. Some members commented that, if this proposal were adopted, the proposed specifications, tolerances, notes, and user requirements would be available for use in a timelier manner by jurisdictions that do not specifically prohibit the use of temperature compensation. This would encourage uniformity in the implementation of such requirements among those jurisdictions and prevent inconsistencies for consumers doing business in various jurisdictions.

Based on the many suggestions that it heard between the 2008 Interim and Annual Meetings to allow time for additional study and development of the related method of sale requirements, the Committee decided to change the status of this item from Voting to Information.

330-2 I N.4.6. Pour and Drain Times for Hand-held Test Measures

Following deliberations at the 2008 NCWM Interim Meeting, Item 330-2 was deleted from the Committee's agenda and the issue addressed under new Item 310-4 as a proposal to add a paragraph to the General Code to designate general requirements for all field standards. At the 2008 NCWM Annual Meeting, the Committee decided (as a result of comments received following the Interim Meeting) to reinstate item 330-2 (which proposes an addition to the Liquid-Measuring Devices Code to specify pour and drain times for measuring device test standards) as an Information item based upon the rationale described below. Note that the Committee retained Item 310-4 and presented that item as a Voting item at the Annual Meeting. See Item 310-4 for the Committee's original recommendation and background information and the outcome of that discussion.

Recommendation: The Committee is considering a proposal to add a new paragraph N.4.4. Field Standards to address the selection and use of field standards for inspecting and testing liquid-measuring devices covered under the Liquid-Measuring Devices Code.

N.4.4. Field Standards. – Field standards shall be certified to meet the accuracy requirements of NIST Handbook 105 Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 3. Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards.

N.4.4.1. Pour and Drain Times for Hand-held Test Measures. – Hand-held test measures require a 30 second (± 5 seconds) pour followed by a 10-second drain, with the measure held at a 10 degree to 15 degree angle from vertical during use.

N.4.4.2. Drain Times for Bottom Drain Test Measures or Provers. – Bottom drain field standard provers require a 30-second drain time after main flow cessation.

(Added 200X)

Background/Discussion: The Committee received comments from the CWMA and heard comments during the 2008 NCWM Annual Meeting open hearing that specific hand-held test measure use requirements are still needed in the LMD Code for weights and measures officials and service agents. Therefore, the Committee agreed that language originally submitted by the CWMA be reinstated in the Committee's report as an Information item for the Liquid-Measuring Devices Code according to the General Conference Information, Item Categories in Publication 16 page Gen-2.

The Committee also heard comments during the 2008 Annual Meeting that key elements for the use of test measures and provers should be included in the Notes section of the LMD Code. In response to the comments, the Committee expanded the proposal to include drain requirements for bottom drain provers and test measures.

The Committee agreed to amend the original proposal to cite the specific document in addition to the test measure use requirements to read as shown in the recommendation above.

330-3 I Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD)

Source: This item originated from WMD and the regional associations and first appeared on the Committee's 2007 Agenda. (This item was previously a Developing item under 360-2, Part 3, Item 2.)

Recommendation: The Committee is considering a proposal to make the following modifications to Section 3.30. Liquid-Measuring Devices (LMD) Code to address price posting and computing capability for retail motor-fuel dispensers as follows:

S.1.6.4. Display of Unit Price and Product Identity.

S.1.6.4.1. Unit Price.

(a) 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.

*(b) Whenever a grade, brand, blend, or mixture is offered for sale from a device at more than one unit price, then all of the unit prices at which that product is offered for sale shall be displayed or shall be capable of being displayed on the dispenser using controls available to the customer prior to the delivery of the product. It is not necessary that all of the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed prior to the delivery of the product. This subsection shall not apply to fleet sales, other contract sales, **~~or~~** truck refueling sales**, or all purchases of fuel accompanied by an automatically printed receipt of the transaction containing the discount unit price, the total gallons delivered, and total price of the sale**.*

[Effective and nonretroactive as of January 1, 1991]

(Amended 1989**~~, and~~** 1997**, and 200X)**

S.1.6.5.4. Selection of Unit Price. *– Except for dispensers used exclusively for fleet sales, other price contract sales, ~~and~~ truck refueling (e.g., truck stop dispensers used only to refuel trucks)**, and purchases where an automatic printed receipt of the transaction containing the discount unit price, the total gallons delivered, and total price of the sale**, when a product or grade is offered for sale at more than one 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 product.
[Nonretroactive as of January 1, 1991]

(Added 1989) (Amended 1991, 1992, 1993, **~~and~~** 1996**, and 200X**)

S.1.6.7. Recorded Representations. *– Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:*

(a) the total volume of the delivery,

(b) the unit price,

(c) the total computed price, and

(d) the product identity by name, symbol, abbreviation, or code number.
[Nonretroactive as of January 1, 1986]

(Added 1985) (Amended 1997)

UR.3. Use of Device.

UR.3.2. Unit Price and Product Identity.

(a) The following information shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale:

(1) except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), all of the unit prices at which the product is offered for sale; and

(2) in the case of a computing type or money-operated type, the unit price at which the dispenser is set to compute.

Provided that the dispenser complies with S.1.6.4.1. Display of Unit Price, it is not necessary that all the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed or posted.

(b) The following information shall be conspicuously displayed or posted on each side of a retail dispenser used in direct sale:

(1) the identity of the product in descriptive commercial terms, and

(2) the identity of the grade, brand, blend, or mixture that a multi-product dispenser is set to deliver.

(Amended 1972, 1983, 1987, 1989, 1992, and 1993)

UR.3.3. Computing Device. – Any computing device used in an application where a product or grade is offered for sale at one or more unit prices shall be used only for sales for which the device computes and displays the sales price for the selected transaction.

(Added 1989) (Amended 1992)

The following exceptions apply:

(a) Fleet sales and other price contract sales are exempt from this requirement.

(b) A truck stop dispenser used exclusively for refueling trucks is exempt from this requirement provided that:

(1) all purchases of fuel are accompanied by a printed receipt of the transaction containing the applicable price per gallon, the total gallons delivered, and the total price of the sale; and
(Added 1993)

(2) unless a dispenser complies with S.1.6.4.1. Display of Unit Price, the price posted on the dispenser and the price at which the dispenser is set to compute shall be the highest price for any transaction which may be conducted.
(Added 1993)

(c) All *purchases of fuel accompanied by an automatically printed receipt of the transaction containing the discount unit price, the total gallons delivered, and total price of the sale.*
(Added 200X)

UR.3.4. Printed Receipt. – Except for *purchases conducted under UR.3.3.(c) *see note below, the total price, the total volume of the delivery, and the price per **unit ~~liter or gallon~~** shall be shown, **on a receipt by** either **being automatically** printed or **printed** in clear hand script**~~, on any printed ticket issued by a device and containing any one of these values.~~**

***Note: Purchases conducted under UR.3.3.(c), shall only be automatically printed, containing at minimum, the total price, the total volume of the delivery, and the discount price per unit.**
(Amended 2001 **and 200X**)

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-credit. 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 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.

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.

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 WWMA acknowledged that marketing practices change on a daily basis and the task to ensure HB 44 codes address each scenario is monumental. However, the WWMA encouraged NIST in its efforts to tackle this ongoing issue. Therefore, the WWMA recommended this item be considered and move forward to the national level as a Developing item as did the SWMA and NEWMA.

The CWMA recommended that the State Directors compile information regarding whether or not they are enforcing 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). If they are not enforcing the specific code requirement, it should be stated why not (for example, overriding state statute). Information was to be sent to James Truex, then Chief of the Ohio Division of Weights and Measures.

At the 2007 NCWM Interim Meeting, the Committee agreed to add this proposal to its agenda as a Developing item.

At its 2007 Annual Meeting, the WWMA urged all stakeholders to provide comments. NEWMA recommended this item remain a Developing item as did the CWMA at its 2007 Interim Meeting.

At its 2007 Annual Meeting the SWMA was informed that the National Association of Convenience Stores recognized a problem with the current price posting and computing capability requirements in HB 44 and was currently working on information on this item to provide to the NCWM S&T Committee.

At the 2008 Interim Meeting, Ohio Weights and Measures submitted a proposal to the Committee that included specific language for modifying Section 3.30 to address the various pricing and marketing structures being used in retail motor-fuel applications. Based on its review of that proposal, the fact that a specific proposal has now been developed and presented, and the number of jurisdictions reporting a need to move forward with this issue, the Committee decided to elevate the status of this item from a Developmental item to an Information item. Consequently, the Committee is considering the specific language submitted by Ohio and encourages the weights and measures community to review the proposal and submit comments on this item.

At its spring 2008 meeting, the CWMA S&T Committee reported hearing comments that current language does not meet the needs of what is actually happening in the marketplace. Currently, there are economic issues dealing with fair competition and there are numerous marketing techniques that the language in NIST HB 44 cannot address. The CWMA S&T Committee believes the item as proposed is a good start on addressing this issue but, it does not entirely provide adequate language to aid in enforcement. The CWMA S&T recommended that a working group be formed to further evaluate this item. Some examples of the panel discussion were, but not limited to:

1. Discounts calculated at the pump and other 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.
6. All is okay as long as the receipt explains the transaction.

NEWMA's spring 2008 meeting report stated that this is a very important item and NEWMA supports continued work on it as an Informational item. One member suggested that at the next NEWMA Interim Meeting a work group spend some time coming up with suggestions for this item.

At the 2008 Annual Meeting, the Committee heard comments on the proposed changes to the Liquid-Measuring Devices Code. Several weights and measures officials expressed concern about the provision in the proposed language that would allow discounts to be calculated at the console after the customer has dispensed product. These officials felt that devices should be able to compute the total sales price at the unit price at which the product is offered for sale. Several industry members expressed support of the proposed language. One member stated that it is important for retailers with mechanical dispensers to be able to offer their customers a cash discount.

Current NIST Handbook 44 requirements state that the selection of the unit price must be made by the customer using controls on the device or other customer-activated controls. One industry member questioned whether making arrangements for a given method of payment at the console might be considered as satisfying that requirement since the customer is initiating the sale and the conditions of payment prior to the transaction. Weights and measures officials acknowledged the comment, but emphasized the need for the customer to retain control over the selection of the price, preferably by making a selection at the dispenser or using customer controls.

The Committee expressed appreciation for the work that had been done thus far, acknowledging that additional work is needed on this item and noted that a working group is being formed to develop this issue further and that working group will meet during the 2008 Annual Meeting. The Committee looks forward to receiving input and suggestions from the working group and encourages interested parties to participate in the working group and/or forward comments to the Committee.

Technical Advisor's Note: A meeting was held on July 15, 2008, (in conjunction with the NCWM Annual Meeting) of individuals interested in the issue of pricing requirements for retail motor-fuel dispensers. Participants in the meeting included weights and measures officials, gasoline pump manufacturers, and other interested parties. The purpose of the meeting was to establish an informal work group to review the issue of price posting and computing capability for retail motor-fuel dispensers. The work group will focus on the development of proposed changes to NIST Handbook 44 necessary to provide flexibility to marketers while ensuring that the buyer and seller have adequate information about all aspects of the transaction with respect to the pricing and method of payment. The CWMA had suggested the formation of this small working group to study this issue with the idea that the item could be more thoroughly developed than could be done in the limited time available during the NCWM Interim and Annual Meetings. Note that this work does not replace the discussion of this item at the NCWM Interim and Annual Meetings, but rather is intended to supplement the work and provide the S&T Committee with some proposals to consider.

Participants at that meeting were asked to indicate their interest in the work as either "work group participants" (expected to regularly participate and contribute to the work) or "observers" (will be kept abreast of work group activities, including meeting agendas and summaries). Because there is no budget to support the cost of regular face-to-face meetings, the work group will attempt to accomplish its objectives through e-mail and other electronic communication. Anyone interested in the details of this work should contact Tina Butcher (NIST WMD) by e-mail at tbutcher@nist.gov or by telephone at (301) 975-2196.

331 VEHICLE-TANK METERS

331-1 V S.5.7. Meter Size (Marking Requirements)

(This item was adopted.)

Source: Central Weights and Measures Association (CWMA)

Proposal: Amend S.5. by adding a new sub-paragraph S.5.7. as follows:

S.5.7. Meter Size. – Except for milk meters, if the meter model identifier does not provide a link to the meter size (in terms of pipe diameter) on an NTEP Certificate of Conformance, the meter shall be marked to show meter size.
[Non-retroactive as of January 1, 2009]

Background/Discussion: Wisconsin Weights and Measures reported that field inspectors may not be able to correctly determine the size of a VTM (in terms of pipe diameter) and, therefore, may have applied incorrect tolerances to product depletion tests. The requirement for marking the meter size would provide field inspectors with a positive method for applying the correct tolerance.

The CWMA recommended that the language above move forward as a Voting item on the NCWM S&T Committee Agenda.

At the 2008 Interim Meeting, the Meter Manufacturers' Association (MMA) opposed the proposal submitted by the CWMA in the Committee's Interim Agenda. The MMA stated that currently all NTEP CCs designate the meter size in terms of pipe diameter for each specific model identifier. The MMA also stated that adding an additional marking to the identification plate would add considerable additional cost and that the cost was not justified because the information is already readily available on the NTEP CC. The Committee acknowledged the need for the official to be able to readily determine meter size in order to properly apply the tolerances for the product depletion test. The Committee also acknowledged (as did some manufacturers) that this can sometimes be difficult to determine in a field application given the varying sizes of piping and flanges in a system. However, the Committee agreed with the MMA's concerns noted above and, consequently, modified the original proposal as shown above to allow for alternate approaches for providing the information for the official. The Committee agreed to present the item for a vote at the 2008 NCWM Annual Meeting.

In its spring 2008 meeting report, the CWMA S&T Committee recommended that the item move forward for a vote with a non-retroactive date of January 1, 2009.

At the 2008 NCWM Annual Meeting, the Committee heard comments supporting the compromise language in this item. Comments were also received from NEWMA and WMD that consideration should be given to develop tolerances for product depletion based on the meter flow rate. NEWMA stated in its spring 2008 meeting report that it was going to develop a new proposal where the tolerances will be based on meter flow rates and that the current proposal should be adopted pending the submission of a new agenda item.

331-2 I T.2.1. Automatic Temperature-Compensating Systems

Source: Western Weights and Measures Association (WWMA)

Proposal: 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.

Background/Discussion: For more than 13 years, Alaska has been testing mechanical and electronic temperature-compensating vehicle-tank meters ranging in flow rates from 100 gal/min to 300 gal/min. 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 this amount, there is a risk these problems will be missed.

The following example illustrates the point using:

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 2007 Annual Meeting, the WWMA was presented with a letter from a meter manufacturer in support of the proposal based on a request from Alaska Weights and Measures for input from manufacturers of the mechanical and electronic compensators. The letter states that the proposed changes will align the VTM tolerances for the difference between meter error for results determined with and without the automatic temperature-compensating system activated with the LMD Code. 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.

The WWMA recommends that this proposal move forward as a Voting item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, the CWMA commented that tightening the tolerance was premature without additional input from other jurisdictions and manufacturers to see how or if this would affect devices currently in the field. Therefore, the CWMA requested that data to support or oppose this item be gathered from additional jurisdictions.

At the 2008 Interim Meeting, the MMA and some individual manufacturers opposed this proposal. While they were comfortable with a tighter tolerance being used during type evaluation they were concerned with the impact of a tighter tolerance during routine field examinations. During routine field evaluations it becomes more difficult to control the influence factors that impact the measurement process leading to higher uncertainty in the accuracy of the test results. The Committee agreed that more information is needed before moving the item forward and, consequently, made 331-2 an Information item on its 2008 agenda.

In their spring 2008 meeting reports, CWMA and NEWMA stated that there is not enough data to support the proposed changes in tolerance and recommended that the item remains an Information item. WMD submitted comments supporting the collection of additional data, and also suggested that the tolerances for stationary and vehicle-mounted meters be re-examined and compared to ensure consistency across codes for the same meter type. Additionally, WMD noted that as the use of VTMs with ATC increase, there may be a period of transition as jurisdictions and companies become accustomed to the test procedures and application of tolerances for these systems and that this experience may provide a good indication of how the uncertainties involved in the test process will impact the proposed tolerance change.

At the 2008 NCWM Annual Meeting the Committee reported that it has not received additional data from other jurisdictions on the impact of this proposal to existing devices. The Committee also heard comments that the

tolerances in the VTM code need to be less stringent than equivalent tolerances in the LMD code since VTM meters and accessories are mobile devices that are subject to road vibrations and other environmental factors. The Committee does not understand the rationale for the comment since the tolerances for Accuracy Class 0.3 in Table T.1. for VTMs are tighter than Accuracy Class 0.3 devices in the LMD code.

The Committee is interested in receiving compliance data from jurisdictions that are enforcing ATC tolerance requirements on VTMs. If no information is received, the Committee will consider recommending that this item move forward as a Voting item in 2009.

331-3 I UR.2.5. Automatic Temperature Compensation for Refined Petroleum Products

Source: Southern Weights and Measures Association (SWMA)

Proposal: Add the following subparagraphs to the Vehicle-Tank Meters Code:

UR.2.5.2.1. Period of Use. – When fuel is bought or sold on an automatic temperature-compensation basis, it shall be bought or sold using this basis over at least a consecutive 12-month period unless otherwise agreed to by both the buyer and seller in writing.

UR.2.5.2.2. 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.

Discussion: Currently there are no published guidelines for how a company has to use or operate their VTM with or without temperature compensation. They 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 on certain products such as home heating oil and not use ATC with diesel, kerosene, or gasoline.

These two proposals will help to eliminate the potential for facilitation of fraud with ATC. The proposals also will help to eliminate consumer confusion regarding why certain products are currently sold using ATC and others are not.

At its 2007 Annual Meeting, the SWMA received the proposal shown above and recommended it move forward as a Voting item on the NCWM S&T Committee agenda.

Based on comments received at the 2008 Interim Meeting that the proposal should only apply to fuel products and to VTMs the Committee modified the proposal and agreed to present it for a vote at the 2008 NCWM Annual Meeting.

In its spring 2008 meeting report, the CWMA S&T Committee stated that it heard comments that there may be problems with uniformity over buyer and seller agreements at the retail level. The CWMA S&T Committee recommended that the item be moved back to an Informational status for further clarification.

In its spring 2008 meeting report, NEWMA reported that it initially supported this item, but after hearing comments raised by the CWMA regarding written agreements, it re-considered its position and proposed that the item be moved back to an Information item. NEWMA members commented that unscrupulous companies could have customers unwittingly sign contracts agreeing to gross or net deliveries to their disadvantage. Some members suggested that maybe the written agreement language should be removed altogether. NEWMA did not have a solution to this problem but recognized how this could be misused.

NIST WMD noted that the numbering of the proposed paragraphs needs to be reviewed and the paragraphs reorganized within the code before proceeding with this item.

The Committee heard concerns regarding the proposed UR.2.5.2.1. from the CWMA and NEWMA and during its open hearings at the 2008 NCWM Annual Meeting. While an identical paragraph is presently included in the Liquid-Measuring Devices Code, its use has been limited to wholesale applications where the buyer and the seller

are well educated regarding the use of temperature compensation. There are concerns that this paragraph is not appropriate for the Vehicle-Tank Meters Code since this applies to retail applications where the buyer may not fully understand or appreciate the significance of temperature compensated deliveries and may not notice references to the basis for the sale in any delivery contract or understand the significance of the references. There is particular concern that a seller could include a time period shorter than a 12-month period in a contract and that the timeframe could include a time period where the use of temperature compensation is most advantageous to the business. Comments suggested that the Committee delay proposing this item for a vote until the language can be more carefully studied.

Based on the comments received, the Committee decided to change the status of this item from Voting to Information.

336 WATER METERS

336-1 V UR.2. Accessibility Customer Indication

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Proposal: Add a new paragraph UR.2. to HB 44, Section 3.36. Water Meters, as follows:

> **UR.2. Accessibility of Customer Indication. – An unobstructed standing space of at least 30 in wide, 36 in deep, and 78 in high shall be maintained in front of an indication intended for use by the customer to allow for reading the indicator. The customer indication shall be readily observable to a person located within the standing space without necessity of a separate tool or device.**

Background/Discussion: At its 2006 Annual Meeting, the WWMA received an industry proposal intended to assist enforcement personnel in properly and uniformly enforcing the applicable regulations for obtaining meter readings. The proposed language is more appropriate than (1) trying to define inherently ambiguous and subjective terms like "reasonable" and "ordinary circumstances" or (2) defining specific height requirements that insure visibility for customers and/or officials. The industry proposal recommended that a new paragraph UR.2. Accessibility for Reading should be added to Section 3.36. Water Meters Code of HB 44 because of the need for language to describe acceptable and applicable provisions.

Industry members stated that existing language in General Code paragraphs G-UR.2.1.1. and G-UR.3.3. includes terms such as "reasonable" and "readily observable" which are subjective requirements; it is not possible to understand the installation requirements without relying on each local authority's interpretation of these terms, which varies even within the same jurisdiction.

In a vast majority of cases, water submetering locations are NOT chosen by the service agency or the property/meter owner, but are dictated by the engineers and architects who use both national and state building and plumbing codes as their primary guide.

The regulation which is most commonly cited on notices of violation for register visibility issues is paragraph G-UR.3.3. Position of Equipment. HB 44 defines direct sale as "*a sale in which both parties in the transaction are present when the quantity is being determined*…." Industry notes that paragraph G-UR.3.3. is being misapplied and should have no bearing on a water submeter application since both parties are **not** present when the quantity is determined. Furthermore, the antonym of a direct sale would be an indirect sale. NIST HB 130, Packaging and Labeling, Section 11. Exemptions, Subsection 11.1.1. Indirect Sale of Random Packages gives examples of indirect sales, several of which are exact examples of how water-submetering bills are paid. Examples of such indirect methods include on-line bill payments, phone bill payments, fax bill payments, and bill payments by mail.

Since water submetering is typically billed on a monthly cycle and since water submetering is not a direct sale where both parties are present at the time of the transaction, accessibility requirements for reading water meters should not

be the same as those enforced on direct sale devices where transactions take place frequently and with both parties present.

If the interpretation of the terms "reasonable and readily observable" continue to be enforced as they are currently, many meter owners will choose to abandon their systems for alternative billing methods such as "remote utility billing service" (RUBS) because re-plumbing existing water lines within walls is costly to building and coop/condo owners. This is especially true because there is no framework in place to know how to perform such a plumbing retrofit so that the work will be compliant with all interpretations of "reasonable" and "readily observable."

A detailed, 12-month sampling of call center complaints from California properties showed that not a single complaint about the difficulty in obtaining a water meter reading had been received.

HB 44, Water Meters Code paragraph S.1.1.1. General permits a remote display as long as it is "readily accessible to the customer."

The industry proposed language was no more definitive than the existing language. The industry proposal removed the requirement for providing a readily accessible customer indicator. The California Division of Measurement Standards (DMS) proposed alternative language that would remove the vagueness from the current requirement while providing flexibility to installers.

Property owners do not read the indicators on each meter or they would be placed in a more convenient reading location. With remote reading, however, many meters are now being placed in inaccessible locations. Hardware is being installed to permit remote readings for billing purposes, but may not be available for customers' use.

Complaints have been lodged where the remote billing did not match the meter readings and the WWMA believed that customers should be able to easily monitor their actual use without involving the property owner.

The industry in California has been advised that remote customer indications are permissible. However, industry has not submitted devices to California DMS for type evaluation. This problem can be resolved in a manner more consistent with other device applications through submitting for type evaluation remote customer indicators to be used in future meter installations.

The WWMA considered the proposal developed by industry and an alternate recommendation developed by California DMS. The industry proposal would have permitted access to indications either through a primary indicator or a remote indicator. Alternatively, operators would be required to provide customer access to meter indications within 24 hours of notification within a billing cycle. The California DMS proposal specified installation requirements that provide for a clear, unobstructed perimeter surrounding the device to ensure accessibility for viewing meter indications.

The WWMA acknowledged that utility submeters are commercial devices. However, the measurement operation takes place over an extended period of time and the customer is not able to observe the entire measurement operation. The customer then receives a bill on a periodic cycle based on meter indications taken at the start and at the end of the billing period. In some cases, the meter operator/owner may be offsite and does not observe primary meter indications. Consequently, no one General Code or Water Meters Code requirement appears to provide a complete and uniform set of guidelines that specifies all conditions for making meter indications available so the consumer can verify the measurement and allow the official to conduct an inspection. Some jurisdictions have developed policies to address this situation. In 2002 paragraph S.1.1.1. General was amended to ensure that when indications are remote they remain accessible to the customer.

In any case, requirements and jurisdiction policies should address the needs of the customer and the official for access to meter indications without placing an undue burden on the operator or customer, and they should not deter a customer from making a legitimate complaint. It is essential in the marketplace to have all components used in determining utility charges transparent; this includes meter indications that are available to all parties involved in the transaction.

The WWMA agreed that each proposal has some elements necessary to address meter accessibility and indicator accessibility. Therefore, the 2006 WWMA recommended the proposal become a Developing item to allow time to rework the text to provide uniform guidelines that fully address accessibility and include the following points: (1) Installation and location is such that there is no obstruction of the meter or indications, and (2) Indications are accessible for viewing by the customer and official without the use of tools separate from the device.

At its 2007 Annual Meeting, the WWMA heard comments from the California DMS stating that the dimensions listed in its alternate proposal are excerpted from utility meter requirements in the Pacific Gas & Electric Utility Company (Green Book) manual and California Weights and Measures Electric Meter regulations. The WWMA agreed with comments from DMS to add a new paragraph UR.2. to the Water Meters Code and believed it was sufficiently developed to be moved forward as a Voting item on the NCWM S&T Committee Agenda.

At the 2008 Interim Meeting, the Committee heard no opposition to the item and agreed to present it for a vote at the 2008 NCWM Annual Meeting.

In their spring 2008 meeting reports, the CWMA and NEWMA supported moving the item forward for a vote.

358 MULTIPLE DIMENSION MEASURING DEVICES

358-1 V A.1. General, Note 7 in Table S.4.1.b., and Appendix D. Definitions

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add new paragraphs A.1.1. and A.1.2.; amend Note 7 in Table S.4.1.b.; and add new definitions to Appendix D. Definitions. as follows:

A.1. General. – This code applies to dimension and volume measuring devices used for determining the dimensions and/or volume of objects for the purpose of calculating freight, storage, or postal charges based on the dimensions and/or volume occupied by the object. A multiple dimension measuring device:

(a) is generally used to measure hexahedron-shaped objects, and
(Added 2008)

(b) may be used to measure irregularly-shaped objects.
(Added 2008)

Multiple Dimension Measuring Systems Table S.4.1.b. Notes for Table S.4.1.a.
7. Materials, shapes, structures, combination of object dimensions, speed, **spacing, minimum protrusion size,** or object orientations that are inappropriate for the device or those that are appropriate.

(Amended 2004 and 2008)

Appendix D – Definitions.

hexahedron. A geometric solid (i.e., box), with six rectangular or square plane surfaces. [5.58]
(Added 2008)

irregularly-shaped object. Any object that is not a hexahedron shape. [5.58]
(Added 2008)

Background/Discussion. This proposal clarifies the requirements for multiple dimension measuring devices by defining the type of objects measured by these devices and including the definitions for these objects. This proposal also clarifies a complex marking requirement currently included in this section by:

1. Providing a better description of the various objects measured using these devices. As the MDMD Irregular WG discussed "irregularly-shaped objects," it was determined that clarification was required as to the definition of irregularly-shaped objects. Examples of irregularly-shaped objects include, but are not limited to, pails, mufflers, tail pipes, palletized freight containing multiple hexahedron objects, and palletized freight containing large uncontainerized objects such as transmissions or engines.

2. Directing current marking requirements to the appropriate shapes. Current wording requires marking the unit for both appropriate and inappropriate shapes.

3. Defining the terms hexahedron and irregularly-shaped objects to clarify the application of various MDMD devices.

The submitters of this proposal state there are no additional cost impacts to the parties involved in the evaluation of these devices. This proposal will benefit both the NTEP evaluation process as well as the field evaluation process by clarifying the objects to be used during testing.

The WWMA recognized that clarification of the device application and marking requirements, along with the additional definitions, are integral to the understanding of this relatively new NIST Handbook 44 code. However, the WWMA recognized that none of its members have experience in field testing or type evaluating these devices. Consequently, the WWMA recommended that this proposal be an Information item so that others with more experience may provide comments.

At its 2007 Interim Meeting, the CWMA heard comments that the proposed language provided a better description of the various objects measured on multiple dimension measuring devices and supported the language as proposed.

At its 2007 Annual Meeting, the SWMA recommended the proposal move forward on the NCWM S&T Committee Agenda as a Voting item.

At the 2008 NCWM Interim Meeting, the Committee was informed that Measurement Canada believed that the proposal could be in conflict with some of their requirements. The Committee was aware that the MDMD work group was scheduled to meet immediately following the Interim Meeting. The Committee agreed to give the WG the opportunity to address Measurement Canada's concerns and modify the proposal as needed. The Committee further agreed to hold a conference call to discuss any proposed changes to the recommendation as a result of the WG meeting. The WG, with participation from Measurement Canada, modified the proposal and, thereby, resolved Measurement Canada's concerns. During the conference call the Committee agreed to accept the proposed changes from the MDMD work group and to present the item for a vote at the NCWM Annual Meeting.

At the 2008 NCWM Annual Meeting, the Committee heard support for the item from some of the device manufacturers present and received no comments in opposition to this item.

358-2 V S.1.5. Value of Dimension/Volume Division Value

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add a new subparagraph S.1.5.2. Devices Capable of Measuring Irregularly-Shaped Objects to paragraph S.1.5. Value of Dimension/Volume Division Value, add a new paragraph UR.3.3. as follows, then renumber succeeding paragraphs.

S.1.5.2. Devices Capable of Measuring Irregularly-Shaped Objects. – For devices capable of measuring irregularly-shaped objects, the value of the division size (d) shall be the same for the length axis (x) and

the width axis (y) and may be different for the height axis (z), provided that electronic rotation of the object to determine the smallest hexahedron is calculated in only a two-dimension horizontal plane, retaining the stable side plane as the bottom of the hexahedron.

(Added 2008)

UR.3.3. Object Placement. – If the object being measured must be transported (e.g., shipped) on a stable side, that irregularly-shaped object must be measured while placed on that stable side. The electronic rotation of the object to determine the smallest hexahedron shall be calculated in a two-dimensional horizontal plane, retaining the stable side plane as the bottom of the hexahedron.

(Added 2008)

Background/Discussion: Irregularly-shaped objects are often electronically rotated in software on the "x" and "y" axis to determine the smallest regular hexahedron shape. The only accurate way to perform this function is if the "x" and "y" dimensions are measured with the same resolution, i.e., the same size "d."

The WWMA acknowledged that additional clarifying language may be needed to describe the specifications of devices in this relatively new handbook code. However, the WWMA recognized that none of its members had experience in field testing or type evaluating these devices. Consequently, the WWMA recommended this proposal be an Information item so that others with more experience may provide comments.

At its 2007 Interim Meeting, the CWMA heard comments that the proposed language provided a better description of the various objects measured on multiple dimension measuring devices and supported the language as proposed.

At its 2007 Annual Meeting, the SWMA recommended the proposal move forward on the NCWM S&T Committee Agenda as a Voting item.

At the 2008 NCWM Interim Meeting, the Committee was informed that Measurement Canada believed that the proposal could be in conflict with some of their requirements. The Committee was aware that the MDMD work group was scheduled to meet immediately following the Interim Meeting. The Committee agreed to give the WG the opportunity to address Measurement Canada's concerns and modify the proposal as needed. The Committee further agreed to hold a conference call to discuss any proposed changes to the recommendation as a result of the WG meeting. The WG, with participation from Measurement Canada, modified the proposal and, thereby, resolved Measurement Canada's concerns. During the conference call the Committee agreed to accept the proposed changes from the MDMD work group and to present the item for a vote at the NCWM Annual Meeting.

At the 2008 NCWM Annual Meeting, the Committee heard support for the item from some of the device manufacturers present and received no comments in opposition to this item.

358-3 V N.1.2. Position Test

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add a new subparagraph N.1.2.1. to paragraph N.1.2. Position Test. as follows:

N.1.2.1. Irregularly-Shaped Test Object Placement. – Irregularly-shaped objects must be measured while placed on a stable side. The rotation of the object to determine the smallest hexahedron should be calculated in a two-dimension plane, retaining the stable side plane as the bottom of the hexahedron.

Background/Discussion: This issue is important to transportation companies which are the primary users of these devices. It is critical that goods are moved while in a stable position in order to ensure the safety of the employees as well as avoiding the damage of goods being transported. Examples are goods mounted to pallets, placement in transportation vehicles, and goods moving along a conveyor belt.

Three-dimension rotation would result in a measurement that typically leaves the measured object in an unacceptable position for transportation for these safety and damage concerns. In fact, it was noted by the MDMD WG that irregularly-shaped goods are frequently labeled with "This End Up," "Top Load," or "Do Not Stack" messages by shippers to enforce these concerns.

To address these concerns, this proposal maintains the "smallest hexahedron" concept while allowing the object to be placed on a stable plane.

The WWMA agreed that clarification and additional guidance was needed for proper field testing of irregularly-shaped items. However, the WWMA recognized that none of its members have experience in field testing or type evaluating these devices. Consequently, the WWMA recommended this proposal be an Information item so that others with more experience may provide comments.

At its 2007 Interim Meeting, the CWMA heard comments that the proposed language provided a better description of the various objects measured on multiple dimension measuring devices and supported the language as proposed.

At its 2007 Annual Meeting, the SWMA recommended the proposal move forward on the NCWM S&T Committee Agenda as a Voting item.

At the 2008 NCWM Interim Meeting, the Committee was informed that Measurement Canada believed that the proposal could be in conflict with some of their requirements. The Committee was aware that the MDMD work group was scheduled to meet immediately following the Interim Meeting. The Committee agreed to give the WG the opportunity to address Measurement Canada's concerns and modify the proposal as needed. The Committee further agreed to hold a conference call to discuss any proposed changes to the recommendation as a result of the WG meeting. The WG, with participation from Measurement Canada, modified the proposal and, thereby, resolved Measurement Canada's concerns. During the conference call the Committee agreed to accept the proposed changes from the MDMD work group and to present the item for a vote at the NCWM Annual Meeting.

At the 2008 NCWM Annual Meeting, the Committee heard support for the item from some of the device manufacturers present and received no comments in opposition to this item.

358-4 V N.1.4. Test Objects

(This item was adopted.)

Source: Western Weights and Measures Association (WWMA)

Recommendation: Add new subparagraphs N.1.4.2. and N.1.4.3. to paragraph N.1.4. Test Objects. as follows:

N.1.4.2. Irregularly-Shaped Test Objects. – For irregularly-shaped test objects, at least one angle shall be obtuse and the smallest dimension for an axis shall be equal to or greater than the minimum dimension for that axis.

N.1.4.3. Test Objects with Protrusions – If the device is marked with a minimum protrusion dimension to be measured, test objects with a protrusion shall be used to verify the marked limitation, during type evaluation.

Background/Discussion: The primary use of these devices is in the calculation of freight transportation charges based on the size of the package. Irregularly-shaped items are typically wrapped in plastic, not enclosed in a container or banded by straps. When these items are measured by humans, judgment can be used to exclude loose plastic wrapping, fly tag labels, strap ends and other protrusions from the dimensions used to determine the irregular object's shape.

When determining the size of irregular objects, these protrusions need to be excluded from the smallest regular hexahedron dimension or the resulting dimensions will generate excessive freight charges to the customer. Defining

the size limit of the protrusion is necessary to distinguish those protrusions that will be excluded from those that are included in an irregular object's shape.

The WWMA agreed that clarification and additional guidance was needed for proper field testing of irregularly-shaped items. However, the WWMA recognized that none of its members have experience in field testing or type evaluating these devices. Consequently, the WWMA recommended this proposal be an Information item so that others with more experience may provide comments.

At its 2007 Interim Meeting, the CWMA heard comments that the proposed language provided a better description of the various objects measured on multiple dimension measuring devices and supported the language as proposed.

At its 2007 Annual Meeting, the SWMA recommended the proposal move forward on the NCWM S&T Committee Agenda as a Voting item.

At the 2008 NCWM Interim Meeting, the Committee was informed that Measurement Canada believed that the proposal could be in conflict with some of their requirements. The Committee was aware that the MDMD work group was scheduled to meet immediately following the Interim Meeting. The Committee agreed to give the WG the opportunity to address Measurement Canada's concerns and modify the proposal as needed. The Committee further agreed to hold a conference call to discuss any proposed changes to the recommendation as a result of the WG meeting. The WG, with participation from Measurement Canada, modified the proposal and, thereby, resolved Measurement Canada's concerns. During the conference call the Committee agreed to accept the proposed changes from the MDMD work group and to present the item for a vote at the NCWM Annual Meeting.

At the 2008 NCWM Annual Meeting, the Committee heard support for the item from some of the device manufacturers present and received no comments in opposition to this item.

360 OTHER ITEMS

360-1 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	•R 21 "Taximeters" •R 50 "Continuous Totalizing Automatic Weighing Instruments (Belt Weighers)" •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"

NIST Weights and Measures Division (WMD) Contact List for International Activities	
Contact Information	**Responsibilities**
Mr. Steven Cook (LMDG) (301) 975-4003 steven.cook@nist.gov	•R 60 "Metrological Regulations for Load Cells" •R 76 "Non-automatic Weighing Instruments"
Dr. Charles Ehrlich (ILMG) (301) 975-4834 charles.ehrlich@nist.gov	•CIML Member •B "OIML Certificate System for Measuring Instruments" •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," & "OIML Procedures for Review of Laboratories to Enable Mutual Acceptance of Test Results and OIML Certificates of Conformity" •TC 3 "Metrological Control"
Mr. Richard Harshman (LMDG) (301) 975-8107 Richard.harshman@nist.gov	•R 51 "Automatic Catchweighing 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 61 "Automatic Gravimetric Filling Instruments" •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	•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" •R 85 "Automatic Level Gauges for Measuring the Level of Liquid in Fixed Storage Tanks" •R 105 & 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" •R 137 "Gas Meters" (Diaphragm, Rotary Piston, & Turbine Gas Meters) •R 140 "Measuring Systems for Gaseous Fuel" (i.e., large pipelines) •TC 3/SC 4 "Verification Period of Utility Meters Using Sampling Inspections"
Dr. Ambler Thompson (ILMG) (301) 975-2333 ambler@nist.gov	•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" •R 34 "Accuracy Classes of Measuring Instruments" •R 46 "Active Electrical Energy Meters for Direct Connection of Class 2" •TC 5/SC 2 "General Requirements for Software Controlled Measuring Instruments"
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"

NIST Weights and Measures Division (WMD) Contact List for International Activities			
Contact Information		**Responsibilities**	
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.

360-2 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 Developing items are currently under review by at least one regional association, technical committee, or organization.

Developing items are listed in Appendix A according to the specific HB 44 code section under which they fall. Periodically, proposals 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 A 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.

Carol P. Fulmer, South Carolina, Chairman

Todd R. Lucas, Ohio
Brett Saum, San Luis Obispo County, California
Kristin Macey, California
Steve Giguere, Maine

Ted Kingsbury, Measurement Canada, Technical Advisor
Steven Cook, NIST, Technical Advisor
Tina Butcher, NIST, Technical Advisor

Specifications and Tolerances Committee

Appendix A

Item 360-2: Developing Items

Part 1, Item 1 General Code: G-S.1. Identification – (Software)

Source: National Type Evaluation Technical Committee – Software Sector

Recommendation: Amend G-S.1. and/or G-S.1.1. to include the following:

Method	NTEP CC No.	Make/Model/Serial No.	Software Version/Revision
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 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	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.

Background/Discussion: In 2005 the Board of Directors established a NTETC Software Sector. The tasks of the Sector are to:

- Develop a clear understanding of the use of software in today's weighing and measuring instruments.
- Develop NIST HB 44 specifications and requirements, as needed, for software incorporated into weighing and measuring devices. This may include tools for field verification, security requirements, identification, etc.
- Develop NCWM Publication 14 checklist criteria, as needed, for the evaluation of software incorporated into weighing and measuring devices, including marking, security, metrologically significant functions, etc.
- Assist in the development of training guidelines for W&M officials in verifying software as compliant to applicable requirements and traceable to an NTEP Certificate. Training aids to educate manufacturers, designers, service technicians and end users may also be considered.

During their October 2007 meeting, the Sector discussed the value and merits of required markings for software. This included the possible differences in some types of devices and 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, S.N. to comply with G-S.1. Identification.

The Sector recommended that the recommendation to amend G-S.1. and/or G-S.1.1. be given Developmental status since additional work is needed to develop the appropriate language to amend paragraphs G-S.1. and G-S.1.1. The Sector is also interested in receiving input from the weights and measures community about this item. Working with input from the weights and measures community, the Sector plans to introduce proposed modifications to current requirements through the regional weights and measures associations and other technical committees. In the meantime, the Sector welcomes opportunities to discuss this item at regional weights and measures associations to ensure the item is adequately addressed.

To comment on this proposal, contact Norm Ingram by e-mail at ningram@cdfa.ca.gov, or by telephone at (916) 229-3016 and Jim Pettinato by e-mail at jim.pettinato@fmcti.com, or by telephone at (814) 898-5250 or by mail at NCWM, Inc., 1135 M Street, Lincoln, NE 68508.

Part 1, Item 2 Appendix D – Definition of Electronic Devices, Software-Based

(This item first appeared on the 2008 S&T Committee Interim Agenda as Item 310-2)

Source: National Type Evaluation Technical Committee (NTETC) – Software Sector

Recommendation: Add a new definition and cross-reference term to Appendix D in HB 44 for "Electronic devices, software-based" as follows:

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.

Background/Discussion: During the NTETC Software Sector discussion on marking requirements and G-S.1.1. Location of Identification Information, 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 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).

At the 2008 Interim Meeting, the SMA supported the intent of the item, but stated that it is premature to place these definitions in HB 44. The SMA recommended that the status of the item be changed to Developing on the S&T Committee Agenda. The Committee agreed to move Item 310-2 of the 2008 S&T Committee Interim Agenda and assign Developing status as 360-2 Part 1, Item 2.

At the 2008 Annual Meeting, the Committee heard comments from the former NTETC Software Sector Chairman indicating that the Sector had completed its review of this item and could not develop it any further. He requested that the Committee consider moving the item from the Developmental section of the agenda and at least make it an Information item on the Committee's agenda to facilitate discussion and comment on the proposed language.

The Sector indicated that it has completed its work on the item and noted that sufficient information (including specific proposed language) was included in the submission to enable action by the Committee; consequently, the Committee agreed to forward the item to the regional weights and measures associations for consideration and will include this item on its 2009 Interim Agenda.

Part 2, Item 1 Scales: S.1.4.6. Height and Definition of Minimum Reading Distance, UR.2.10. Primary Indicating Elements Provided by the User, UR.2.11. Minimum Reading Distance and Definitions of Minimum Reading Distance and Primary Indications

Source: NTETC WS

Note: This proposal was Carryover Item 320-2 which first appeared in the Committee's 2006 Agenda and again on the Committee's 2007 Agenda as Item 320-4. (This item originated from the 2005 NTETC WS.) The Committee believes that although the proposal has merit there does not appear to be a consensus on the size and quality of primary indication information on devices used in direct and indirect sales transactions or an enforcement date for such requirements. Therefore, the Committee removed Item 320-4 from its agenda and made it a Developing item to allow sufficient time for the community to fully develop requirements acceptable to those affected.

Recommendation: Add new paragraphs S.1.4.6., UR.2.10., and UR.2.11. to the Scales Code as follows:

S.1.4. Indicators.

S.1.4.6. Height. – All primary indications shall be indicated clearly and simultaneously.

(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm (0.4 in) high.

(b) The units of mass and other descriptive markings or indications, such as lb, kg, gross, tare, net, etc., shall be clearly and easily read and shall be at least 2 mm (0.08 in) high.

[Nonretroactive as of January 1, 200X]

(Added 200X)

UR.2. Installation Requirements.

UR.2.10. Primary Indicating Elements Provided by the User. – Primary indicating elements that are not the same as the primary indicating elements provided by the original equipment manufacturer (e.g., video display monitors) shall comply with the following:

(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm (0.4 in) high.

(b) The units of mass and other descriptive information, such as gross, tare, net, etc., shall be displayed or marked on the device and shall be at least 2 mm (0.08 in) high.

(Added 200X)

UR.2.11. Minimum Reading Distance – On digital devices that display primary indications, the height of the numbers expressed in millimeters should be not less than three times the minimum reading distance expressed in meters, without being less than 2 mm (0.08 in). (Example: If the height of the primary indications is 10 mm, then the minimum reading distance should not be greater than 30 m).

(Added 200X)

Add new definitions of "minimum reading distance" and "primary indications" to Appendix D as follows:

minimum reading distance. The shortest distance that an observer is freely able to approach the indicating device to take a reading under normal conditions of use. This approach is considered to be free for the observer if there is a clear space of at least 0.8 m in front of the indicating device. However, if the minimum reading distance "S" in Figure X below is less than 0.8 m, then the minimum reading distance is "L" in Figure X. [2.20]

(Added 200X)

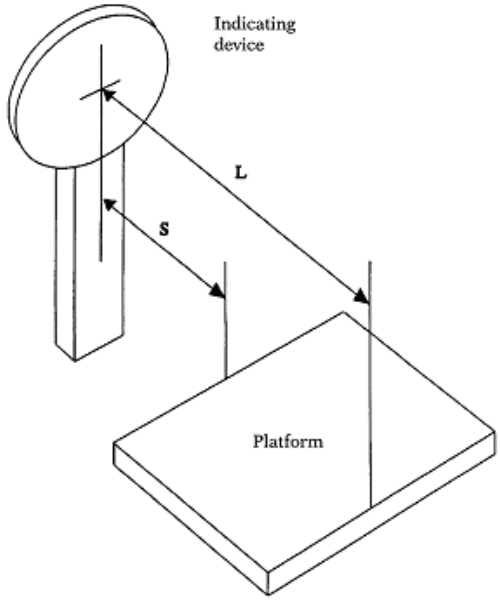

Figure X

primary indications. Weight or other units of measurement values displayed by a primary indicating element. The primary indications are used as the determining factor in arriving at the sale representation when the device is used commercially. (Examples of primary indications include the measurement value, unit price or count, and total price on instruments capable of price computing. Primary indications do not include indications from auxiliary indicating devices such as totalizing registers and pre-determined stop mechanisms.) [1.10], [2.20]

(Added 200X)

This proposal was developed to address a growing problem with the readability of weight indications and the values that define transaction information. Field and laboratory officials indicate both are becoming increasingly smaller, as demonstrated in the following example of a weight display where the actual size of the weight values are 23 mm in height, but the unit of measurement (g) is 4 mm in height.

The Committee agreed that although the clarity and readability of indications was a growing issue, the current proposal had only limited support from the public and private sectors. The Committee recognized the proposal required a significant amount of work before the language was clear, technically correct, and deemed applicable to

the different types of installations and technologies in current use. The Committee had concerns about whether or not the proposed 2 mm height requirements for units of measurement and other markings were adequate. The Committee also questioned the clarity of the proposed user requirements for the minimum reading distance.

The Committee recommended the submitter consider several points in its review of the current proposal such as:

- Any specification and corresponding user requirement should provide laboratory and field officials with uniform guidelines:

  - determine if the required markings on a new equipment design from the manufacturer or a device recently modified by the owner or a service company were suitable for continued use in a particular application; and

  - remove all ambiguity or subjectivity when assessing if primary indications can be observed from a reasonable customer and operator position.

- A size requirement for figures and their corresponding descriptive symbols and characters specified as a percentage might be a good approach.

- Corresponding new language in HB 44 that is similar to that which exists in HB 130 for labels to specify, "all required markings shall be prominent, definite, plain, and conspicuous as to size and style of symbols, letters, and numbers and as to color that is in contrast to the background and presented so that there is adequate free area surrounding those markings."

- A recognized vision standard such as those used to determine visual acuity (eye exam charts, etc.) might be a good source for establishing specific distance limits.

- When the size of indications becomes a selectable configuration parameter, access to this feature must be sealed.

The NIST technical advisor to the NTETC WS amended the proposal to address the concerns and suggestions from the manufacturers, NTEP labs, and WMD and placed the item on the 2007 WS agenda. The NIST technical advisor did not develop any changes to the proposed definition of "Primary Indications," the proposed User Requirements, and the associated definition for "Minimum Reading Distance." The Sector was asked to review the proposed language in its agenda and provide a recommendation that can be forwarded to the regional weights and measures associations. The Sector agreed to submit the following revised language to the regional weights and measures associations and the NCWM S&T Committee. The Sector also recommends deleting the proposed amendment to the definition of primary indications. Additionally, the Sector did not discuss or make any recommendations on the proposed user requirements and definition for "minimum reading distance."

S.1.4. Indicators.

S.1.4.6. Direct Sale Primary Indications – Size and Character. Scales designed for direct sale applications with a capacity of 100 kg (200 lb) or less shall comply with the following:

a. All indications shall be indicated clearly and simultaneously.

b. All indications and associated descriptive markings (e.g., lb, kg, gross, tare, net, etc.) shall be presented in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphics and shall be at least 2 mm ($^{3}/_{32}$ in) high.

c. All indications and associated descriptive markings shall be in a color or shade that contrasts conspicuously with its background.

d. All primary numeric indications displayed to the customer shall be at least 9.5 mm (0.4 in) high.

e. All units and descriptors shall be at least 2 mm (3/32 in) high.
[Nonretroactive as of January 1, 200X]
(Added 200X)

primary indications. Weight or other units of measurement values displayed by a primary indicating element. The primary indications are used as the determining factor in arriving at the sale representation when the device is used commercially. (Examples of primary indications include the measurement value, unit price or count, and total price on instruments capable of price computing. Primary indications do not include indications from auxiliary indicating devices such as totalizing registers and pre-determined stop mechanisms.) [1.10], [2.20]
(Added 200X)

At its 2007 Annual Meeting, the WWMA heard from one scale manufacturer that his company's devices will pass the 9.5 mm and 2 mm requirements, but not the 21 %.

The WWMA recommended this item remain a Developing item on the NCWM S&T Committee Agenda.

At its 2007 Interim Meeting, the CWMA commented that although a specification in HB 44 has merit, the proposed language in Scales Code paragraph S.1.4.6. is not necessary since other requirements already present in HB 44 General Code G-UR.3.3. Position of Equipment states that a device shall be positioned so that its indications may be accurately read from some reasonable "customer" and "operator" position. Additionally, the new language for installation requirements in proposed paragraphs UR.2.10. and UR.2.11. are also addressed in paragraph G-UR.3.3. and, therefore, is not necessary.

The CWMA recommended this item remain a Developing item on the NCWM S&T Committee Agenda.

At its 2007 Interim Meeting, NEWMA recommended this item be Withdrawn as it was already covered in HB 44 General Code paragraph G-S.5.1.

At the 2007 SWMA Annual Meeting, a scale manufacturer stated it could support S.1.4. Indicators, but not UR.2. Installation Requirements. The SWMA agreed to forward the comment to the NCWM S&T Committee for consideration.

To comment on this proposal, contact Steven Cook, NIST Technical Advisor to the NTETC WS, by e-mail at steven.cook@nist.gov, by telephone at (301) 975-4003, by fax at (301) 975-8091, or by postal mail at NIST WMD, 100 Bureau Drive MS 2600, Gaithersburg, MD 20899-2600.

For more background information refer to the Committee's 2006 and 2007 Final Reports.

Part 3, Item 1 Belt-Conveyor Scale Systems: UR.3.2.(c) Maintenance; Zero Load Tests

Source: 2005 Western Weights and Measures Association (WWMA)

Recommendation: Modify UR.3.2.(c) as follows:

UR.3.2. Maintenance. – Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer's instructions and the following requirements:

(c) **Zero-load and load (simulated or material) tests, ~~S~~simulated load tests, or material tests, and ~~zero load tests~~** shall be conducted at periodic intervals between official tests in order to provide reasonable assurance that the device is performing correctly.

(Amended 200X)

The action to be taken as a result of the zero-load tests is as follows:
(Added 200X)

- **if the change in zero is less than ± 0.1 %, make no adjustment, record results and proceed to simulated load tests; or**

- **if the change in zero is ± 0.1 % to ± 0.25 %, inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements and retest.**
  (Added 200X)

The action to be taken as a result of the **simulated load or** material tests ~~**or simulated load tests**~~ is as follows:
(Amended 2002 **and 200X**)

- if the error is less than 0.25 %, no adjustment is to be made;

- if the error is at least 0.25 % but not more than 0.6 %, **inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements and repeat the test**~~**adjustment may be made if the official with statutory authority is notified**~~;
  (Amended 1991 **and 200X**)

- **if the result of tests, after compliance with UR.2. Installation Requirements is verified, remain greater than ± 0.25 %, a span correction shall be made and the official with statutory authority notified;**

- if the error is greater than 0.6 % but does not exceed 0.75 %, **inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements, and repeat the test;**
  (Amended 1991 **and 200X**)

- **if the result of tests, after UR.2. Installation Requirements compliance is verified, remains greater than ± 0.25 %, a span correction shall be made, the official with statutory authority shall be notified, and an official test shall be conducted;**

- if the error is greater than 0.75 %, an official test is required.
  (Amended 1987 **and 200X**)

Discussion: HB 44 gives limited guidance on what to do with zero-load test results. Belt loss is not the only factor which may require the scale operator to make physical adjustments to the belt-conveyor system to correct for deficiencies. For example, a dirty scale structure or a worn belt scraper will increase the zero-reference number and the test results may exceed tolerances.

The scale user/owner has to protect his interest between weighing transactions. At present, some belt-conveyor systems may have errors greater than 0.5 % in zero reference over a 24-hour period. The belt is part of tare (net load) on any empty running system and the system must be maintained to within tolerance at all times.

During its 2006 meeting, the WWMA recommended the alternate industry proposal shown above. The WWMA also recommended the alternate proposal be considered at a future meeting of the USNWG on Belt-Conveyor Scale Systems. The WWMA recommended the alternate proposal remain a Developing item to allow sufficient time for a review by the WG. The CWMA and the SWMA concurred with the WWMA's recommendation.

During the 2007 NCWM Annual Meeting, the Committee heard testimony that a work group of the National Weighing and Sampling Association was working on this item and would have a recommendation for the WWMA prior to its 2007 Annual Meeting.

Participants in the work group include:

Phil Carpentier, PTC Consulting, LLC	ptcarpentier@att.net
Paul Chase, Chase Technology, Inc.	mjc@emily.net
Al Page, Montana Weight and Measures	awp88bb@gmail.com
Peter Sirrico, Thayer Scale	psirrico@thayerscale.com
Bill Ripka, Thermo Ramsey	bill.ripka@thermofisher.com

This WG agrees that there is a need to establish some zero-load test interval for the normal use of a belt-conveyor scale system and that there is also a need to vary that interval (longer interval if the scale is stable; shorter if the zero-load tests require frequent adjustment). The WG has reviewed and discussed this Developing item and submitted the following revised proposal to the NIST technical advisor to the S&T Committee.

UR.3.2. Maintenance. – Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer's instructions and the following requirements:

(c) **Simulated load tests or material tests and zero-load tests** ~~**S**~~**s**~~imulated load tests, or material tests, and zero-load tests~~ shall be conducted at periodic intervals between official tests in order to provide reasonable assurance that the device is performing correctly. **The minimum test interval shall be established by the official with statutory authority.**

(Amended 200X)

The action to be taken as a result of the zero-load tests is as follows:

(Added 200X)

- **If the zero error is less than 0.25 %, adjustment to zero.**

- **If the zero error is at least 0.25 % but not more than 0.5 %, inspect the belt-conveyor scale system for installation and maintenance items (e.g., clearance, material adhering to the belt, alignment, etc.), make required corrections, adjust the zero, and repeat the zero-load test.**

- **If the zero error is greater than 0.5 %, inspect the belt-conveyor scale system, make required corrections to installation and maintenance items (e.g., clearance, material adhering to the belt, alignment, etc.), adjust the zero, and reduce the interval between zero tests.**

(Added 200X)

The action to be taken as a result of the material tests or simulated load tests is as follows:

(Amended 2002)

- If the error is less than 0.25 %, no adjustment is to be made.

- If the error is at least 0.25 % but not more than **0.5**~~**6**~~ **%, the span shall be adjusted by an authorized service agent and** ~~**adjustment may be made if**~~ the official with statutory authority is notified**;**

  (Amended 1991 **and 200X**)

- If the error is greater than **0.5**~~**6**~~ **%**~~**but does not exceed 0.75 %, adjustments shall be made only by a competent**~~ **an authorized service** ~~**person**~~ **agent** ~~**and the official with statutory authority shall be notified. After such an adjustment, if the results of a subsequent test require adjustment in the same direction, an official tests shall be conducted**~~**shall adjust the span, perform maintenance on the belt-conveyor scale system, and schedule an official test with statutory authority**.

  (Amended 1991 **and 200X**)

- ~~**If the error is greater than 0.75 %, an official test is required.**~~
  (Amended 1987)

At its 2007 Annual Meeting, the WWMA heard comments from a BCS manufacturer that the NW&SA WG version was superior to current language. However, the manufacturer stated that this item needed additional development and subsequent review by the entire NW&SA. The WWMA believed this item was not sufficiently developed and did not have a consensus from the NW&SW WG and therefore recommended this remain a Developing item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, the CWMA recommended this item be Withdrawn.

During the 2008 NCWM Interim Meeting, the Committee was informed that the USNWG on Belt-Conveyor Scales is going to further develop the proposal during their next meeting on February 27 - 28, 2008, in St. Louis, Missouri.

To comment on this proposal, contact Steven Cook, NIST Technical Advisor to the NTETC Belt-Conveyor Scales Sector, by e-mail at steven.cook@nist.gov, by telephone at (301) 975-4003, by fax at (301) 975-8091, or by postal mail at NIST WMD, 100 Bureau Drive MS 2600, Gaithersburg, MD 20899-2600.

Part 3, Item 2 Belt-Conveyor Scale Systems: N.3.1.4. Check for Consistency of the Conveyor Belt Along Its Entire Length

Source: 2005 Western Weights and Measures Association (WWMA)

Recommendation: Amend NIST Handbook 44, Section 2.21. Belt Conveyor Scales (BCS) Systems Code, paragraph N.3.1.4. as follows:

N.3.1.4. 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 paragraphs N.3.1.2. Initial Stable Zero and N.3.1.3. 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 200X)</u>**

Discussion: The BCS WG agrees that the existing language in N.3.1.4. 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 3-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.

The current tolerance of plus or minus 3 divisions can allow belt weight variation to contribute too large a portion to the 0.25 % belt-conveyor scale tolerance. The actual quantity represented by 3 divisions can vary with the belt-conveyor scale application. Paragraph N.2.3. Minimum Totalized Load (b) allows a material test load to be the amount of material to be weighed during one revolution of the belt. If the tolerance for the material test is 0.25 %, then on a root-sum-square basis, the variation in zero resulting from changes in the weight of the belt itself should not exceed 0.18 % (0.25 % times $\{\sqrt{2}\}$ / 2).

Some rationale other than root-sum-square could result in a different allowable variation due to belt weight.

The following example illustrates the difference between divisions and percent for this purpose:

Belt length	= 800 ft,
Division size	= 0.1 ton,
Maximum capacity	= 800 tons/hr, and
Belt speed	= 400 ft/min

These minimum totalized load (MTL) values in paragraph N.2.3. are in a feasible range for an actual application.

N.2.3. (a) 800 divisions	= 80.0 tons
N.2.3. (b) one revolution	= 26.67 tons, which is (66.67 lb/ft * 800 ft)
N.2.3. (c) ten minutes	= 133.3 tons

The materials test tolerance (T.1.) based on the MTL in N.2.3.(b) = 0.07 tons.

The allowable variation due to belt weight is ± 3 divisions or ± 0.3 tons. Using ± 0.3 ton error in zero allows a total delivery error that can exceed maintenance tolerance in paragraph T.1. Tolerance values because of acceptable belt weight variation of 0.6 tons currently in HB 44 paragraph N.3.1.4. This tolerance exceeds the 0.25 % tolerance of the weighing system without weighing any material. Even for a 10 min MTL (N.3.1.4.c), the allowable error is 0.45 % of 133.3 tons.

The proposed language changes the tolerances in N.3.1.4. from ± 3 divisions to 0.18 %. In the above example, the allowable change in the totalizer readings could be no greater than 0.048 tons [0.18 % x 26.67 tons (MTL)].

NIST HB 44 paragraph N.2. Conditions of Test. was amended, and the minimum totalized load (MTL) requirements were amended and renumbered to paragraph N.2.3. Since 10 min of operation in N.3.2.(c) typically results in a test load larger than (a) or (b), the 10 min MTL is used for most BCS installations. Additionally, the words "or a normal weighment" were removed from MTL requirements because, at that time, it was thought the words were no longer needed since language was developed to allow a smaller material test load provided the scale demonstrated compliance with BCS tolerances with the MTL and the smaller test load.

As a result of removing the words "or a normal weighment," it has been reported that the revised MTL requirements were not suitable for BCS installations that issue individual weights for vehicles and railcars. This is due to limitations of the installation and uncertainties in determining the net weights of several vehicles or railcars to compare material test results of the 10 min MTL with the alternate test load of "2 % of the load totalized in 1 hour."

The current NIST HB 44 paragraph N.2.3. permits "a smaller minimum totalized load down to 2 % of the load totalized in 1 hour…." In the above example the minimum load would be 16 tons for this criterion so the belt variation is even a larger percentage of the weighed load.

The change to 0.18 % is a better criterion in several ways.

1. "It defines the allowable excursion of the totalized value during the zero procedure. Plus or minus requires some reference value and it is not known at the start of a zero test whether that portion of the belt is heavy or light."
2. It is independent of division size. (But the division size must be small enough to resolve the variation.)
3. It is in harmony with OIML R 50.

In the above example 0.18 % of 26.67 tons is 0.048 tons. This is quite different from 3 divisions or ± 3 divisions.

At its 2007 Annual Meeting, the WWMA heard comments from a device manufacturer who would like to leave the item as either Developing or Withdrawn. The NIST technical advisor agreed the proposal needed additional work. Therefore, the WWMA recommended this proposal be a Developing item to allow the BCS WG additional time to make modifications.

During the 2008 NCWM Interim Meeting, the Committee was informed that the USNWG on Belt-Conveyor Scales is going to further develop the proposal during their next meeting on February 27 - 28, 2008, in St. Louis, Missouri.

To comment on this proposal, contact Steven Cook, NIST Technical Advisor to the NTETC Belt-Conveyor Scales Sector, by e-mail at steven.cook@nist.gov, by telephone at (301) 975-4003, by fax at (301) 975-8091, or by postal mail at NIST WMD, 100 Bureau Drive, MS 2600, Gaithersburg, MD 20899-2600.

Part 4, Item 1 Liquid-Measuring Devices: T.5. Predominance – Retail Motor-Fuel Devices

Source: Central Weights and Measures Association (CWMA)

Recommendation: The CWMA recommends withdrawing its earlier proposal (to add a new paragraph G-UR.4.1.1. to the General Code) and replacing it with the following new proposal developed by the Nebraska Weights and Measures Division to add a new paragraph T.5. to HB 44 Section 3.30. as follows:

T.5. Predominance - Retail Motor-Fuel Devices. – The retail motor-fuel devices in service at a single place of business shall be considered maintained in proper operating condition when evaluation of normal test results indicate the following parameters are met:

(a) The number of meters with minus test errors in excess of one-half maintenance tolerance shall be less than 60 % of the meters at the location, and

(b) When there are three or more meters of a single grade or type of fuel, the average error of the meters shall not be a minus value exceeding one-half maintenance tolerance. Meter test results that exceed maintenance tolerance shall not be included in determining the average meter error of a single grade or type of fuel.

(Added 200X)

Background/Discussion: In 1991 this same topic was brought before the NCWM as an Information item. The intent of the proposal at that time was to provide guidance to states in the interpretation of General Code paragraph G-UR.4.1. Maintenance of Equipment. In 1993, the State of Wisconsin adopted and later refined a policy that defined "predominance" to assist field officials in consistently applying the criteria. In 2005 the CWMA agreed to submit a modified proposal to the NCWM S&T Committee with a recommendation that it be placed on the Committee's agenda as a Developing item.

See the 2007 Final Report of the NCWM S&T Committee for additional background information on this item.

At its 2007 Annual Meeting, the WWMA heard comments from state and local jurisdictions that they have been able to enforce G-UR.4.3. Predominance through administrative policies and rules. The WWMA forwarded these and other comments to the submitter along with a recommendation that the specific proposal being considered be Withdrawn and replaced with an alternate proposal and the new item be made developmental.

At its 2007 Interim Meeting, the CWMA heard comments in favor of this item and from state and local jurisdictions that they have been able to enforce G-UR.4.3. Predominance through administrative policies and rules. However, there was some concern that the proposed tolerance was not stringent enough and allowed the meters to be set at acceptance tolerance values. Consequently, the CWMA developed an alternate proposal for consideration.

At its 2007 Interim Meeting, NEWMA stated that they continue to oppose this item and recommended it be withdrawn as it was already adequately addressed in the General Code.

At its 2008 Annual Meeting, the CWMA recommended the item be Withdrawn.

Part 4, Item 2 Liquid-Measuring Devices: Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD)

At the 2008 Interim Meeting, Ohio Weights and Measures submitted a proposal to the Committee that included specific language for modifying Section 3.30 to address the various pricing and marketing structures being used in retail motor-fuel applications. Based on its review of that proposal, the fact that a specific proposal has now been developed and presented, and the number of jurisdictions reporting a need to move forward with this item, the Committee decided to elevate the status of this item from a Developmental item to an Information item. See Item 330-3 for details.

Part 5, Item 1 Water Meters: UR.2. Accessibility for Reading (See 336-1)

Recommendation: The WWMA believes that this item is sufficiently developed and recommends that the alternative proposal provided by the DMS as shown in the Committee's Agenda Item 336-1 be placed on the NCWM S&T Committee Agenda as a Voting item.

Part 5, Item 2 Water Meters: S.1.1. 3. Value of the Smallest Unit

Source: Southern Weights and Measures Association (SWMA)

Proposal: Clarify S.1.1.3 of Handbook 44, Section 3.36., for the "value of the smallest unit" of indicated delivery.

Background/Discussion: At its 2007 Annual Meeting, the SWMA received a request from a meter manufacturer for clarification of the intent of S.1.1.3. Along with the request, the manufacturer stated that, "our assumption is that this refers to the value of each graduation of the primary indicating element. If this is indeed the intention of S.1.1.3., then the S.1.1.3.(a) requirement of 10 gal would pose no problem for utility type meters. However, this would represent very poor resolution for smaller water meters. Again, if S.1.1. is indeed referring to the values for individual graduations, values for utility type meters under S.1.1.3. should instead be separated into three cateogries: 0.1 gal for meters 1 in and smaller, 1.0 gal for meters 1½ in through 3 in and 10 gal for meters 4 in and larger. Similarly, metric "smallest unit" values would also be in three categories: 1 L for meters 1 in and smaller, 10 L for meters 1½ in through 3 in, and 100 L for meters 4 in and larger.

Utility type water meters 1 in and smaller have 10 gal test circles with 100 graduations (i.e., 0.1 gal increments). Utility meters 1½ in through 3 in have 100 gal test circles with 100 graduations (i.e., 1 gal increments), and utility meters 4 in and larger have 1000 gal test circles with 100 graduations (i.e., 10 gal increments). See comparable registration details for metric offerings (with 0.1 m^3, 1.0 m^3, and 10 m^3 test circle offerings for progressively larger meter sizes)."

The SWMA also heard comments from the manufacturer that several other water meter manufacturers were having difficulty meeting HB 44 requirements for repeatability that were added in 2002. Additionally part of the problem was the determination of what constitutes the smallest unit of measure for various sizes of their utility meters. The manufacturer is requesting a change to the test draft requirements and/or smallest unit of measure requirements to be more appropriate for the meters they and others manufacture. The SWMA agreed to forward the proposal to the NCWM S&T Committee for consideration.

Part 5, Item 3 Water Meters: N.4.1.1. Repeatability Tests and T.1. Tolerance Values

Source: Southern Weights and Measures Association (SWMA)

Proposal: Amend repeatability requirements in Section 3.36., Water Meters as follows:

A) Alternative A: Eliminate the repeatability requirements of HB 44, Section 3.36. (N.4.1.1. and T.1.1.) for utility type meters; or

B) Change the test draft quantities of Tables N.4.1. and N.4.2. of HB 44, Section 3.36., as shown in the table below, in order to meet the repeatability requirements as given in N.4.1.1. and T.1.1. for utility type meters.

Changes in test drafts, HB 44, Section 3.36., **if** current repeatability criteria is to be enforced for utility meters (see Tables N.4.1., and N.4.2)

	Maximum Rate			Intermediate Rate			Minimum Rate		
Meter Size (inches)	**Rate of Flow (gpm)**	**Test Draft (gal)**	**Test Draft (ft^3)**	**Rate of Flow (gpm)**	**Test Draft (gal)**	**Test Draft (ft^3)**	**Rate of Flow (gpm)**	**Test Draft (gal)**	**Test Draft (ft^3)**
less than ⅝	8	**100**	**10**	2	**40**	**4**	¼	**20**	**2**
		~~**50**~~	~~**5**~~		~~**10**~~	~~**1**~~		~~**5**~~	~~**1**~~
⅝	15	**100**	**10**	2	**40**	**4**	¼	**20**	**2**
		~~**50**~~	~~**5**~~		~~**10**~~	~~**1**~~		~~**5**~~	~~**1**~~
¾	25	**100**	**10**	3	**40**	**4**	½	**20**	**2**
		~~**50**~~	~~**5**~~		~~**10**~~	~~**1**~~		~~5~~	~~**1**~~
1	40	**100**	**10**	4	**40**	**4**	¾	**20**	**2**
		~~**100**~~	~~**10**~~		~~**10**~~	~~**1**~~		~~**5**~~	~~**1**~~
1½	80	**500**	**50**	8	**400**	**40**	1½	**200**	**20**
		~~**300**~~	~~**40**~~		~~**50**~~	~~**5**~~		~~**10**~~	~~**1**~~
2	120	**500**	**50**	15	**400**	**40**	2	**200**	**20**
		~~**500**~~	~~**40**~~		~~**50**~~	~~**5**~~		~~**10**~~	~~**1**~~
3	250			20	**400**	**40**	4	**200**	**20**
		500	50		~~**50**~~	~~**5**~~		~~**10**~~	~~**1**~~
4	350	**5000**	**500**	40	**4000**	**400**	7	**2000**	**200**
		~~**1000**~~	~~**100**~~		~~**100**~~	~~**10**~~		~~**50**~~	~~**5**~~
6	700	**5000**	**500**	60	**4000**	**400**	12	**2000**	**200**
		~~**1000**~~	~~**100**~~		~~**100**~~	~~**10**~~		~~**50**~~	~~**5**~~

Background/Discussion: At its 2007 Annual Meeting, the SWMA received a proposal from a meter manufacturer with two options for modifying Section 3.36. as shown above. The manufacturer provided the following justification for the modification:

For proposal A: Water meter "transaction" volumes are based on billing cycles of monthly or quarterly "reads." As such, each transaction for a residential meter may be on the order of 3000 to 30 000 gal. Commercial/industrial accounts with larger meters may have transaction volumes that are one or two orders-of-magnitude larger than this. Meter repeatability over the course of a pattern approval test volume (currently as little as 5 gal for a residential meter, for example) is, therefore, not relevant. Utility water meters are not designed to provide the resolution required to meet the Section 3.36. repeatability requirements under typical test drafts.

For Proposal B: The graduations on the primary indicating element for the meter under test can normally be read within an uncertainty of roughly ⅓ of a graduation. This is the result of limits in optical discernment, minor parallax, minor asymmetries in mechanical gear trains, minor asymmetries in graduation printing, etc. Combining the meter's reading uncertainty at the start of any single test run with the uncertainty at the end of this same test run, total meter reading uncertainly is, therefore, roughly ⅔ of a graduation. Keeping in mind there are other resolution/repeatability concerns for any given test series (resolution in reading the reference volume/mass, ability to duplicate parameters such as flow rate, water temperature, water pressure, evaporative losses, etc.), the uncertainty limitations for reading the meter under test should not "consume" more than ¼ of the total repeatability requirement. For the 1.3 % repeatability requirement at the minimum flow rate, this corresponds to a test draft equal to roughly 200 graduations of the primary element. For the 0.6 % repeatability requirement at the intermediate rate, this corresponds to a test draft equal to roughly 400 or 450 graduations of the primary element. Test draft volumes for

the maximum flow rate must be even larger since these drafts must address other sources of error unique to testing at higher flow rates (for example, errors due to ramping up and ramping down the flow rates at the beginning and end of the test, which must be done slowly enough so as to not cause water hammer, or mechanical impulse loading of the meter registration device).

The SWMA also heard comments from the manufacturer that several other water meter manufacturers were having difficulty meeting HB 44 requirements for repeatability that were added in 2002. Additionally part of the problem was the determination of what constituted the smallest unit of measure for various sizes of their utility meters. The manufacturer is requesting a change to the test draft requirements and/or smallest unit of measure requirements to be more appropriate for the meters they and others manufacture. The SWMA agreed to forward the proposal to the NCWM S&T Committee for consideration.

Just prior to the 2008 NCWM Annual Meeting, the Committee received a proposal for changes to this item from Scott Swanson, with Sensus Metering Systems on behalf of five water meter manufacturers, including Badger Meter, Inc., Elster Metering, Master Meter, Neptune Metering, and Sensus Metering. During the Committee's open hearings, the S&T Chairman notified NCWM members that copies of this information were available to interested parties. The proposed changes to this item as submitted by Mr. Swanson are included in Appendix B to this report.

During the Committee's open hearings, Jeff Humphreys, Los Angeles County, provided some additional data to consider in conjunction with this item. A letter submitted by Mr. Humphreys that includes the data and that outlines his jurisdiction's comments on the proposal is included in Appendix C to the Committee's report.

Concerns were expressed regarding whether or not the size of the test draft for larger meters is realistic. A manufacturer of test equipment noted that the largest prover being manufactured at present is 2000 gallons.

Appendix B

Water Meter Manufacturers' Proposed Changes to Developing Item Part 5, Item 3 Water Meters

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SENSUS
METERING SYSTEMS

The National Conference on Weights and Measures
Attn: Ms Cardin – NCWM Chair and Mr. Fulmer – S&T Committee Chairman
15245 Shady Grove Road
Suite 130
Rockville, MD 20850

July 10, 2008

Subject: Proposed changes to Handbook 44 section 3.36 Water Meters

Dear Ms Cardin and Mr. Fulmer,

Attached are three separate proposals for change to section 3.36 Water Meters of Handbook 44. The specific sections are N.3 Test Drafts and N.4 Testing Procedures, T1.1 Repeatability, S1.1.3 Value of Smallest Unit and S1.1.6 Proving Indicator. I have also included a version of 3.36 as it would read if all of the proposals were accepted.

These proposals are supported by five water meter manufacturers. The manufactures involved are; Badger Meter Inc., Elster Metering, Master Meter, Neptune and Sensus Metering.

We are not asking for any immediate action at the July conference, but would like the committee to review the proposals if time permits. I unfortunately will not be able to attend the conference, but we have been working with Ms Kristin Macey of Division of Measurement Standards California Department of Food & Agriculture, and I'm sure she could provide some additional insight if needed.

We will be submitting these proposals to the regional conferences this fall in order to gain their support.

If you have any questions, please do not hesitate to contact me.

Thank you for your time and consideration.

Regards,

Scott Swanson
Manager, Customer Quality & Engineering Support
Sensus Metering Systems

PROPOSAL

COMMITTEE: S&T Standing Committee

Priority Level: 1		***Date:***	July 10, 2008
Contact Person:	Scott Swanson	***Telephone:***	(724) 430-4059
		Fax:	(724) 439-7861
		Email:	scott.swanson@sensus.com
Jurisdiction:	All NCWM Sections and derivative standards.		
Proposal:	Amend Section T.1. in Handbook 44, Sec. 3.36.		

We propose that Section T.1. be amended to address repeatability for utility type water meters.

We propose that Section T.1.1. Repeatability read as follows. The tables mentioned below can be found on the following page.

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 tolerances. When performing repeatability tests on utility type water meters, test draft sizes shall comply with Tables T.1.1. and T.1.2. Repeatability Testing for Utility Type Water Meters is to be applied only during type evaluation testing.

Justification:	Harmonize with utility type water meter designs derived from AWWA standards

When agencies use inadequate test draft quantities erroneous test results can be produced. These erroneous test results have and are continuing to have *serious financial consequences to manufactures and distributors*.

The vast majority of utility-type water meters sold in the United States are designed to comply with ANSI/AWWA meter standards. Coupled with actual utility metering practices in the field, this results in meter designs sharing common meter reading resolution. These designs are quite different than those used for batching-type meters.

For utility-type meters 1" and smaller, meter registration test hands (proving indicators) have graduations with resolution down to 0.1 gallons or 0.01 cubic feet. For meters 1½ inch and 2 inch, test hands have graduations with resolution down to 1.0 gallons or 0.1 cubic feet. In visually reading the test hand position relative to these graduations, resolution is limited to a range of roughly ⅓ or ½ of an individual graduation (at both the start of each test and at then at the end of each test).

A test draft equal to only 100 graduations, while adequate for accuracy testing, will be insufficient when testing for repeatability (given the five-fold tighter tolerance for meter repeatability, compared to the tolerance for meter accuracy). For example, an uncertainty of ⅓ graduation at the initial meter reading, and an additional reading uncertainty of ⅓ graduation at the end of the test, would result in a cumulative meter reading uncertainty of 0.67 %, for such a 100-graduation test. Test draft sizes need to be increased, so that meter reading uncertainties do not consume more that ¼ of the total allowable tolerances for this testing. For a repeatability range requirement of 0.6 %, test draft size should equal 400 graduations of the test index, in order to have acceptable meter reading resolution. Similarly, for a repeatability range requirement of 1.3 %, test draft size should be equal to 200 graduations of the test index.

Reasons for:	
Additional Considerations:	

PROPOSAL

COMMITTEE: S&T Standing Committee

Priority Level: 1		***Date:***	July 10, 2008
Contact Person:	Scott Swanson	***Telephone:***	(724) 430-4059
		Fax:	(724) 439-7861
		Email:	scott.swanson@sensus.com
Jurisdiction:	All NCWM Sections and derivative standards.		
Proposal:	Amend Section N.3. and N.4. in Handbook 44, Sec. 3.36.		

We propose that Section N.4. Testing Procedures be changed to address specific issues related to utility type water meters. The three related proposals are to add subsections under paragraph N.3, change the title of tables N.4.1. and N.4.2, and to incorporate two new tables to N.4. that speak directly to utility type water meters.

1. The first proposal is to amend paragraph N.3. to read as follows.

N.3. Test Drafts.

(a) Non-Utility Type Water Meters.

Test drafts should be equal to at least the amount delivered by the device in 2 minutes and in no case less than the amount delivered by the device in 1 minute at the actual maximum flow rate developed by the installation. The test draft sizes shown in Table N.4.1., Flow Rate and Draft Size for Non-Utility Type Water Meters Normal Tests, and in Table N.4.2. Flow Rate and Draft Size for Non-Utility Type Water Meters Special Tests, shall be followed as closely as possible.

(b) Utility Type Water Meters.

The test draft sizes shown in Table N.4.X. and N.4.Y. shall be followed as closely as possible. Testing shall be done in like volumes (meters with gallon registration tested in gallon volumes, meters with cubic feet registration tested in cubic feet volumes).

2. The second proposal is to amend the title of Table N.4.1. and Table N.4.2., changing the words "for Water Meters" to read "for Non-Utility Type Water Meters".

3. The third proposal is to include in Sections N.4.1. and N.4.2. two new tables that harmonize test flow rates and draft sizes listed in Section 3.36. with that of the AWWA specification found in the AWWA M6 manual, Table 5.3. The two proposed tables are attached.

Justification:	Harmonize with AWWA standards and water meter manufacturers.

When agencies use inadequate test draft quantities erroneous test results can be produced. These erroneous test results have and are continuing to have ***serious financial consequences to manufactures and distributors***.

The vast majority of utility-type water meters sold in the United States are designed to comply with ANSI/AWWA meter standards. Coupled with actual utility metering practices in the field, this results in meter designs sharing common meter reading resolution. These designs are quite different than those used for batching-type meters.

For utility-type meters 1inch and smaller, meter registration test hands (proving indicators) have graduations with resolution down to 0.1 gallons or 0.01 cubic feet. For meters 1½ inch and 2 inch, test hands have graduations with resolution down to 1.0 gallons or 0.1 cubic feet. In visually reading the test hand position relative to these graduations, resolution is limited to a range of roughly ⅓ or ½ of an individual graduation (at both the start of each test and at then at the end of each test).

(N.3. and N.4. arguments) As a result, a test draft equal to only 50 graduations will result in large meter reading uncertainties (cumulative uncertainty range on the order of 1.2 % or worse). Compared to the accuracy tolerances for water meters, this level of reading uncertainty is unacceptable, and larger test drafts must be used. See AWWA M6 for examples of the larger test drafts that are required, given these reading resolution limitations.

Reasons for:	
Additional Considerations:	

PROPOSAL

COMMITTEE: S&T Standing Committee

Priority Level: 3		***Date:***	July 10, 2008
Contact Person:	Scott Swanson	***Telephone:***	(724) 430-4059
		Fax:	(724) 439-7861
		Email:	scott.swanson@sensus.com
Jurisdiction:	All NCWM Sections and derivative standards.		
Proposal:	Amend Section S.1.1.3. in Handbook 44, Sec. 3.36.		

We propose that subsection (a) be amended and an additional subsection be added to S.1.1.3. Value of Smallest Unit.

We propose that Section S.1.1.3. read as follows.

S.1.1.3. 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) 50 L (10 gal, 1 ft^3) on utility type meters, sizes 1 inch and smaller, or
(b) 500 L (100 gal, 10 ft^3) on utility type meters, sizes 1.5 inch and 2 inch, or
(c) 0.2 L (1/10 gal, 1/100 ft^3) on batching meters delivering less than 375 L/min (100 gal/min, 13 ft^3/min), or
(d) 5 L (1 gal, $^1/_{10}$ ft^3) on batching meters delivering 375 L/min (100 gal/min, 13 ft^3/min) or more.

S.1.1.6. Proving indicator: Utility type meters shall be equipped with either a mechanical-type proving indicator, or a high-resolution digital proving indication. The individual graduations on a mechanical proving indicator shall indicate volumes no larger than $^1/_{100}$ of the value of the smallest unit of indicated delivery required in S.1.1.3. For digital proving indications, the smallest unit of volume displayed shall be no larger than 1/1000 of the value of the smallest unit of indicated delivery required in S.1.1.3.

Justification:	Harmonize with AWWA standards and water meter manufacturers.

The vast majority of utility-type water meters sold in the United States are designed to comply with ANSI/AWWA meter standards. Coupled with actual utility metering practices in the field, this results in meter designs sharing common meter reading resolution. These designs are quite different than those used for batching-type meters.

For utility-type meters 1inch and smaller, meter registration test hands (proving indicators) have graduations with resolution down to 0.1 gallons or 0.01 cubic feet. For meters 1½ inch and 2 inch, test hands have graduations with resolution down to 1.0 gallons or 0.1 cubic feet. The smallest unit of indicated deliver is then given by one full revolution of the test hand (amounting to 100 graduations).

Reasons for:	
Additional Considerations:	

Appendix C

Jeff Humphrey's Letter and Comments on Developing Item Part 5, Item 3 Water Meters

September 2, 2008

TO: Steven Cook, NIST, Technical Advisor
Specifications and Tolerances Committee
National Conference on Weights and Measures

FROM: Jeff Humphreys
Deputy Director – Weights and Measures Bureau

SUBJECT: S&T Committee 2008 Report, Specifically Item 360-2, Part 5, Item 3: Water Meters

This letter is intended to clarify comments made concerning water meter tolerances during the NCWM 2008 meeting open hearing regarding a proposal to amend HB 44 Section 3.36 T.1. Appendix A, Part 5, Item 3, in the S&T Committee report describes a Developing Item proposal to either eliminate HB 44 repeatability requirements, or amend HB 44 Section 3.36, Tables N.4.1 and N.4.2. by increasing test draft sizes. We believe that the results of numerous water meter tolerance tests conducted on this Department's test bench at our South Gate facility will show that the proposed increases in test draft sizes are unnecessary, and could result in substantial increases in costs to jurisdictions performing these tests.

In the "Background/Discussion" section, the proponents argue that due to uncertainties associated with reading individual graduations, additional water volume is required to be run through the meters in order to obtain a fair test of their accuracy. In order to determine the truth to this claim, especially to the tests conducted at the minimum flow rate, the Department conducted tests at both the 5 gallon test draft size, and at the 10 gallon draft size for those 5/8" meters that failed to meet tolerance at 5 gallons. The accompanying chart summarizing our tests show that substantial numbers of multi-jet water meters that failed their 5 gallon slow-flow tests continued to fail the 3% tolerance requirement when tested again at 10 gallons.

The enclosed information also shows that very few positive displacement meters fail tolerance tests at any of the current HB 44 flow rates. The claim has been made that the tests as currently being conducted have seriously impacted meter sales for several water meter manufacturers. Our tests show that manufacturers of positive displacement meters should not be negatively impacted by being tested at the current established flow rates.

The Department has received a large number of 5/8" meters for testing over the last several years. The proposed requirement to increase test draft sizes would substantially increase the amount of time necessary to test these meters at the three flow rates (from approx. 30 minutes to approx. 90 minutes). If evidence supported the necessity to conduct these tests, the Department would certainly adopt these larger draft sizes. We believe however, that the evidence shows that larger draft sizes are unnecessary. Such tests would increase costs to the Department, and these increased costs would ultimately have to be borne by all owners of water sub-meters.

The proposal appears to be advanced by a manufacturer of multi-jet meters. Our suggestion to that manufacturer of these meters would be to look to improve the quality of their product.

KEF:RKI:JNH:jh

Enclosure

Water Meter Test Results

January 2008 - June 2008

Minimum Flow Rate (¼ GPM) – 5 Gallon vs. 10 Gallon

5/8 in Positive Displacement Meters

Minimum Rate Tolerances: 1.5 % Overregistration, 5 % Underregistration

Failure Percentages		
	5 Gallon	**10 Gallon**
Meter #1	-13.0%	-13.0%
Meter #2	-6.6%	-7.1%
Meter #3	-83.6%	-87.7%

("-" indicates underregistration, "+" indicates overregistration)

*All three meters failed by underregistration on both 5 gallon and 10 gallon tests.

Water Meter Test Results

January 2008 - July 2008

Minimum Flow Rate (¼ GPM) – 5 Gallon vs. 10 Gallon

5/8" Multi-Jet Meters

Minimum Flow Rate Tolerances: 3 % Overregistration, 3 % Underregistration

*Meters #3, #9, #10, #19, #21, #22, #23, #26, and #27 failed on the 5 gallon test and **passed** on the 10 gallon test.

The rest of the meters failed both 5 gallon and 10 gallon tests. All meters except two (#21 and #27) were underregistering.

Failure Percentages			
"-" indicates underregistration, "+" indicates overregistration			
	Error 5 gal	**Error 10 gal**	**% Difference**
Meter #1	-3.78 %	-3.38 %	-0.40 %
Meter #2	-3.92 %	-3.30 %	-0.62 %
Meter #3	-3.06 %	-2.98 %	-0.08 %
Meter #4	-3.80 %	-3.71 %	-0.09 %
Meter #5	-3.44 %	-3.47 %	0.03 %
Meter #6	-4.28 %	-3.73 %	-0.55 %
Meter #7	-4.80 %	-4.28 %	-0.52 %
Meter #8	-5.20 %	-4.60 %	-0.60 %
Meter #9	-3.54 %	-3.00 %	-0.54 %
Meter #10	-3.30 %	-2.49 %	-0.81 %
Meter #11	-4.48 %	-3.49 %	-0.99 %
Meter #12	-3.88 %	-4.08 %	0.20 %
Meter #13	-3.32 %	-3.26 %	-0.06 %
Meter #14	-7.34 %	-5.87 %	-1.47 %
Meter #15	-4.10 %	-3.13 %	-0.97 %
Meter #16	-4.38 %	-3.61 %	-0.77 %
Meter #17	-6.34 %	-5.57 %	-0.77 %
Meter #18	-4.78 %	-4.05 %	-0.73 %
Meter #19	-3.50 %	-2.73 %	-0.77 %
Meter #20	-4.34 %	-3.65 %	-0.69 %
Meter #21	3.20 %	0.82 %	2.38 %
Meter #22	-17.40 %	-1.78 %	-15.62 %
Meter #23	-3.80 %	-2.20 %	-1.60 %
Meter #24	-10.20 %	-26.68 %	16.48 %
Meter #25	-3.68 %	-3.54 %	-0.14 %
Meter #26	-3.12 %	-0.92 %	-2.20 %
Meter #27	3.60 %	0.81 %	2.79 %
Meter #28	-7.68 %	-12.95 %	5.27 %
Average	***-4.45 %***	***-4.32 %***	***-0.14 %***
Std Dev	***0.036461744***	***0.049867807***	***0.0460693***

WATER METER TEST RESULTS: JAN. '08 - JULY '08

						Meters failing tolerances within passed lots					Meters failing tolerances within failed lots				
Make	Model	Size	Lots	Meters Tested	Meters Passed	Min. Flow	Int. Flow	Max. Flow	Total Fails	Misc. Fails	Min. Flow	Int. Flow	Max. Flow	Total Fails	Misc Fails
Arad		5/8"	1	2	0								2	2	
Amco	C-700	5/8"	16	183	174	9			9						
Amco	C-700	3/4"	3	22	22										
Amco	C-700	1"	3	42	42										
Badger	RCDL 25	5/8"	21	171	165	6			6						
Kent	C-700	5/8"	1	2	1		1		1						
Neptune	T-10	5/8"	65	749	655	26	9	1	42	6 mech fails		4		52	34mech fails
Master Meter	USA 140C F	5/8" USG HOT	51	875	765	5	4	8	19	2		11	37	91	7 NoS/N
Master Meter	MM3C	5/8"	3	39	26									13	
Master Meter	MM4	3/4"	3	28	23				1					4	
Master Meter	MM5C	1" USG COLD	12	337	262	5		6	53			1	21	22	
Master Meter	FAM	5/8" USG COLD	29	575	466	3	15		21			17	1	88	
Master Meter	FAM	3/4"	1	14	3							11		11	
Perfor-mance	PPD	5/8"	1	1	1										

PASSING RATES FOR METERS TESTED - JAN. '08 - JUL. '08

	Arad	**AmcoC 700 5/8"**	**AmcoC 700 3/4"**	**AmcoC -700 1"**	**Badger RCDL25 5/8"**	**Kent C-700 5/8"**	**Neptune T-10 5/8"**	**USA140CF 5/8"**	**Master Meter MM3C 5/8"**	**Master Meter MM4 3/4"**	**Master Meter MM5 C1" USG**	**Master Meter FAM 5/8" USG**	**Master Meter FAM 3/4"**	**Performance PPD 5/8"**
% passed of total tested for each model	0	95	100	100	96	50	87	87	67	82	78	81	21	100
Lots passed	0	13	3	3	21	1	59	27	0	2	7	14	0	1
Lots failed	1	3	0	0	0	0	6	24	3	1	5	15	1	0

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Report of the Professional Development Committee (PDC)

Agatha Shields, Chairman
Franklin County Weights and Measures
Columbus, Ohio

Reference
Key Number

400 INTRODUCTION

This is the report of the Professional Development Committee (hereinafter referred to as the "Committee" or PDC) for the 93rd Annual Meeting of the National Conference on Weights and Measures (NCWM). This report is based on the Interim Report offered in 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 Training Program (NTP)	2
401-2	I	Create a Curriculum Plan	4
401-3	D	Instructor Improvement	5
401-4	D	Certification	5
401-5	D	Recommended Topics for Conference Training	6
402		**PROGRAM MANAGEMENT**	**7**
402-1	I	Safety Awareness	7
402-2	D	PDC Publication	8

Table B
Appendices

Appendix	Title	Page
A	Strategic Direction for the Professional Development Committee	A1
B	Curriculum Package: Cover Memorandum	B1
C	Curriculum Package: NCWM Core Competency Model	C1
D	Curriculum Package: NCWM Curriculum Template	D1
E	Curriculum Package: NCWM Sample Curriculum	E1
F	Curriculum Package: Guide for Developing Test Questions	F1
G	Curriculum Package: National Training Curriculum Outline	G1
H	Curriculum Package: NCWM Curriculum Work Plan	H1
I	Model Professional Development Training and Certification Standards Statute for Inspectors and Sealers of Weights and Measures (Legislative Model)	I1

Table C
Voting Results

Reference Key Number	*House of State Representatives*		*House of Delegates*		*Results*
	Yeas	*Nays*	*Yeas*	*Nays*	
400 (Report in its Entirety Voice Vote)	0	0	0	0	Passed

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

401 EDUCATION

401-1 I National Training Program (NTP)

Source: Carryover Item 401-1 (This item originated from the Committee and first appeared on its agenda in 2003.)

Background: For complete background information, see the PDC page of the NCWM website, http://www.ncwm.net/members.

The Committee's overall strategic direction is summarized in Appendix A.

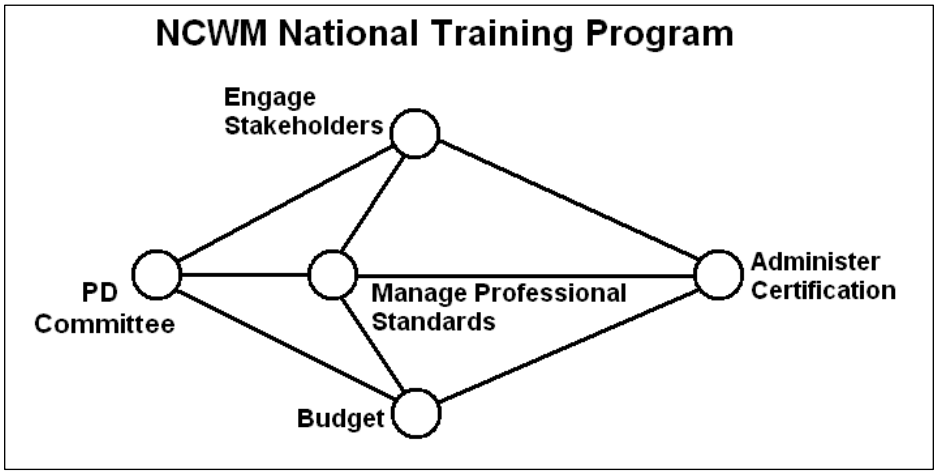
Discussion: The PDC encourages each regional association to dedicate a portion of their Annual Meeting to the National Training Program (NTP).

During the 2008 Interim Meeting, the Committee discussed the WWMA's suggestion to establish an action plan and timeline. The Committee has developed an NTP, Critical Component Analysis, which is an action plan of the components of the NTP. The Committee presents a draft of this document below.

National Conference on Weights and Measures
National Training Program
Critical Component Analysis
DRAFT, February 21, 2008

The Committee has begun a comprehensive effort to identify critical resources and tasks necessary for the project, and the logical sequence in which those tasks must be performed, including the possible use of parallel activities.

Critical path analysis techniques were developed to manage complex projects just like the National Training Program. The Committee is planning to use those techniques to the extent possible to plan our future activities as we work toward a certification program.

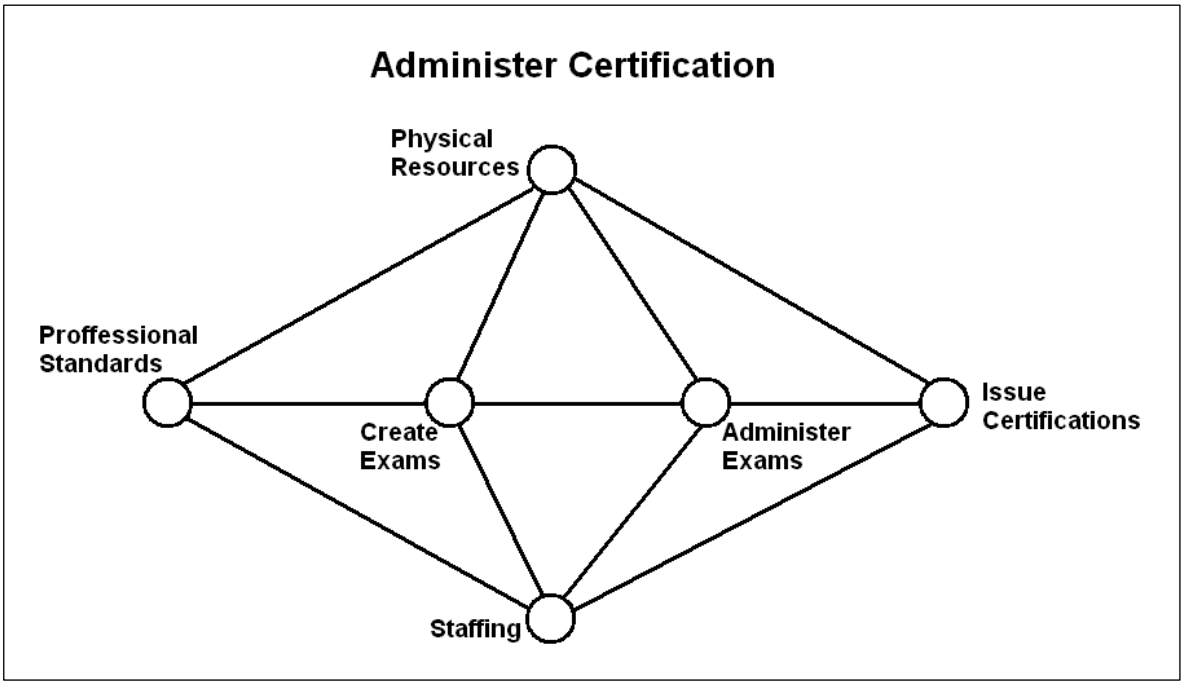


The Committee sees its task as one of managing four critical elements that come together as a certification program as depicted above. Each bubble in the figure represents a milestone that must be reached in order to complete the objective. Those four main elements are:

Budget – involves tasks to secure necessary funding from the Board and other sources to undertake and complete all the other tasks.

Engage Stakeholders – involves tasks necessary to identify stakeholders and the resources they can bring to the project, encourage them to participate at all levels, and particularly to incorporate the professional standards in their training programs and to eventually take part in the certification program. It should be noted that the stakeholders will be the ones doing the training and not the NCWM. The NCWM will only be coordinating the professional standards and administering the certifications.

Manage Professional Standards – involves tasks necessary to create and manage a set of standards for the profession. The Committee has identified the professional standards, the first task that must be completed. The completion of the curriculum plan, the curriculum template and the guide to preparing curriculum segments and the guide to preparing test questions are some of those important steps. The work groups are now finalizing the first seven curriculum segments and corresponding test questions. This is a great start and there still is a significant amount of additional work necessary in this area.



Administer Certification – involves tasks necessary to create certification exams, administer those exams, and issue certifications to those who qualify. The Committee will manage staffing, both paid and volunteer, and physical resources to secure the exams and record and issue the certificates.

As the necessary curriculum segments are completed and test questions prepared, we may begin to embark on some of the steps toward certification. Over the coming months, the Committee will continue to elaborate on the details in this project and keep refining it as we move forward.

401-2 I Create a Curriculum Plan

Source: Carryover Item 401-2 (This item originated from the Committee and first appeared on its agenda in 2003.)

Background: For complete background information, see the PDC page of the NCWM website http://www.ncwm.net/members.

Discussion: Prior to the 2007 Annual Meeting, the Committee reviewed the curriculum segments submitted by the following regions:

- SWMA, Class III and III L scales;
- WWMA, Retail Motor-fuel Dispensers;
- and NEWMA, Small Scales.

At the 2007 Annual Meeting, the Committee decided, based on comments from several of the regions and its own assessment, it was essential to have a standardized format to ensure uniformity. Based on a collective review of curriculum plans received, the Committee created a sample template and example for regions to use in developing other curricula. The Committee updated its curriculum (Curriculum Package) to include the NCWM Core Competency Model (Appendix C), which provides a model for improving the quality of education in a select discipline. The Committee included this information as a general guideline for the regions to use as they develop other curriculum topics. In addition, the Committee revisited the original "National Training Curriculum Outline" from its 2004 NCWM Annual Report (Final Report). The Committee prepared an accompanying "NCWM

Curriculum Work Plan," which is intended to assist in the management of curriculum development; this item is included in Appendix H. The Committee also revised the original curriculum outline to match the Work Plan.

The Committee updated the Curriculum Package, and it is included in the following Appendices:

- Cover Memorandum (guide to curriculum development) Appendix B
- NCWM Core Competency Model Appendix C
- NCWM Curriculum Template (curriculum guideline) Appendix D
- NCWM Sample Curriculum (examples of desired format) Appendix E
- Guide for Writing Test Questions (including examples) Appendix F
- National Training Curriculum Outline Appendix G
- NCWM Curriculum Work Plan Appendix H

The Committee has received the following curriculum drafts:

- 4.2 NIST Handbook 44 – Introduction to Device Control;
- 4.3.1 Static Electronic Weighing Systems, General;
- 4.3.5 Small Capacity Weighing Systems, Class III;
- 4.3.7 Vehicle Class III or III L;
- 4.4.1 Retail Motor Fuel Dispensers; and
- 5.3.1 Commodities, General

The Committee will return to the curriculum drafts received, along with the newly revised curriculum package to the development team in each region to make revisions based on the Committee's recommendations.

The Committee will also be requesting that each region set aside time for a presentation of the new Curriculum Package at their upcoming Annual or Interim Meeting. In addition, the Committee is requesting volunteers develop additional segments. The Committee acknowledges that the CWMA volunteered to sponsor the first training session on the use of the completed curriculum.

401-3 D Instructor Improvement

Source: Carryover Item 401-3 (This item originated from the Committee and first appeared on its agenda in 2003.)

Background: For complete background information, see the PDC page of the NCWM website http://www.ncwm.net/members.

Industry has continued to support and sponsor training on their new technology for weighing and measuring devices. NIST has assured the Committee they will continue their work towards providing technical training for the trainers.

Discussion: 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.

401-4 D Certification

Source: Carryover Item 401-4 (This item originated from the Committee and first appeared on its agenda in 2003.)

Background: For complete background information, please see the PDC page of the NCWM website http://www.ncwm.net/members.

Subsequent to the 2006 NCWM Annual Meeting, all states not previously contacted were sent a letter requesting the name of their State Certification Coordinator (SCC). The state director becomes the default SCC in the absence of a designated contact. The SCC contact list is posted on the PDC page of the NCWM website (http://www.ncwm.net/members).

Discussion: The Committee continues to hear support from the regions concerning the establishment of a certification program.

The Committee has contacted the SCC of each state to gather information on its current training and certification programs. The Committee will be reviewing the Model Professional Development Training and Certification Standards Statute for Inspectors and Sealers of Weights and Measures (Appendix I) that was submitted by NEWMA. The Committee will study the sample with the possibility that it might ultimately be used to establish model criteria for a certification program.

The Committee has included a Guide for Developing Test Questions (Appendix F) in the curriculum package referenced in Item 401-2. At the 2008 Interim Meeting, the Committee brought forth two options for building the bank of questions for certification. The first option was to build one large bank of questions developed for use in training and during the certification exam. The second option would be to develop two banks of questions using one bank of questions for training and the second bank of questions, which would be protected, for certification only.

Recommendations during the open hearing included having jurisdictions take the lead on developing the questions, administering the examination, and grading. The NCWM would issue certificates based on the jurisdictions' reported results.

Pursuant to the recommendations from the WWMA and the CWMA, the Committee is in the process of developing the infrastructure of the program. The Committee believes that a model is necessary to determine what the program will look like and what the roles of the states and NCWM should be.

401-5 D 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: 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 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) Risk-based Inspections (Robert Williams, Tennessee, volunteered to present his state's Retain Motor-Fuel Device (RMFD) testing program);
(b) Marketplace Surveys;
(c) Auditing the Performance of Field Staff (Will Wotthlie, Maryland, volunteered to lead the session);
(d) Alternative Fuels (including motor-fuel trends and technology updates);
(e) Device Inspections Using a Sampling Model;
(f) Emerging Issues;
(g) Proper Lifting Techniques (recommended by Ken Deitzer, Pennsylvania);
(h) Overview of OIML and its Relationship to Standards Development (recommended by Julie Quinn, Minnesota);
(i) Back and Stress Techniques (recommended by Don Onwiler);
(j) Public Relations, specifically dealing with aggressive/angry people (recommended by the SWMA);
(k) Inspector Investigative Procedures (recommended by the SWMA),
(l) General Safety Issues (recommended by the WWMA);
(m) Defensive Driving (recommended by the WWMA);
(n) Administrative Civil Penalty Process (recommended by the WWMA);
(o) Price Verification (recommended by the WWMA);
(p) Customer Service (recommended by the WWMA);
(q) Ethics (recommended by the CWMA);
(r) Automatic Temperature Compensation (ATC) testing for field inspectors;

(s) Hydrogen Measuring Systems; and
(t) OSHA Safety.

For the 2008 NCWM Annual Meeting Technical Education Sessions, the Committee recommends Automatic Temperature Compensation (ATC) testing for field inspectors and OSHA Safety.

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: 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.

At the 2005 Annual Meeting, Past-Chairman Dennis Ehrhart recommended the committee make training its highest priority. The Voluntary Quality Assurance Assessment program, NCWM Associate Membership Scholarships, and safety awareness efforts were carryover items from the Committee on Administration and Public Affairs (A&P) and not PDC items.

Jurisdictions should send their safety reports and issues to their regional safety liaison, who in turn will forward them to Charles Gardner, the NCWM Safety Coordinator. Charles recommends the reports or report summaries be published in the NCWM newsletter. At the 2005 Interim Meeting, a CD-ROM on safety produced for the U.S. Environmental Protection Agency was made available for review. The Committee believes safety awareness should be a part of every aspect of training for NCWM stakeholders. The regional safety liaisons are listed below.

SWMA	Steve Hadders, Florida Department of Agriculture & Consumer Services
WWMA	Dennis Ehrhart, Arizona Department of Weights & Measures
CWMA	Agatha Shields, Franklin County Weights & Measures
NEWMA	Michael Sikula, New York Bureau of Weights & Measures

At the 2007 Interim Meeting, the Committee decided to reach out to the regional safety liaisons and ask that they write newsletter articles designed to raise safety awareness and provide safety tips to the weights and measures community. These archived articles are on the PDC page of the NCWM website. The NCWM newsletter is published three times a year and all articles should be e-mailed to the NCWM headquarters office, at ncwm@mgmtsol.com, by the deadline dates listed below. (**Note:** The NCWM e-mail address will change after October 1, 2008, to info@ncwm.net.)

Association	Issue	Article Deadline
WWMA	2008, Issue 2	March 15, 2008
CWMA	2008, Issue 3	July 15, 2008
NEWMA	2009, Issue 1	November 15, 2008
SWMA	2009, Issue 2	March 15, 2009

Discussion:

Southern Weights & Measures Association (SWMA): The SWMA PDC received a report involving static electricity while using a three 5 gal unit to return retail motor fuel to storage. An inspector pulled the delivery hose from a PVC storage tube, inserted the hose into the area of the return storage tank, and a flash fire from the static electricity occurred. The hose and the top of the return were on fire.

The SWMA PDC recommends the following:
1. replacing the PVC storage tubes with aluminum tubes;
2. drilling several holes in the aluminum tube to vent the hose and tube;

3. connecting the delivery hose to the truck to ensure grounding before approaching the storage tank;
4. holding annual safety meetings with staff to review safety and testing procedures;
5. hands-on fire extinguisher training for inspectors with a fire marshal present; and
6. eliminating all plastic materials (buckets, funnels) in fuel inspections.

The SWMA PDC also received a report about a ruptured hose accident that occurred during a Liquefied Petroleum Gas (LPG) inspection. A company representative was present to help the inspector properly handle the safety issues.

The SWMA PDC recommends the following:

1. An attendant, company representative, or two people should be present during the testing of LPG, home heating oil, rack meters, and terminal meters for operational purposes.
2. Safety and test procedures should be reviewed at annual staff meetings.

The SWMA PDC encourages state and local programs to report safety incidents to Steve Hadder, the safety liaison, immediately so this information can be distributed to other agencies. Steve's contact information is as follows:

Steve Hadder
Division of Standards
3125 Conner Boulevard
Field Operations, Bldg. 1
Tallahassee, FL 32399-1650

Office: (850) 487-2634
Fax: (850) 922-6655
E-mail: hadders@doacs.state.fl.us

402-2 D PDC Publication

As reported in Item 402-3 of the Committee's 2007 Annual Report, the PDC also maintains a PDC document archive on the "members only" PDC page of the NCWM website at http://www.ncwm.net/members. This archive is intended to enable NCWM members to follow the history and work of the PDC. The website will continue to be updated as new documents are developed. The following listed documents are currently archived on the PDC page of the NCWM website for easy access and downloading as needed.

History of the PDC
Formal Scope of the PDC
NCWM Board of Directors Charge to the PDC
The PDC's Role in the NCWM Strategic Plan
The PDC's Strategic Plan
National Training Curriculum Outline
Suggested Topics for the NCWM Annual Conference
Standard Categories of Weighing and Measuring Devices (Adopted by the 92nd NCWM, July 2007)
Safety Liaison Contact Information
List of State Certification Coordinators and Contacts
NCWM Issued Certification Program
Voluntary Quality Assurance Assessment Program
Curriculum Package (Guide for Creating a Curriculum)

This item will be removed from the PDC agenda following the 2008 Annual Meeting.

Agatha Shields, Chair, Franklin County, Ohio
Ross Andersen, New York
John Sullivan, Mississippi
Stacy Carlsen, Marin County, California
Tina Butcher, NIST, Weights and Measures Division
Charles Gardner, New York, Safety Liaison
Linda Bernetich, NCWM Staff Liaison

Professional Development Committee

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Appendix A

Strategic Direction for the Professional Development Committee

The Committee developed its strategic direction to define its roles and responsibilities to the NCWM and the weights and measures community. The Committee members wrote principles to guide them in their deliberations and defined four main areas to focus their efforts. The Committee recognizes that its direction and responsibilities may be changed by the Board of Directors.

The guiding principles of the group are:

- Keep things simple;
- Develop programs that are realistic and achievable;
- Minimize redundancy and administrative tasks;
- Recognize that no one size fits all; and
- Meet the needs of weights and measures officials, service companies, industry, and manufacturers.

The four main areas for focusing their efforts are:

National Training Program – The focus of the National Training Program (NTP) is to increase technical knowledge, strengthen credibility, and improve the professionalism of the individual weights and measures official. A strong NTP would promote uniformity across the nation.

National Certification System – Develop a national certification system to recognize or accredit weights and measures programs as competent or capable. The program would include requirements around individual training, proper test standards, use of national handbooks, and a data gathering system.

Conference Training Topics – The Committee would be the focal point for gathering and recommending workshops or symposia on leadership, management, and emerging issues to be presented during the Annual Meeting. These topics would provide a forum for the exchange of ideas and discussion of changes in the marketplace.

Uniformity of Data – The Committee would develop standard categories for devices and inspection areas so that such things as the number of devices, compliance rates, frequency of inspection and other areas could be compiled and compared at the national level. These statistics could be used to benchmark organizations and to communicate the value of weights and measures to the public and to decision makers (see Item 402-4).

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Appendix B

Curriculum Package

National Conference on Weights and Measures
National Training Program
COVER MEMORANDUM

TO: **Curriculum Development Volunteers**
FROM: **NCWM Professional Development Committee (PDC)**
DATE: **October 29, 2007**
RE: **Development of Basic Level Curriculum**

Thank you for volunteering to work on the curriculum for a Basic Level Inspector. We define "basic" as the competency level required for the inspector to operate without direct supervision. In this work, we are moving to an outcome-based approach for setting educational standards and away from a textbook approach. The outcome approach is widely used in primary and secondary education and in the training of many professionals. Under this model we focus on the outcomes and use these to describe the organization and coverage of the training course. The course materials become a means to an end rather than the end itself. The approach encourages innovation and creativity because it does not limit the trainer to a specific textbook or course presentation. The outcomes and milestones in the curriculum also will directly drive the certification program.

The curriculum lists the outcomes in terms of the specific knowledge and skills we expect the basic inspector to possess at the end of the training. Each outcome will be further defined by a set of milestones, or competencies, that specify the activities and tasks that will be used to measure the student's mastery of the knowledge and skills (i.e., outcomes). The milestones must specify a single, clear objective, stating what the student will be able to do after the training. Milestones must be measurable and should lead to obvious test questions. Your task is to create the curriculum for a small segment of our profession.

Since many groups will be working on selected pieces of the overall curriculum, the Committee has selected a format for the curriculum materials from the NCWM Core Competency Model based on work of the California Society of Certified Public Accountants (CACPA). In their publication, *The California Core Competency Model for the First Course in Accounting*, they provide a model accounting curriculum, a discussion of their methodology, and the rationale for using that methodology. Before beginning your work, we strongly recommend you read the short introduction to the NCWM Core Competency Model and if you would like a copy of the CACPA, we will be happy to send that to you as well. This common format will ensure that the pieces that get developed mesh together without extensive reformatting and editing.

The Committee is also asking that you review the NCWM Sample Curriculum (Appendix E). These serve as a Weights and Measures example of the format we want to use and were prepared using the CACPA model. These segments also demonstrate the level of detail we want to see in the final product. As in the NCWM Core Competency model document, our goal is to set standards rather than create a "lesson plan."

Please note the layered approach used in the small scale materials and how this limits redundancy in the curriculum. The first segment on general device inspection should be considered a prerequisite for the second segment on basic scales. Both are prerequisites for the segment on small capacity scales. The first segment is also a prerequisite for any other measuring device area. For some devices, like timing devices, only one layer below this first layer is necessary. For liquid measuring devices, we would expect there to be two layers, a general layer that applies to all dynamic volume measuring and then a number of specific disciplines below that. Above all of these is a much broader segment that will include state and local laws and regulations, administrative procedures, enforcement policies, etc that need not be included with each specific device segment.

Your task will be to identify the outcomes and the milestones that are pertinent to the area of Weights and Measures you chose to work on. We suggest a process that involves the following steps:

1. Brainstorm – Create a bullet list of knowledge and skills expected. Ask simple questions. What should the inspector know? What should the inspector understand? What should the inspector be able to do?
2. Group the bullets to define a broad outcome. For a device segment consider groupings like; technology and terminology, classification and performance standards, markings and operational controls, technical requirements, user requirements, and test procedures. As a guideline, you should aim to have three to eight milestones under each outcome.
3. Create a concise outcome statement for each outcome. See Outcomes and Competencies of the NCWM Core Competency Model document and Appendix E, NCWM Sample Curriculum.
4. Group similar milestones to the extent practical into a broader category. For example, instead of listing expectations for use of zero, tare, units buttons, state a single expectation regarding typical controls on the device and consider listing specific controls parenthetically.
5. Create a milestone statement, i.e. competency, using a verb from the list based on the levels of cognitive learning in Bloom's Taxonomy in Inventory of Concrete Verbs from the NCWM Core Competency Model document. For the basic inspector we recommend you limit your milestones primarily to the first three levels, i.e. knowledge, understanding, and application. The higher levels of learning in Bloom's Taxonomy, analysis, synthesis, and evaluation, typically require practical experience not expected in the basic inspector.

In Bloom's Taxonomy,

- Knowledge refers to the ability to recall facts, terms, and basic concepts.
- Understanding refers to the ability to interpret or explain concepts using your own words.
- Application refers to the ability to put knowledge/understanding to practical use and demonstrate skills required to actually perform specific acts.

As an added challenge to our work groups, we are asking you to draft sample test questions for your milestones. Please note that there is a tendency to focus only on knowledge in the typical multiple-choice question. Please try to also write questions that also evaluate understanding and require application of knowledge. For these you might want to consider putting the candidate in a situation and asking specific questions that require multiple steps to achieve an answer. In these cases fill-in-the-blank format may be superior to multiple choice. In addition to getting the answer, also consider asking the student to cite the specific code reference.

As a curriculum segment draft is completed, the Committee will do a quick review and suggest editing for uniformity of format. When it is ready, we will circulate the draft for review and comment. The critical questions we will ask are: What is missing from this curriculum segment and what should be removed or

moved to another segment in another level? With this review process, we hope to build a consensus of agreement on the standards being set. The same would apply to sample questions.

By using Appendix C, NCWM Competency Guide Model; Appendix D, NCWM Curriculum Template; Appendix E, NCWM Sample Curriculum, it should guide you through writing your curriculum so that the National Training Program will be uniform throughout all the courses. Appendix F, Guide for Developing Test Questions, will guide you through writing ten certification questions on the subject you have chosen.

The Committee greatly appreciates your willingness to contribute to this project. Please send your comments or questions on the project to the current chair Agatha Shields at aashield@franklincountyohio.gov of the PDC committee with a carbon copy to Linda Bernetich at NCWM Inc., lbernetich@mgmtsol.com. Ross Andersen has agreed to help with questions about the format and the NCWM Core Competency model. Please contact him at ross.andersen@agmkt.state.ny.us or by phone at 518-457-3146.

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Appendix C

Curriculum Package

The National Conference on Weights and Measures
National Training Program
CORE COMPETENCY MODEL

October 2007

The National Conference on Weights and Measures Professional Development Committee is proud to present this NCWM Core Competency Model for use in creating the curriculum for the NCWM National Training Program.

The idea for this model began with a grassroots movement of weights and measures educators who wanted to reverse a deteriorating articulation process for the modules in weights and measures.

The model presented here is the result of efforts of PDC members and has made extensive use of the California Core Competency Model for the First Course in Accounting. That model was developed by the California Society of CPAs' Committee on Accounting Education and was released in July 1995.

The competency-based concept and format for the NCWM curriculum was taken almost verbatim from that work. The hours of time volunteered for this project is an impressive example of professional volunteerism at its best. Even more impressive is the fact that when conflicts arose, committee members searched for creative solutions that would meet the needs of more than one point of view. Clearly, weights and measures educators consistently subordinated their individual views of the course to the greater good—the long-run improvement of education.

If you are a weights and measures educator, you are urged to share this model with your faculty and help improve weights and measures education. We hope this model will help you to facilitate your weights and measures training.

THE MISSION OF THE PROFESSIONAL DEVELOPMENT COMMITTEE

The mission of this Committee is to improve the quality of education. Since the state jurisdictions are such an integral part of the weights and measures education, our mission is to help prepare an outline for you to use in your endeavors.

ACCOMPLISHING OUR MISSION

We have accomplished our mission by identifying expected student outcomes and core competencies as a basis for articulation agreements. The diversity of emerging instructional models for weights and measures has made the process of articulation very difficult. To reduce the severity of this problem requires a dramatic change in how course equivalencies between states are measured. It is proposed, therefore, that the basis for articulation agreements shift from the current textbook/topic approach to one that focuses on identifying desirable outcomes students should achieve and core competencies that measure their achievement.

GENERAL PHILOSOPHY ABOUT HOW TO USE THIS MODEL

Identifying outcomes and core competencies is an important step in the process of improving weights and measures education. How training officers help students master these outcomes and competencies and how they simultaneously measure student mastery are equally important tasks.

Our intent is *not* to develop a "statewide lesson plan" for weights and measures. Instead, we want individual states to be creative in implementing the common set of outcomes and core competencies described in this *model*. Moreover, we hope each state program will develop a set of outcomes and special competencies that will reflect the unique perspective of its state and the special needs of its students. Thus, our philosophy encourages diversity. Although we want students to attain the educational objectives of the weights and measures training program, we do not expect them to attain these objectives in a prescribed manner.

Agatha Shields, Franklin County, Ohio (Chair)
Kenneth Deitzler, Pennsylvania
Ross Andersen, New York
John Sullivan, Mississippi
Stacy Carlsen, Marin County, California
Dave Wankowski, Kraft Foods, Inc. (Associate Member Representative)
Tina Butcher, NIST, Weights and Measures Division
Linda Bernetich, NCWM Staff Liaison

Professional Development Committee

MILESTONES FOR IMPLEMENTING COMPETENCY-BASED ARTICULATION

The intent of the Committee on Accounting Education is to promote the widespread acceptance of essential student outcomes and competencies, while encouraging individual programs to implement these outcomes and competencies in ways that best suit their own students. The following milestones are used to evaluate progress in implementing this competency-based articulation system:

MILESTONE 1: Derive expected student outcomes (knowledge and skills).

MILESTONE 2: Create core competencies (activities expressed in behavioral terms) that are logically derived from the expected student outcomes.

MILESTONE 3: Promote a competency-based articulation approach by conducting workshops for interested faculty on how to implement and assess core competencies.

MILESTONE 4: Establish acceptance of a single set of outcomes and core competencies.

OUTCOMES AND COMPETENCIES

HOW DO YOU DISTINGUISH AN OUTCOME FROM A COMPETENCY?

An outcome is "what" you expect your students to achieve, whereas a competency demonstrates "how" your students can achieve that outcome. Think of an outcome as an end and a competency as a means to that end.

Outcomes are the knowledge and skills recommended. Competencies are the specific activities used to measure a student's mastery of the knowledge/skills or outcomes.

The outcome/competency approach is different from the traditional textbook/topic approach to accounting instruction. First, the choice of a textbook no longer dictates the organization and coverage of the course. Instead, the outcomes and competencies become the driver and the textbook becomes the vehicle. A related difference is that the course is driven by an output measure (outcomes/competencies) rather than an input measure (textbook/topics). Finally, students more clearly know the content they are expected to study and the precise activities they must perform on examinations and other forms of evaluation by studying the outcome/competency pairings and working problems that reflect them.

CHARACTERISTICS OF WELL-CONSTRUCTED COMPETENCIES

A well-constructed behavioral learning objective or competency has the following characteristics:

- it expresses one objective;
- it is specific;
- it states what the student will be able to do after the learning experience; and
- it uses a concrete verb to specify the desired activity that must be performed by the student to demonstrate competency.

INVENTORY OF CONCRETE VERBS DENOTING ACTION TAKEN IN COMPETENCIES

The following suggested verbs are arranged in the six cognitive domains identified in Bloom's Taxonomy.

1. Knowledge		**2. Comprehension**		**3. Application**	
arrange	order	classify	record	apply	operate
define	recognize	describe	report	choose	practice
duplicate	relate	discuss	restate	demonstrate	schedule
label	recall	explain	review	dramatize	sketch
list	repeat	express	select	employ	solve
memorize	reproduce	identify	tell	engage	transfer
name		indicate	translate	illustrate	use
		locate		interpret	

4. Analysis		**5. Synthesis**		**6. Evaluation**	
analyze	differentiate	arrange	organize	appraise	evaluate
appraise	discriminate	assemble	plan	argue	judge
calculate	distinguish	collect	prepare	assess	predict
categorize	examine	compose	present	attach	rate
compare	experiment	construct	propose	choose	score
contrast	inventory	create	setup	compare	select
convert	question	design	suggest	debate	support
criticize	test	formulate	summarize	defend	value
diagram		justify	write	estimate	
		manage			

The model is a "living document." It will be re-evaluated annually to consider the evolving content.

Appendix D

Curriculum Package

The National Conference on Weights and Measures
National Training Program
GUIDE FOR DEVELOPING CURRICULUM SEGMENTS

Prepared by the NCWM Professional Development Committee
First Draft – October 2007

This guide was prepared to assist those work groups preparing segments for the National Training Program Curriculum. Each curriculum segment represents a small portion of the standards for educating our weights and measures professionals. The Committee is recommending a standard format be used as described below.

The curriculum will cover the broad range of knowledge included in the field of weights and measures. It is organized in a hierarchy of segments ranging from broad topics with general information at level one to narrow topics with highly specific information at level three. These segments will be combined to provide the standards for educating our professionals. It is critical to understand that a curriculum is not a lesson plan for the trainer. Rather it is an organized set of objectives and measurable milestones that can be used to verify that the trainer has covered the subject. Since the curriculum is concerned with outcomes rather than input, the trainer must use the objectives and milestones in preparing the lesson plan for training.

Curriculum Segment Format:

- Segment Number and Title
- Overview and Scope
- Prerequisite Segments
- Objectives and Competencies

Segment Number and Title
Obtain these directly from the Curriculum Plan with the numbers and titles assigned by the Professional Development Committee. Please include a revision date under the title.

Overview and Scope
Provide a brief narrative overview and description of the scope of the segment. This should generally be a short paragraph of only a few of sentences.

Prerequisite Segments
List the segment number and title of any prerequisite segments that should be mastered before undertaking the material in this segment. Generally, this will remain within one of the four main topic areas in the curriculum. When covering device inspection topics, do not include prerequisite segments Weights and Measures General, Metrology, or Market Practices areas.

Objectives and Competencies
A curriculum segment will typically have multiple objectives, each with two to perhaps ten measurable competencies, sometimes called milestones. If the number of competencies exceeds ten, it is best to break the objective into two or more objectives.

The objective statement should follow the guidelines in the NCWM Core Competency Model. A given category or area may require more than one objective and associated competencies. Well-constructed objective statements should express a single, specific objective. For consistency, the Committee asks that objectives generally be ordered following the table below. The order is to provide a consistent feel to the curriculum. Depending on the needs of

the particular segment, any one or more categories from this chart may not apply. Following the objective statement add a lead-in to the bulleted competencies such as, "To demonstrate this, the inspector can:".

The competencies or milestones should represent measurable actions that demonstrate a mastery of one aspect of the objective. For base level inspectors, each competency begins with an action verb from the NCWM Core Competency Model beginning with the cognitive levels of knowledge, understanding, or application. As the curriculum is expanded to journeyman and advanced levels, additional cognitive levels of analysis, integration and evaluation may be added. Please present the competencies in bullets.

Device Segment Category	**Purpose**
Technology and Terminology	These sections should set standards for knowledge of the technology used in this area of responsibility and understanding of the common terms used to communicate effectively.
Device Operations and Functionality	These sections should set standards for knowledge of metrologically significant operations and features of the items under inspection.
Technical Requirements – Inspection	These sections should set standards for understanding of the technical requirements (specifications) for a device or commodity and for the ability to conduct inspection to verify conformance.
User Requirements – Inspection	These sections should set standards for understanding of the requirements incumbent on a device or commodity user and for the ability to conduct inspection to verify conformance.
Test Methods	These sections should set standards for understanding of the physical test procedures used to verify device or commodity performance and for the ability to conduct these tests.

For assistance in working with this template, please contact the current Chair of the Professional Development Committee. A sample curriculum segment following this template is also available from the Committee.

Appendix E

Curriculum Package

The National Conference on Weights and Measures
National Training Program Curriculum

Segment 3.1.1. Static Electronic Weighing Systems, General

Revised: October 31, 2007

Overview

This segment sets standards for knowledge, understanding, and performance required for inspection and testing of static electronic scales. This segment will cover a wide range of information that is generic and applicable to many different static scale applications.

Prerequisites

3.0. Introduction to Device Control
3.0.a Safety Considerations
3.1. Weighing Technologies and Terminology, General

Objectives and Competencies

1. Technology of Weighing Systems

A weights and measures inspector should understand the method of operation and the primary technologies used in typical electronic weighing systems. To demonstrate this, the inspector can:

- Restate that scales measure the weight of material resulting primarily from the force exerted by gravity on the material on the scale.
- Restate that weight on a scale is a close approximation of the mass of the material on the scale in reference to reference standards used when the device is calibrated; hence, scale units are in units of mass, e.g., lb or kg.
- Describe the basic components of a weighing system: load receiver, load sensor, indicator, and peripherals like printers and computers.
- Describe the principle of operation of strain gage load cell scale technologies from the load sensors, to A to D converters, to computer-based processors, to indicators/printers.
- Explain that the digital division for a typical system is defined by the two zones of uncertainty (break points) at approximately +½ d and –½ d.
- Restate that digital scale components can be packaged in multiple ways involving separate discrete elements (OIML: modules).
- Define common terms used with regard to electronic weighing systems.

2. Classes, Tolerances and Performance Requirements for Scales with a Class Mark

A weights and measures inspector should understand the classification system for static scales and be able to apply the performance standards under each class. To demonstrate this, the inspector can:

- Explain how the basic tolerances, repeatability tolerances, agreement requirements, and General Code abnormal performance requirements all work together to specify limits to deviations in scale performance.
- Describe how the concepts of accuracy, repeatability, linearity and hysteresis relate to scale performance.
- Describe the organization of accuracy classes for marked scales as specified in Table 3.
- Explain how scale class is related to typical application in Table 7a in the Scales Code.
- Appraise whether a scale conforms to the class declared by the manufacturer.
- Compute tolerances for any class marked scale as per Table 6 of the Scales Code.

- Illustrate how to find either the acceptance or maintenance tolerance for any load on a scale given the scale class, capacity and division size.
- Illustrate how repeatability requirements apply to static scales.

3. Scale Markings and Operations

A weights and measures inspector should understand the various marking requirements applicable to a static scale and demonstrate ability to operate a static scale. To demonstrate this, the inspector can:

- Recognize and interpret required identification markings on a scale as per Table S.6.3.
- Recognize and interpret required markings on the controls, indications and features of a scale.
- Demonstrate how to operate the following functions/operations on a typical scale.
  - Power on/off
  - Zero
  - Tare (both platter and keyboard tare) and Tare Clear – if scale has a tare function
  - Units selector – if scale indicates in more than one unit
- Recognize and interpret the information displayed on a scale, including:
  - Gross, Net, and Tare weight indications
  - Center of Zero, Motion, pricing displays, and others
  - Underload/Overload error conditions

4. Technical Requirements

A weights and measures inspector should be able to apply the various technical requirements to a static scale and cite the applicable code reference for a deficiency. To demonstrate this, the inspector can:

- Apply the technical specifications relating to the following scale features/indications and cite the HB 44 Code paragraph.
  - Zero-load indications, zero-setting operations, and automatic zero setting (zero tracking)
  - Digital scale divisions and limit of indication
  - Level indication for portable scales
  - Motion detection requirements – zero, tare, printing, etc.
  - Design requirements for weighing elements
- Interpret the rules for matching weighing elements to indicating elements (modules).

5. User Requirements

A weights and measures inspector should be able to apply the various user requirements applicable to a static scale and cite the applicable code reference for a deficiency. To demonstrate this, the inspector can:

- Assess suitability of a class marked scale for a given application, considering design, class, application and typical load in Tables 7a. and 8.
- Evaluate compliance of a scale with scale installation requirements in UR.2.
- Evaluate compliance of a scale with general use requirements in UR.3. (Subsections 3.1., 3.2., 3.3., and 3.5.)
- Evaluate compliance of a scale with maintenance requirements in UR.4.

6. Basic Test Procedures

A weights and measures inspector should be able to apply the appropriate performance tests to a static scale and evaluate compliance with the applicable tolerances and performance standards. To demonstrate this, the inspector can:

- Demonstrate how to properly use test weights and care for them when not in use.
- Determine minimum amounts of standards required for testing a given scale.
- Select appropriate test loads for an Increasing Load Test for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances.
- Select appropriate test loads for a Decreasing Load Test for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances.
- Select appropriate test loads for a Shift Test (eccentric loading) for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances and agreement requirements.
- Discuss appropriate times to perform a Discrimination Test or a Repeatability Test.

- Select appropriate test loads for a Discrimination Test for a given scale, perform the test, and evaluate the test results for compliance with the applicable standards.
- Select appropriate test loads for a Repeatability Test for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances and agreement requirements.

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Appendix F

Curriculum Package

The National Conference on Weights and Measures
National Training Program
GUIDE FOR DEVELOPING TEST QUESTIONS

Prepared by the NCWM Professional Development Committee
First Draft – January 2007

This guide was prepared to assist those work groups preparing curriculum materials as they prepare test questions. These test questions will be used both as aids to training delivery and also as a measuring stick in any future certification effort. If the certification program is to have credibility, it is vital that the test questions adequately evaluate that the student has achieved the multiple milestones in each curriculum area.

As you write your questions, please remember that we have set the bar at a level of application, the third in Bloom's Taxonomy. Thus, we expect the trainee will KNOW certain things, UNDERSTAND other things, and be able to APPLY the remainder. We are not looking for higher learning levels in Bloom's Taxonomy for basic inspectors and we will not be testing for analysis, integration, or evaluation.

Testing for Knowledge – A test question for knowledge is usually in the form of a true/false, multiple choice, or fill-in-the-blank question. At this point, the Committee is suggesting that developers focus on multiple choice and fill-in-the-blank questions, such as questions 1 and 2 below. With true/false, the person has a 50-50 chance of guessing and getting the right answer. Please note that at this level the trainee need only demonstrate that he/she knows the information and not necessarily that he/she understands it or can apply it.

1. **Which statement best describes the legal standing of NIST Handbook 44?** (Answer: B)

   A. Handbook 44 is a federal regulation published by the National Institute of Standards and Technology that preempts the states.
   B. Handbook 44 is adopted either by act of the state legislature or through promulgation in regulation by the state.
   C. Handbook 44 is amended each year and all states agree to abide by the actions of the National Conference on Weights and Measures.
   D. Handbook 44 is adopted as part of the administrative policy by order of the state director.

2. **A paragraph beginning with "S." in any of the NIST Handbook 44 Codes is a _____.** (Answer: Specification)

Testing for Understanding – A test question for understanding is usually a multiple-choice question, such as questions 3 and 4 below. Questions concerning understanding often ask the trainee to pick the best response in situations where more than one answer could be correct in some respect. For example, in Question 3, answer B could be a correct answer if the equipment was manufactured after the effective date. Answer C is a better answer since it is more specific and also includes items brought into the state after the effective date. Please note for understanding the trainee needs to demonstrate that he/she knows and understands the information and not necessarily that he/she can apply it.

3. A nonretroactive requirement is best described by which of the following statements? (Answer: C)

A. A nonretroactive requirement is enforceable on all equipment up to the terminal date.
B. A nonretroactive requirement is enforceable only on new equipment after the effective date.
C. A nonretroactive requirement is enforceable on equipment manufactured after the effective date or brought into the state after the effective date.
D. A nonretroactive requirement is enforceable on equipment with an NTEP Certificate granted after the effective date.

4. Which of the following best describes the difference between "d" and "e" in the Scales Code? (Answer: D)

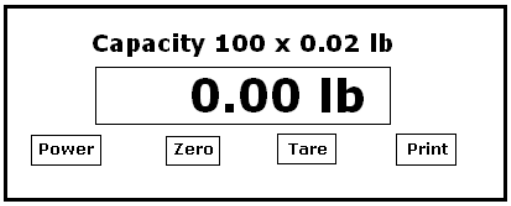
A. The value of "e" is always displayed while "d" may or may not be.
B. The value of "d" is always smaller than or equal to "e".
C. The display of values for "d" must always be different in size or character from "e".
D. When "d" does not equal "e", the tolerances are applied to the value of "e".

Testing for Application – A test question for application should be either be a multiple-choice question or a "Yes/No with reason" question, such as questions 5 and 6 below. Questions concerning application will usually require the trainee to perform multiple steps to reach the correct answer. In the field, they will not be guided to the correct section of the handbook, but will have to find it based on their knowledge and experience. For example, the question may provide information about the situation and some test results. The trainee must then decide whether to apply maintenance or acceptance tolerances and then evaluate the test results against the appropriate tolerances for that test. In question 5 below, the person must see that the scale is subject to the non-retroactive requirement in Scales Code S.1.7.(b) and then correctly deduce that the only correct response is an overload error. The Yes/No with reason question (question 6) also requires several steps but goes further in that it also requires the trainee to state the nature of any violation and cite the section of the Handbook that is violated. This is critical as this reason and citation would have to be indicated on any official stop-use order issued for the violation. Please note that the trainee needs to demonstrate that he/she knows, understands, and can apply the requirements.

5. You are inspecting a new price-computing sale (30 x 0.01 lb) in a deli that was placed in service last week. It has an NTEP CC # 99-205. You place a 1 lb weight on the scale and press the tare key. You then place an additional 29.2 lb of test weights on the scale. Which of the following is an acceptable indication for this test load? (Answer: A)

A. Overload error
B. 29.24 lb
C. 29.18 lb
D. 29.16 lb

6. You are inspecting the scale at right and find that it has no zero tracking. With the scale at zero as indicated, you add 0.1 d (0.002 lb) to the platform and the scale indicates a stable 0.02 lb. Is this acceptable?



Yes or No (No must include reason and citation) _____

Answer: No – The digital zero indication must be maintained accurate within ± ¼ d of true zero or the scale must have a center zero indicator. Scales Code S.1.1.1.

Initially the Committee is looking to build a bank of test questions that evaluate if the trainee has reached the milestones in each curriculum segment and cover a range of difficulty. Any exam that is prepared will include a mix of questions at each appropriate level in Bloom's Taxonomy from the curriculum, and varying levels of difficulty from easy to challenging. In that way, the test can be fair yet still differentiate those who really have mastered the discipline from those who haven't.

After the questions are prepared and tested (testing method to be developed), the Committee would then split the questions into two groups. The first group, called "sample questions," would be widely circulated for use in training programs. Instructors could use the sample questions in their training or as part of quizzes or final exams to measure effectiveness of the training. Most important, trainees would be exposed to the kinds of questions and the range of difficulty that would be included in a certification exam.

The second group of questions would be secured for use in a certification exam program. The Committee envisions charging some group to administer the certification exam and assist in the grading. That group would also create alternative exams or periodically change the questions so the exam is not the same for candidates that fail to pass the first time. Please look to set the bar so it is fair yet represents the high level of ability you want working for you.

A long journey begins with one step. We are counting on our curriculum development teams to start generating our bank of test questions (with an answer key) based on the milestones they choose in the curriculum segment(s) they are preparing. If we work together to create a good range of difficulty in those questions, we can be well on our way toward that certification program we want. There is plenty of room for creativity in this effort, including the use of graphics and photographs.

Thanks again for your willingness to contribute. Please call or e-mail Ross Andersen, New York, with questions or comments at (518) 457-3146 or ross.andersen@agmkt.state.ny.us.

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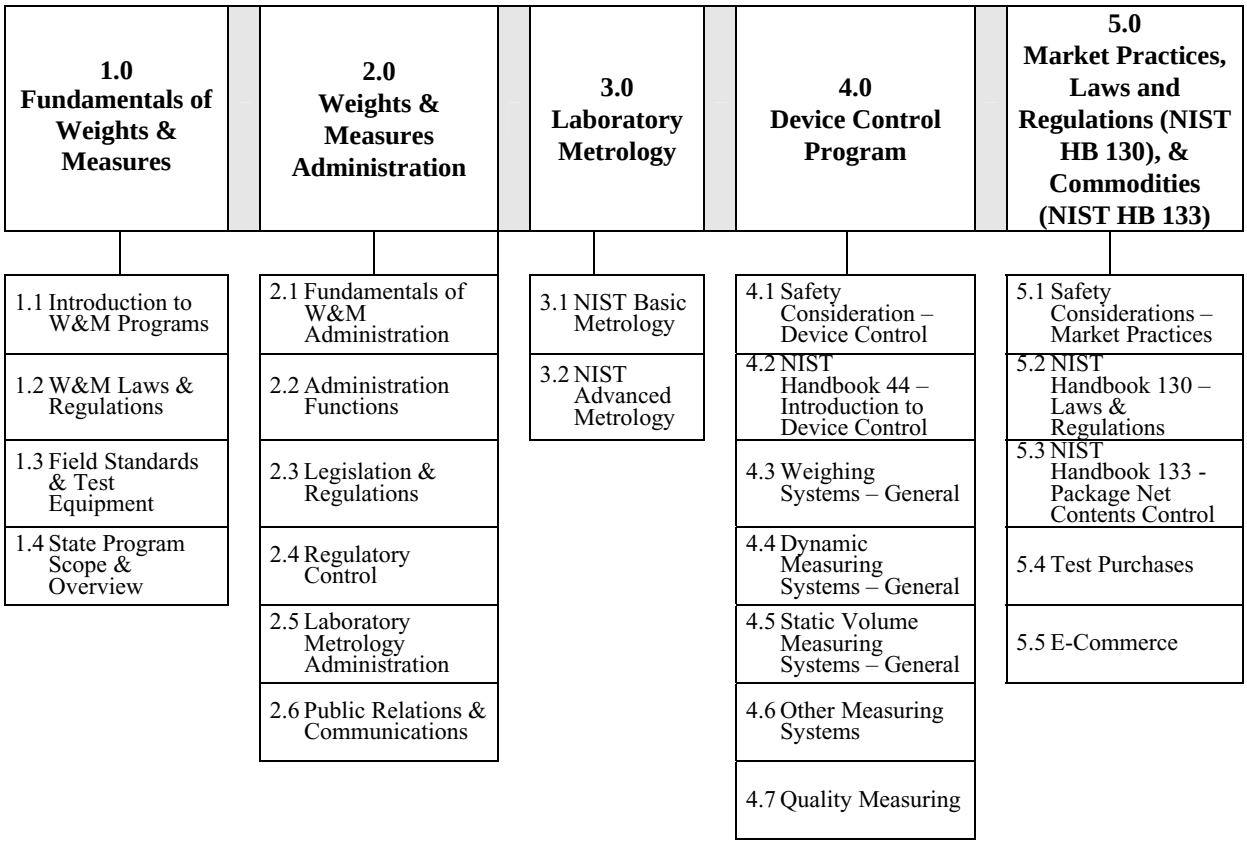
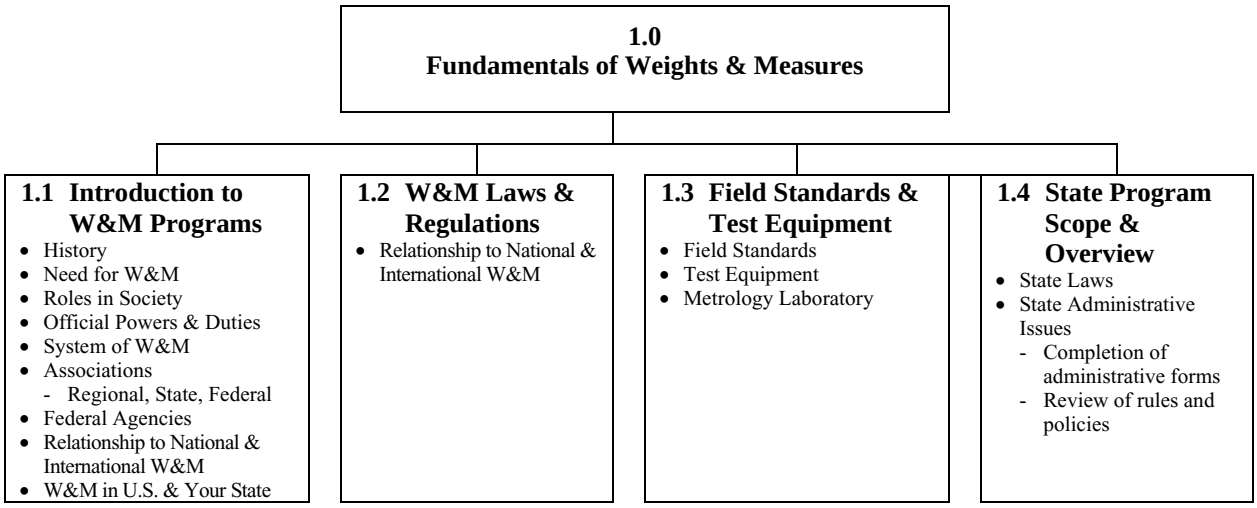
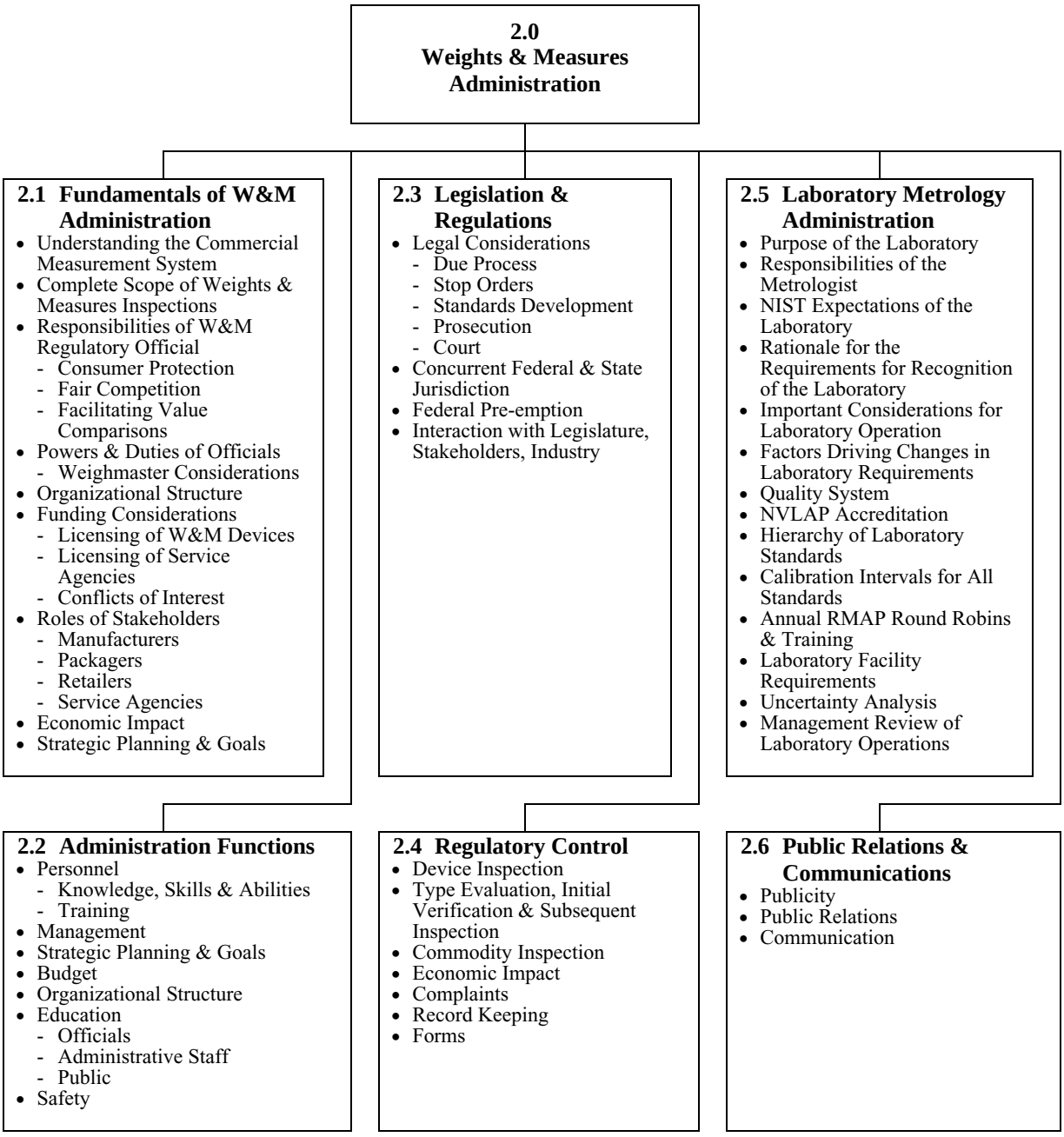
Appendix G

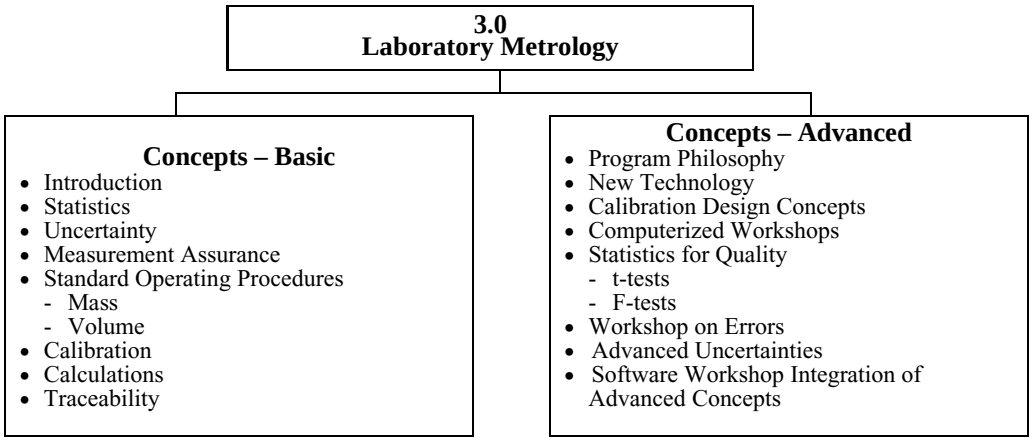
Curriculum Package
National Conference on Weights and Measures
NATIONAL TRAINING CURRICULUM OUTLINE

Revised November 2007






2.0
Weights & Measures Administration
2.1 Fundamentals of W&M Administration
• Understanding the Commercial Measurement System
• Complete Scope of Weights & Measures Inspections
• Responsibilities of W&M Regulatory Official
- Consumer Protection
- Fair Competition
- Facilitating Value Comparisons
• Powers & Duties of Officials
- Weighmaster Considerations
• Organizational Structure
• Funding Considerations
- Licensing of W&M Devices
- Licensing of Service Agencies
- Conflicts of Interest
• Roles of Stakeholders
- Manufacturers
- Packagers
- Retailers
- Service Agencies
• Economic Impact
• Strategic Planning & Goals
2.3 Legislation & Regulations
• Legal Considerations
- Due Process
- Stop Orders
- Standards Development
- Prosecution
- Court
• Concurrent Federal & State Jurisdiction
• Federal Pre-emption
• Interaction with Legislature, Stakeholders, Industry
2.5 Laboratory Metrology Administration
• Purpose of the Laboratory
• Responsibilities of the Metrologist
• NIST Expectations of the Laboratory
• Rationale for the Requirements for Recognition of the Laboratory
• Important Considerations for Laboratory Operation
• Factors Driving Changes in Laboratory Requirements
• Quality System
• NVLAP Accreditation
• Hierarchy of Laboratory Standards
• Calibration Intervals for All Standards
• Annual RMAP Round Robins & Training
• Laboratory Facility Requirements
• Uncertainty Analysis
• Management Review of Laboratory Operations
2.2 Administration Functions
• Personnel
- Knowledge, Skills & Abilities
- Training
• Management
• Strategic Planning & Goals
• Budget
• Organizational Structure
• Education
- Officials
- Administrative Staff
- Public
• Safety
2.4 Regulatory Control
• Device Inspection
• Type Evaluation, Initial Verification & Subsequent Inspection
• Commodity Inspection
• Economic Impact
• Complaints
• Record Keeping
• Forms
2.6 Public Relations & Communications
• Publicity
• Public Relations
• Communication


3.0
Laboratory Metrology
Concepts – Basic
Introduction
Statistics
Uncertainty
Measurement Assurance
Standard Operating Procedures
- Mass
- Volume
Calibration
Calculations
Traceability
Concepts – Advanced
Program Philosophy
New Technology
Calibration Design Concepts
Computerized Workshops
Statistics for Quality
- t-tests
- F-tests
Workshop on Errors
Advanced Uncertainties
Software Workshop Integration of Advanced Concepts

4.0
Device Control Program

4.1 Safety Considerations

4.2 NIST Handbook 44 – Introduction to Device Control
- Terminology
- NIST Handbook 44
- Fundamental Considerations
- Uncertainty
- Safety
- Support Equipment
- Seals
- Supports
- General Enforcement Guidelines

4.3 Weighing Systems – General
- Terminology
- Scale Types
- Technology
- Suitability
- User Requirements
- Operation/Markings
- Scale Classes & Tolerances
- Basic Scale Test Procedures
- Basic Inspection

Weighing Device General Points:
- Common Traits
- Contents of EPO
  - Examination Specifications
  - User Requirements
  - Suitability
  - Test Equipment
  - Examination, Installation, & Maintenance
  - Test Specifications
  - Evaluation
- Field/Practical Exercises

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 Vehicle Scale Class III or III L
4.3.8 Vehicle Scale Class III or III L – Advanced
4.3.9 Railroad Track Scales
4.3.10 In-Motion Railroad Track Scales
4.3.11 Hopper Scale 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 Scales
4.3.16 Point-of-Sale Scale Systems
4.3.17 Other Specialty Weighing Systems

4.4 Dynamic Measuring Systems – General
- Terminology
- Measuring Device Types
- Technology
- Suitability
- User Requirements
- Operation & Markings
- Tolerances
- Basic LMD Tests
- Basic LMD Inspections

Measuring Systems General Points:
- Terminology
- Measuring Device Types
- Technology
- Suitability
- User Requirements
- Operation & Markings
- Tolerances for LMDs
- Basic LMD Test
- Basic LMD Inspections

4.4.1 Retail Motor Fuel Dispensers
4.4.2 Loading Rack and Other Stationary Metering Systems
4.4.3 Loading Rack & 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.)

4.0
Device Control Program (cont.)

4.5 Static Volume Measuring Systems – General

- Terminology
- Measuring Device Types
- Technology
- Suitability
- User Requirements
- Operation & Markings
- Tolerances
- Basic Tests
- Basic Inspections

4.5.1 Liquid Measures
4.5.2 Farm Milk Tanks
4.5.3 Dry Measures

4.6 Other Measuring Systems

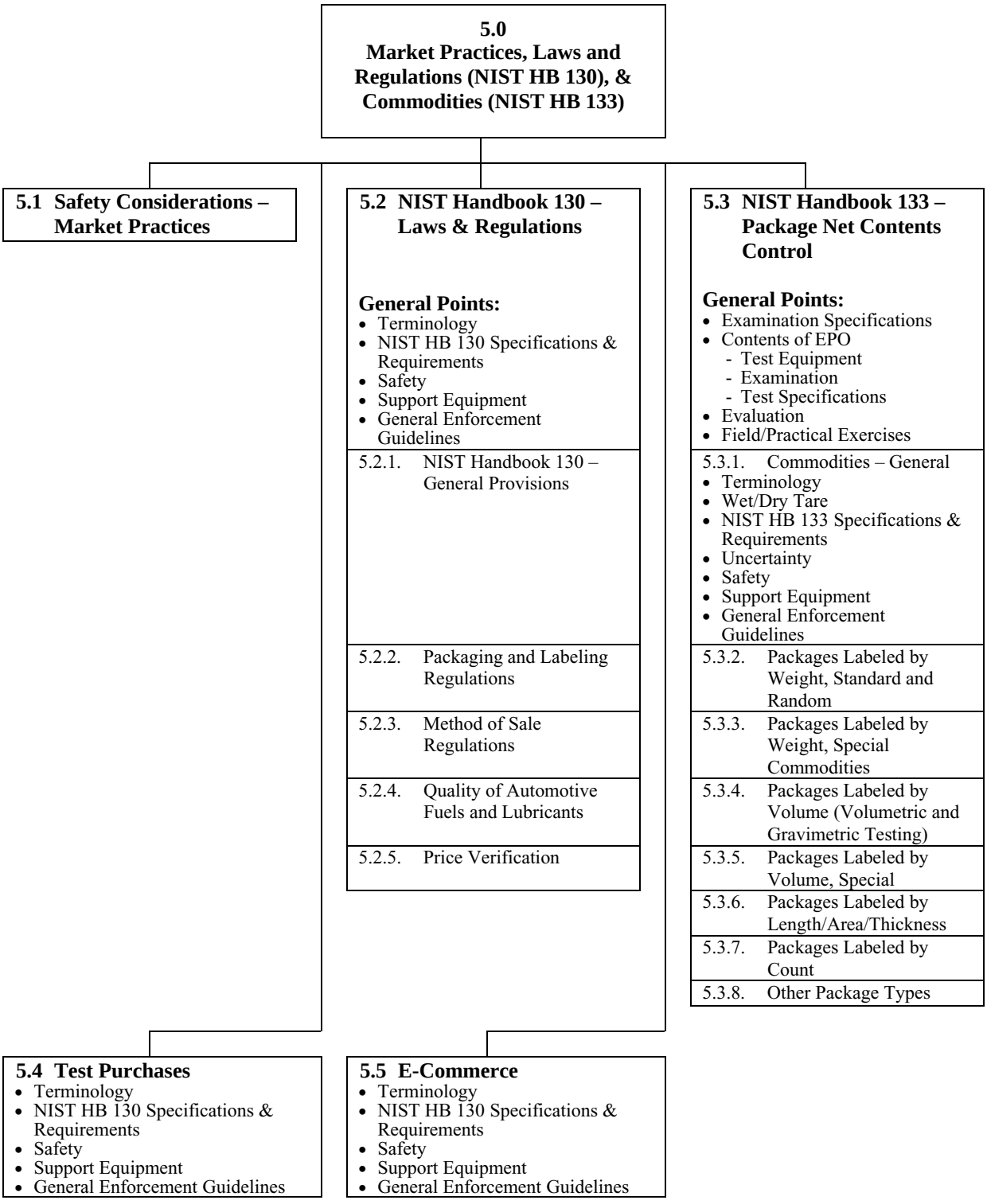
- Terminology
- Other Device Types
- Technology
- User Requirements
- Operation & Markings
- Tolerances
- Suitability
- Basic Tests
- Basic Inspections

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

- Terminology
- Measuring Device Types
- Technology
- Suitability
- User Requirements
- Operation & Markings
- Tolerances
- Basic Tests
- Basic Inspections

4.7.1 Grain Moisture Meters
4.7.2 NIR Grain Analyzers
4.7.3 Carcass Evaluation Systems


5.0
Market Practices, Laws and Regulations (NIST HB 130), & Commodities (NIST HB 133)
5.1 Safety Considerations – Market Practices
5.2 NIST Handbook 130 – Laws & Regulations
General Points:
• Terminology
• NIST HB 130 Specifications & Requirements
• Safety
• Support Equipment
• General Enforcement Guidelines
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
General Points:
• Examination Specifications
• Contents of EPO
- Test Equipment
- Examination
- Test Specifications
• Evaluation
• Field/Practical Exercises
5.3.1. Commodities – General
• Terminology
• Wet/Dry Tare
• NIST HB 133 Specifications & Requirements
• Uncertainty
• Safety
• Support Equipment
• General Enforcement Guidelines
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
• Terminology
• NIST HB 130 Specifications & Requirements
• Safety
• Support Equipment
• General Enforcement Guidelines
5.5 E-Commerce
• Terminology
• NIST HB 130 Specifications & Requirements
• Safety
• Support Equipment
• General Enforcement Guidelines

Appendix H

Curriculum Package

The National Conference on Weights and Measures
National Training Program
CURRICULUM WORK PLAN

Revised November 2007

Segment/Subject

Level 1/Level 2/Level 3

1.0 Fundamentals of Weights and Measures
- 1.1 Introduction to W&M Programs
- 1.2 W&M Laws and Regulations
- 1.3 Field Standards & Test Equipment
- 1.4 State Program Scope and Overview

2.0 W&M Administration
- 2.1 Fundamentals of W&M Administration (Commercial System, Powers & 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 & Communications (Publicity, Public Relations, Communications)

3.0 Laboratory Metrology
- 3.1. NIST Basic Metrology
- 3.2. NIST Advance Metrology

4.0 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 Vehicle Scale Class III or III L
  - 4.3.8 Vehicle Scale Class III or III L – Advanced
  - 4.3.9 Railroad Track Scales
  - 4.3.10 In-Motion Railroad Track Scales
  - 4.3.11 Hopper Scale 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 Scales
  - 4.3.16 Point-of-Sale Scale 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 & 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

5.0 Market Practices, Laws and Regulations (NIST HB 130), & Commodities (NIST HB 133)

- 5.1 Safety Considerations – Market Practices, NIST HB 130, NIST HB 133
- 5.2 NIST Handbook 130 – Laws & 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 HB 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 been left off this listing and will be addressed later.

Appendix I

Model Professional Development Training and Certification Standards Statute for Inspectors and Sealers of Weights and Measures

Submitted by NEWMA, October 2007

DRAFT

1. Definition of Terms: Unless defined otherwise by statute, the definitions contained herein shall apply to this statute.

1.1 **Commission:** The permanent advisory commission appointed pursuant to this statute to develop, plan, and certify training standards, certification, and continuing education.

1.2 **Director [Commissioner or other senior state official]:** Charged by statute to administer, guide, or direct Weights and Measures activities within the state at state, county, or municipal level.

1.3 **Sealers and Inspectors of Weights and Measures:** Those public officials appointed pursuant to existing law to inspect, approve, or condemn weighing and measuring devices or perform other activities as directed by statute or regulation. This definition shall also apply to deputy, assistant, or associate Sealers and Inspectors of Weights and Measures.

1.4 **Industry Specialists:** Those individuals approved and/or licensed by the State Director to inspect, approve, or condemn specific classes or types of weighing and measuring devices.

2. Certification and Standards Commission

2.1 **Appointment:** There shall be a permanent standing advisory commission comprised of the director of the state weights and measures department or his designee, and a designee from each of the following organizations: the State Weights and Measures Association, the various Regional Weights and Measures Associations, and one individual representing Industry Specialists. Members of said commission shall serve without compensation. Said commission shall be chaired by the director or deputy director of weights and measures.

2.2 **Rule Making Authority:** The commission shall promulgate rules and regulations necessary to implement and maintain this statute consistent with existing rule-making state legislation.

2.3 **Duties:** The commission shall develop, and from time to time, revise the certification and continuing education requirements that are established by the Department of Weights and Measures with the advice and consent of the commission. The commission shall certify all inspectors, sealers and deputies and industry specialists in accordance with sections [insert specific statue citation covering the appointment of these officials] and regulations promulgated by the commission including, but not limited to, regulations covering initial written certification testing for inspectors, sealers and deputies and industry specialists as well as mandatory continuing education programs for inspectors, sealers and deputies, and industry specialists to maintain their certifications. Every store, retail establishment, food store or food department and all merchants within the jurisdiction of the state department of weights and measures shall provide adequate space for the display of information relative to how the state inspector, local sealer or inspector or the department of weights and measures can be contacted as provided in regulations to be promulgated by the commission. Notwithstanding any certification exemption, all sealers, inspectors, deputy sealers, deputy inspectors, and industry specialists shall participate in continuing education programs. The commission shall establish a training and education fee to be paid by the state, county, municipality, or industry specialist's organization, which employs such sealer, inspector, deputy sealer and deputy inspector, or industry specialist sufficient to offset the cost of providing such training and education.

2.4 **Fees:** There shall be a revolving account established into which shall be deposited any training and education fees paid by the state, county, municipality, or industry specialist. These fees shall be used to offset any cost associated with providing such training and education mandated by the commission.

3. Appointment of Sealers, Inspectors, Deputy Sealers

3.1 **Appointment:** The sealer, inspector, and all deputies shall be certified by the commission within one year after assuming their powers and duties. Failure to become certified within one year shall be cause for termination; provided, however, sealers, inspectors or deputy sealers or deputy inspectors, employed by the state, county, or a municipality upon the effective date of this paragraph, shall become certified within two years. Sealers, inspectors or deputy sealers or deputy inspectors who pass a civil service exam for a position as a sealer, inspector or deputy sealer or deputy inspector of weights and measures, shall be exempt from initial certification requirements provided that said civil service exam contains questions and/or practices consistent with initial certification requirements.

3.2 **Continuing Education:** Notwithstanding any certification exemption, all sealers, inspectors and deputy sealers and deputy inspectors shall participate in continuing education programs. The commission shall establish a training and education fee to be paid by the county or municipality which employs such sealer, inspector, deputy sealer and deputy inspector sufficient to offset the cost of providing such training and education.

4. Appointment of Industry Specialists

4.1 **Appointment:** All industry specialists shall be certified by the commission prior to assuming their powers and duties as licensed industry specialists; provided, however, industry specialists performing such duties shall become certified within one year from the effective date of this statute. Failure to become certified prior to assuming their powers and duties as industry specialists shall render any inspections conducted null and void and such individuals shall be barred from further inspections for a period of not less than one year.

4.2 **Continuing Education:** Notwithstanding the appointment of industry specialists, they shall participate in continuing education programs approved by the commission. The commission shall establish a training and education fee to be paid by the business or organization employing industry specialists sufficient to offset the cost of providing such training and education.

5. Conflict with other Laws: Whenever the application of any provision of any other law of this state conflict with the application of any provision of sections one through four, inclusive, said sections shall prevail.

6. Partial Invalidity: If any provision of said sections one to four, inclusive, or the application of said sections shall be held invalid, the remainder of said sections, or the application of such provision to any person or circumstance other than that as to which it is invalid, shall not be affected thereby.

Report of the
National Type Evaluation Program (NTEP) Committee

Steve Malone, Chairman
Director
Nebraska Weights and Measures Division

Reference
Key Number

500 INTRODUCTION

The National Type Evaluation Program (NTEP) Committee (hereinafter referred to as "Committee") submits its report for consideration by the 93rd 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 13 - 17, 2008, in Burlington, Vermont. The Committee considered communications received prior to and during the 93rd 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 **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in *italics*.

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 may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Reference Key Number	Title of Item	Page
INTRODUCTION		1
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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

Table C
Voting Results

Reference Key Number	House of State Representatives		House of Delegates		Results
	Yeas	Nays	Yeas	Nays	
500 (In its entirety) voice vote	All Yeas	No Nays	All Yeas	No Nays	Passed

Table D
Glossary of Acronyms*

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

1. Mutual Recognition Arrangement (MRA)

Background: Both Measurement Canada (MC) and the NTEP labs are engaged in continuing dialog to improve the data exchange under the Mutual Recognition Arrangement (MRA). Over the past several months, NTEP and Measurement Canada have been in continuous contact regarding the flow of information related to the MRA. Measurement Canada has also supplied the U.S. NTEP labs with several updated versions of an Excel spreadsheet program to standardize the test report forms for devices that fall under the MRA. This updated version of the spreadsheet has been well received by the labs. There is also continued dialog between the labs and the NTEP Director.

Steve Patoray, NTEP Director, reported that the NTEP labs met in April 2008 in Ottawa, Canada. The main topic of the Weighing labs was improvements to the MRA for Weighing Devices. Measurement Canada provided an updated Excel spreadsheet checklist, which included all updated criteria for both Measurement Canada and NTEP. The NTEP labs are now using this checklist for all devices evaluated by the labs.

Gilles Vinet, Measurement Canada, provided comments on how important the MRA is to Measurement Canada, and that they intend to continue to support and improve the MRA process.

2. Mutual Acceptance Arrangement (MAA)

Background: Information regarding the OIML MAA can be found at http://www.oiml.org/maa. NCWM has signed the OIML DoMC for R 60 Load Cells as a utilizing participant.

A meeting was held in May 2008 of the OIML Technical Subcommittee TC 3/SC 5 on Conformity assessment. The main focus of this meeting was revision of the following OIML B documents that are classified as Basic Publications:

- OIML B 3 *OIML Certificate System for Measuring Instruments*, identified as project p7,
- OIML B 10-1 *Framework for a Mutual Acceptance Arrangement on OIML Type Evaluations,* identified as project p8, and
- OIML B 10-2 *Checklists for Issuing Authorities and Testing Laboratories carrying out OIML Type Evaluations*, identified as project p9.

Additionally, there were presentations and discussions on TC 3/SC 5 project p2 – *Expression on uncertainty in measurement in legal metrology applications* related to drawing up a horizontal document to implement uncertainties in conformity assessment in legal metrology.

NCWM participated in this meeting through written correspondence only. The correspondence was addressed to the secretariat of TC 3/SC 5 indicating NCWM's continued support of the MAA and also indicating its opposition to the use of manufacturers' data for type evaluation.

Dr. Charles Ehrlich, NIST, provided comments on the recent meetings related to the MAA and the OIML Certificate system.

Regine Gaucher, BIML, provided comments on the status of activities at the BIML related to the MAA.

3. NTEP Participating Laboratories and Evaluations Reports

Background: At the 2008 NCWM Interim Meeting, the NTEP Director updated the Committee on NTEP laboratory and administrative activities since October 1, 2007.

Steve Patoray, NTEP Director reported the backlog at the NTEP labs has gone up slightly higher than historical levels over the past two months. These values will continue to be monitored.

Upcoming meetings:

Grain Analyzer Sector	August 2008	Kansas City, Missouri
Weighing Sector	September 2008	St. Louis, Missouri
Measuring Sector	October 2008	Atlanta, Georgia

NTEP Application Statistics 10/01/06 to 06/18/08			
	Previous Quarter	**Current Quarter**	**Total To Date**
	2006 - 2007 10/1/06 - 6/18/07	**2007 - 2008 10/1/07 - 6/18/08**	**Grand Total 10/1/00 - 6/18/08**
Applications Processed	246	158	1900
Applications Completed	198	52	1538
New Certificates Issued	245	129	1636
Certificates Distributed to State Directors	247	118	1735
Certificates Posted to Website	246	126	4282
Current Active NTEP Certificates (12/31/2006)			1669

	Average	**Median**
Time for NCWM to Assign an Evaluation	14 days	8 days
Time for NCWM to Review a Draft Certificate	8.5 days	8 days
Time for Complete Evaluation (Completed NCWM Assignments)	188 days	133 days

4. NTETC Sector Reports

Background:

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 22 and 23, 2007. A draft of the final summary was provided to the Committee prior to the 2008 NCWM Interim Meeting for review and approval.

The next meeting of the Grain Moisture Meter and NIR Protein Analyzer Sectors is scheduled for August 2008 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:

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

Jack Barber
J.B. Associates
10349 Old Indian Trail
Glenarm, IL 62536
Phone: (217) 483-4232
E-mail: jbarber@motion.net

Measuring Sector: The NTETC Measuring Sector met October 19 and 20, 2007, in Little Rock, Arkansas. A draft of the final summary was provided to the NTEP Committee prior to the 2008 NCWM Interim Meeting for review and approval.

The next meeting of the Measuring Sector is scheduled for October 2008 in Atlanta, Georgia, in conjunction with the Southern Weights and Measures Association's 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:

Tina Butcher
NIST WMD
100 Bureau Drive, Stop 2600
Gaithersburg, MD 20899-2600

Phone: (301) 975-2196
Fax: (301) 975-8091
E-mail: tina.butcher@nist.gov

Weighing Sector: The NTETC Weighing Sector met September 6 - 8, 2007, in Sacramento, California. A final draft of the meeting summary was provided to the Committee prior to the 2008 NCWM Interim Meeting for review and approval.

The next Weighing Sector meeting is scheduled for September 2008 at a location to be determined and announced. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector technical advisor:

Steven Cook
NIST WMD
100 Bureau Drive, Stop 2600
Gaithersburg, MD 20899-2600

Phone: (301) 975-4003
Fax: (301) 975-8091
E-mail: steven.cook@nist.gov

Software Sector: The NTETC Software Sector met October 17 - 18, 2007, in Little Rock, Arkansas. A final draft of the meeting summary was provided to the Committee prior to the 2008 NCWM Interim Meeting for review and approval.

The Software Sector met May 20 - 21, 2008 in Columbus, Ohio.

There has been a change to the Sector Chair and Technical Advisor positions.

Documentation Teri Gulke,

Tech Advisor Doug Bliss,

Co-Sector Chairs Norm Ingram and Jim Pettinato.

The date of the next Software Sector meeting has not been scheduled although it is anticipated the meeting will be scheduled for spring of 2009. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector technical advisor:

Doug Bliss
Mettler Toledo
1150 Dearborn Drive
Worthington, OH 43085

Phone: (614) 438-4307
E-mail: doug.bliss@mt.com

The NTEP Committee reviewed all of the recommendations of the NTETC Sectors for change to the technical policies of NCWM Publication 14. All technical recommendations were accepted by the NTEP Committee with the exception of item 4(d) of the Weighing Sector (sleep/screen saver mode). The appropriate sections of NCWM Publication 14 will be updated per those recommendations.

In addition to the technical recommendations of the Sector, the NTEP Director made a technical recommendation to the NTEP Committee to update NCWM Publication 14, Force Transducers, Section L. Subsection II. Determination of Creep to include all information found in NIST Handbook 44. The NTEP Committee agreed to these changes.

The NTEP Director also requested that information found in a previous version of NCWM Publication 14 Administrative Policy on Appeals, Section T., which had been inadvertently removed during a previous revision, be reinstated. During open hearings of the Interim Meeting, the NTEP Committee invited public comment on this recommendation. The NCWM Board reviewed this administrative policy recommendation from the NTEP Committee and agreed to place the removed information back into NCWM Publication 14, *Administrative Policy*.

5. NTEP Participation in U.S. National Work Group (USNWG) on Harmonization of NIST Handbook 44, NCWM Publication 14 and OIML R 76 and R 60

Background: At its October 2006 meeting in Cape Town, South Africa, the 41st CIML approved DR 7: R 76-1 Non-automatic weighing instruments. Part 1: Metrological and technical requirements – Tests. The DoMC for R 76 will need to be updated to reflect the changes included in the new revision of R 76. Further updates on the current status of this project will be provided by Steve Cook.

During the 2008 NCWM Annual Meeting, Steve Cook, NIST WMD, provided comments regarding the current status of activities in these areas.

6. Conformity Assessment Program

Background: 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.

The Conformity Assessment Program consists of the following components:

1. Certificate Review
2. Initial Verification
3. Verified Conformity Assessment Program (VCAP)

A conference call for the VCAP work group was held in early January. It was determined at that time that sufficient development has taken place to initiate a pilot VCAP program for load cells. Don Onwiler indicated that with the changes in the NCWM management, the implementation of a pilot of VCAP on load cells will be reevaluated by the NCWM Board at their spring Board meeting.

Lou Straub, Chair of the Initial Verification (IV) working group, expressed concern over the direction and implementation of the Initial Verification Program. Don Onwiler thanked Lou for all of his work in this area and indicated that NCWM still intends to implement IV as soon as possible.

During the NCWM Annual Meeting, Jim Truex, NTEP Administrator, reported that a notice had gone out to all holders of active NTEP Certificates of Conformance (CC) for load cells regarding a VCAP Pilot. In addition, Jim presented the NCWM members with a timetable for implementation.

NTEP VCAP Timeline – Load Cells				
Jul 2008 - Dec 2008	**Jan 2009 - Dec 2009**	**Jan 2010 - Mar 2010**	**Apr 2010 - Nov 2010**	**Nov 2010**
• Refine VCAP Procedures. • Answer incoming questions. • Refine/develop appeals process. • Notify all CC holders of updated plan, Q&A, etc.	• LC Manufacturers to put VCAP QM system in place. • Conduct audit by Certified Body. • Submit audit report to NCWM/NTEP.	• NTEP to evaluate incoming Certification Body reports.	• NTEP to contact manufacturers not meeting VCAP and encourage compliance before annual maintenance fee is due in Nov. • Continue to evaluate incoming reports.	• CCs declared inactive if CC holders fail to meet VCAP.

7. Use of NTEP Logo

Background: Information on the NTEP logo policy can be found by selecting "Logo" on the NCWM/NTEP homepage (www.ncwm.net/ntep/) or at the following URL:

http://www.ncwm.net/ntep/index.cfm?fuseaction=logo

Steve Patoray, NTEP Director, reported to the NCWM members that the NTEP logo policy has been fully implemented, and currently there are no open issues regarding NTEP Logo misuse.

8. NTEP Policy for Issuing Certificates of Conformance for Software

Source: NTETC Software Sector

This item has been moved under Item 4 above and will no longer be a standalone item on the Committee's agenda. For additional information, refer to the Committee's 2007 Annual Report found in Appendix D.

During the NCWM Interim Meeting, the NTEP Committee heard comments from the floor regarding the recommendation by the NTETC Software Sector that NCWM reconsider its decision on issuing Certificates of Conformance on software. Both support and opposition were heard from various NCWM members. One concern was that NTEP might be overwhelmed with new applications for various types of periphery software packages. Don Onwiler attempted to answer this concern by indicating that there would be no fundamental change in what NTEP is currently evaluating and certifying. This would mainly be better identification of the device type as software on NTEP Certificates of Conformance.

9. Update to NCWM Publication 14 Administrative Policy

The NTEP Committee recommended the changes below to the NCWM Board of Directors. The NTEP Committee also received comments from the NCWM members during an open hearing on these items. No negative comments were received. The Board approved these changes to the NCWM Publication 14 Administrative Policy.

ITEM A. Clarification of Appendix B and Fees

Page: Administrative Policy, AP - 8

E. TYPE EVALUATION PROCESS

The type evaluation process follows a sequence of steps. These are explained further in sections F and G. *Refer also to Section S, Conformity Assessment.*

E.1. Steps for Type Evaluation

a. Request for type evaluation (usually by the manufacturer) to NCWM or to Measurement Canada.* **This request will include a completed NTEP application for the correct device type, an application fee and a processing fee. Refer to Appendix B. for additional information on fees.**

b. Decision by NCWM to accept (or reject) the request. A decision to reject an application is based solely upon the inability of NTEP to perform an evaluation on the device due to lack of procedures in NCWM Publication 14 "Weighing Devices," "Measuring Devices," or "Grain Analyzers."

c. Assignment by the NCWM to a Participating Laboratory.*

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N. STATUS OF CERTIFICATE OF CONFORMANCE MAINTENANCE FEE

Except for Grain Analyzers, a Certificate of Conformance (CC) does not have an expiration date; however, the device manufacturer must update the design of a device to meet new or modified requirements adopted by the NCWM. The NCWM charges an annual maintenance fee for active Certificates to support the technical and administrative activities of the NCWM for NTEP. **Refer to Appendix B for additional information on this annual fee.**

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APPENDIX B

AUTHORIZED AREAS AND OTHER SERVICES

1. Authorized Areas of Evaluation by U.S. Participating Laboratories

Refer to NCWM website: ~~***www.ncwm.net***~~ ***http://www.ncwm.net/ntep/pdf/authorizedareas.pdf***

2. Administrative Fees

Application and Certificate Processing Fee:

A nonrefundable application fee* and a certificate processing fee* are due at the time the application is submitted to NTEP. The application will not be processed or entered into the system until these fees are received. If an open file remains inactive for a period of more than 90 days (for example, if the application is assigned to the laboratory and the equipment is not received from the manufacturer within 90 days), the application request will be closed. Once an application request is closed, the manufacturer must reapply and submit another application **and certificate processing** fee in order to pursue a CC for the device.

Drafting Fee:

A drafting fee* is charged for ~~**management,**~~ certificate preparation~~**, duplication, and distribution of the NTEP Certificates of Conformance**~~**.** This charge is in addition to the application fee and certificate processing fee. **The certificate preparation may be completed by the NTEP authorized laboratory, or by NTEP.**

Annual Fees:

The NCWM charges an annual maintenance fee* for active Certificates to support the technical and administrative activities of the NCWM for NTEP. The Certificate holder, usually the manufacturer or re-manufacturer, declares intent to continue to manufacture or remanufacture the device by paying the NCWM an annual maintenance fee for the Certificate.

In addition to the above, Grain Moisture Meter manufacturers must pay an annual participation fee for the NTEP Laboratory On-Going Calibration Program (OCP) Phase II in order to maintain their Certificate in an active status.

NTEP Logo Usage Fee:

A one time license fee is charged to non-holders of NTEP CCs for use of the NTEP Logo. No license fee is charged to current holders of active NTEP CCs.

Please contact the NCWM Headquarters or check the NCWM website for the latest fee structure.* ***See http://www.ncwm.net/ntep/index.cfm?fuseaction=fees*

~~**The manufacturer must indicate on the application at the time of submission all the parameters (capacity, size, features) that are being requested for inclusion on any CC resulting from the NTEP evaluation. Once testing is completed, according to the parameters listed in the application, a draft certificate will be prepared.**~~

~~**The following applies:**~~

- ~~**If a request is made to add parameters to the CC and such parameters would require additional testing or reanalysis, the manufacturer must either: (1) approve the draft CC which covers the parameters originally requested, at which time the CC will be processed and issued. Then submit a new application requesting an addendum to the certificate that includes the additional parameters. A new application and processing fee must be submitted with the application; OR (2) abandon the draft CC based on the original request and await completion of the testing required to evaluate the additional parameters.**~~
- ~~**For requests to add parameters which do not require additional testing and which are allowed within the NTEP technical policies, the additional parameters can be included on the CC only during the time the draft CC is being reviewed.**~~

3. World Wide Web – NCWM Home Page

The NCWM home page on the World Wide Web is: www.ncwm.net

Information may be printed or downloaded to individual personal computers, NTEP related information available includes:

- Active and Inactive CCs issued from January 1, 1986, to present
- List of NTEP Participating Laboratories
- ~~**Authorized Areas of Evaluation for Participating Laboratories**~~ (see above)
- ~~**U.S./ Canadian MRA**~~ Frequently Asked Questions (FAQs)

- NTEP Applications
- NTEP Fees
- **NTEP Logo**

For additional information, please refer to http://www.ncwm.net/ntep.

ITEM B. Proposed Language Changes Related to Provisional NTEP CCs

Page: Administrative Policy, AP - 12

I.2. Provisional Certificate of Conformance

The NCWM may issue a Provisional Certificate of Conformance under some circumstances without full evaluation. This must be reviewed and authorized by the NTEP Committee.

In accepting a Provisional Certificate of Conformance, the manufacturer shall agree in writing that:

a. Further evaluation will take place before a full Certificate of Conformance can be issued, and

b. Existing copies of the type will be modified or retrofitted if required.

As an example, a Provisional Certificate of Conformance may be issued after partial or limited evaluation, if ~~**there is**~~ an urgent need for use of the type **exists within the marketplace** and NTEP is temporarily unable to carry out a complete evaluation **due to an absence of evaluation criteria and/or procedures and/or appropriate equipment**. *See also Section K.*

j. If the changes ultimately incorporated into NCWM Publication 14 are more demanding and require additional evaluation, the type will be tested under those criteria. The applicant will be notified that the type must be submitted for evaluation against the new policies and/or procedures within a ninety (90) day period for the Provisional Certificate to remain active. The Provisional Certificate will be given a withdrawn status if the type has not been submitted within the ninety (90) day period or if the type fails the additional evaluation. If the type is submitted and successfully evaluated using the more demanding criteria, a full Certificate of Conformance will be issued.

k. Modifications made to the type as a result of the additional requirements may not be required retroactively to existing devices unless applicable retroactive requirements are incorporated into NIST Handbook 44.

The NTEP Director will re-evaluate Provisional Certificates of Conformance every two (2) years to determine if the situation or conditions necessitating the provisional status of the Certificate continue to exist. When these conditions no longer exist and an appropriate testing procedure and/or equipment become available to conduct a full NTEP evaluation of a device covered under a Provisional Certificate of Conformance, the NTEP Director will notify the device manufacturer giving the manufacturer a maximum of ninety (90) days in which to submit the required device(s) for NTEP evaluation. On successful completion of the evaluation, the Provisional Certificate of Conformance will be upgraded to a full NTEP Certificate of Conformance. If the device manufacturer finds it necessary to make a modification or change in the construction of the device, the devices manufactured under the Provisional Certificate of Conformance must receive the same change in order to be covered under the new Certificate.

Should the device manufacturer fail to submit the required device(s) for evaluation within the ninety (90) day time limit or if the device(s) fail to successfully complete the NTEP evaluation after the allowed number of attempts, the Provisional Certificate of Conformance covering the device(s) will be withdrawn. In such a case, devices manufactured under the Provisional Certificate of Conformance will no longer be suitable for commercial service.

Page: Administrative Policy, AP - 16

N.3. Inactive Status

An inactive Certificate of Conformance is a Certificate which was previously active, but the devices are no longer being manufactured ~~**or remanufactured**~~ for commercial applications **subject to local regulations or laws**; however, devices already manufactured, installed or in inventory, but not yet sold, may be used, sold, repaired and resold under inactive Certificates of Conformance.

Page: Administrative Policy, AP - 16

N.5. Withdrawn Status

The Certificate of Conformance remains valid unless withdrawn as the result of a specific determination by NTEP.

a. Reasons for Withdrawal

(1) Deficiencies in the type;

(2) Production devices do not meet type;

(3) Failure to pay costs incurred during the evaluatio**n;**

(4) Use of the NTEP certification mark without a license from NCWM;

(5) Misuse of the NTEP certification mark; or

(6) Failure to convert a Provisional Certificate of Conformance to a full NTEP Certificate of Conformance. (See also Section K.)

ITEM C. Clarification of Section L

Page: Administrative Policy, AP – 15

L. WHAT CONSTITUTES A "DIFFERENT" TYPE

With two similar types from a single manufacturer, a decision must be made whether to conduct one or two separate evaluation processes **and a decision must be made on one or multiple NTEP Certificates of Conformance.** The following guidelines should be followed:

Steve Malone, Nebraska, NTEP Committee Chair
Judy Cardin, Wisconsin, NCWM Chair
Jack Kane, Montana, NCWM Chair-Elect
Charles Carroll, Massachusetts
Randy Jennings, Tennessee

NTEP Technical Advisor: S. Patoray, NTEP Director

National Type Evaluation Program Committee

Appendix A

National Type Evaluation Technical Committee
Grain Analyzer Sector

August 22 - 23, 2007 – Kansas City, Missouri
Meeting Summary

Agenda Items

1. Report on the 2007 NCWM Interim and Annual Meetings A1
2. Report on NTEP Type Evaluations and OCP (Phase II) Testing A2
3. Review of Ongoing Calibration Program (Phase II) Performance Data A3
4. Proposed Change to the GMM Chapter of Publication 14 to Avoid Reducing a Previously Evaluated Approved/Pending Moisture Range Due to Lack of Data A3
5. Editorial Change to NIST HB 44, Section 5.56. (a) Table S.1.2. and Section 5.57. Table S.1.2. Column Headings to Add a Column for "Grain Class" A14
6. State Responses to Questions in Don Onwiler's Letter to Enhance State Participation in the Grain Analyzer Sector A16
7. Report on OIML TC 17/SC 1 IR59 "Moisture Meters for Cereal Grains and Oilseeds" A18
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12. Time and Place for Next Meeting A25

1. Report on the 2007 NCWM Interim and Annual Meetings

The Interim Meeting of the 92nd National Conference on Weights and Measures (NCWM) was held January 21 - 24, 2007, in Jacksonville, Florida. At that meeting the NTEP Committee accepted the Sector's recommended amendments and changes to the 2006 Edition of NCWM Publication 14. These changes appear in the 2007 Edition. For additional background, refer to *Committee Reports for the 92nd Annual Meeting,* NCWM Publication 16 – April 2007.

Amendments/Changes to the Grain Moisture Meters Chapter in the 2006 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
VII. Additional Type Evaluation Test Procedures and Tolerances for Grain Moisture Meters Incorporating an Automatic Test Weight per Bushel Measuring Feature	Add paragraph C. Tolerances For Test Weight per Bushel Calibration Performance.	GMM-16	08/06 Grain Analyzer Sector – Item 4

Amendments/Changes to the Near Infrared Grain Analyzers Chapter in the 2006 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
III. Accuracy, Precision, and Reproducibility Requirements	Amend to add criteria applicable to "multi-class" calibrations.	NIR-3 thru NIR-6	08/06 Grain Analyzer Sector – Item 6(b)

Two items of interest to the Grain Analyzer Sector were reviewed by the Specifications and Tolerances Committee (S&T) at the NCWM Interim Meeting and were forwarded as voting items for consideration at the NCWM Annual Meeting scheduled for July 8 - 12, 2007, in Salt Lake City, Utah.

Conference Item Number	Handbook 44 Section Number	Recommendation	Source
356-1.1	5.56.(a) Grain Moisture Meters	Modify Paragraph S.1.2. and Table S.1.2. to include minimum acceptable abbreviations for multi-class grain moisture calibrations.	Grain Analyzer Sector
357-1	5.57. Near Infrared Grain Analyzers	Modify Paragraph S.1.2. and Table S.1.2. to add criteria applicable to "multi-class" calibrations.	Grain Analyzer Sector

Diane Lee, NIST/OWM, reported that both items were approved by the Conference and will appear in the 2008 issue of Handbook 44, *Specifications, Tolerances and Other Technical Requirements for Measuring Devices.*

Steve Patoray, NTEP Director, reported that the NCWM Board of Directors adopted a more detailed policy on the use of the NTEP logo which is a registered trademark of NCWM. All users of the NTEP logo will now be required to sign a license agreement regarding its use. Additional information regarding changes to the NCWM Publication 14 Administrative Policy, the License Agreement, and guidelines on the use of the NTEP logo will be placed on the NCWM website.

Steve Patoray noted that conformity assessment does not affect Grain Analyzers at present. Conformity assessment remains an issue mostly of interest to the Weighing Sector.

2. Report on NTEP Type Evaluations and OCP (Phase II) Testing

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. In addition to regular grain moisture meter (GMM) calibration updates, evaluation of the Perten AM5100 GMM was completed and a certificate of conformance (CC) was issued in December 2006. She reported that the following device types are enrolled in the OCP (Phase II) for the 2007 harvest:

[Note: Models listed on a single line are considered to be of the same "type."]

DICKEY-john Corporation	GAC2000, GAC2100, GAC2100a, GAC2100b
DICKEY-john Corporation	OmegAnalyzer G
Foss North America	Infratec 1241
Foss North America	Infratec 1227, Infratec 1229
Perten Instruments	AM5100
The Steinlite Corporation	SL95

Ms. Brenner explained that although the CC for Seedburo Equipment Company's 1299A does not expire until July 1, 2008, Seedburo has elected not to enroll in Phase II for the 2007 harvest. Because there are still six devices in the program, the same as in 2006, the cost to manufacturers for Phase II will remain $7,730 per meter type.

3. Review of Ongoing Calibration Program (Phase II) Performance Data

At their August 2005 meeting, the Sector 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, Cathy Brenner, representing GIPSA, the NTEP Participating Laboratory for Grain Analyzers, presented data showing the performance of NTEP meters compared to the air oven. These data are based on the last three crop years (2004 - 2006) using calibrations updated for use during the 2007 harvest season.

Ms. Brenner pointed out that data on the DICKEY-john OmegAnalyzer G was not included in the comparisons because it had only been in the program for one year. Next year data on Perten's AM5100 will not be included for the same reason. 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.

She noted that no Durum samples in the 16 % to 18 % Moisture Range had been received since the 2002 harvest season. Dr. Richard Pierce, GIPSA, observed that Medium Grain Rough Rice data showed very few samples in the 14 % to 16 % Moisture Range while the adjacent ranges, both above and below, show nearly four to five times that number. No one was able to offer an explanation.

Cassie Eigenmann, DICKEY-john, offered the general comment that performance data appears to be getting much better; meters are closer to each other and closer to the air oven.

4. Proposed Change to the GMM Chapter of Publication 14 to Avoid Reducing a Previously Evaluated Approved/Pending Moisture Range Due to Lack of Data

Background: This is a carryover item from the Sector's August 2006 meeting. This issue was first raised at the Sector's 2005 meeting when Dr. Richard Pierce, GIPSA (the NTEP Laboratory) mentioned that the NTEP Laboratory was having problems increasing and decreasing "Approved" or "Pending" ranges of grain moisture meters depending on the data available in the most recent 3-year period. Most Sector members agreed that it didn't seem logical to reduce a range solely because data previously used to justify the range classification had to be dropped from the most recent 3-year period.

At their 2006 meeting, the Sector discussed guidelines for possible revisions to the GMM chapter of Publication 14 to address this problem. Two of the most significant guidelines considered for revision were:

1. Redefine "Pending" to be simply: "A new calibration that has not been validated by ongoing calibration data collected as part of the national calibration program."

2. The maximum upper moisture interval and the minimum lower moisture interval that can be given "Approved" status will be defined for each grain. These upper and lower limits are to be fixed values that do not change from year to year.

Most Sector members were generally in favor of either redefining or eliminating the "Pending" classification; however, this approach implied that another method had to be found to determine operating ranges, because "Pending" Moisture Ranges have traditionally been used to set the upper and lower moisture limits (operating range) for each calibration. Manufacturers objected to using a single fixed range for all types of devices, noting that some technologies were more accurate than others at high moistures. They preferred an option that would allow them to competitively extend the operating range and objected to being restricted by limitations in the Phase II sample collection system. Subsequent discussion led to the suggestion that the manufacturer should specify the operating Moisture Range for each grain. This range would NOT be listed on the Certificate of Conformance (CC), but would be used to determine when warnings would be displayed and printed to indicate that the displayed/printed moisture content of a sample being measured was beyond the operating range of the device. (See NIST Handbook 44, Section 5.56.(a)., paragraphs S.1.1.(f) and S.1.3.(c).)

The Sector decided that additional study was needed before a final recommendation could be made on this issue. The following points summarize the Sector's thinking at the close of their August 2006 meeting:

1. The "Pending Approval" classification will be eliminated. Operating ranges (upper and lower moisture limits) will be specified by the manufacturer. Operating ranges will NOT be listed on CCs.

2. The three most recent years of Phase II data will continue to be used to evaluate calibration performance.

3. Certificates will list a single "standard" Moisture Range for each grain calibration. These ranges will not vary from year-to-year. They will be the same for all instruments (see exception for new instruments). The "standard" ranges have to be wide enough to encompass the Moisture Ranges most commonly used in the market (to be determined) but narrow enough to assure that sufficient Phase II data will be available (over a three-year period) to:

   a. permit a new meter's calibrations to be "verified" over those ranges by the end of its third year in Phase II; and

   b. permit existing NTEP certified meters' calibrations to be "verified" over those ranges using the most recent 3 years of Phase II data when the new rules are first adopted.

4. Once a calibration has been "verified" a recalibration will not be forced due to lack of samples.

5. New instruments will be "evaluated" over the basic 6 % Moisture Ranges for corn, soybeans, and hard red winter wheat. Certificates for new instruments will continue to list the 6 % Moisture Ranges as the "evaluated" or "verified" ranges until sufficient Phase II data has been collected to allow the new instrument to achieve "verified" status for the full Moisture Range.

6. Outside the basic 6 % Moisture Range, tolerances that used to require a change in calibrations will continue to include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval.

[For additional background, see the Grain Analyzer Sector's August 23 - 24, 2006, Meeting Summary, Agenda Item 7.]

Discussion: To determine suitable "standard" Moisture Ranges, the NTEP laboratory reviewed historical OCP data for the crop years 2000 through 2006, noting the total number of samples in each 2 % moisture interval and each running 3-year period. Additionally, for each 2 % interval, they compared the basic approval tolerance (one-half the HB 44 acceptance tolerance) to the 95 % confidence interval tolerance that is based on the number of samples. For an example of the data reviewed, see Table 4.1 and Figure 4.1.

Table 4.1 Number of Phase II Corn Samples					
Moisture Interval	**3 Year Totals**				
	2000 - 2002	**2001 - 2003**	**2002 - 2004**	**2003 - 2005**	**2004 - 2006**
8 - 10	13	4	7	7	12
10 - 12	23	13	17	19	16
12 - 14	81	67	80	95	117
14 - 16	113	113	125	128	161
16 - 18	109	106	107	98	87
18 - 20	89	99	101	94	88
20 - 22	53	59	60	48	55
22 - 24	40	45	41	35	41
24 - 26	41	41	60	46	46
26 - 28	39	33	26	18	14
28 - 30	29	27	29	23	19
30 - 32	12	17	22	26	27
32 - 34	7	12	25	24	24
34 - 36	1	4	15	17	19
36 - 38	1	3	8	9	11
38 - 40	0	3	6	6	3
40 - 42	0	6	7	9	3
42 - 44	0	2	3	4	2
44 - 46	0	1	2	3	2
46 - 48	0	1	1	1	0

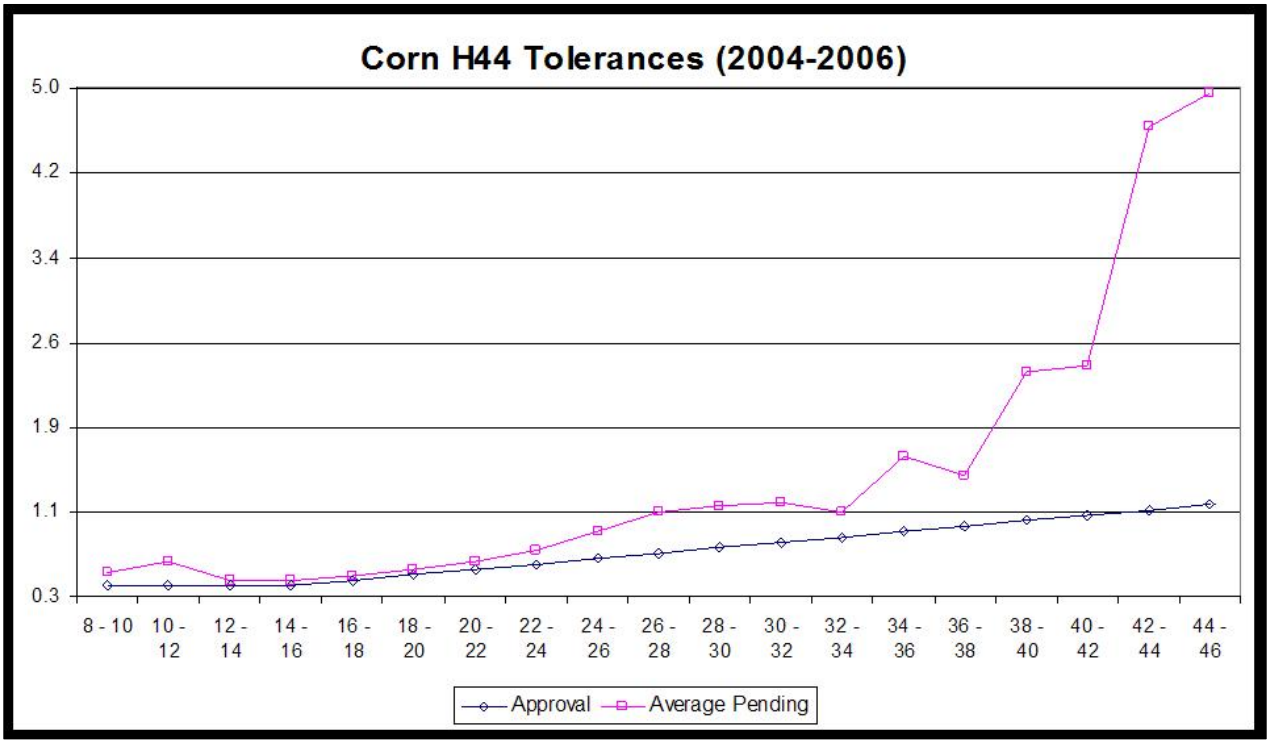

Figure 4.1 – Corn Moisture Tolerances

Recommendation (1): Based on the review of historical data, the NTEP laboratory proposed grain specific recommendations for the following Moisture Ranges and limits:

- **Basic 6 % Interval** – the Moisture Range used for Phase I Type Evaluation.
- **Standard Moisture Range** – the Moisture Range used for OCP Phase II calibration review.
- **Maximum Moisture Limit** – the upper moisture limit for calculating overall moisture bias in Phase II calibration review.

Grain-specific "standard" Moisture Ranges were selected to encompass the 2 % intervals where the majority of samples have been available and where the basic approval tolerance (one-half the HB 44 acceptance tolerance) was not significantly different from the tolerance that includes the application of a 95 % confidence interval.

These ranges and the percent of samples represented in each proposed Standard Moisture Range are listed in Table 4.2 along with the corresponding GIPSA sample collection Moisture Range.

While reviewing the historical data, a trend was noticed in the data for Oats. The bulk of the Oats data is from the 8 % to 14 % moisture interval instead of the 10 % to 16 % moisture interval presently specified in Publication 14. The NTEP lab proposes that the basic 6 % Interval for Oats be changed to 8 % to 14 % moisture for both moisture and test weight per bushel evaluation.

Table 4.2 Proposed Standard Moisture Ranges and Maximum Moisture Limits

Grain	GIPSA Moisture Handbook Range	Basic 6 % Interval	Proposed Standard Moisture Range	Proposed Maximum Moisture Limit	% N
Corn	8 % - 30 %	12 % - 18 %	10 % - 26 %	36 %	84
Grain Sorghum	8 % - 25 %	10 % - 16 %	10 % - 18 %	20 %	89
Durum Wheat	7 % - 20 %	10 % - 16 %	8 % - 16 %	16 %	89
Hard Red Spring Wheat	7 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	91
Hard Red Winter Wheat	8 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	95
Hard White Wheat	7 % - 20 %	8 % - 14 %	8 % - 14 %	16 %	95
Soft Red Winter Wheat	7 % - 20 %	10 % - 16 %	10 % - 18 %	20 %	91
Soft White Wheat	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	95
"All Class" Wheat	7 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	93
Wheat Excluding Durum	7 % - 20 %	10 % - 16 %	8 % - 18 %	20 %	94
Long Grain Rough Rice	7 % - 25 %	10 % - 16 %	10 % - 20 %	24 %	81
Medium Grain Rough Rice	7 % - 25 %	10 % - 16 %	10 % - 20 %	24 %	80
"All Class" Rough Rice	7 % - 25 %	10 % - 16 %	10 % - 20 %	24 %	85
Proposed change to Oats	8 % - 20 %	8 % - 14 %	8 % - 14 %	14 %	89
Soybeans	8 % - 20 %	10 % - 16 %	8 % - 18 %	22 %	95
Sunflower Seed	5 % - 25 %	6 % - 12 %	6 % - 16 %	20 %	86
Six-Row Barley	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	90
Two-Row Barley	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	94
"All Class" Barley	8 % - 20 %	10 % - 16 %	8 % - 16 %	18 %	91

Conclusion (1): The Sector accepted Recommendation (1) by consensus after the proposed Standard Moisture Ranges for both Medium Grain Rough Rice and "All Class" Rough Rice were changed from 10 % to 24 % to 10 % to 20 % to agree with the Standard Moisture Range for Long Grain Rough Rice. [Note: Table 4.2, above, incorporates these changes.]

Recommendation (2): Ongoing Calibration Program (OCP) Calibration Review

The NTEP Laboratory proposed the following guidelines for OCP calibration review:

1. The most recent 3 years of data will still be used to determine if the calibration performance is acceptable.

2. For each of their device types, manufacturers will be provided with a report listing all available data in 2 % moisture intervals. The report will indicate whether the calibration meets or exceeds the appropriate NTEP tolerances for each 2 % interval within the standard range and whether it meets or exceeds the overall moisture bias of ± .20 % moisture for all available data up to the Maximum Moisture Limit. (*Note: The current report indicates whether a calibration is "Approved," "Pending," or does not meet either tolerance for all available 2 % moisture intervals. The overall moisture bias in the current report is calculated using all available data.*)

3. The status of "Approved," "Pending," and "Not Available" would be removed from both the Certificate of Conformance (CC) and Publication 14. Instead, only grain moisture calibrations that have passed Phase I or meet the tolerances for Phase II data will be listed on the CC. All other NTEP grains will be listed on the CC as "calibration not available."

4. Manufacturer(s) will still be provided with all valid data collected during the OCP, even for samples exceeding the maximum limits.

Table 4.3 Current Long Grain Rough Rice Report Example

Moisture Level	No. of Samples	Average Bias	Standard	Approval Tolerance	Pending Tolerance	Status
8 - 10	42	0.04	0.31	0.40	0.48	*
10 - 12	90	0.04	0.17	0.40	0.43	*
12 - 14	50	0.11	0.20	0.40	0.45	*
14 - 16	70	0.12	0.34	0.40	0.47	*
16 - 18	190	0.07	0.31	0.45	0.49	*
18 - 20	140	0.11	0.37	0.50	0.55	*
20 - 22	68	0.03	0.39	0.55	0.63	*
22 - 24	44	0.15	0.56	0.60	0.74	*
24 - 26	8	0.24	0.54	0.65	1.01	*
26 - 28	5	0.87	0.97	0.70	1.62	**
ALL	707	0.09	0.35			

STATUS column:
* meets the NTEP approval tolerance
** does not meet NTEP approval tolerance, but meets Pending tolerance
*** does not meet either tolerance

Table 4.4 Proposed Long Grain Rough Rice Report							
Moisture Level	**No. of Samples**	**Average Bias**	**Standard**	**One-half HB 44 Acceptance Tolerance**	**Adjustment for 95 % Confidence Interval**	**NTEP Phase II Tolerance**	**Status**
8 - 10	42	0.04					
10 - 12	90	0.04	0.17	0.40	NA	0.40	*
12 - 14	50	0.11	0.20	0.40	NA	0.40	*
14 - 16	70	0.12	0.34	0.40	NA	0.40	*
16 - 18	190	0.07	0.31	0.45	.04	0.49	*
18 - 20	140	0.11	0.37	0.50	.05	0.55	*
20 - 22	68	0.03					
22 - 24	44	0.15					
To Max Limit	694	0.08	0.34			0.20	*
24 - 26	8	0.24					
26 - 28	5	0.87					
STATUS column: * meets the NTEP tolerance ** does not meet NTEP tolerance							

Conclusion (2): Recommendation (2) was accepted by consensus.

Recommendation (3): Certificate of Conformance

The NTEP Laboratory has proposed the following guidelines for preparing the Certificate of Conformance (CC):

The body of the CC will still report the moisture intervals used during the Phase I evaluation. It will no longer list either the "Approved Moisture Range" or the "Pending" Moisture Range. A grain will be listed only if it meets either of the criteria listed below:

Phase I – Passes either the Accuracy Test (corn, soybeans, hard red winter wheat) or the Moisture Bias Check (the "Other 12" NTEP grains) as currently specified in Publication 14.

Phase II – Meets both the NTEP Phase II tolerances applied to each 2 % moisture interval within the Standard Moisture Range and the NTEP Phase II tolerance for overall moisture bias for all available data up to the maximum moisture limits.

A comparison of the way a grain calibration appears on the current CC with the way it will appear on the proposed CC is shown in Table 4.5.

Table 4.5 Certificate Calibration Table Comparisons	
Current Table Example	**Proposed Table Example**
Corn Designation: Corn Calibration Version: 200705 Moisture Range – Approved: 8 % - 28 % Moisture Range – Pending: 8 % - 28 % Calibration Constants: K1 = 0001 K2 = 0020 K3 = 0300	Corn Designation: Corn Moisture Calibration Version: 200705 Calibration Constants: K1 = 0001 K2 = 0020 K3 = 0300

Discussion (3): Most of the discussion on the NTEP Lab's recommendations centered on the following questions:

1. Should the manufacturer be required to submit data to support the operating ranges (upper and lower moisture limits) claimed by the manufacturer?

2. Should the operating ranges (upper and lower moisture limits) claimed by the manufacturer be listed on the CC?

3. How should the "standard" Moisture Ranges be specified on the CC?

4. If a meter fails a single 2 % moisture interval outside the "basic" interval does the entire calibration fail or does the approval fall back to the "basic" interval?

Regarding question (1), some Sector members strongly favored requiring the manufacturer to submit some kind of data supporting the claimed upper and lower moisture limits for each grain, suggesting that big problems could result if data were not required to be submitted. There was concern that a manufacturer might use tempered grain to support an operating range. Others were opposed to requiring manufacturer data believing that it served no real purpose in that the Standard Moisture Ranges encompass the moistures over which the vast majority of grain is traded commercially. Furthermore, there would be no way that manufacturer data could be verified in the field (or in the lab without expensive testing) and that mandating its submission (and implied review by the NTEP lab) would require more NTEP lab effort than it was worth. Also, if the manufacturer decided to change a limit, modification of the CC would be required even if no changes had been made in the calibration. (Note: Manufacturers will still be required to submit data with their initial application for Type Evaluation.)

As for question (2), the suggestion that CCs carry the notation, "Evaluated over the Moisture Range of ___ % to ___ %, and certified for use over the range of ___ % to ___ %," was previously rejected by the Sector on the grounds that an NTEP certificate was not intended to be a marketing tool. It was pointed out that the functionality of displaying or printing a suitable warning message whenever a moisture limit is exceeded is verified by the NTEP lab in Phase I testing. Also, in practice when an elevator receives grain at harvest with an indicated "exceeds upper moisture limit" warning it typically ignores the warning message and receives the grain, accepting the indicated moisture value.

Regarding question (3), there was general agreement that the verified Moisture Ranges, whether "basic" or "standard" should be specified explicitly somewhere on the CC. The NTEP laboratory representative indicated that they were not overly opposed to including Standard Moisture Ranges in the body of the CC. However, they were opposed to including <u>any</u> Moisture Ranges on the calibrations page. The central argument was that the "basic" range would apply uniformly in year one and the "standard" range thereafter, and that the table of these ranges would be identical for all manufacturer certificates and would not need to be changed or updated other than including a statement indicating which verified range applies, i.e., "basic" or "standard."

Question (4) was answered quite simply. The entire calibration fails. The manufacturer is obliged to revise the calibration and re-predict moistures using the most recent three years of available Phase II raw data. Concern that calibrations might be failed unjustly or might not be able to be revised to "fit" available data were addressed by pointing out that Publication 14 changes would be proposed to disregard any 2 % interval containing less than five samples. Additionally, outside the "basic" Moisture Range a 95 % confidence interval will be added to the maximum tolerance.

Conclusion (3): With the understanding that manufacturer-supplied calibration operating ranges would not be specified in the certificate, but that verified ranges would be included in the body of the certificate rather than in the calibration table, the Sector agreed to Recommendation (3) by consensus.

Final Conclusion/Recommendation: Having agreed to accept the recommendations/guidelines of the NTEP Laboratory, subject to the changes noted in the above three conclusions, the Sector agreed by a vote of 11 to 1 to accept the amendments/changes to Part IV of the Grain Moisture Meter Chapter of *NCWM Publication 14* as originally proposed. The deletion from Part V of "Special Cases Dealing with Inadequately Represented Moisture Intervals" (except for a portion of "Special Considerations for Multi-Class Calibrations"), was accepted by

consensus. Details of the recommended amendments/changes, designed to avoid reducing a previously evaluated Approved/Pending Moisture Range due to lack of data in the On-going Calibration Program (Phase II), and the related changes to the 6 % moisture interval for Oats in Part VII and Appendix D are shown below.

IV. Tolerances for Calibration Performance

Calibration performance must be tested against established criteria at the following stages of the type evaluation process:

1. Evaluation of the calibration data supplied by the manufacturer with the application for type evaluation.

2. Evaluating instrument and calibration performance over the 6 % Moisture Range for corn, HRW wheat and soybeans (accuracy test discussed earlier).

3. Initial calibration approval for grains other than corn, HRW wheat, and soybeans.

4. Review of ongoing calibration data collected as part of the national calibration program (Phase II).

Calibrations for corn, HRW wheat and soybeans will be approved initially based upon type evaluation testing over a 6 % Moisture Range. The bias of all samples in a 2 % moisture interval may not exceed one-half of the Handbook 44 acceptance tolerance.

Calibrations for other grains will be approved initially based upon a bias check using a set of 10 to 12 samples referenced to the FGIS air oven laboratory and the FGIS official meter. "Multi-class" calibrations will be bias checked using 10 to 12 samples of each individual grain class included in the calibration. The maximum allowable overall bias between the meter under test and air oven is ± 0.4 for this bias check. An overall bias will be applied to the calibration in making approval decisions.

In order for a calibration to remain on the CC, the calibration must continue to meet tolerances for all 2 % moisture intervals in the Standard Moisture Range. This requirement is waived if a 2 % moisture interval contains fewer than five samples. For 2 % moisture intervals outside the basic 6 % Moisture Range, tolerances used to require a change in calibrations will include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval. The intent of applying the confidence interval is to avoid forcing a calibration change based upon insufficient data. After only one year of data collection, the number of samples in some intervals will be small, and the confidence interval may be as large as the tolerance limit. In this instance, the calibration would have to be extremely poor before a calibration change would be mandated. After the instrument has been in the calibration program for several years, the confidence interval should be reduced to approximately 0.05 and recommendations can be made with greater certainty. The latest three years of data will be used to make decisions regarding the need to make a calibration update.

Whenever a calibration update is made, the manufacturer shall re-predict moisture values using the three most recent years of available raw data collected by the Type Evaluation Laboratory.

Updated calibrations will be approved based upon the re-predicted moisture values. Tolerances will be one-half of the Handbook 44 acceptance tolerance and will be applied in 2 % intervals over the Standard Moisture Range. Tolerances will include the application of a 95 % confidence interval to the maximum tolerance for each 2 % moisture interval outside the basic 6 % moisture interval.

Additionally, all calibrations must meet the following requirements for up to three years of available data:

a. The difference between the average bias to air oven for all samples up to the maximum moisture limit in a given year and the average bias to air oven for any other year shall not exceed: 0.90 for corn; 0.80 for rice, oats, sunflowers and sorghum; and 0.70 for wheat, soybeans, and barley.

b. The range of year-to-year differences in bias to air oven shall not exceed the HB 44 tolerances for three or more consecutive 2 % moisture intervals. Only moisture intervals consisting of five or more samples per year will be considered for this comparison.

c. The average calibration bias with respect to air oven shall not exceed 0.20 % moisture, calculated using the most recent calibration and all available raw data collected within the last three years through the maximum moisture limit.

Failure to meet the requirements in item a., b., or c. above will cause a "No Longer Approved for Use" status to be assigned to the affected grain type(s) on the NTEP Certificate of Conformance (CC) for that instrument. Calibration coefficients will not be listed for any calibration failing these requirements.

Until calibrations for NTEP grains have been evaluated successfully, they shall not be used on NTEP instruments. Calibrations for any of the NTEP grain types that have not been evaluated (or that a manufacturer chooses not to provide) will be listed on the CC as "Not Available."

V. Criteria for NTEP Moisture Calibration Review

By grain, the basic 6 % Moisture Interval, Standard Moisture Range, and Maximum Upper Limit for moisture calibration review are:

Grain Type or Class	Basic 6 % Moisture Interval	Standard Moisture Range	Maximum Upper Limit
Corn	12 % - 18 %	10 % - 26 %	36 %
Durum Wheat	10 % - 16 %	8 % - 16 %	16 %
Hard Red Spring Wheat	10 % - 16 %	8 % - 18 %	20 %
Hard Red Winter Wheat	10 % - 16 %	8 % - 18 %	20 %
Hard White Wheat	8 % - 14 %	8 % - 14 %	16 %
Soft Red Winter Wheat	10 % - 16 %	10 % - 18 %	20 %
Soft White Wheat	10 % - 16 %	8 % - 16 %	18 %
All-class Wheat	10 % - 16 %	8 % - 18 %	20 %
Wheat Excluding Durum	10 % - 16 %	8 % - 18 %	20 %
Grain Sorghum	10 % - 16 %	10 % - 18 %	20 %
Long Grain Rough Rice	10 % - 16 %	10 % - 20 %	24 %
Medium Grain Rough Rice	10 % - 16 %	10 % - 20 %	24 %
All-class Rough Rice	10 % - 16 %	10 % - 20 %	24 %
Oats	8 % - 14 %	8 % - 14 %	14 %
Six-Row Barley	10 % - 16 %	8 % - 16 %	18 %
Two-Row Barley	10 % - 16 %	8 % - 16 %	18 %
All-class Barley	10 % - 16 %	8 % - 16 %	18 %
Soybean	10 % - 16 %	8 % - 18 %	22 %
Sunflower Seed (Oil)	6 % - 12 %	6 % - 16 %	20 %

The following criteria are to be applied along with criteria listed in Part IV above to verify calibration performance.

Special Considerations for "Multi-Class Calibrations

For Phase II, data for each individual grain class included in a "multi-class" calibration will be reviewed to determine what adjustments, if any, are needed.

Data for each individual grain class and the combined data for all grain classes included in the "multi-class" calibration will be reviewed to verify calibration performance for each individual grain class and the combined data.

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VII. Additional Type Evaluation Test Procedures and Tolerances for Grain Moisture Meters Incorporating an Automatic Test Weight per Bushel Measuring Feature

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B. Accuracy, Precision, and Reproducibility:

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Type of Grain	Moisture Range	Minimum Test Weight per Bushel Range	Criteria for Sample Selection
Corn	12 % - 18 %	54 - 58	a) No less than 8 samples should come from the lowest two-thirds of the 6 % Moisture Range. b) No less than 2 samples should come from the highest one-third of the 6 % Moisture Range. c) Samples should represent a distribution of Test Weights per Bushel (TW) that minimizes the correlation between TW and moisture.
Soybeans	10 % - 16 %	55 - 59	
Hard Red Winter Wheat	10 % - 16 %	59 - 63	
Durum Wheat	10 % - 16 %	59 - 63	
Soft White Wheat (except White Club)	10 % - 16 %	58 - 62	
Hard Red Spring Wheat (and White Club)	10 % - 16 %	58 - 61	
Soft Red Winter Wheat	10 % - 16 %	56 - 60	
Hard White Wheat	8 % - 14 %	60 - 64	
Two-Row Barley	10 % - 16 %	47 - 51	
Six-Row Barley	10 % - 16 %	43 - 47	
Oats	8 % - 14 %	33 - 39	
Sunflower Seed (Oil Type)	6 % - 12 %	28 - 31	
Long Grain Rough Rice	10 % - 16 %	43 - 47	
Medium Grain Rough Rice	10 % - 16 %	44 - 48	
Grain Sorghum or Milo	10 % - 16 %	58 - 62	

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Appendix D

Sample Temperature Sensitivity

(For grains/oil seeds other than corn, soybeans, & hard red winter wheat)

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Moisture Ranges and Tolerance for Sample Temperature Sensitivity (for the "Other 12" NTEP grains)		
Grain Type	**Moisture Range for Test**	**Tolerance Limit (Bias at Temperature Extremes)**
Durum Wheat	10 % - 16 %	0.35
Soft White Wheat	10 % - 16 %	0.35
Hard Red Spring Wheat	10 % - 16 %	0.35
Soft Red Winter Wheat	10 % - 16 %	0.35
Hard White Wheat	8 % - 14 %	0.35
Sunflower seed (Oil)	6 % - 12 %	0.45
Grain Sorghum	10 % - 16 %	0.45
Two-rowed Barley	10 % - 16 %	0.35
Six-rowed Barley	10 % - 16 %	0.45
Oats	8 % - 14 %	0.45
Long Grain Rough Rice	10 % - 16 %	0.45
Medium Grain Rough Rice	10 % - 16 %	0.45

5. Editorial Change to NIST HB 44, Section 5.56. (a) Table S.1.2. and Section 5.57. Table S.1.2. Column Headings to Add a Column for "Grain Class"

Background: At its August 2006 meeting, the Sector recommended changes to both the Grain Moisture Meter (GMM) and Near Infrared Grain Analyzer (NIR) sections of NIST HB 44 to include criteria applicable to "multi-class" calibrations. These recommendations were subsequently adopted by the NCWM for inclusion in the 2008 version of NIST HB 44.

Overlooked in the original recommendations were changes to column headings to more specifically indicate that the items listed in those columns include grain "types" or "classes." Following the NCWM Annual Meeting NIST conducted a review of the Specifications and Tolerances Committee's (S&T) Grain issues. At this review Diane Lee, NIST-WMD, mentioned the additional changes to Table S.1.2. to add "Class" to the headings. These changes were judged to be editorial changes not requiring Sector approval. Steve Cook of NIST, new NCWM S&T Technical Advisor, and Ms. Lee further modified the tables to improve their appearance and to clarify the relationship between "Type" and "Class" by adding columns for "Grain Type" and "Grain Class." Additional changes were made to the titles in tolerance tables to include "Class." The modified tables are shown below as they will appear in the 2008 version of NIST HB 44:

Accepted:

a. In Table S.1.2. of Section 5.56.(a) add a column for "Grain Class" as shown below.

Section 5.56.(a) GRAIN MOISTURE METERS

S.1.2. Grain or Seed Kind and Class Selection and Recording

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Table S.1.2. Grain Types and Multi-Class Groups Considered for Type Evaluation and Calibration and Their Minimum Acceptable Abbreviations		
Grain Type	***Grain Class***	***Minimum Acceptable Abbreviation***
Barley	*Two-Rowed Barley*	*TRB*
	Six-Rowed Barley	*SRB*
	*All-Class Barley**	*BARLEY*
Corn	---	*CORN*
Grain Sorghum	---	*SORG or MILO*
Oats	---	*OATS*
Rice	*Long Grain Rough Rice*	*LGRR*
	Medium Grain Rough Rice	*MGRR*
	*All-Class Rough Rice**	*RGHRICE*
Small Oil Seeds (under consideration)	---	---
Soybeans	---	*SOYB*
Sunflower seed (Oil)	---	*SUNF*
Wheat	*Durum Wheat*	*DURW*
	Soft White Wheat	*SWW*
	Hard Red Spring Wheat	*HRSW*
	Hard Red Winter Wheat	*HRWW*
	Soft Red Winter Wheat	*SRWW*
	Hard White Wheat	*HDWW*
	*All-Class Wheat**	*WHEAT*
	*Wheat Excluding Durum**	*WHTEXDUR*

[Note: Grain Types marked with an asterisk (*) are "Multi-Class Calibrations"]
[Nonretroactive as of January 1, 1998]
(Table Added 1993) (Amended 1995, 1998, and 2007)

b. In Table S.1.2. of Section 5.57. add a column for "Grain Class" as shown below.

Section 5.57. NEAR-INFRARED GRAIN ANALYZERS

S.1.2. Selecting and Recording Grain Class and Constituent

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Table S.1.2. Grain Types and Multi-Class Groups Considered for Type Evaluation and Calibration and Their Minimum Acceptable Abbreviations

Grain Type	***Grain Class***	***Minimum Acceptable Abbreviation***
Barley	*Two-Rowed Barley*	*TRB*
	Six-Rowed Barley	*SRB*
	*All-Class Barley**	*BARLEY*
Corn	---	*CORN*
Soybeans	---	*SOYB*
Wheat	*Durum Wheat*	*DURW*
	Soft White Wheat	*SWW*
	Hard Red Spring Wheat	*HRSW*
	Hard Red Winter Wheat	*HRWW*
	Soft Red Winter Wheat	*SRWW*
	Hard White Wheat	*HDWW*
	*All-Class Wheat**	*WHEAT*
	*Wheat Excluding Durum**	*WHTEXDUR*

[Note: Grain Types marked with an asterisk (*) are "Multi-Class Calibrations"]
[Nonretroactive as of January 1, 1998]
(Table Added 1993) (Amended 1995, 1998, and 2007)

6. State Responses to Questions in Don Onwiler's Letter to Enhance State Participation in the Grain Analyzer Sector

Background: In mid-February 2007, Don Onwiler, NTEP Committee Chairman, sent a letter to key weights and measures (W&M) officials seeking their responses to the following questions:

1. Does your jurisdiction inspect devices for accuracy in test weight determination? How is that working out? Are the test procedures and tolerances appropriate?
2. Has your jurisdiction performed inspections of grain analyzers for protein content of grain? How has that worked out? If you have not done these inspections, is there a reason why? Are there still hurdles to clear in NIST Handbook 44?
3. How are you getting along with the tolerances and test procedures for grain moisture?

This was done in an attempt to identify issues of immediate interest to state W&M personnel; reasoning that an agenda featuring issues that are of high concern to them would encourage participation by state W&M personnel. Also, a direct written request from NCWM for assistance on topics of high concern to them may be helpful when they approach administrators for travel funds.

Responses to Don's questions were received from six states: Colorado, Illinois, Maryland, Nebraska, North Carolina, and South Carolina. They are summarized below:

1. Four of the six states have been inspecting grain moisture meters (GMMs) for Test Weight per Bushel (TW) for several years. An additional state will begin this year. The sixth state has been unable to collect

samples that will test within the tolerances. (There may be a misunderstanding regarding samples used for testing.) Among the states presently inspecting GMMs with TW capability, one reported using a single SRWW sample for this test. Another reported that rejection rates for TW dropped from 47.7 % in 2004 to 12.27 % in 2006, with tests thus far in 2007 at 2.83 %. Cheryl Tew, North Carolina Department of Agriculture, suggested that it would be helpful if there were procedures for the preparation/selection of field test samples. All respondents presently inspecting GMMs for TW were of the opinion that test procedures and tolerances were appropriate.

2. None of the six states reported that they were performing inspections of NIR grain analyzers measuring protein in grain. Four of the six indicated that to the best of their knowledge their jurisdictions did not have any commercial meters performing protein tests. The fifth gave no reason, but said that they have "no plans at this time to conduct inspections on the protein content in grain." The remaining state, Colorado, gave several reasons why they were not inspecting NIR grain analyzers at present:

    a) **Statutory authority:** The Colorado Measurement Standards Act provides for the licensing of grain moisture meters but not for NIR grain analyzers.
    b) **Resources:** To implement a grain analyzer for protein (NIR) program, we would require more test samples, metrologist and field staff training, and additional inspection time. To date we have not researched the number of eligible devices in our state.
    c) **Industry input:** We have not yet contacted our industry partners for input.
    d) **Handbook 44, Section 5.57. paragraph N.1.2.:** Colorado interprets this paragraph to mean that constituent values be assigned to NIR test samples by GIPSA. We suspect that purchasing enough samples from GIPSA to test all the commercially used devices in Colorado would be cost prohibitive.

3. All six states had no problems with current test procedures and tolerances for grain moisture; however, several areas of concern were mentioned:

    a) **Testing with high moisture corn** – difficult to determine if a "failed" inspection is due to the meter or the sample.
    b) **Sample preparation** – some makes of meters agree well with air oven on a sample while other makes do not. Is the problem with the air oven or is this a normal difference between meter types?
    c) **Testing meter to unlike meter** – consistent problems approving one specific type and a large percentage of rejects of another type.

4. One state suggested that it might be helpful to do a round robin air oven comparison among laboratories.

Discussion: The Sector was surprised to learn that field inspections of NIR grain analyzers were not being performed. When the NIR Sector was founded, over 15 years ago, there was an indication that there was an urgent need to develop Handbook 44 Code covering near infrared protein analyzers. The scope of the Code was later expanded to include near infrared devices measuring additional grains/oil seeds and additional constituents. The Near Infrared Grain Analyzer Code was elevated to permanent status effective January 1, 2003.

Diane Wise, Colorado Department of Agriculture, estimated that there are 100 to 150 NIR instruments in Colorado, mostly used in grain elevators for determining wheat protein. She reported that letters have been sent out to survey industry needs and to seek participants in a pilot program for testing NIR units in the field.

A question was raised regarding how the standard reference samples needed for field-testing would be provided to the states. It was pointed out that, at present, states must provide the samples. Paragraph N.1.2. of the NIR Grain Analyzer Code of NIST Handbook 44 stipulates:

> **N.1.2. Standard Reference Samples. –** Reference samples used for field inspection purposes shall be clean and selected to reasonably represent the constituent range. These samples shall be selected such that the difference between constituent values obtained using the GIPSA standard reference method and an official GIPSA NIR grain analyzer does not exceed one-half of the acceptance tolerance shown in Table T.2. for individual test samples or 0.375 times the acceptance tolerance shown for the average of five samples.
> (Amended 2001and 2003)

Dr. Richard Pierce, GIPSA, did not immediately recall the origin of the traceability numbers, but suspected they came from the original Tentative Code that covered only wheat protein. He noted that they would not apply to soybeans.

The estimated cost of the NIR protein, Combustion Nitrogen Analyzer (CAN) as-is protein, and air oven moisture tests (based on the fees/charges listed in USDA/GIPSA/FGIS Directive 9180.74, dated February 12, 2007) are listed below:

GIPSA NIR Wheat Protein (at 12 % M.B.)	$10.00
GIPSA Lab Fees/test:	
CNA "as is protein"	$16.00
Air Oven Moisture*	$13.00
Total per sample	$39.00

(*required for reporting protein on a specified moisture basis.)

A minimum of five samples are required for field inspection of devices measuring protein in wheat. More than five samples might have to be submitted for testing to assure that at least five samples will meet the criteria specified in N.1.2.

Because of time constraints, further discussion on this issue was postponed to a future Sector meeting.

7. Report on OIML TC 17/SC 1 IR59 "Moisture Meters for Cereal Grains and Oilseeds"

Background and Discussion: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 17/SC 1. The Secretariat (China) is working closely with the United States and a small international work group (IWG) to revise OIML R 59 "Moisture Meters for Cereal Grains and Oilseeds." All committee drafts (CD) have been distributed to the United States National Working Group (USNWG), which for the most part is a subset of the NTEP Grain Analyzer Sector.

TC 17/SC 1 last met in September 2004 in Paris, France to review comments to the April 2004 2 CD of OIML R 59. Since that time, revisions and comments have been handled by mail. A 4 CD dated July 2006 was received from the Secretariat and circulated to the USNWG in August 2006. U.S. comments were returned to the Secretariat in November 2006. To assist in identifying and locating changes that had been made to the 3 CD for inclusion in the 4 CD, a copy of the collated comments to the 3 CD from all participating countries was forwarded to the USNWG in May of 2007.

The United States will host the next meeting of TC 17/SC 1 at NIST September 24 and 25, at which time comments on the 4 CD will be reviewed. Diane Lee, NIST/WMD, briefed the Sector on the status of comments to the 4 CD of IR 59 and brought the Sector up to date on plans for the TC 17/SC 1 meeting to be held at NIST.

Many of the 172 comments on the 4 CD of IR 59 dealt with formatting or editorial issues. Major issues brought up in the comments are summarized below:

Japan	Change scope from "fully automated digitally indicating" to "direct indicating" grain moisture meters.
	Remove "The minimum allowable sample size used in analysis shall be 100 g or 400 kernels or seeds, whichever is smaller" (or remove resistance type meters from the scope).
	Remove requirement that Meters must be equipped with a communications interface.
BIML	In order to have a complete harmonization of the measurements, it would be appropriate to define an International Reference Method based on ISO Standards. In 4 CD, the reference method for moisture content is defined by the national responsible body. Reference Methods should be those defined in International Standards (e.g., ISO 711, ISO 712, ISO 665…).
	Disturbance tests should include at least: • Radiated radiofrequency electromagnetic fields (OIML D 11 - 12.1.1), • Conducted radiofrequency fields (OIML D 11 - 12.1.2), • Electrostatic discharges (OIML D 11 - 12.2), • Bursts on supply lines (OIML D 11 - 13.5), • Surges on supply lines (OIML D 11 - 13.8), • Bursts on signal, data and control lines (OIML D 11 - 12.4), • Surges on signal, data and control lines (OIML D 11 - 12.5), • AC mains voltage dips short interruptions and voltage variation (OIML D 11 - 13.4), • Mechanical shocks (OIML D 11 - 11.2), • Damp heat cyclic (OIML D 11 - 10.2.2), • Low voltage of internal battery (OIML D 11 - 14.1)
BIML (continued)	Testing procedures should specify the number of instruments to be tested. Only one could be used for all the tests except reproducibility test which could specify that at least two samples of moisture meters shall be provided by the manufacturer for type approval testing. (Note: Many countries have objected to requiring that two instruments be submitted for all tests.)
	Requirements related to software should be included on the basis of OIML TC 5/SC 2 work. Please refer to the draft Recommendation R 76-1 (clause 5.5 for requirements and annex G for evaluation and testing procedures).
	Proposal: Manufacturers shall provide the technical documentation, a user manual and the description of the adjustment procedure. Other information may be provided such as information on performance tests, on calibrations that support a determination whether the design of the moisture meter meets the requirements of this Recommendation. The technical documentation shall include: • a list of the electronic sub-assemblies with their essential characteristics; • a description of the electronic devices with drawings, diagrams; • a description of the software and its characteristics (including identification numbers) and operation including a list of the data variables and the circumstances when they may be changed; • mechanical drawings; and • a plan for marking and sealing.

Ms. Lee asked Sector members (most of whom are also members of the USNWG) to review the country comments and provide any reply or concerns they may have with these comments by September 15, 2007. She will arrange a conference call with those who plan to attend the TC 17/SC 1 meeting to discuss some of the more important concerns with the standard.

[Editor's Update: During the September 24 - 25, 2007, TC 17/SC 1 meeting, the subcommittee members agreed to a number of changes to the OIML grain moisture Recommendation and addressed a number of the issues that were reviewed during the Sector meeting. The subcommittee agreed that:

- the scope would state that "This Recommendation applies to digitally indicating grain moisture meters that directly display moisture content,"
- ISO Standards were recommended but the reference method will still be determined by the national responsible body,
- the sample size of 100 g or 400 Kernels remains in the standard but the national authorities may determine otherwise,
- at least two instruments must be submitted for type approval.

Efforts were made at the meeting to harmonize the OIML grain moisture Recommendation and the protein Recommendation. The updated grain moisture Recommendation will be forwarded to the USNWG when updates to the Recommendation have been completed].

8. Report on OIML TC 17/SC 8 Draft International Recommendation "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. The first meeting of OIML TC 17/SC 8, charged with developing an International Recommendation (IR) for "Protein Measuring Instruments for Cereal Grain," was held in Sydney, Australia May 31 - June 1, 2004, to review comments received on an outline draft that had been developed earlier by Australia, the Secretariat of TC 17/SC 8. At that meeting, the scope of the recommendation was expanded to include wheat, barley, corn, soybeans, and rice, and changes were made to allow the national measurement authority to determine moisture basis, reference method, instrument monitoring process, and whether or not to test non-direct measuring devices.

The United States received a 2nd working draft (WD) of this document in August 2004, and a 3rd draft was received in May 2005. The USNWG members provided comments to these drafts relating mostly to parts of the document that appeared to be in conflict with U.S. metrological practice and procedures. In June 2005, a work group meeting was held in Berlin to address comments on the 3rd draft. Subsequently, a 1st Committee Draft (CD) of "Protein Measuring Instruments for Cereal Grain and Oil Seeds" dated May 2006 was forwarded to the USNWG with a request for comments by July 1, 2006. A second meeting of the work group was held in Ottawa, Canada in September 2006 to review comments received on the 1 CD. The main points of contention were: 1) Maximum permissible errors (MPEs), and 2) the standard reference method (Kjeldahl method vs. Dumas method). A small working group (WG) was established to consider appropriate MPEs for protein measuring instruments. A table of proposed MPEs (see table following) has been distributed to USNWG members for review and comment by June 25, 2007.

The United States will host the next meeting of the TC 17/SC 8 work group at NIST September 20 and 21, 2007, to attempt to resolve issues related to MPEs and the standard reference method.

Grain type	MPE (type approval) %	MPE (repeatability) %	MPE (in-field, verification, re-verification) %	MPE (reproducibility) %
Wheat	± 0.3	± 0.2	± 0.4	± 0.3
Barley	± 0.4	± 0.3	± 0.5	± 0.4
Rice	± 0.5	± 0.25	± 0.5	± 0.5
Corn	± 0.5	± 0.25	± 0.8	± 0.5
Soybean	± 0.55	± 0.5	± 0.8	± 0.55

Discussion: Diane Lee, NIST/WMD, reported that U.S. comments had been forwarded to Australia. The United States response included a table of the tolerances that are applied in the U.S. type evaluation program for protein measuring instruments and also field evaluation tolerances and an explanation of how the tolerances are applied. As of the August 2007 Grain Analyzer Sector meeting, no response had been received from Australia.

[Editor's Update: Australia's reply to comments on the Table of Proposed MPEs was received in the United States approximately one week after the Grain Analyzer Sector meeting. The reply was distributed to members of the USNWG requesting comments or feedback by September 15, 2007. In summary, Australia's reply indicated that they were firmly opposed to separate MPEs for repeatability and reproducibility and to the further separation of MPEs for particular instrument characteristics. However, they would support the inclusion of tight MPEs for repeatability, but they are yet to be convinced that there is any need for MPEs for reproducibility.]

[Additional Editor's update: During the September 20 - 21, 2007, TC 17/SC 8 meeting, Australia and other members of the subcommittee agreed to add additional tests and separate MPEs for these tests to the OIML Protein Recommendation. An updated OIML Protein Recommendation with changes from the September 20 - 21, 2007, TC 17/SC 8 meeting will be circulated to the USNWG when the United States receives the updates from the Secretariat.]

9. Report on OIML TC 5/SC 2 Draft "General Requirements for Software Controlled Measuring Devices" and NTETC Software Sector Activities

Background: This item was included on the Sector's agenda to provide a summary of the activities of OIML TC 5/SC 2 and the NTETC Software Sector. In 2004, all OIML TCs and SCs that were revising an OIML Recommendation were contacted to ensure that software aspects would be considered in revised Recommendations. All OIML Documents and Recommendations published since 1990 have been reviewed for terms and requirements related to software. A pre-draft of the document "Software in Legal Metrology" was circulated in October 2004 by the Co-Secretariats (Germany and France). When complete, this document will serve as guidance for OIML technical committees addressing software requirements in Recommendations for software-controlled instruments. NIST submitted U.S. comments on an early draft in February 2005. The 1st working draft (WD) of this document, titled "General Requirements for Software Controlled Measuring Instruments" was received in February 2006. U.S. comments to this WD were sent to the Secretariat in June 2006. A 1st Committee Draft (CD), addressing comments received on 1 WD, was recently distributed by the Secretariat. Copies (in pdf format) are available at http://www.oiml.org/download/cds.html.

The NTETC Software Sector held its first meeting in April 2006. At that time, several subcommittee work groups were formed to focus on various aspects relating to the use of software in today's weighing and measuring instruments. A second meeting was held in October 2006.

Discussion: Diane Lee, NIST/WMD, reported that Ambler Thompson of NIST-WMD has requested that any U.S. comments on 1 CD should be sent to him no later than September 7, 2007. The next meeting of TC 5/SC 2 is scheduled to be held at the PTB in Berlin, Germany during the week of December 3 - 7, 2007. Comments to 1 CD will be addressed at that time.

The NTETC Software Sector held its third meeting May 7 - 8, 2007, in Sacramento, California. Their next meeting is tentatively scheduled for the spring of 2008, either immediately preceding or following the meeting of NTEP laboratory representatives held at that time. Steve Patoray, NTEP Director, reported that the WELMEC document for Type P (built-for-purpose) and Type U (using a universal general-purpose computer) instruments is being used as a model for much of the Software Sector's proposed Code.

[Editor's Note: A history and overview of WELMEC activities towards the development of software requirements and software examination for measuring instruments under legal control can be downloaded from http://www.oiml.org/bulletin/2000/07/welmec.pdf. The complete WELMEC software document is available from http://www.welmec.org/publications/7-2en.pdf.]

10. Enhanced Trait Soybeans – Calibration Issues

Source: United Soybean Board (USB)

Background: Near infrared analyzers are becoming increasingly necessary for measuring soybean composition factors. In some cases, the factors are those covered by NTEP (protein and oil) and in others the factors are outside NTEP (individual fatty acids, sugar profiles, and others). Successful development of new traits requires uniform measurements across the entire developmental chain, from seed breeder to end user, a broader scope than covered by NIST Handbook 44. Additional instruments beyond those actually submitted for NTEP are used; collectively all instruments across the development chain need to agree, both on average, and, to the extent possible, from sample to sample.

Two United Soybean Board projects, Soybean Quality Traits (SQT) and Analytical Measurements and Marketing Standards Initiative (AMMS) have been developing a program that would generate a common soybean sample pool (with reference chemistry) that could be used to:

1. Modify existing instrument calibrations of all manufacturers (whether NTEP participants or not) such that differences among them are minimized.
2. Allow new manufacturers/technologies to enter the market efficiently.
3. Form the basis for a voluntary-participation proficiency program open to any user at any point in the development chain, many of which would not be subject to Handbook 44.
4. Allow rapid evaluation and introduction of tests for new traits, such as amino acids, phytate, fatty acid profiles. This would include the measurement of general market factors (protein and oil) on specialty grains that likely were not in the calibration pool of the NTEP calibrations.

The overall goal is to facilitate the introduction of new technologies and new traits in an organized way that supports the more direct supply chain markets developing from bioprocessing and biotechnology. Activities of the two USB projects could provide both support and sample materials for the NTEP program.

Discussion: Participants in the SQT and AMMS projects will share results and future concepts for cooperation with the Grain Analyzer Sector. Some of the topics include:

1. Should we bring new traits more quickly into the NTEP system, and if so, how can the USB programs assist?

2. Can we harmonize sample pools?
3. Is there a way to collaborate to gain participation in NTEP of instruments not necessarily designed/marketed for trade use, but that still are integral parts of the value chain (i.e., those designed for breeder use).
4. How to harmonize contractual trades as well as those subject to open market regulation - especially when NTEP factors may be measured along with others, but on specialty rather than general market grains.
5. How to update NTEP calibrations to measure the general market factors on new genetics not likely to be found in open market channels.

Amy Lopez, AOCS, manager of the USB SQT Analytical Standards Program, summarized efforts underway on the development and evaluation of analytical tools for the analysis of soybean quality traits. These efforts involve both wet chemistry and NIR analyzers. Work is being done with mulitple NIR companies to improve calibrations not only for protein and oil, but also for fatty acids and amino acids. Toward this end, a sample library, representative of many of the new genotypes, is being maintained. Assistance is offered to NIR manufacturers by supplying samples for calibration development. Calibration files developed in the SQT Analytical Standards Program (with yearly calibration updates) are offered to NIR device users. Also included is the opportunity to take advantage of a QC program in which the same prepared sample is sent to all participating laboratories to obtain specific analytical results. After performing the required analyses a participaing laboratory returns the results to AOCS which provides a statistical evaluation of the analytical results that compare, on a confidential basis, that laboratory's data with those of the other participating laboratories. A submitting laboratory's identity is known only to the submitter.

Dr. Nick Bajjalieh, Integrative Nutritition, Inc., outlined the approach the USB AMMS program was taking to develop marketing initiatives especially in the animal feed area.

Following the presentations, it was pointed out that most of the suggested topics were outside of the Sector's scope. However, several Sector members agreed that all NIR instruments in commercial use should be capable of providing in-tolerance results for protein, oil, and moisture when tested using the same soybean sample, whether that sample is a commodity-type soybean variety or a so-called "enhanced trait" variety. In other words, protein, oil, and moisture measurements using a "specialty soybean calibration" should agree with protein, oil, and moisture measurements using an NTEP soybean calibration. As more "enhanced trait" varieties are introduced, it is inevitable that some will find their way into commodity soybean channels, so harmonization of soybean protein, oil, and moisture calibrations between NTEP calibrations and "Enhanced Trait" calibrations should be a goal.

Dr. Pierce noted that GIPSA is expanding their NIR calibration database to include some specialty trait grains.

11. Prevention of Potential GMM Fraud – Expected Integrity among Moisture Meter Manufacturers

Source: DICKEY-john Corporation

Background: This item is intended to call attention to the potentially fraudulent practice of "calibrating" field instruments to read differently (higher) than like-type NTEP meters in the grain moisture meter (GMM) Ongoing Calibration Program (OCP) at GIPSA in Kansas City, thereby encouraging elevator owner-operators to purchase meters reading higher than the Federal Standard moisture meter. This issue has recently surfaced again due to seasonal grain movement in commercial corn markets.

For years, certain manufacturers or service agencies have been suspected of performing fraudulent electronic calibration adjustments to grain moisture meters before returning them to the field after repair or periodic routine maintenance. In fact, many like-type commercial moisture meters in field use have been noted to read (consistently) at the high end of the maintenance tolerance for moisture, thus allowing them to read several tenths to full percentage points higher in moisture, during commercial grain trade, than the GAC2100 Federal Standard meter. Grain purchased using a meter reading higher, inaccurate moisture values costs producers money in terms of inflated drying charges and excess shrinkage, thus benefiting the buyer. This same grain can then be sold by the buyer using a different meter (one that reads lower moisture) without incurring excess shrinkage or inflated drying cost, affording the buyer (now seller) an unfair profit at the cost of the producer.

This alleged fraudulent practice has been noted due to the fact that comparative OCP data for Corn identifying the Official Meter and listing the average bias for each NTEP meter type published by the NTEP Participating Laboratory for Grain Analyzers in 2005 and 2006 clearly show the Official Meter (the DICKEY-john GAC2100) to agree within 0.2 % moisture with any other NTEP meter up to 20 % moisture. Above 20 % moisture, the GAC2100 moisture indication increases to over 0.4 % moisture above other NTEP meters and peaks to 1.3 % moisture above most other meters at 27 % moisture. These data would indicate that most *field* meters should consistently read the same as the Federal Standard meter below 20 % moisture and below the Federal Standard meter at moistures higher than 20 %. However, state regulatory field test results for Corn (crop years 2005 and 2006) appear to indicate that the opposite may be true.

There are several NIST HB 44 requirements that speak to the maintenance and use of devices that are intended to prevent the user from taking advantage of the tolerance of any device. The general code in HB 44 includes the following pertinent paragraphs:

G-UR.4.1 Maintenance of Equipment
This paragraph states that, *"...Equipment in service at a place of business found to be in error predominately in a direction favorable to the device user shall not be considered maintained in a proper operating condition."* Although this does not speak directly to moisture meters, its intent is to ensure that when devices are calibrated, the calibration is set as close to zero as possible and is not set to one side of the tolerance in favor of the device owner.

G-UR.4.3 Use of Adjustments
This paragraph states that "…*Whenever equipment is adjusted, the adjustment shall be so made as to bring performance as close as practicable to zero value*."

Fundamental Considerations, NIST HB 44, paragraph 2.3. Tolerance and Adjustments
"…*Equipment owners should not take advantage of the tolerances by deliberately adjusting their equipment to have a value or to give performance at or close to the tolerance limit..."*

There are also provisions for avoidance of perpetration of fraud found in NIST Handbook 130 Uniform Laws and Regulations:

Section 15, Misrepresentation of Quantity
"*No person shall: sell, offer, or expose for sale a quantity less than the quantity represented, nor take more than the represented quantity when, as buyer, he/she furnished the weight or measure by means of which the quantity is determined, nor represent the quantity in any manner calculated or tending to mislead or in any way deceive another person."*

Section 22, Prohibited Acts
"No person shall use or have in possession for use any incorrect weight or measure..."

The above information is not intended in any way to accuse or insinuate that any particular meter manufacturer is knowingly participating in fraudulent practices, but is intended to provide information regarding the regulations designed to prevent such potential occurrences. Reviewing these regulations is intended to remind manufacturers and their service agencies that intentionally adjusting meters *to be in error predominately in a direction favorable to the device user* is considered a fraudulent practice, and also to remind weights and measures officials that meters adjusted in this manner *shall not be considered maintained in a proper operating condition.*

Discussion: Questions were raised about the validity of the 2002 study in Illinois, especially with regard to the use of high-moisture corn samples (above 22 % moisture), many of which were so wet that they had to be hand-shelled. Responding to the question, "How do you prove that production does or does not meet type?" Dr. Richard Pierce, GIPSA, noted that because different meter types react differently to the same sample, the only way to show conformance to type is by a meter-to-like-meter comparison where the "standard" meter is traceable to the meters in the NTEP Phase II program at GIPSA. Steve Patoray, NTEP Director, suggested that this may be an enforcement issue, not a conformity issue. As such, this type of issue should be discussed at a regional meeting. Co-Technical Advisor, Jack Barber, offered the opinion that it is a standardization or normalization issue. If a difference does

exist between the NTEP "standard" meters and a device in the field, it could be due to improper adjustment either by the manufacturer or by a service agency. It was suggested that states may need to ensure that there is a Registered Service Agent program in the state and that service personnel receive the proper training to ensure that adjustments made to the meter are appropriate.

The Sector took no action on this issue.

12. Time and Place for Next Meeting

The next meeting is tentatively planned for Wednesday, August 20 and Thursday, August 21, 2008, in the Kansas City, Missouri area. Meetings will be held in either the meeting hotel or the National Weather Service Training Center. 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 May 2008.

If you would like to submit an agenda item for the 2008 meeting, please contact Steve Patoray, NTEP Director, at spatoray@mgmtsol.com; G. Diane Lee, NIST Technical Advisor, at diane.lee@nist.gov; or Jack Barber, Technical Advisor, at jwbarber@insightbb.com by April 15, 2008.

Change Summary

Recommended Amendments/Changes to the Grain Moisture Meters Chapter in the 2007 Edition of NCWM Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
IV. Tolerances for Calibration Performance	Delete all text relating to "approved" and "Pending" categories. Amend/modify to show the revised criteria for calibration approval.	GMM-5 thru GMM-7	08/07 Grain Moisture Meter Sector Agenda Item 4
V. Criteria for NTEP Moisture Calibration Review	Add Table specifying "Basic 6 % Moisture Interval," "Standard Moisture Range," and "Maximum Upper Limit" for each grain type or class. Delete Cases I through VII dealing with inadequately represented moisture intervals. Modify "Special Considerations for 'Multi-Class' Calibrations."	GMM-7 thru GMM-10	08/07 Grain Moisture Meter Sector Agenda Item 4
VII.B. Accuracy, Precision, and Reproducibility	Change Oats Moisture Range from 10 % to 16 % to 8 % to 14 % in table.	GMM-13	08/07 Grain Moisture Meter Sector Agenda Item 4
Appendix D – Sample Temperature Sensitivity (For grains/oil seeds other than corn, soybeans, and hard red winter wheat)	Change Oats Moisture Range from 10 % to 6 % to 8 % to14 % in table titled "Moisture Ranges and Tolerance for Sample Temperature Sensitivity."	GMM-44	08/07 Grain Moisture Meter Sector Agenda Item 4

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Appendix B

National Type Evaluation Technical Committee
Measuring Sector

October 18 - 19, 2007 – Little Rock, Arkansas
Meeting Summary

Agenda Items

National Type Evaluation Technical Committee B2

1. Recommendations to Update NCWM Publication 14 to Reflect Changes to NIST Handbook 44 ..... B2
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   - C. Checklist and Test Procedures (LMD – 32) B2
   - D. Checklist and Test Procedures (LMD – 33, 34) B3
   - E. Checklist and Test Procedures for Specific Criteria for Vehicle Tank Meters (LMD – 44) B3

Carryover Items B6

2. Table of Key Characteristics of Products in Family Products Table for Meters B6
3. NTEP Checklist for Water Meters in Submetering Applications B10
4. NTEP Checklist for LPG Vapor Meters in Submetering Applications B11
5. Testing Meters Made of Different Metals B11

New Items B13

6. Revise NTEP Policy F "New Product Applications for Meters" B13
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8. Next Meeting B15

Additional Items as Time Allows B15

9. Temperature Compensation for Liquid-Measuring Devices Code B15

List of Appendices B16

Appendix A – Measurement Canada Approval Procedure for Electronic Registers and Printers B16
Appendix B – Measurement Canada Approval Procedure for Linearization Functions Incorporated in Measuring Instruments B16
Appendix C – Measurement Canada Approval Procedure for Automatic Temperature Compensator Electronic Type B16
Appendix D – Checklist and Test Procedures for Water Meters B16

National Type Evaluation Technical Committee

1. Recommendations to Update NCWM Publication 14 to Reflect Changes to NIST Handbook 44

Source: NIST/WMD

Background: The 92nd National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2008 Edition of NIST Handbook 44 (HB 44) and NCWM Publication 14. These items are part of the agenda to inform the Measuring Sector (MS) of the NCWM actions and recommend changes to NCWM Publication 14.

Recommendation: The Sector reviewed following changes to Publication 14 based on changes to NIST HB 44:

A. Checklist and Test Procedures (LMD – 28)

Code Reference: S.1.2.3. Value of Smallest Unit		
7.24.	The value of the quantity division shall not exceed the equivalent of one ~~pint~~ **0.5 L (0.1 gal) on retail devices with a flow rate of 750 L/min (200 gal/min) or less**.	**Yes ☐ No ☐ N/A ☐**

B. Checklist and Test Procedures (LMD – 30)

Code Reference: S.1.6.5.6., Display of Quantity and Total Price, Aviation Refueling Applications		
7.41.	**S.1.6.5.6. Display of Quantity and Total Price, Aviation Refueling Applications.** **(a) The quantity shall be displayed throughout the transaction.** **(b) The total price shall also be displayed under one of the following conditions:** **i. The total price can appear on the face of the dispenser or through a controller adjacent to the device.** **ii. If a device is designed to continuously calculate and display the total price, it shall be displayed for the quantity delivered throughout the transaction.** **(c) The total price and quantity shall be displayed for at least 5 min or until the next transaction is initiated by using controls on the device or other customer-activated controls.** **(d) A printed receipt shall be available and shall include, at a minimum, the total price, quantity, and unit price.**	**Yes ☐ No ☐ N/A ☐**

C. Checklist and Test Procedures (LMD – 32)

Code Reference: S.2.2.1. Multiple Measuring Devices with a Single Provision for Sealing		
9.6	A change to the adjustment of any measuring element shall be individually identified.	**Yes ☐ No ☐ N/A ☐**

Note: Examples of acceptable identification of a change to the adjustment of a measuring element include, but are not limited to:			
	(a)	a broken, missing, or replaced physical seal on an individual measuring element,	
	(b)	a change in a calibration factor for each measuring element,	
	(c)	display of the date of or the number of days since the last calibration event for each measuring element or,	
	(d)	a counter indicating the number of calibration events per measuring element.	
Note (2): S.2.2.1. will be removed in the 2010 edition of Handbook 44 when General Code paragraph G-S.8.1. Multiple Weighing or Measuring Elements with a Single Provision for Sealing becomes effective.			

D. Checklist and Test Procedures (LMD – 33, 34)

10. Discharge Lines and Discharge Line Valves			
Code Reference: S.3.1. Diversion of Measured Liquid			
This paragraph does not apply to devices that comply with Paragraph S.3.2.			
To prevent fraudulent practices, no means for which any measured liquid can be diverted from the measuring chamber or the discharge line of a device shall be available.			
A device may have two or more delivery outlets if there are automatic means to insure that:			**Yes ☐ No ☐ N/A ☐**
	(a)	liquid can flow from only one outlet at a time, and	
	(b)	the direction of liquid flow is definitely and conspicuously indicated.	
10.1.		Except as identified above, it shall not be possible to divert measured liquid from the measuring chamber or the discharge line of the device.	**Yes ☐ No ☐ N/A ☐**
10.2.		Two or more delivery outlets may be installed if there are automatic means to ensure that liquid can flow from only one outlet at a time, and the direction of flow for which the mechanism may be set at any time is definitely and conspicuously indicated.	**Yes ☐ No ☐ N/A ☐**
10.3.		Except as identified above, a**n** ~~**manually controlled**~~ outlet that may be opened for purging or draining the measuring system or for recirculating**, if recirculation is required in order to maintain the** product in **a deliverable state,** ~~**suspension**~~ shall be permitted **only when the system is measuring food products,** ~~**or**~~ **agri-chemicals, biodiesel, or biodiesel blends.** Effective **automatic** means shall be provided to prevent passage of liquid through any such outlet during normal operation of the measuring system and to inhibit meter indications (or advancement of indications) and recorded representations while the outlet is in operation.	**Yes ☐ No ☐ N/A ☐**

E. Checklist and Test Procedures for Specific Criteria for Vehicle Tank Meters (LMD – 44)

Checklist and Test Procedures for Specific Criteria for Vehicle Tank Meters
Code Reference S.2.5. Automatic Temperature Compensation for Refined Petroleum Products

24.	**Primary Elements**	
24.12.	**A device may be equipped with an automatic means for adjusting the indication and registration of the measured volume of product to the volume at 15 °C for liters or the volume at ~~(~~60 °F~~)~~ for gallons and decimal subdivisions or fractional equivalents thereof where not prohibited by state law.**	
24.13	**On a device equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of liters (gallons) compensated to 15 °C (60 °F), provision shall be made for deactivating the automatic temperature-compensating mechanism so the meter can indicate and record, if it is equipped to record, in terms of the uncompensated volume.**	**Yes ☐ No ☐ N/A ☐**
24.14	**A device equipped with automatic temperature compensation shall indicate or record, if equipped to record, both the gross (uncompensated) and net (compensated) volume for testing purposes. It is not necessary that both net and gross volume be displayed simultaneously.**	**Yes ☐ No ☐ N/A ☐**

26 Measuring Element		
Code Reference: S.2.2. Provision for Sealing		
26.3.	The adjusting mechanism shall be readily accessible to affix a security seal.	**Yes ☐ No ☐ N/A ☐**
Code Reference: S.2.5.4. Provision for Sealing Automatic Temperature-Compensating Systems		
26.4	**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 an automatic temperature-compensating system cannot be disconnected and no adjustment may be made to the system.**	**Yes ☐ No ☐ N/A ☐**
Code Reference: S.2.4. Zero Set-Back Interlock, Vehicle-Tank Meters, Electronic		
26.4**5**	Except for vehicle-mounted metering systems used solely for the delivery of aviation fuel, a device shall be so constructed that after individual or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for 3 minutes, the transaction must be completed before additional product flow is allowed. The 3-minute timeout shall be a sealable feature on an indicator.	**Yes ☐ No ☐ N/A ☐**

Code Reference S.2.5.5. Temperature Determination with Automatic Temperature Compensation		
26.6	**For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:** **(a) in the liquid chamber of the meter, or** **(b) immediately adjacent to the meter in the meter inlet or discharge line.**	**Yes ☐ No ☐ N/A ☐**

28 Marking Requirements		
Code Reference: S.5.6. Temperature Compensation for Refined Petroleum Products.		
28.4.	**If a device is equipped with an automatic temperature compensator, the primary indicating elements, recording elements, and recorded representations shall be clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15 °C for liters or the volume at 60 °F for gallons and decimal subdivisions or fractional equivalents thereof.**	**Yes □ No □ N/A □**

Field Evaluation and Permanence Tests for Metering Systems

(Section C. below is part of agenda item E.)

C. Field Evaluation and Permanence Test for Vehicle-Tank Meters, Except LPG, Cryogenic, and CO_2

The following tests are considered to be appropriate for vehicle-tank metering systems:

- Four test drafts at each of five flow rates.
- One vapor or air eliminator (product depletion) test.

Note: The normal test of a measuring system shall be made at the maximum discharge rate that may be anticipated under the conditions of the installation. Any additional tests conducted at flow rates down to and including one-half of the sum of the maximum discharge flow rate and the rated minimum discharge flow rate shall be considered normal tests. (Code reference N.4.1.)

Only one meter is required for the initial test, and after the test, the meter will be placed into service for the permanence test. The minimum throughput criterion for these meters is the maximum rated flow in units per minute x 2000.

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.

Tests of Automatic Temperature Compensating Systems (Code Reference T.2.1.)

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 % for mechanical automatic temperature-compensating systems; and

(b) 0.2 % 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.

Repeatability on Vehicle-Tank Meters (Code Reference T. 3.)

When multiple tests are conducted at approximately the same flow rate, 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. This tolerance does not apply to the test of the automatic temperature-compensating system.

Tests for repeatability shall 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.

Conclusion: The Sector agreed to forward Items 1A through E to the NTEP Committee for addition to Publication 14.

Carryover Items

2. Table of Key Characteristics of Products in Family Products Table for Meters

Source: NTEP Director

Background: Prior to the 2006 Sector Meeting the NTEP director, Steve Patoray, submitted the following comments for Sector consideration:

This is a developing item. Probably all of you reading this know more about this topic than I ever will. I have had discussions with several different people on this topic over the past several months. The Product Family Table in NCWM Publication 14 has been improved over the past several years. Currently, Mass Flow Meters have a key characteristic of specific gravity. PD meters have a key characteristic of viscosity. We list in the table numbers. However, these numbers are without reference. These are normally tied to some temperature. None is listed. Also, there is no cross reference for anyone to identify what products might fall within those ranges. I had a very difficult time finding specific information on even some very basic products that we normally use in evaluations. Several of the folks on the Sector helped locate various tables and charts to help ID these values. The information in these charts varies for the "same" product.

As an example of the potential confusion, there are both dynamic (absolute) and kinematic viscosity. The values for these are not the same for the same product, the unit for these, respectively, is CentiPoises and CentiStokes.

Quoting from the Engineering Tool Box: The viscosity of a fluid is highly temperature-dependent and for either dynamic or kinematic viscosity to be meaningful, the reference temperature must be quoted.

In the table on page LMD-3 there are numbers for both Viscosity and Specific Gravity but no temperatures. While S.G. may not be as temperature-dependent, some reference should still be cited.

To expand on this in the table in Pub 14 on page LMD-3, we have Test C which just states viscosity, while Test E states specifically kinematic viscosity. This may be very important for the device that uses these tests, but I would suggest that it be clarified and consistent. The use of just the term "viscosity" could be misinterpreted.

What I am proposing is that this group consider listing specific values for each of the typical products listed in this table. It may need to be a separate table. With this information, the NTEP evaluator would then be able to look to the chart and find the correct value for the critical characteristic. This could be listed on the CC and the range could clearly be identified. Additional products could be added as necessary when used for an evaluation. The main point is that the same values will be used.

Also, there are four different product groups for crop chemicals. Without further information, this can lead to confusion.

Trying to follow all of the special notes is very difficult.

There still seem to be product families that are based on some other factor that is not specified, not just viscosity or specific gravity (first page of table). Many of the different products' values overlap.

This should be enough to get the discussion started. I hope that I have been clear in the fact that I would like to see this table continue to be revised and if possible condensed.

At the 2006 meeting, the Sector discussed the NTEP director's concerns and explored the concept of having a table of additional product characteristics beyond what is currently in the Product Family Table. The Sector considered appointing a separate work group to develop this item for presentation and discussion at the next meeting. The Sector ultimately agreed that further development of key characteristics should be included in the tasks of the work group formed to develop a new Product Family Table approach, as discussed in the 2006 agenda Item 5.

Work Group (WG) Recommendation: The Product Family Table from Pub 14 has been reviewed and reorganized by the work group as shown below. The new table removes the named liquids and focuses on the influence factors for the mass, magnetic, positive displacement, and turbine flowmeters.

There remains a need to list the liquids describing the viscosity, specific gravity, and conductance.

Product Family	**Flowmeter Test Requirements**
Normal Liquids	**Magnetic Flowmeters – Use Test F** **Mass Flowmeters – Use Test B** **Positive Displacement Flowmeters – Use Test C** **Turbine Flowmeters – Use Test E** **Other Flowmeter Types – Use Test A**
Heated Products (above 50 °C)	**Mass Flowmeters – Use Test D** **Positive Displacement Flowmeters – Use Test D** **Other Flowmeter Types – Use Test A**
Compressed Liquids	**Mass Flowmeters – Use Test D** **Positive Displacement Flowmeters – Use Test D** **Turbine flowmeters – Use Test E** **Other Flowmeter Types – Use Test A**
Cryogenic Liquids and Liquefied Natural Gas	**Mass Flowmeters – Use Test D** **Positive Displacement Flowmeters – Use Test A** **Turbine flowmeters – Use Test D** **Other Flowmeter Types – Use Test A**
Compressed Gases	**Mass Flowmeters – Use Test D** **Not applicable to Positive Displacement Flowmeters** **Other Flowmeter Types – Use Test A** **Note: CNG is only included in Section 3.37 Mass Flow Meters of Handbook 44**

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 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 family within the viscosity range tested.

Test D – To obtain coverage for a product family: Test with one product in the product 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 the family with conductivity equal to or above the conductivity of the tested liquid.

Product Family	Typical Products[1]	Viscosity[5] (Centipoise) (Centistokes)	Specific Gravity[2]
Normal Liquids	Diesel Fuel[3], Distillate, Gasoline[4], Fuel Oil, Kerosene, Light Oil, Spindle Oil, Lubricating Oils, SAE Grades, Bunker Oil, 6 Oil, Crude Oil, Asphalt, Vegetable Oil, Biodiesel above B20, Avgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, Cooking Oils, Sunflower Oil, Soy Oil, Peanut Oil, Olive Oil, etc. Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, etc. Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene, etc. Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc. Tap, Deionized, Demineralized, Potable, Nonpotable Water Nitrogen Solution; 28 %, 30 % or 32 %; 20 % Aqua-Ammonia; Urea; Ammonia Nitrate; N-P-K solutions; 10-34-0; 4-10-10; 9-18-9; etc. Herbicides: Round-up, Touchdown, Banvel, Treflan, Paraquat, Prowl, etc. Fungicides, Insecticides, Adjuvants, Fumigants Dual, Bicep, Marksman, Broadstrike, Doubleplay, Topnotch, Guardsman, Harness, etc. Fungicides Micronutrients 3-10-30; 4-4-27, etc. Liquid Molasses; Molasses plus Phos Acid and/or Urea; etc. Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid, etc.	0.3 to 2500 0.44 to 2270	0.6 to 1.85
Heated Products (above 50 °C)	Bunker C, Asphalt, etc.		0.8 to 1.2

Product Family	Typical Products[1]	Viscosity[5] (Centipoise) (Centistokes)	Specific Gravity[2]
Compressed Liquids	LPG, Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc. Anhydrous Ammonia Note: If a meter is certified for anhydrous ammonia the same meter type may also be certified for LPG without further testing		0.1 to 0.77
Cryogenic Liquids and Liquefied Natural Gas	Liquefied Oxygen, Nitrogen, etc.		0.07 to 1.4
Compressed Gases	Compressed Natural Gas		0.6 to 0.8

Discussion/Conclusion: The WG presented their work to date and received comments and recommendations. One member stated his belief that the statement in the table that the Compressed Liquids Family was not applicable to positive displacement meters should be removed. If a manufacturer is able to produce a positive displacement meter that will measure compressed liquids appropriately, they should not be restricted from doing so. The WG will continue to develop the item for presentation and discussion at the next meeting. The WG will also look at identifying the units of measure and reference temperatures as appropriate for various products in the table.

3. NTEP Checklist for Water Meters in Submetering Applications

Source: NTEP Director

Background/Discussion: The NTEP Committee asked the MS to consider and develop a checklist for residential water meters. These devices will most likely be used for submetering. Several states have recently contacted NTEP regarding these devices. California already has evaluation and certification of these devices in their state. It is recommended that the Sector review the procedures used by California and rework them into a format acceptable to NCWM Publication 14.

Comments from the California NTEP laboratory:

I have found a Word version of the water meter checklist and test procedure and copied the specific section. This is used as an EPO for field enforcement, but the same guidelines are followed in type approval. Three tests at three flow rates are performed and repeatability is verified. The basic form can be printed and used for water meter tests. This follows HB 44 sections 1.10. and 3.36.

In type evaluation California uses a procedure (not a checklist) for the evaluator, which starts with an application review and other directives not pertinent to actual testing. An electronic form is available which is specific for the California provers. California follows the testing criteria of the EPO. The electronic form could probably be formatted to the Pub 14 format.

The California type evaluation checklist for Domestic Cold Water Meters was included as Appendix C of the 2006 meeting agenda.

At its 2006 meeting, the Sector agreed that the best approach for developing a Publication 14 checklist for water meters would be the utilization of a WG made up of technical experts and other interested parties. The members present at the meeting who volunteered to serve on the WG were: Dan Reiswig, California NTEP Laboratory; Jim Welch, Measurement Canada; and Rodney Cooper, Actaris Neptune. The Sector Chairman, Mike Keilty will also invite participation by water meter manufacturers AMR, Badger Meter, and Neptune water meter division.

At the time of development of the 2007 meeting agenda no information had been received from the WG. Following distribution of the initial agenda the California NTEP Laboratory submitted a draft checklist based on Handbook 44 that is used in their lab. The Sector reviewed the draft checklist to determine if it should be submitted to the NTEP Committee for inclusion in Publication 14 with or without modification as shown in Appendix D.

Conclusion: The Sector reviewed the checklist submitted by the California NTEP laboratory. The NTEP director stated that the draft checklist needs to be formatted for inclusion in Publication 14. The NTEP director and the California laboratory will convert the checklist into the proper format and submit it to the members with a ballot for approval prior to forwarding to the NTEP Committee for inclusion in Publication 14.

4. NTEP Checklist for LPG Vapor Meters in Submetering Applications

Source: NTEP Director

Background/Discussion: The NTEP Committee asked the MS to consider and develop a checklist for residential water meters. These devices will most likely be used for submetering. Several states have recently contacted NTEP regarding these devices. California already has evaluation and certification of these devices in their state. It is recommended the Sector review the procedures used by California and rework them into a format acceptable for NCWM Publication 14.

The California type evaluation checklist for LPG vapor meters was included as the Appendix D of the 2006 meeting agenda.

At its 2006 meeting, Sector agreed the best approach for developing a Publication 14 checklist for LPG vapor meters would be the utilization of a WG made up of technical experts and other interested parties. Dan Reiswig, California NTEP Laboratory, will provide a list of vapor meter manufacturers to be contacted for participation in the WG.

At the time of development of the 2007 meeting agenda no information had been received from the WG. At the meeting, the Sector reviewed a recommendation and considered changes to Publication 14 deemed appropriate.

Conclusion: After reviewing a draft presented by the California NTEP laboratory, the Sector agreed that "LPG" in the title should be changed to "Hydrocarbon Gas" so that the measurement of natural gas would be included. The California NTEP laboratory and the NTEP director will continue to develop this checklist for presentation and discussion at the next Sector meeting.

5. Testing Meters Made of Different Metals

Source: California NTEP Laboratory

Discussion/Background: The California NTEP Laboratory is conducting an NTEP evaluation of a family of meters using multiple products in different product families. The meter family includes meters made of aluminum and stainless steel. Because Publication 14 does not specifically address this scenario, the laboratory is asking for input from the Sector before testing starts.

At the 2006 meeting the Sector discussed the scenario described above. 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.

The MMA provided the following white paper for Sector consideration during the discussion:

Meter Manufacturers Association

Speaking as experienced manufacturers of PD Meters, Turbine Meters, and Mass Meters, it is our experience that the materials of construction do not affect the quality of measurement over the specified operating range of a particular metering technology, as these have been considered and accounted for during the design phase of the meter.

It is the manufacturer's responsibility to ensure that the meter meets type; additionally, material selection is the manufacturer's responsibility and is typically driven by the requirements of chemical compatibility with the liquid products that are being measured or by industry regulations (e.g., non-ferrous meters for aircraft refueling).

Materials are not selected or modified for reasons of accuracy. The market does identify and eliminate the inferior products through the normal surveillance process as well as the manufacturer's warranty process.

It is normal industry practice to include material varieties such as stainless steel, aluminum, cast iron, plastic, etc., into one meter; for example, some of our PD meters have cast steel outer housings, stainless steel bearings, cast iron rotors, anodized aluminum blades or cast iron blades or plastic blades. Non-ferrous aircraft meters will utilize aluminum cast components and SS bearings. We manufacturer turbine meters with stainless steel housings and aluminum rotors. The point being the measurement accuracy is a function of the manufacturing process, not the materials used.

It is not the intent of HB 44 to differentiate between measurement technologies, only the intended application.

Doesn't material selection fall under measurement technology?

Where do you draw the line on NTEP lab decisions on the materials of construction?

The manufacturers believe that the answer to the question is in the **LONG** history of meters themselves. There are hundreds of thousands of meters in service in the United States used for direct sales (e.g., home heating oil delivery, loading rack wholesale deliveries, aircraft refueling, agriculture chemical deliveries, etc.). These meters are verified routinely by the local W&M agencies, and if problems are detected (accuracy out of range) then they are taken out of service.

Summary: The meter manufacturers make determination of materials of construction. Meter manufacturers make the determination of what particular attributes of a meter enable it to be considered as part of a family.

Questions that need to be answered in order to make an informed decision:

1) Is there a real world problem that requires a solution by the inclusion of a new section specifically aimed at materials in Pub 14?

2) Is there an inequity in the market, facilitation of fraud?

One of the NTEP laboratories stated that during an evaluation of a mass flow meter the performance was different for two meters with different "tube" materials. Two mass flow meter manufacturers stated that if both meters were calibrated for the product being measured there should be no difference in performance due to "tube" material. Another laboratory stated that the permanence test of a meter conducted after 30 days is not a true indicator of long-term permanence. Another member stated that NTEP should be interested in testing key characteristics and metrologically significant components.

After further discussion at the 2006 meeting, the Sector agreed that the best approach for resolving the issue of what components are "metrologically significant" and require additional evaluation was to include the discussion and development of a proposal for Sector consideration in the tasks of the WG formed to develop a new Family Product Table approach, as discussed in agenda Item 5.

Recommendation/Discussion: At the time of development of the 2007 meeting agenda no information had been received from the WG, nor was any formal update presented at the meeting. One industry member suggested the item be withdrawn. The Sector technical advisor cautioned the group that withdrawing the item would not resolve the question as to whether or not a change in material used in the construction of a meter would require that the model be resubmitted for NTEP evaluation in order to maintain a valid CC. The manufacturers present at the meeting met following the conclusion of the first day's agenda and came back with some suggestions for resolving the problem. One suggestion was for the manufacturer to submit a drawing listing material used, similar to what is done with Underwriters Laboratories, Inc. (UL), who evaluates or tests what they consider to be the worst case. Another suggestion was to include ASTM specifications for the original material and any replacement material. Some of the NTEP laboratories believed that changing material constitutes a change of design and, therefore, requires a new model designation.

Conclusion: The Sector was not able to reach a consensus on this item, and it will be carried over for further development and consideration at the next Sector meeting.

New Items

6. Revise NTEP Policy F "New Product Applications for Meters"

Source: Endress and Hauser

Background/Discussion: Publication 14 Policy F addresses "New Product Applications for Meters". Criteria 1 and Criteria 2 apply to an initial evaluation of a device where a new product family is added. However, when a device has been repeatedly evaluated, the entire range of meter sizes should be covered—not just one size larger and one size smaller.

Researching past NTETC Sector reports, Endress and Hauser found little information regarding Policy F. One year there was a little discussion from an unidentified lab reporting that Policy F was a necessity for initially submitted devices. Criteria 2, which requires the new product fall within a less strict NIST Handbook 44 accuracy class than the most strict accuracy class covered by the existing CC, places a restriction upon devices previously tested and held to a high level of performance. Endress and Hauser recommended that Criteria 2 be deleted from Policy F.

The Sector was asked to consider the request to delete Criteria 2 from Policy F and develop a recommendation to the NTEP Committee.

The NTEP laboratories discussed this item thoroughly. The California lab submitted a proposal to reverse requirements 1 and 2 of Section F in Publication 14. The laboratories were concerned that accuracy class should not be the only consideration for adding a new product to a CC. The family products subgroups and a product's physical characteristics should also be considered when determining what products can be added to an existing CC based on the testing of one additional product.

At the Sector meeting, Endress and Hauser explained they recently experienced a problem with an NTEP laboratory's interpretation of Section F during an evaluation. The Sector discussed the issue at length and developed the chart shown below as a replacement to the current text in Section F.

F. New Product Applications for Meters

~~**If a manufacturer wants to add a new product to an existing family of meters, the following criteria will be applied:**~~

~~**1. If the accuracy class in NIST Handbook 44 for the new product falls within the same NIST Handbook 44 accuracy class or a more strict accuracy class than the most strict accuracy class covered on the Certificate of Conformance, the entire range of meter sizes will be covered for the product tested.**~~

~~**2. If the accuracy class in NIST Handbook 44 for the new product falls within a less strict NIST Handbook 44 accuracy class than the most strict accuracy class covered by the Certificate, the new product will only be covered for the meters meeting the requirements of paragraph E, Meter Sizes to be Included on a Certificate of Conformance.**~~

Meter Sizes Covered when Adding a New Product					
Certificate Covers	**Test**	**Tolerance Class HB 44**	**Product Family Pub 14**	**New Certificate Covers**	**Example** (to be added)
Application for new CC	**1 meter**	**Any Accuracy Class (Tolerance)**	**Any Product Family**	**Policy E.**	
Range of Sizes	**1 meter**	**Same or New Accuracy Class with greater tolerance**	**Same Product Family**	**Current Range of Sizes + Policy E.**	
Range of Sizes	**1 meter**	**New Accuracy Class with smaller tolerance**	**Same Product Family**	**Policy E.**	
Range of Sizes	**1 meter**	**Any Accuracy Class**	**New Product Family**	**Policy E.**	
Range of Sizes with 2 or more Accuracy Classes and[1] 2 or more Product Families	**1 meter**	**Any Accuracy Class**	**Any Product Family**	**Current Range of Sizes + Policy E.**	

If the product being added is from a family of products that has been previously subjected to the permanence test, then the requirement for a permanence test may be waived provided the initial test of the product being added meets following conditions:

a) the results of the initial test were not questionable; and
b) multi-point calibration may not be used to add the new product.

Conclusion: The Sector agreed to forward the proposed changes to the NTEP Committee for approval and inclusion in Publication 14.

7. Add Testing Criteria to NTEP Policy U "Evaluating electronic indicators submitted separate from a measuring element"

Source: California NTEP Lab

Background/Discussion: Section U allows for testing an indicator separate from a measuring element. Specific test criteria has not been developed for this section.

Recommendation: Develop and add specific criteria for testing an indicator separate from a measuring element for this section. California recommended using Canada's test criteria as a guideline to develop the tests as outlined in Appendices A, B, and C.

Conclusion: The Sector agreed the California NTEP laboratory should lead a WG to develop a specific test procedure for review at the next Sector meeting. Members of the WG are Dave Rajala (Veeder Root Company), Rich Miller (FMC Measurement Solutions), Maurice Forkert (Tuthill Transfer Systems), Dmitri Karimov (Liquid Controls), Rodney Cooper (Actaris Neptune), and Ralph Richter (NIST).

8. Next Meeting

Background/Discussion: The Sector discussed the date and location for its next meeting.

Conclusion: The Sector agreed that the 2008 meeting should be held immediately prior to the Southern Weights and Measures Association Annual Meeting that is tentatively scheduled for October 12 - 16, 2008, at the Doubletree Hotel in Atlanta, Georgia.

Additional Items as Time Allows

9. Temperature Compensation for Liquid-Measuring Devices Code

Source: NCWM S&T Committee

Background/Discussion: 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 as shown in Item 330-4 of the Final Report of the 2007 S&T Committee:

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. In response to these concerns and to encourage uniformity in applications where temperature compensation is being used, the Committee developed this proposal to provide design and performance requirements and testing criteria for retail metering systems that incorporate temperature compensation capability. The Committee was also concerned that if the current L&R Committee's proposed language for the Method of Sale of Commodities in NIST HB 130 was adopted, retail motor-fuel devices could be placed in service with no guidelines in NIST HB 44 for type approval and field testing. The L&R proposed language would permit the temperature-compensated sale of petroleum products at all levels of distribution.

At the Interim Meeting, the L&R Committee moved forward with a Method of Sale proposal containing permissive language for retail sales of petroleum products using automatic temperature compensation (see L&R Item 232-1). Although the Committee recognized that this S&T item was still not fully developed, it felt it could resolve the remaining issues in time for the NCWM Annual Meeting in July 2007; therefore, the Committee unanimously voted to make this item a "priority" Voting item as described in Section H of the Introduction of HB 44. The Committee

felt strongly that if the L&R item passed it was very important there be a corresponding S&T item that provided HB 44 guidance as described above. Following the Committee vote, the Committee chairman went before the NCWM Board of Directors (BOD) for their input. The BOD instructed the Committee to make this an Information item. Irrespective of the concerns about the timing of adoption of language in HB 130, after further deliberation the Committee concurred with the BOD and added the proposal to its agenda as an Information item. The BOD further informed the Committee of its plan to form a steering committee to provide guidance and give support to both the S&T and L&R Committees on temperature compensation issues. The Committee looks forward to working with the steering committee on this important issue.

This item is still in development. Below are some of the issues the Committee is currently working on.

Recorded Representations (S.1.6.7.): What, if any, abbreviations are acceptable for devices equipped with ATC (e.g., gal at 60 ºF)?

API Gravity: How should the API gravity be entered in the device and what API gravity should the inspector use during test? Should an average API gravity be used (national or state)? The Committee will work on gathering API data in order to resolve this issue.

Difference between Net and Gross (T.4.): Is the current tolerance of 0.1 % (electronic) appropriate for field-testing of retail devices with ATC? Will maintaining our current tolerances mean taking extra drafts to obtain a stable temperature? The Committee will gather data concerning temperature measurement.

The Committee will continue work on this item and will seek input from the regions and other interested parties in the weights and measures community.

Background/Discussion: The Sector was asked, if time allowed, to review the proposed changes to the LMD code and provide comments and recommend changes to the NCWM S&T Committee.

Conclusion: The Sector did not have time to review this item during the meeting.

List of Appendices

Appendix A – Measurement Canada Approval Procedure for Electronic Registers and Printers

Appendix B – Measurement Canada Approval Procedure for Linearization Functions Incorporated in Measuring Instruments

Appendix C – Measurement Canada Approval Procedure for Automatic Temperature Compensator Electronic Type

Appendix D – Checklist and Test Procedures for Water Meters

(Note: The appendices were distributed as separate documents with the 2007 Sector Agenda. Copies are available from NIST/WMD.)

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Appendix C

National Type Evaluation Technical Committee
Weighing Sector

September 6 - 9, 2007 – Sacramento, California
Meeting Summary

Agenda Items

Railway Track Scale Items C2

1. CLC Type Evaluation Tests on Railway Track/Vehicle Scales – Technical Policy (Carryover) C2
2. In-Motion Railway Track Scale Performance and Permanence - Technical Policy (Carryover) C4
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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		

Unless Otherwise Stated:
- "Handbook 44" (HB 44) means the 2007 Edition of NIST Handbook 44 "Specifications Tolerances, and Other Technical Requirements for Weighing and Measuring Devices"
- "Handbook 130" (HB 130) means the 2007 Edition of NIST Handbook 130 "Uniform Laws and Regulations in the areas of legal metrology and fuel quality."
- "Publication 14" (Pub. 14) means the 2007 Edition of NCWM Publication 14 - Weighing Devices - Technical Policy • Checklists • Test Procedures
- "Sector" means the NTETC Weighing Sector.

Note: NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.

Railway Track Scale Items

1. CLC Type Evaluation Tests on Railway Track/Vehicle Scales – Technical Policy (Carryover)

Source: 2006 NTETC Weighing Sector Agenda Item 13

Background: Please see the 2006 NTETC Weighing Sector Meeting Summary Agenda Item 13 for complete background information on this item.

During the 2006 NTETC Weighing Sector meeting, the NTEP Director, Stephen Patoray, noted that the proposed amendment to Publication 14 technical policies in Section 8.e. applies only to devices submitted for evaluation and could not be applied to previous evaluations without additional testing as it is currently worded. The Sector discussed the impact of the proposal to accept a vehicle scale application on an existing NTEP CC for railway track scales.

The NTEP director suggested, and the Sector agreed, that Publication 14 Section E. Modification of Type could be amended to update existing railway track scale CCs to include vehicle-weighing applications without additional testing if:

1. the section test on the railway track scale was performed with 100 000 lb of certified test weights or weight carts;

2. strain load tests were conducted during the original railway track scale evaluation;

3. the design of the load-receiving element (LRE) is no wider than 12 ft; and

4. the design of the weighing element is "beam and girder" design. (This item would not be applicable to other scale designs such as composite designs where the strength of the deck is dependent on several individual elements being combined in the design of the scale deck.)

Above items (1-3) were added to the 2007 Edition of Publication 14 as notes to technical policy paragraph 8.2.e.

To address Item 4, the Sector also recommended specific language for Publication 14 Section E. Modifications be developed as a carryover item based on the above discussion. Stephen Patoray, Todd Lucas, and Steve Beitzel agreed to review Section E and develop language to be considered by the Sector during its 2007 Annual Meeting.

For the 2007 Sector Meeting, the NIST technical advisor developed language for Publication 14 Section E. Modifications for a new paragraph 10 titled "Adding a vehicle scale feature or option to an active railway track scale CC" for review by the Sector. The Sector was asked to review and comment on the proposed new paragraph to determine if it was sufficiently developed to recommend that it be added to Publication 14.

During the development of this agenda item, Stephen Patoray and Steven Cook noted that several existing railway track and combination vehicle/railway track scales have the dump-through option listed on the CC without additional evaluation. Publication 14 Technical Policy E. Modification of Type paragraph 7 does not include railway track and combination vehicle/railway track scales in the language. Additionally, paragraphs 8 and 9 do not specify what kind of evaluations are to be conducted. The Sector was asked to review the proposed amendments to paragraphs 7, 8, and 9 developed by the technical advisor and:

1. agree with the proposal to include "railway track, or a combination vehicle/railway track scales" to the existing language;

2. recommend that either an initial or complete evaluation be conducted on the scales with composite construction for the "dump-through" option;

3. recommend that either an initial or complete evaluation be conducted on the scales with composite construction for the "rotary dump" feature/option; and

4. provide any additional comments and recommendations proposed by the technical advisor.

Discussion: The Sector reviewed the proposed language to amend Publication 14 Technical Policy Section E paragraphs 7, 8, and 9, and the new paragraph 10. The sector provided the technical advisor with additional suggestions to amend the proposed language in paragraph 10 to include a limitation that the LRE be no wider than 12 ft to be consistent with current technical policy in section 8.1.c. "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," and corresponding footnote 3 for scales with widths greater than 12 ft, which requires additional testing with procedures "addressed by NTEP management and the NTEP laboratories on a case-by-case basis."

The Sector also discussed the proposed revisions to Section E Modification of Type paragraphs 7 through 9 and provided input to the four recommendations.

Conclusion: The Sector agreed to recommend that Publication 14 Section E Modification of Type paragraphs 7 through 9 be amended and paragraph 10 be added to:

1. provide NTEP laboratories and applicants with guidelines to add a vehicle scale feature or option to an active railway track scale CC;

2. clarify that combination vehicle/railway track scales are included in paragraphs addressing the "dump-through" option;

3. clarify that a full evaluation is required to add a "dump-through" option for scales with other than the "beam and girder" design; and

4. clarify that a full evaluation is required to add a "rotary dump" option for all railway track scales with an active CC.

A copy of the recommended changes to Publication 14 Section E Modification of Type is in Appendix A – Recommendations to Publication 14 – Agenda Item 1.

2. In-Motion Railway Track Scale Performance and Permanence - Technical Policy (Carryover)

Source: 2007 NTETC Weighing Sector Agenda Item 15

Background: See 2006 Weighing Sector Agenda Item 15 (a) for additional background information on an NTEP appeal to the permanence testing requirements for evaluation of a separable in-motion indicator interfaced to railway track scale with an active CC. The Sector was unable to come to a consensus on whether to agree with the NTEP Committee or propose any changes to the permanence test requirements at its 2006 meeting. The Sector chairman asked for a vote to see if the Sector agrees with the NTEP Committee decision to waive permanence testing for indicators and controllers used in coupled-in-motion (CIM) railway track scale type evaluations.

- 8 Sector members voted *to support* the NTEP Committee decision.
- 9 Sector members voted *not to support* the NTEP Committee decision.
- 1 Sector member *abstained* from voting.

The Sector made no recommendation on this item since Don Onwiler reported that the NTEP Committee would reconsider its decision during their October 2006 meeting.

During the 2006 Fall meeting of the NCWM Board of Directors, the NTEP Committee (a subset of the board members) offered the Sector several options in its response to the 2006 Sector discussion on this item. A copy of the NTEP Committee's response was provided to 2007 NTEP Participating Laboratory meeting and to the full NTETC Weighing Sector. The NTEP Committee requested the Weighing Sector revisit this subject to review and discuss NCWM Publication 14, Digital Electronic Scales (DES) Section 68, Performance and Permanence Tests for Railway Track Scales Used to Weigh In-Motion, including the opening paragraph that states:

> Performance tests are conducted to determine compliance with the tolerances. The tests described here apply primarily to the indicating element. It is assumed that the weighing/load-receiving element used during the test has already been examined and been found to comply with applicable requirements. If the design and performance of the weighing/load-receiving element is to be determined during the same test, the applicable requirements for Railway Scales Used to Weigh Statically must also be referenced.

The NTEP Committee also suggested the Sector come to one of the following conclusions, or develop an alternate proposal:

1. The Sector may agree with the implication of this opening paragraph that a CIM controller may be used in conjunction with any weighing/load-receiving element that is NTEP certified for static weighing. If so, the NTEP Committee recommends Section 68 be modified to eliminate reference to permanence testing.

2. The Sector may determine that NTEP certification of a weighing/load-receiving element as a static scale is not sufficient for its use in commerce in a CIM weighing system. If so, the NTEP Committee recommends a new checklist be developed explicitly for the performance and permanence testing of a CIM weighing/load-receiving element and another checklist be developed explicitly for the performance evaluation of the CIM controller.

3. The Sector may determine that the NTEP certification for CIM weighing should be on an entire system, limiting use of the CIM controller only in connection with the weighing/load-receiving element(s) with which it underwent type approval. If so, the NTEP Committee recommends this clarification be provided.

Existing certificates would be amended providing this limitation of use and additional testing may be required to correctly identify and certify these system requirements.

At the May 2007 NTEP Laboratory meeting, the NTEP "field" labs met separately and reviewed the NTEP Committee's recommendation to the Weighing Sector. The "field" labs agreed with the NTEP Committee's first suggestion and provided a recommendation to modify Publication 14 DES, Section 68. The proposal makes Section 68 a checklist for the evaluation of a CIM controller. It recognizes that any weighing/load-receiving element with an NTEP certificate as a static railway track scale may be used in conjunction with the controller. The permanence testing of the weighing/load-receiving element will be verified when the checklist in Section 69 is completed. The "field" labs forwarded their recommendation to the Sector and also recommended that a definition for an "in-motion controller" be developed.

Discussion: The first part of the discussion was on the possible directions/options suggested by the NTEP Committee.

Steve Beitzel, System Associates, stated that in-motion devices should be NTEP evaluated and certified as a system. However, he does not agree with suggested option 3 from the NTEP Committee. Under option 3 nearly all installations would need to be evaluated since it requires the system be limited to the metrological elements approved during the evaluation and would not permit the mixing and matching of compatible elements unless they were listed on the certificate for the system. Darrell Flocken, Mettler Toledo, agreed that this option does not give the applicant flexibility to use compatible elements and suggested the Sector consider NTEP Committee options 1 and 2 or develop an alternative 4th option. Stephen Patoray, NTEP director, stated that a CC for a system is specific for the components or elements that were evaluated as part of the system. He asked what the purpose of the NTEP evaluation of a complete system is if it is determined that a previously certified static W/LRE is allowed to be substituted with other certified static W/LREs.

The Sector discussed option 2 in great detail. Following are the salient points of the discussion regarding tests/verifications in the controller and W/LRE checklists:

1. An in-motion system can be very long, and the controller has to resolve varying parameters (e.g., speed, direction, etc). The permanence test provides confidence the system (installation) can perform over a period of time.

2. Does the permanence test apply to the in-motion controller, W/LRE, and the entire system?

3. The permanence test should apply to just the controller since it must be able to compensate for both metrological and non-metrological signals from the W/LRE and other inputs from the installation in order for the controller to determine the proper time to establish a weight.

4. Track settling issues:
   a. Parts of the track may have settled or loosened causing unwanted signals that are received and compensated for by the in-motion controller;
   b. Could NTEP evaluate 20 to 30 days after installation? Too costly since the railroads would have to pay for an extra "placed-in-service" test in addition to the subsequent test or tests performed by NTEP (GIPSA);
   c. NTEP should consider verifying the approach foundation is installed according to the manufacturer's (and/or railroad's) recommendations;
   d. Performance problems cannot be resolved by recalibration; problems are typically caused by poor/inappropriate installation;
   e. Installation problems where the open track interfaces with the track supported by the concrete foundations are also a source of performance problems;
   f. The in-motion controller checklist would have to include testing to verify it can compensate or filter out unwanted signals. Can unwanted signals be simulated?

A straw poll of the Sector indicated the majority of the Sector agreed with option 1 of the NTEP Committee, though WMD representatives supported option 3 since it is a more complete evaluation. As a result of the straw poll, the Sector proceeded to discuss the NTEP "field" labs' proposal on the agenda.

Conclusion: The Sector agreed with the proposal from the NTEP "field" labs to eliminate the permanence test requirements in Publication 14 Section 68 and to limit the evaluation to "in-motion" controllers since the W/LRE is required to be evaluated as a static railway track scale in Publication 14 Section 69. Performance and Permanence Tests for Railway Track Scales Used to Weigh Statically. The Sector agreed to change the term "coupled in-motion" systems to "in-motion" systems since the type evaluation requirements apply to both coupled and uncoupled in-motion railway track scale controllers.

The Sector also asked the NIST technical advisor to develop a Publication 14 definition of the term "in-motion controller." The NIST technical advisor will investigate the possibility on making the definition broad enough to include controllers for other "in-motion" weighing devices such as dynamic monorail scales. The proposed language will be voted on by the Sector in a letter ballot prior to the 2008 NCWM Interim Meeting.

The Sector suggested minor changes to the NTEP "field" labs' proposed amendment to Section 68 as shown in Appendix A – Recommendations to Publication 14 – Agenda Item 2 and recommended the changes be incorporated into Publication 14.

3. Vehicle and Railway Track Scale NTEP Capacity – Technical Policy (New)

Source: Don Onwiler, Nebraska

Background: This item questions the necessity of basing the NTEP-certified capacity limits of vehicle and railway track scales on strain-load testing.

- In Nebraska's experience, performance problems are identified in type evaluations during section tests. By the time a strain-load test is conducted, problems related to performance have been identified and corrected. (Note: The shift test is usually conducted first because this test frequently reveals accuracy problems.)
- In section testing on vehicle scales, the evaluator is testing to at least 90 % of CLC. This provides a better test of the upper range capabilities of a scale than strain-load testing which distributes the load to multiple sections of the scale.
- For railway track scales, the minimum strain load is 200 000 lb, regardless of the desired nominal capacity. If a manufacturer requests to amend a CC for a higher capacity, Publication 14 Technical Policy 8.2.a. (for scales with a capacity greater than 200 000 lb) only obligates the evaluator to repeat the tests completed in the original evaluation since there are no differences in the required load used for the strain-load test.
- Handbook 44 provides formulas for maximum nominal capacity of these devices based on CLC and section capacities.

Strain-load tests may still have value in demonstrating the ability of the scale sections to interact with each other and sum together to provide accurate weighments when loads are distributed on the platform.

Nebraska recommends the following:

- Modify the Publication 14 DES Technical Policy for Scales to allow a maximum capacity for vehicle and railway track scales based on the formulas in paragraphs S.6.1. and S.6.4. in Handbook 44, and

- Modify the evaluation checklist for vehicle scales to provide guidance for minimum strain loads other than the traditional nominal capacity provided by the manufacturer or submitter of the device. For example, NTEP could perform a stain-load test to 160 000 lb or 80 % of the calculated maximum nominal capacity of the device under evaluation, whichever is less.

The Sector agenda included additional background from HB 44 Scales Code marking requirements, the 1994 and 2001 S&T Committee Final Reports, and the 2000 NTETC Weighing Sector Final Report discussing the original

justification and history on the development of CLC and section capacity and the ranges covered on the CC for scales with a capacity greater than 200 000 lb.

Conclusion/Discussion: The Sector reviewed the background information in the agenda and agreed there is no value in conducting an additional evaluation to increase the section and nominal capacity of a railway track scale CC since there is no difference in the tests to be conducted on the scale with increased capacities. The Sector recommended the NTEP director review the application under question to verify the request to amend the CC is consistent with existing CCs with similar parameters.

The Sector also 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.

Carryover Items

4. Recommended Changes to Publication 14 Based on Actions at the 2007 NCWM Annual Meeting

The NIST technical advisor, Steve Cook, provided the Sector with specific recommendations for incorporating test procedures and checklist language based upon actions of the 2007 Annual Meeting of the 92nd NCWM. The Sector was asked to briefly discuss each item and, if appropriate, provide general input on the technical aspects of the issues.

4.(a) G-S.2. Facilitation of Fraud

Background: See the Annual Report of the 2007 NCWM S&T Committee Agenda Item 310-1 for additional background information regarding the discussions to amend HB 44 General Code paragraph G-S.2. During its 2007 Annual Meeting, the NCWM agreed to amend HB 44 1.10. General Code G-S.2. in the 2008 Edition of HB 44 to clarify that the prohibition against facilitating fraud applies to electronic manipulation or alteration of electronically programmed and coded components of weighing and measuring devices.

Conclusion: The Sector agreed with the NIST technical advisor that no changes to Publication 14 are required to reflect the amended language in HB 44 paragraph G-S.2.

4.(b) G-S.5.6.1. Indicated and Recorded Representation of Units – Appropriate Abbreviations and Table 1. Recorded Representation of SI Units on Equipment with Limited Character Sets

Background: See the Annual Report of the 2007 NCWM S&T Committee Agenda Item 310-2 for additional background information regarding discussions to amend the 2008 Edition of Handbook 44 General Code paragraph G-S.5.6.1. and Table 1. to require abbreviations for SI units as specified in NIST Special Publication 811 "Guide for the Use of International System of Units (SI)" and HB 44 Appendix C – General Tables of Units of Measurement for both indications and recorded representations on new technology. The amendment would also continue to permit exceptions to those guidelines for older equipment with limited character sets.

Discussion: The Sector reviewed the changes to HB 44, Publication 14 DES Section 76, and HB 44 Appendix C page C-4 and noted that Publication 14 may be in conflict with HB 44 since Appendix C (page C-4) lists the abbreviation for "grain" (gr) and Publication 14 DES Section 76 List of Acceptable Abbreviations/Symbols lists different abbreviations for the word grain as "GRN," "grn," or "GN."

Conclusion: The Sector reviewed HB 44 Appendix C – General Tables of Units of Measurement and agreed the exceptions in Publication 14 Section 76 are appropriate since they are widely used in the marketplace and cannot be confused with other abbreviations in HB 44.

The Sector also agreed to recommend the changes to DES Section 12 and 76 as proposed by the NIST technical advisor as shown in Appendix A – Recommendations to Publication 14 – Agenda Item 4.(b).

4.(c) G-S.8.1. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing

Background: See the Final Report of the 2007 NCWM S&T Committee Agenda Item 310-3 for additional background information to add paragraph G-S.8.1. to the General Code of the 2008 Edition of Handbook 44. General Code Paragraph G-S.8.1 regarding the identification of adjustments to individual weighing or measuring elements is required when systems have multiple weighing or measuring elements with a single provision for sealing.

Conclusion: The Sector agreed to recommend the addition of new language to DES-10 in Pub 14 as proposed by the NIST technical advisor, which is shown in Appendix C (Agenda Item 4.(c).

4.(d) S.1.1.(c) Zero Indication (Marking Requirements)

Source: 2004 Weighing Sector Agenda Item 4 – S.1.1.(c) Zero Indication (Marking Requirements).

Background: See the Annual Report of the 2007 NCWM S&T Committee Agenda Item 320-1 for additional background information regarding the justifications for and against the proposed language to amend Scales Code paragraph S.1.1.(c) Zero Indication (Marking Requirements).

Discussion/Conclusion: The Sector reviewed the proposed amendments to Publication 14 to verify that automatic means are provided to inhibit a weighing operation or to return to a continuous digital indication when the scale is in an out-of-balance condition according to the requirement in paragraph S.1.1.(c) Zero Indication. The NIST technical advisor used the requirements and procedures from Measurement Canada's laboratory and field manuals to develop the proposed changes to Publication 14.

The Sector agreed the proposed amendments to Publication 14 deleted the references to requiring additional markings when a scale is capable of displaying other than a digital zero indication when the scale is in a zero balance condition. The Sector also discussed the proposed terms and definitions and agreed that the definitions for screen saver and sleep modes could be combined since the only difference between the two features was what was or was not displayed. The Sector also agreed to modify the proposed definition for the power save mode to clarify that it requires operator intervention in order to bring the scale back to normal operation.

The Sector noted the proposed amendment to the checklist did not identify all the ways a scales could automatically enter or exit these modes. Therefore, the Sector developed the following table to summarize when a scale can automatically enter the screen saver and power save modes and what was required by either the operator or the scale to exit the screen saver and power save modes to assure automatic means are provided to inhibit a weighing operation or return to a continuous digital indication when the scale is in an out-of-balance condition.

The Sector also recommended that the NIST technical advisor revise the proposed amendment to Publication 14 to address the conditions under which a scale goes into and comes out of one of these modes. The revised proposal will be balloted to the Sector and the final recommendation will be presented to the NTEP Committee prior to their meeting during the January 2008 NCWM Interim Meeting.

Summary of Screen Saver/Sleep and Power Save Mode of Operation				
Mode	**Display**	**Activated by**	**Exited by**	**Verified by**
Screen Saver/Sleep	i.e., Scrolling or other non metrological information, blank, or annunciator,	Period of time at gross load center of zero	Change in weight, i.e., no longer at gross load zero	***Accurate weights are displayed*** when: - weight is added to the LRE - weight is removed from the LRE, and - the LRE is disturbed by hand
		Period of time with a non changing load on the scale	Deliberate operator action (remove load off scale and rezero if necessary)	***No weights are displayed*** when: - weight is added to the LRE - weight is removed from the LRE, and - the LRE is disturbed by hand
Power save	Off/Blank	Period of time with no activity on the LRE (loaded or unloaded)	Pressing a button, or other deliberate operator action (e.g., turn on the scale, etc.)	***Accurate weights are displayed*** according to Publication 14 Section 53. Values Displayed, Temperature Conditions (Warm-up) Test Procedure 1 or 2

4.(e) Bench/Counter Scale Shift Test and Definitions

Source: 2006 NTETC Weighing Sector Item 3 (Carryover Item)

Background: See the 2006 Summary of the Weighing Sector Agenda Item 3 and the Annual Report of the 2007 NCWM S&T Committee Agenda Item 320-6 for additional background information regarding proposed language to amend Scales Code shift test definitions and procedures.

At the 2007 NCWM Annual Meeting, the S&T Committee believed there was sufficient support for this item with the correction of the references to Figures 1 and 2 in proposed paragraphs. Consequently, the Committee agreed to present the item for a vote and the item was adopted.

These adopted changes apply to all types of platform scales with fewer than three sections except for livestock, vehicle, and railway track scales, vehicle on-board weighing systems, and other scales listed as exceptions in Scales Code paragraph N.3.8. These changes include:

1. deleting paragraph N.1.3.1. Bench and Counter Scales and renumbering subsequent paragraphs;

2. changing the test load for the shift test from 50 % to a range of 30 % to 35 % of the scale capacity;

3. changing the shift test pattern for bench and counter scales to be the same as the current test pattern for the other scales listed in paragraph N.3.7. (formerly N.3.8.); and

4. providing guidance to the application of standards in a manner that is safe for the weights and measures inspector and will not over-concentrate the test load on the load-receiving element.

The major revision to the shift test procedures were made to shift test paragraph N.3.8 which was been renumbered to N.3.7.

Discussion/Conclusion: The Sector reviewed the background information and discussed the revisions to Publication 14 developed by the NIST technical advisor to amend shift test loads from one-half scale capacity to a range of 30 % to 35 % of the scale capacity, including a recommendation to "editorially" amend the references "bench and counter scales" to "platform scales with four or less load supports."

The Sector agreed with the proposed editorial changes throughout the Digital Electronic Scales checklist, changes to Section 31. Multi-Interval Scales and Sections 63 and 64 as shown in Appendix A – Recommendations to Publication 14 – Agenda Item 4(e) and recommends that they be incorporated into Publication 14.

5. Publication 14 Force Transducer (Load Cell) Family and Selection Criteria – Report of the Load Cell Work Group (WG)

Background: During its 2006 Annual Meeting, the Sector agreed with the suggestion for the NTEP Director to forward the proposal to change the Publication 14 Force Transducer (Load Cell) Family and Selection Criteria to holders of NTEP CCs for review and comment by December 1, 2006.

Discussion/Conclusion: The NTEP Director provided the Sector with an update to the status of this item. He reported that he had not received any objections or alternate recommendations on the proposed OIML R 60-based selection criteria (see Appendix C – Attachment to Agenda Item 5 for a copy of the OIML R 60-based load cell selection criteria) and that NTEP will soon receive load cell applications requesting NTEP CCs based on the evaluation of test data from international government laboratories certified to issue test data under the Mutual Acceptance Arrangement (MAA). Additionally, the Publication 14 language on the "selection of load cells" was not identified as an additional national requirement during the "Committee on Participation Review" process since the language in R 60 was developed by the United States; therefore, the load cells submitted for evaluation by the international laboratories will be selected using selection criteria in OIML R 60.

The Sector discussed options for establishing different load cell selection criteria for U.S. and international manufacturers (Publication 14–based criteria for U.S. manufacturers and OIML R 60-based criteria for international manufacturers). However, it was pointed out that this proposal would not be compatible with an existing load cell CC when there is a request to amend the CC. There was also a suggestion for a five-year "phase-in period" after which time existing CCs could no longer be updated using the 2007 Publication 14-based criteria.

Since there were only two load cell manufacturers at the Sector meeting, Darrell Flocken and Stephen Langford stated they would bring this issue before the SMA technical committee during their November 2007 meeting to discuss possible recommendations. Additionally, they will provide the NTEP director and NTEP Committee a report of the discussion and possible recommendation prior to the January 2008 NCWM Interim Meeting.

6. Report of the Tare Work Group

Source: NTEP Participating Laboratories (Carryover Item):

Background: See the 2006 NTETC Weighing Sector Meeting Summary Agenda Item 5, Tare on Multiple Range Scales, for additional background information on the earlier Sector discussions and WG developing items and recommendations.

During its 2006 Annual Meeting, the Sector further recommended the NIST technical advisor submit the Tare Work Group recommendations to the SWMA S&T Committee. These items were considered by the 2006 NCWM S&T Committee. Following is a brief recap of the recommendations and actions by the NCWM. Note there is additional background information available in the 2007 Final Report of the 92nd NCWM S&T Committee.

6.(a) Add New and Amended Tare Definitions and Tare Requirements

2006 Sector Recommendation: Add new and amended definitions to facilitate a uniform understanding of the terms already used in Handbook 44 (e.g., "tare mechanism," "tare," "net," etc.) in Handbook 44 Appendix D – Definitions.

NCWM Recommendation/Action: This item became 2007 NCWM S&T Committee Agenda Item 320-9 and was given "informational" status. The S&T Committee agreed that lengthy discussions on all of the tare proposals demonstrate that, although it is necessary to address tare, the matter is too complex to move forward without a more thorough review of all related proposals by the Weighing Sector and jurisdictions. Consequently, the Committee recommended this proposal and other related proposals intended to address tare features remain as Information Items for further review and development. The Committee also agreed that all tare-related items, when ready, should be presented for voting as a block.

Discussion: The NIST technical advisor has incorporated the changes to proposed definition of "tare mechanism" as recommended by the S&T Committee and updated the Tare Work Group Handbook 44 "Tare" recommendations based on its August 7, 2007, conference call. The Sector was asked to review the Handbook 44 "tare" recommendations and provide the Tare Work Group and the S&T Committee any comment or suggestions (see Appendix C – Attachment to Agenda Item 6 for a copy of the Tare Work Group recommendations).

Conclusion: The Tare WG has completed its work. The Sector agrees the majority of the proposed language is currently verified in Publication 14 with G-S.2. Facilitation of Fraud, S.2.1.6. Combined Zero/Tare(0/T) Key and S.2.3. Tare listed as the HB 44 code references. The WG did not change any existing HB 44 Tare requirements and recommended an amended definition for "Tare mechanism." The Sector also agreed with the WG that the highlighted items for calculated weights and the identification of preset tare weights go beyond what is currently evaluated by NTEP and recommends these items be split into 320-3B and 320-3C.

6.(b) Amend Scales Code and AWS Code Paragraph S.1.1.1. Digital Indicating Elements

2006 Sector Recommendation: Amend Scales Code and AWS Code paragraph S.1.1.1. Digital Indicating Elements to clarify that a scale can display a "center-of-zero" indication with a load on the platform, provided the indication has been zeroed by a tare mechanism while the scale is in the net mode of operation.

NCWM Recommendation/Action: This item became 2007 NCWM S&T Agenda Item 320-2 and was given "informational" status. This proposal was amended after the 2007 NCWM Interim Meeting to include language addressing the "center-of-zero" requirements to coincide with 2007 NCWM S&T Agenda Item 320-1, S.1.1.(c) Zero Indication; requirements for markings of indications for other than digital zero indications. Item 320-1 was withdrawn from the agenda making the changes to S.1.1.1.(a) no longer necessary.

At the 2007 NCWM Annual Meeting, the Committee heard testimony from the CWMA, NEWMA, WMD, and SMA stating that this item has changed from the original intent to verify that zero tracking could be operable in the net mode, to now include the addition of other language which alters the requirement even more. For example, in paragraph S.1.1.1.(a), stating "and" instead of "or" would make both requirements mandatory. Also, if "or" is used instead of "and," then this proposal lowers the current requirement of ½ e to ¼ e. The SMA further stated that the wording in the proposed paragraph (a) adds a dual requirement inconsistent with Canadian and OIML requirements. Therefore, the CWMA, NEWMA, and SMA recommended the proposal be moved back to informational for further consideration.

The Committee agreed with comments that the modifications to the originally proposed language in Publication 15 that now appears in Publication 16 significantly changed the original intent of the proposal. Additionally, the changes to the center-of-zero indication requirements are in conflict with OIML recommendations and Canadian requirements.

The Committee recommends the alternate proposal from the WMD in the Committee's Annual Report become a carryover item for the 2008 Committee agenda since that text is consistent with the intent of the original proposal from the NTETC Weighing Sector.

Discussion/Conclusion: The Sector reviewed the above information and agreed to support the WMD language as recommended in the 2007 NCWM S&T Committee Final Report on Agenda Item 320-2.

6.(c) Amend Scales Code Paragraph S.1.2.1. Weight Units

2006 Sector Recommendation: Amend Scales Code paragraph S.1.2.1. Weight Units and AWS Code paragraph S.2.1. Value of Division Units by adding a note that permits calculated net weights from multi-interval and multiple range scales to be in units other than 0, 1, 2, and 5 in order to maintain the accuracy of tare weights when the gross weights are in a weighing range with a larger scale division.

NCWM Recommendation/Action: This item became 2007 NCWM S&T Committee Agenda Item 320-3. During the 2007 NCWM Annual Meeting, the Committee heard comments from the CWMA and NEWMA supporting this

item with recommendations to change the word "value" to "division" and incorporating the SWMA recommendation to modify paragraph S.2.3.

NEWMA pointed out that the proposed amendment to S.1.2.1. appears to be permissive and not a requirement and asked if the intent was to prohibit multi-interval and multiple range scales from rounding indicating calculated net weights in scale divisions to only 1, 2, or 5 when appropriate or is rounding the scale divisions of 1, 2, or 5 still allowed? The WMD representative to the NCWM Tare Work Group stated that the intent was for the language to be permissive because there are a significant number of NTEP-certified devices in the marketplace that round tare values before calculating net weights.

The S&T Committee made several modifications to the proposal:

- to clarify the examples in the proposed note to paragraph S.1.2.1., and

- to clarify the SWMA proposed modification to the language in S.2.3. for an exception for multi-interval and multiple range scales only applies to the requirement that the value of tare shall be equal the value of the scale division.

The Committee also agreed that the words "scale value" should be changed to "scale division" and recommended the NIST technical advisor forward the amended proposal to the Tare Work Group and NTETC Weighing Sector for their consideration and comment.

During their August 7, 2007, conference call, the Tare Work Group agreed with the recommendations of the S&T Committee. The group also recognized that the proposed note in S.2.1. is inconsistent with OIML R 76. The Group also noted that the R 76 solution to similar examples is to indicate and record net weight calculations where that would be mathematically incorrect since the net weight display would be rounded to the value of d based on the internal resolution of the gross and tare weights.

Discussion/Conclusion: The Sector reviewed the above information and provided the S&T Committee with the following comments:

The Sector supports the item, however it believes there is insufficient information in the example. The example in the note for paragraph S.1.2.1. should provide the values for d or e for each weighing range or segment. Additionally, the second example should come up with a net value that is different than the first example.

The Sector did not have time to provide alternate examples. However, the NIST technical advisor agreed to work with the WWMA S&T Committee during their annual technical conference that immediately followed the meeting of the Weighing Sector.

6.(d) Amend Scales Code Tolerance Paragraph T.N.2.1. General

2006 Sector Recommendation: Amend Scales Code paragraph T.N.2.1. General and AWS Codes paragraph T.2.1. General to clarify that tolerances are also applied to net weight indications from a net indication of zero using any possible tare load.

NCWM Recommendation/Action: This item also became 2007 NCWM S&T Committee Agenda Item 320-3. The S&T Committee further modified the proposed formula for subtractive tare in subparagraph 1 that appears in the definition of "tare mechanism" to clarify that the combined net and tare net weight value should not exceed the permissible gross weight capacity.

The S&T Committee agreed that lengthy discussions on all of the tare proposals demonstrate that, although it is necessary to address tare, the matter is too complex to move forward without a more thorough review of all related proposals by the Weighing Sector and jurisdictions. Consequently, the S&T Committee recommended this proposal and other related proposals intended to address tare features remain as Information items for further review and development. The Committee also agreed that all tare related items, when ready, should be presented for voting as a block.

Discussion/Conclusion: The Sector reviewed the proposal to amend Scales Code paragraph T.N.2.1. and AWS Code paragraph T.2.1. and agreed that it has no additional comments to forward to the NCWM S&T Committee.

7. Minimum Size of Weight and Units Indications

Source: 2006 Weighing Sector Item 6 (Carryover Item)

Background: See the 2007 NCWM Specifications and Tolerance Committee Annual Report Item 320-4 "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.

This proposal was originally developed to address a growing problem with the readability of weight indications and the values that define transaction information. Field and laboratory officials indicate both are becoming increasingly smaller, as demonstrated in the 2006 Weighing Sector (Item 6) example of a weight display where the actual size of the weight values are 23 mm in height, but the unit of measurement (g) is 4 mm in height.

The status of this item was changed to Developing during the January 2007 NCWM Interim Meeting and was moved to Appendix A as Item 360-2: Developing Items Part 1, Item 1 Scales. During the 2007 NCWM Annual Meeting, the Committee was informed that the NTETC Weighing Sector will continue to develop this item.

At its 2007 NTEP Participating Laboratory meeting, the weighing device labs discussed this item and reviewed the equivalent recommendations in OIML R 76. It was noted that the minimum height requirement for the weight display applied to scales used in direct sale applications with a capacity of 100 kg or less. Additionally, it was noted that R 76 was written to apply to weighing devices that indicated primarily in SI units and that U.S. scales are frequently configured with both SI and inch-pound units. The labs agreed with the suggestion that the proposed language for the minimum height of the weight display be limited to scales used in direct sales with a capacity of 100 kg or less. The minimum height of the "units" indication only would be applicable to devices with external lb/kg switching capability since there would be no chance of facilitating fraud using the lb/kg switching capability.

The NIST technical advisor contacted a manufacturer about the labs' recommendation to revise proposed S.1.4.6. The manufacturer believed most products could comply; however, he could not speak for other manufacturers. He also stated that this did not address questions about the minimum size of an annunciator that points to a unit legend silkscreen on the scale next to the annunciator.

WMD believes there has been too little discussion on the clarity of the displays and annunciators and perhaps the proposal should include language similar to the following Handbook 130 Packaging and Labeling Regulation paragraphs:

- 8.1.2. Style of Type or Lettering states that the "declaration or declarations of quantity shall be in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphic material on the package, except that . . .," and

- 8.1.3. Color Contrast states that the "declaration of quantity shall be in a color that contrasts conspicuously with its background . . ."

Discussion/Conclusion: The NIST technical advisor amended the proposal to address the concerns and suggestions from the manufacturers, NTEP labs, and WMD. The NIST technical advisor did not develop any changes to the proposed definition of "Primary Indications" or to the proposed User Requirements and associated definition for "Minimum Reading Distance."

Manufacturers stated they prefer the proposed paragraph be written so the requirements apply to new NTEP applications instead of all devices manufactured after the effective date. They state that the cost to modify the design of the scale displays is not justified considering they have not received comments from their customers stating consumers are complaining that the size of the displays are too small. Additionally, the majority of the

Sector believed the current definition for "primary indications" in HB 44 is sufficient and that it be deleted from the proposal.

The Sector agreed to submit the following revised language to the regional weights and measures associations and the NCWM S&T Committee. The Sector also recommends deleting the proposed amendment to the definition of primary indications. Additionally, the Sector did not discuss or make any recommendations on the proposed user requirements and definition for "minimum reading distance."

S.1.4. Indicators.

S.1.4.6. Direct Sale Primary Indications – Size and Character. Scales designed for direct sale applications with a capacity of 100 kg (200 lb) or less shall comply with the following:

(a) All indications shall be indicated clearly and simultaneously.

(b) All indications and associated descriptive markings (e.g., lb, kg, gross, tare, net, etc.) shall be presented in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphics and shall be at least 2 mm ($^{3}/_{32}$ in) high.

(c) All indications and associated descriptive markings shall be in a color or shade that contrasts conspicuously with its background.

(d) All primary numeric indications displayed to the customer shall be at least 9.5 mm (0.4 in) high,

(e) All units and descriptors shall be at least 2 mm ($^{3}/_{32}$ in) high.
[Nonretroactive as of January 1, 200X]
(Added 200X)

New Items

8. Level Indicating Means – Out-of-Level Test

Source: Paul Lewis, Rice Lake Weighing Systems

Background: Rice Lake Weighing Systems reported there appears to be some confusion within the weighing industry regarding the interpretation of the level requirements in Handbook 44 and Publication 14. Several individuals believe the reference to 5 % refers to 5 % of 90 degrees. This would make the angle for the requirements 4.5 degrees. Therefore, some manufacturers are stating that their devices are "certified" for use out-of-level up to 4.5 degrees.

Handbook 44 Scales Code paragraph S.2.4. Level-Indicating Means. states:

> Except for portable wheel-load weighers and portable axle-load scales, a portable scale shall be equipped with level indicating means if its weighing performance is changed by an amount greater than the appropriate acceptance tolerance when it is moved from a level position and rebalanced in a position that is out of level in any upright direction by 5 % (approximately three degrees). The level-indicating means shall be readable without removing any scale parts requiring a tool.

Rice Lake reports that the reference to 5 % infers this is based on a grade or slope on a 180 degree plane. However, HB 44 does not clearly state it.

The NTEP director added that 5 % out of level means a rise of 5 % of a 100 % run or, in other words, the increase in height is 5 units for every 100 units of run. That means a 45 degree angle would be a 100 % slope. Using this you can calculate the angle by taking the arctangent of $^{5}/_{100}$ or 0.05 which is 2.86 degrees or, rounded off, 3 degrees.

Rice Lake submitted a proposal to amend Publication 14 Digital Electronic Scales Sections 56. Level-Indicating Means – Portable Scales, 63.4. Out-of-Level Test (If Applicable), and 71 Performance and Permanence Tests for Type Evaluation of Electronic Vehicle-On-Board Weighing Systems by adding a new note to clarify the requirement.

Sector members pointed out that the reference paragraph in HB 44 states that the scale's weighing performance cannot shift by an amount greater than the appropriate acceptance tolerance when it is "placed out-of-level by 5 % (approximately three degrees)." The exact conversion of 5 % to degrees is 2.86 degrees. As a result, it is possible that a portable scale without a level indicating means may comply with paragraph S.2.4. when placed out-of-level by 5 % and fail when placed out-of-level by 3°. Additionally, some Sector members believe this is more an interpretation issue that can be better addressed in EPOs, newsletters, etc., and that Publication 14 section 63.4. "Out-of-Level Test" uses the phrase "3° (or 5 percent)" instead of the language in HB 44 paragraph S.2.4. "5 % (approximately three degrees)."

The Sector agreed to recommend the language in Publication 14 be amended to be consistent with HB 44 and that a note be added to clarify that "5 percent refers to a 5 percent slope/grade."

9. Wireless Communication Information on the Certificate of Conformance (CC)

Source: Stephen Langford, Cardinal Scale Manufacturing Co./Detecto Scales Co.

Background: The Sector was asked to review the 2006 Summary of the Weighing Sector Agenda Item 9 for additional background information regarding the development and subsequent recommendation of the type evaluation procedures for wireless communication for metrological information.

Stephen Langford, Cardinal Scale Manufacturing Co./Detecto Scales Co. stated that in many instances the wireless component consists of a separate module connected to the serial port on the indicating device. This module is usually a purchased item although in some instances could be contained within the indicating device enclosure. Listing a specific make or model of the wireless module on the indicating device's NTEP Certificate of Conformance effectively limits the manufacturer to the use of that specific wireless module which was used in the original evaluation. This presents a problem when, the manufacturer is no longer able to purchase that particular device, a more cost-effective substitute is found, or a change is made in the module. In these instances, the manufacturer has no alternative but to have their device re-evaluated in order to maintain the wireless feature on the NTEP certificate.

Cardinal/Detecto also recommended that the wireless feature should be listed simply as a "wireless interface" rather than listing a specific model of wireless interface module. This would allow other types of wireless modules to be substituted without having to submit the device for further examination.

Cardinal/Detecto also stated that NTEP is concerned with the manner in which the indicating or transmitting device and the peripheral or receiving device respond to the loss or degradation of the wireless signal. NTEP is not concerned with the manner in which the data is transmitted or the frequency or type of modulation or encryption method. NTEP's primary concern, however, is that an incorrect weight value is not displayed, recorded, or otherwise interpreted as a valid weight. This is a function of the indicating device and/or the receiving device and not that of the wireless module. Therefore, the characteristics of the wireless module itself are not metrologically significant and, hence, do not need to be listed on the NTEP certificate.

Discussion: The Sector reviewed the background information and discussed the recommendation to amend the information on the NTEP CC to discontinue listing the specific model of the wireless interface and list the "wireless interface" as a feature or option on the NTEP CC.

The Sector also discussed the value of listing the specific model of the wireless communication device(s) on the scale CC since the majority of the devices are added onto the device as opposed to being an integral part of the scale. An example of an integral wireless communication scale is a crane scale where the load-receiving element is

remotely located from the user operator and indicating element. Alternatively, a crane scale can have wireless communication through a non-integral wireless device provided by the OEM or a third party supplier.

Manufacturers stated that it would be difficult for the holder of a CC to keep the CC up-to-date due to the frequent turnover of suppliers and models of wireless communication devices. A participating laboratory stated that using a wireless device is equivalent to a cable that connects separable elements. Other manufacturers stated that the non-integral devices not submitted for NTEP verification, including third party add-on devices, should be permitted provided the "wireless communication" of digital information was verified during type evaluation with a representative wireless communication device. The manufacturers also stated that this policy should not apply to wireless devices that transmit analog information from a W/LRE and the indicating element.

Conclusion: Based on the above discussion, the Sector stated that it is not necessary to indicate the specific model of a wireless device on a CC. Additionally, it was noted that Publication 14 does not require the model designation of the wireless device be listed on the CC. The Sector recommended the term "wireless interface" be listed as a "Standard Feature or Option" on the CC rather than listing the specific model of the wireless device. The Sector also recommended that the manufacturer and model of the wireless device be included in the "Test Conditions" portion of the CC to be consistent with the technical policy in Publication 14 Section B. Certificate of Conformance Parameters which states that only the features and options evaluated will be included on the CC.

During the development of the Sector summary, the NIST technical advisor reviewed Publication 14 to determine if changes were needed in case the Sector recommendation was in conflict with existing technical policies and checklist procedures. Although it appears there are no conflicts, the technical advisor recommended the following changes highlighted in underlined and shaded text to section 11.19 to facilitate consistent application of the Sector recommendation. The technical advisor believes that no changes to Publication 14 Section B. Certificate of Conformance Parameters and the procedures in sections 11.19.1 through 11.19.6 are required.

11.19. As used in this section, a wireless communications device may include weighing elements, load-receiving elements, indicating elements, recording elements (output), etc., with integral or separate add-on communication devices capable of transmitting and/or receiving metrological information between elements.

In order for the wireless communication capability to be listed on the CC, tThe following procedures shall be used to evaluate indicating elements that communicate digital weight and other information from separable load-receiving elements (LRE) or other peripheral equipment (i.e., PC or remote control) by means of a radio transmitter/receiver or other wireless communication devices. At least two (2) complete devices (e.g., crane scales), or a combination of separable indicating, LRE, and recording elements shall be evaluated to ensure:

11.19.1. . . .

10. Hopper Scale Design Parameters – Technical Policy

Source: NTEP Participating Laboratories

Background: Currently due to changes in some state requirements, hopper scales used in concrete batch plants need to be NTEP certified. This presents a concern as to what defines the "type" of hopper scales since there are a multitude of hopper scale variants in order to fit different installations and applications. Also, as the labs discussed, "What characterizes the parameters that will be covered on a single NTEP CC?"

With concrete batch plants in particular, there can be several different shapes, capacities, numbers of supports, method of load application (tension/compression), and permanent/portable designs, etc., all at one installation site.

No specific information is contained in Publication 14 regarding the tests required for these different parameters.

This item was discussed at the May 2007 NTEP Lab meeting. The labs were not in agreement as to the parameters that would define the device type. The labs were also not in agreement as to whether or not these different parameters should be contained on a single NTEP CC or each different parameter should be on a separate NTEP CC. The only parameter listed in Publication 14 is rectangular or circular hopper. There is no mention of number of supports, supports above or below (tension or compression), or several other parameters in Publication 14. During the meeting, the labs discussed this issue and could not reach consensus. The labs did develop a list of possible parameters to consider.

The following is a list of design (type) and installation parameters regarding Hopper Scales developed by the NTEP labs during their May 2007 Annual Meeting:

1. Hopper shape (rectangular, round or oval)
2. Load cell type (suspension vs. compression)
3. Portable vs. permanent installation
4. Mechanical
5. Electronic
6. Electro-mechanical
7. Number of supports
8. Material input and output mechanism
9. Accuracy class, no. of divisions, (based on information provided by the applicant)
10. Peripherals
11. Tolerance values (Class III, Class III L, Grain, Construction Material, ABWS, etc.)

Discussion: The NIST technical advisor reported on the NTEP laboratories' discussion just prior to the Sector meeting and noted the following items that need to be reviewed or addressed:

- Publication 14 only discusses some of the parameters for circular or rectangular designed hopper scales.
- The list of design parameters started by the labs should be reviewed and discussed.
- Publication 14 must cover the HB 44 differences between Class III, III L, and construction material hopper scales.
- How should the multiple variations of hopper scales in an installation used for a single evaluation be treated?
- How many certificates need to be issued if there are different types of scales in one installation?
- What tests need to be done?
- What can be covered in a single evaluation and CC?
- "Modification of type" technical policies are needed since there are scale retrofits that convert mechanical scales to full electronic scales and hoppers to hopper scales.
- How are current active CCs going to be treated when an application is received to revise the CC?
- CCs for only lever systems without the tank/hopper.

The Sector was asked to review and discuss these items (and others that may not be listed) and to provide some technical guidance to the NTEP director and the NTEP labs. The labs were asked to determine whether or not each parameter is a metrologically significant parameter and then develop recommendations to amend Publication 14, Section B.6. "Certificate of Conformance Parameters for Weighing Systems Using a Tank or Hopper Load-Receiving Element." accordingly.

The discussion was focused strictly on hopper scales since the parameters listed above are not common to other weighing devices.

Don Onwiler indicated that an increasing number of NTEP applications for hopper scales are being received, particularly for hopper scales used in concrete batch plants. Designs of these scales vary greatly by geometric shape, number and type of load cells, methods of support, etc. Mr. Onwiler added that the term "hopper scale" is insufficient to describe the "type." Publication 14 Administrative Policy states the definition of "type" as one that "positively identifies the design" and may vary in models and parameters. Publication 14 does not provide sufficient tests to address the various designs and fails to provide guidance on what needs to be tested. Additionally, questions arose regarding what information needs to be included on a CC. Mr. Onwiler is concerned that some CCs already issued have far too many things included based on the number devices submitted for evaluation. Many Sector members had strong opinions regarding different characteristics, e.g., number of supports, different shapes, etc.

Publication 14 includes a definition of the word "type." Don Onwiler interprets the definition to mean that each design is a type; for example, a rectangular hopper and a round hopper are different designs and therefore are also different types. The number of load cells and the kind of load cells used also affect design. Mr. Onwiler's objective was to define design so we know how much to include on a single CC since the CC must be limited to a single design.

Stephen Patoray agreed these different parameters mentioned by Mr. Onwiler need to be tested, yet Publication 14 does not indicate this. If these examples are determined to be a different design or type, then a separate CC is needed for each. However, a single installation being evaluated can have several hopper scales that differ in many of the above parameters. NTEP needs guidance. Also, how many CCs are issued in this kind of example?

No one disagreed about the test to be performed. However, there is no guidance on what is to be listed on the CC, what describes a family, and which sample in the family is selected for evaluation.

Conclusion: Since there was no specific recommendation submitted on this agenda item, the Sector could not come to a consensus on the questions raised on this item and suggested that a hopper scale work group be established to (1) define what is a type, and (2) determine selection of device(s) to be submitted for evaluation, modifications that can be made to the type, and whether or not multiple types can be listed on a CC. Stephen Patoray and Don Onwiler volunteered to develop a specific proposal to be considered by the Sector during the 2008 NTETC Weighing Sector Annual Meeting.

11. Method of Sealing – Set-up and Verification of Calibration/Configuration Access

Source: NTEP Director

Background: At the 2003 NTEP Participating Laboratory meeting, the participating labs reported examples where a device could be sealed with a physical security seal while the device had been configured with access to external means to change calibration and configuration parameters. The labs have been using HB 44 General Code paragraph G-S.2. Facilitation of Fraud to require the applicants to correct this problem.

The discussion in 2003 was to address a specific deficiency that was found in several devices at that time. At least one device manufacturer attempted to address this deficiency with changes to the device function. This device was evaluated and based on the input from the NTEP lab, the NTEP Committee chair and the NTEP director; it was determined that this device met the requirements. Currently several NTEP labs do not believe that this "fix" is acceptable.

It was requested that the Sector review the item from the NTETC Weighing Sector Annual Meeting September 11 - 13, 2003, in Fresno, California, Final Summary, Item 18. Physical Security Seals on Scales with External Calibration Capability.

There is still disagreement among the NTEP labs on this topic. There may be a problem with Pub 14 since the current procedures and type evaluation requirements are not fully supported by HB 44 since the changes were made to Pub 14 in the anticipation of changes to HB 44 and the changes to HB 44 were never submitted.

Discussion: There is disagreement among the NTEP labs on this topic. If you review the 2003 item from the Sector, changes were made to Pub 14 in the anticipation of changes to HB 44. The changes to HB 44 did not happen. There may be a problem with Pub 14 since the current procedures and type evaluation requirements are not fully supported by HB 44.

Stephen Patoray described the issue and indicated there were numerous scales that NTEP had already evaluated with this feature (i.e., an internal jumper that if left installed after calibration would allow someone to go into a set-up mode whenever they desired). The devices in question had a "calibration" switch that enables external keyboard calibration and configuration adjustments. The operator's manual clearly stated that the switch must be returned to its initial position to disable the external adjustment capability for "legal-for-trade" applications. The "fix" that was accepted required the person going into the set-up mode to answer the question "Is this a legal-for-trade device?" If answered "yes," you had to flip a switch to get out. The only foolproof way was to make two different scales – one scale for legal-for-trade applications and one for non-legal-for-trade applications. Building two different scales was determined to be cost prohibitive.

Some members of the 2007 Weighing Sector stated that the 2003 Weighing Sector changes to the 2004 Edition of Publication 14 sufficiently addressed this problem provided device owners and service agents configured the device according to setup and calibrations procedures published in the instruction manuals provided by the manufacturer. Allowing this feature permits an inspector to seal the device not knowing if it is in the setup mode because he may not have a copy of the CC that has instructions on how to verify the "legal-for-trade" status of the scale.

The Sector considered amendments to the General Code User Requirements to include language that:

1. A device shall "be installed **and a security means enabled** in accordance with the manufacturer's instructions" in paragraph G-UR.2.1. Installation.

2. A device shall be located, or such facilities for normal access thereto shall be provided to permit inspecting and applying security seals **according to the manufacturer's instructions** to the device in paragraph G-UR.2.3. Accessibility for Inspection, Testing, and Sealing Purposes.

3. A security seal shall be appropriately affixed **according to the manufacturer's instructions** to any adjustment mechanism designed to be sealed in paragraph G-UR.4.5. Security Seal.

The Sector decided that changes to the User Requirements would not be suitable since users and officials may not always have access to the manufacturer's instructions. The Sector, therefore, developed the following proposed amendment to General Code paragraph G-S.8. Provisions for Sealing Electronic Adjustable Components:

> ***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. [Nonretroactive as of January 1, 1990]*
>
> 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)

Conclusion: The Sector agreed to submit the proposed language to amend G-S.8. Provisions for Sealing Electronic Adjustable Components to the NCWM S&T Committee.

Next Sector Meeting

Discussion/Conclusion: Measurement Canada (Ottawa) is the next laboratory location in the normal rotation of NTEP participating laboratories.

The Sector was asked to discuss these and other locations and make a recommendation for the date and location of the 2008 Annual Meeting of the NTETC Weighing Sector.

It was reported by some of the Sector members that several industry and weights and measures associations meetings and conferences are being held in September 2008, including the WWMA (Alaska), the CWMA (Oklahoma), and the American Railway Engineering and Maintenance-of-Way Association (Utah). A suggestion was made to have the Sector meet in conjunction with one of these associations since it would eliminate an extra trip for many Sector members attending one or more of these meeting. However, the Sector agreed to recommend that the next meeting of the NTETC Weighing Sector be held in Ottawa, Canada, and that consideration be given to schedule a date that does not conflict with the above-mentioned association meetings and conferences.

Appendix A – Recommendations for Amendments to Publication 14[1]

Agenda Item 1: CLC Type Evaluation Tests on Railway/Vehicle Scales – Technical Policy

E. Modification of Type (Digital Electronic Scales Checklist 12-13)

7. **Adding a dump-through option/modification,** without modifying the lever system or load cell placement, to vehicle~~s~~, railway track, or combination vehicle/railway track scales where the ~~vehicle~~ load support primarily comes from the beams and girders on a scale with a combination steel and concrete weighbridge or all steel weighbridge construction, does **not** require evaluation for an existing CC to apply, however, the modification option must be listed on the CC.

8. **Adding a dump-through option/modification**, to vehicle, railway track, or combination vehicle/railway track scales with other than beam and girder design ~~does~~ requires ~~an~~ a full evaluation to be listed on a new or existing CC.

9. **Adding a rotary dump feature/option/modification to a railway track scale** requires ~~an~~ a full evaluation to be listed on a new or existing CC.

10. **Adding a vehicle scale feature or option to an active railway track scale CC** does not require additional evaluation provided that:

    b. The shift test data (located over the sections and mid span between sections) be used to demonstrate compliance with the CLC requirements for the vehicle portion of the scale.

    c. The e_{min} for the vehicle scale is the smallest e_{min} value that was evaluated on the railway track scale certificate.

    d. The CLC for the vehicle scale portion of the device must not exceed the maximum test weight used for the section test of the railway track scale. The CLC listed on the CC shall be no greater than what would be permitted in Section B. 8. d.

    e. The design of the LRE is no wider than 12 ft (See footnote 3 in Section B. 8.1. c.).

The railway track scale is a beam and girder design.

Agenda Item 2: In-Motion Railway Track Scale Performance and Permanence – Technical Policy (Carryover)

68. Performance Tests for Railway Track Scale Controllers Used to Weigh In-Motion

Performance tests are conducted to determine compliance with the tolerances. The tests described here apply primarily to the indicating element, the in-motion system controller (which may include the indicating element), and recording element(s).

The in-motion system controller performance tests are to be conducted with a railway track scale load-receiving element used in an "in-motion" railway track scale application without the use of simulation devices (e.g., load cells, sensors, and other digital inputs intended to simulate actual use).

It is assumed that the weighing/load-receiving element used during the test has already been examined and been found to comply with applicable requirements in Section 69. If the design and performance of the weighing/load-

[1] Recommended changes to Publication 14 are indicated in shaded, ~~strike out~~, and underlined text.

receiving element is to be determined during the same test, the applicable requirements ~~for~~ in Section 69. Performance and Permanence Tests for Railway Scales ~~Used to Weigh Statically~~ must also be referenced.

The following checklist provides specific items to be checked on an in-motion railway track scale system controller.

68.1.	~~Insure~~ Assure that the in-motion controller scale will not indicate or record a weight when the train speed exceeds the manufacturer's declared allowable limit.	Yes ☐ No ☐ N/A ☐
68.2. - 68.7.	***(no change)***	Yes ☐ No ☐ N/A ☐
68.8.	On installations ~~systems~~ where cars are not to be coupled during in-motion weighing, (i.e., uncoupled-in-motion weighing systems) the in-motion controller instrument must selectively prevent the weight of coupled cars from being recorded.	Yes ☐ No ☐ N/A ☐
68.9.	When the primary indication or recorded representation ~~digitizer~~ indicates zeros for the weight of a railcar, a message must be printed indicating the nature of the fault.	Yes ☐ No ☐ N/A ☐ (editorial)

Handbook Compliance

Appropriate l~~L~~aboratory tests of the indicating element must be completed prior to the field performance ~~and permanence~~ testing to assure compliance with the applicable requirements of Handbook 44.

~~If the WIM Controller to be tested incorporates an indicating element with NTEP approval and the indicating element to be tested processes only digital information ("indicators"), then the laboratory test for Influence Factors may be waived.~~

Test Standards *(no change)*

Performance Test *(no change)*

~~**Permanence Test**~~

~~The permanence test shall be conducted after a minimum of 20 days after successful completion of the initial performance test. It is recommended that the performance tests described above be repeated. However, if the original test car is not available, the static test may be conducted with a composite test car. The results of this test must be within the in-motion tolerances specified in Handbook 44. If the device does not meet these tolerance limits, the entire test must be repeated, including successful initial performance testing and a subsequent test after a minimum of 20 days.~~

Determine the Type of Test: ***(no change)***
Rail Scale Testing *(no change)*
Inspect the Scale *(no change)*
The Static Test *(no change)*
The In-Motion Test
Recording Results, Coupled-In-Motion Test Individual Car: *(no change)*

Agenda Item 4.(b): G-S.5.6.1. Indicated and Recorded Representation of Units – Appropriate Abbreviations and Table 1. Recorded Representation of SI Units on Equipment with Limited Character Sets

12. Values Defined
Code References: G-S.5.2.4., G-S.5.3.1., G-S.5.6., and G-S.5.6.1.

Graduations, indications, and recorded values that are intended to have specific values shall be adequately identified by a sufficient number of figures, words, and symbols. These defining terms shall be uniformly placed relative to

the graduations, indications, and recorded values and as close as practical to them without interfering with their readability. When SI units are used, the symbols shall comply with those given ~~in Table 1 of the General Code (Section 1.10 of Handbook 44). Other symbols shall comply with the abbreviations given~~ in Appendix C (General Tables of Units of Measurement) in Handbook 44 or NIST Special Publication SP 811 "Guide for the Use of International System of Units (SI)." Other symbols shall comply with the abbreviations given in Appendix C (General Tables of Units of Measurement) in Handbook 44. Exceptions are the abbreviations for "carat" (c or ct), U.S. short ton (ton or TN), ~~and~~ U.S. "long ton" (LT), and ~~the~~ "grain" in Publication 14 DES Section 76.

76. List of Acceptable Abbreviations/Symbols

Device Application	Term	Acceptable	Not Acceptable
Values Defined:	SI Units	~~Table 1 of the General Code~~ NIST Special Publication 811 – "Guide for the Use of International System of Units (SI)."	
	Notes on SI Units: • lower case "kg" on display panels & keys • lower case "kg" shall ~~should~~ be used for printing ~~when possible; upper case "KG" is acceptable only if lower case "kg" cannot be printed~~		upper case "KG"
	Other symbols	HB 44 Appendix C – General Tables of Units of Measurement ~~General Table of Weights and Measures, HB 44~~*	

Agenda Item 4.(c): G-S.8.1. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing

10. Provision For Metrological Sealing of Adjustable Components or Audit Trail

Code References: G-S.8.1. and S.1.11.

10.11 A change to a sealable metrological parameter (calibration or configuration) of any element shall be individually identified. (**Note:** Compliance with this section is required on devices submitted for evaluation and manufactured on or after January 1, 2010). **Yes ☐ No ☐ N/A ☐**

Examples of acceptable identification of a change to a metrological parameter of an element include but are not limited to: (Check which solution is used on the device.)

- ☐ A broken, missing, or replaced physical seal on an individual element.
- ☐ A change in a calibration factor or configuration setting for each element.
- ☐ Display of the date of or the number of days since the last calibration event for each element.
- ☐ A counter indicating the number of calibration and/or configuration events per element.
- ☐ Other. (Describe the solution to identify the method of sealing for each individual element.)

Agenda Item 4.(e): Bench/Counter Scale Shift Test and Definitions

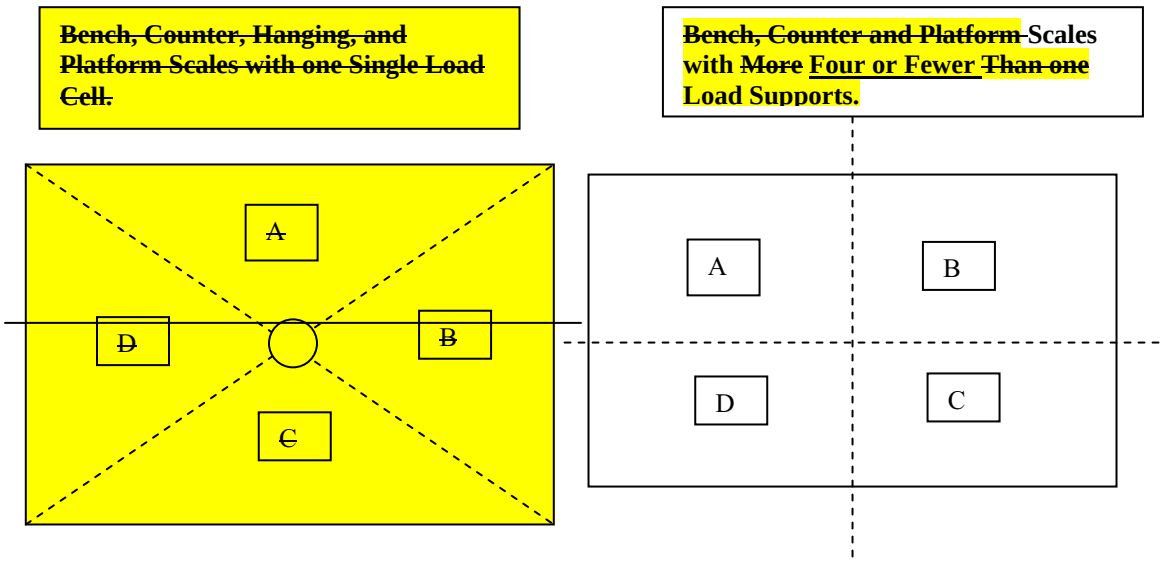
31. Multi-Interval Scales

A multi-interval scale is an instrument having one weighing range that is divided into partial weighing ranges (segments). Each weighing range (segment) is defined by its division size, its minimum capacity, and its maximum capacity. The selection of the appropriate weighing range (segment) is determined automatically according to the load applied, both on increasing and decreasing loads. The shift test shall be conducted at 30 % to 35 % of ~~one-half~~ the capacity of the scale. Corner tests, if appropriate, shall be run at one-quarter of the scale capacity. The number of scale divisions, n, for each weighing range (segment) is determined by dividing the maximum capacity of the weighing range (segment) by e of the same weighing range (segment). In the case of multi-interval scales, e must be equal to d (see NIST Handbook 44 Scales section S.5.3.).

63. Performance and Permanence Tests for Platform Scales With Four or Fewer Load Supports ~~Counter (Bench) Scales~~ (Including ~~Computing~~ Platform Scales with Computing Capability) page DES-90.

63.3. Shift Test

Test with test loads equal to 30 % to 35 % of ~~one half~~ capacity as specified in N.1.3.~~1~~7, and at test positions as illustrated below.



63.7. Field Permanence Tests

Review performance of the width of zero, zone of uncertainty, sensitivity, and discrimination near zero and at or near capacity.

Make certain that movement of the load cell cable does not affect the "live" load.

A minimum of four sets of increasing-load, decreasing-load, and shift tests are to be conducted at the evaluation installation at the start of the field permanence test. The scales are to be tested to capacity using certified test weights. The results of all increasing-load, decreasing-load, and shift tests conducted during the initial tests must be within acceptance tolerances. If scale repeatability is very good (e.g., <0.5d) the fourth test may be waived.

-
- On the first increasing-load test, when 30 % to 35 % of ~~one half~~ capacity is reached, perform a shift test with the 30 % to 35 % ~~one-half~~ capacity load located in each quadrant. (Be careful to avoid back-weighing.)

-
- On the third increasing-load test, perform a shift test at 30 % to 35 % ~~one-half~~ capacity with the load located in each quadrant.

64. Performance and Permanence Tests For Platform Scales With No More Than Four Load Supports (Field Permanence Tests) ~~Floor Scales~~ page DES-93.

64.1. Initial Type Evaluation Performance Test

Initial Review

-

A minimum of four sets of increasing-load, decreasing-load, and shift tests are to be conducted at the evaluation installation as the start of the field permanence test. The scales are to be tested to capacity using certified test weights. The results of all increasing-load, decreasing-load, and shift tests conducted during the initial permanence tests must be within acceptance tolerances. If scale repeatability is very good (e.g., <0.5 d), the fourth test may be waived.

- . . .
- On the first increasing-load test, when 30 % to 35 % ~~one-half~~ capacity is reached, perform a shift test with the 30 % to 35 % ~~one-half~~ capacity load located in each quadrant. (Be careful to avoid back-weighing.)
- On the second increasing-load test, perform a corner test at ¼ capacity.
- On the third increasing-load test, perform a shift test at 30 % to 35 % ~~one-half~~ with test load located in each quadrant.

Agenda Item 8: Level Indicating Means – Out-of-Level Test

56. Level-Indicating Means – Portable Scales
Code Reference: S.2.4.

Portable wheel-load weighers and portable axle-load scales intended for law enforcement must weigh accurately when placed out-of-level by 5 percent* (approximately 3 degrees).

A portable scale which is intended to be moved must either be equipped with a readily observable level-indicating means (typically a bubble level) or the scale must still weigh accurately when placed out-of-level by 5 percent (approximately 3 degrees). Weighing accurately means the results must be within acceptance tolerance.

*Note: 5 percent refers to 5 percent slope/grade

63.4. Out-of-Level Tests (If Applicable)

If the scale is not equipped with a level-indicating means, it must be tested in an out-of-level condition to determine compliance with paragraph S.4. Leveling-Indicating Means.

63.4.1. Place one side of the scale 5 percent* (approximately 3 degrees) ~~3 degrees (or 5 percent)~~ out-of-level with respect to the width axis of the scale. Zero the scale. Conduct a shift test[1] and increasing and decreasing load tests.

63.4.2. Place the opposite side or the scale out-of-level, zero, and repeat tests.

63.4.3. Place the front of the scale 5 percent* (approximately 3 degrees) ~~3 degrees (or 5 percent)~~ out-of-level with respect to the length axis of the scale. Zero the scale and conduct the shift, increasing, and decreasing load tests.

63.4.4. Place back of scale out-of-level, zero the scale, and repeat tests. All test results must be within acceptance tolerances. If the scale fails any of these tests, a level-indicating means is needed.

*__Note:__ 5 percent refers to 5 percent slope/grade.

71. Performance and Permanence Tests for Type Evaluation of Electronic Vehicle On-Board Weighing Systems

Out-of-Level Tests

A vehicle on-board weighing system shall operate within tolerance when the weighing system is out-of-level up to 5 percent (approximately 3 degrees). Note that 5 percent refers to 5 percent slope/grade. However, beyond the 3 degrees or 5 percent, if the accuracy is affected by out-of-level conditions normal to the use of the device, the system shall be equipped with an out-of-level sensor that inhibits the weighing operation when the system is out-of-level to the extent that the accuracy limits are exceeded.

Appendix B – Meeting Attendees

2007 Weighing Sector Meeting Attendees
Marriott Rancho Cordova – Sacramento, California
September 6 - 8, 2007

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Appendix C – Attachments

Attachment for Agenda Item 5

D. Force Transducers (load cells) to be Submitted for Evaluation

Force transducers (load cells) of essentially the same design may be considered to form a family that can be listed on an NTEP CC. If force transducers (load cells) within a family are made from different materials, such as aluminum, alloy steel, or stainless steel, then all material types must be submitted for evaluation. If the force transducers (load cells) within a family are available in either a 4-wire or 6-wire version, then at least one 4-wire version and one 6-wire version must be evaluated. This policy applies to all applications for new or amended NTEP Certificates of Conformance received after January 31, 2007. This policy is non-retroactive for NTEP Certificates of Conformance issued prior to February 1, 2007.

Under the Mutual Acceptance Arrangement (MAA) for the International Organization of Legal Metrology (OIML), it is possible to obtain either an NTEP CC or an OIML R 60 Certificate or both with a single evaluation. NCWM is a utilizing participant under the MAA and as such will accept test data from issuing participants within the MAA. Evaluations performed by NTEP laboratories can only result in an NTEP CC. These certificates can cover a family of force transducers (load cells) based on the evaluation of representative samples from the family. In order to determine which specific models of force transducers (load cells) are to be used for evaluation, the following selection criterion shall be used:

1. *Evaluation of New Force Transducers (load cells) for NTEP Certificates Only*

Required Information

The following information is required from the manufacturer for review and selection of sample force transducers (load cells):

a. Properly completed request for evaluation

b. A drawing of each capacity force transducer (load cell) within the family to substantiate that they are of the same basic design

c. A determination of quality or accuracy class

d. Maximum number of scale divisions requested (n-max)

e. Minimum verification scale division requested (V-min)

f. Force transducer (load cell) capacities

g. The type(s) of material from which the force transducers (load cells) are made

h. As applicable, outline dimensions and general description illustration of any special equipment (loading fixtures, interconnection boxes, etc.) intended to accompany the force transducers (load cells) submitted

i. A complete set of test data on the force transducers (load cells) submitted for evaluation. (Test data is only required for those force transducers (load cells) submitted for type evaluation; test data for each capacity model in the family is not required.)

j. The technology employed by the force transducer (load cell); e.g. strain gage (analog or digital), hydraulic, vibrating wire, piezoelectric, or other. Applicants for analog strain gage force transducers

(load cells) must indicate on the application whether 4-wire or 6-wire (or both) design force transducers (load cells) are included in the family.

Note: The manufacturer may market force transducers (load cells) with a smaller number of scale divisions (n-max) and/or with a larger V-min value than those listed on the approval certificate; however, the force transducer (load cell) or accompanying documentation must be marked with the appropriate n-max and V-min for which the force transducer (load cell) may be used.

Selection Criteria

A. Selection of force transducers (load cells) from the family shall be based on the following considerations:

1. The selection of force transducers (load cells) shall be such that the number of force transducers (load cells) to be evaluated is minimized.

2. Where force transducers (load cells) of the same capacity belong to different groups within the family, approval of the force transducer (load cell) with the best metrological characteristics (greatest n_{max}, smallest v_{min}) implies approval of the force transducers (load cells) with the lesser metrological characteristics. When a choice exists, the force transducers (load cells) with the best metrological characteristics shall be selected for the evaluation.

3. Force transducers (load cells) with a capacity in between the capacities evaluated, as well as those with a capacity greater than the largest capacity model tested, but not over five times the largest capacity evaluated, are deemed to be certified.

4. For any family of force transducers (load cells), the model with a capacity nearest the center of the range of capacities and with the best metrological characteristics shall be selected for evaluation. When the ratio of the largest capacity force transducer (load cell) within the group or family to the smallest capacity force transducer in the same group or family is 10:1 or less, a cell with a capacity nearest the center of the range shall be selected. The capacity of the selected cell shall not have a ratio greater than 5:1 in regard to the capacity of the force transducers (load cells) at the each extreme of the capacity range. If this is not possible, a second force transducer (load cell) must be selected for evaluation (see Item 5 below). If the selected mid-range capacity cell cannot be evaluated due to laboratory limitations, the NTEP representative should be contacted to select the specific model for evaluation.

5. When the ratio of the largest capacity force transducer (load cell) within the group to the smallest capacity force transducer (load cell) within the same group or family significantly exceeds 10:1, then another force transducer (load cell) shall be selected for evaluation. The selected force transducer (load cell) shall have a capacity between 5 and 10 times that of the first force transducer (load cell) that was selected for evaluation. When no capacity meets this criteria, the selected force transducer (load cell) shall be that having the smallest capacity that exceeds 10 times that of the nearest smaller capacity force transducer (load cell) that has been selected for evaluation. Should the capacity of the selected cell exceed the capacity of the greatest capacity model in the family or group by a ratio greater than 10:1, an additional model must be selected for evaluation.

6. If both 4-wire and 6-wire designs of force transducers (load cells) are included in the family, then at least one of the selected models for evaluation shall be of the 4-wire design and at least one of the remaining models shall be of the 6-wire design.

7. If the family of force transducers (load cells) includes two or more types of material used for construction of the device, then at least one of the selected models for evaluation shall be of each type of material used for construction.

8. If the family of force transducers (load cells) includes two or more means of environmental sealing (potting, welded cups, etc.), then at least one model using each sealing means shall be selected for evaluation.

9. If the family of force transducers (load cells) includes two or more output levels (2 or 3 mV/V), then at least one model with each output level shall be selected for evaluation.

B. Examples of force transducer (load cell) model selection for evaluation:

a. Force Transducer (load cell) Family A characteristics:

1. Both stainless steel and alloy steel models

2. 2 mV/V and 3 mV/V outputs

3. Bending beams in smaller capacities and shear beams in larger capacities

4. 4-wire and 6-wire designs

5. n_{max} is 5000 on all models

6. Potting or welded metal cup sealing variations

7. All v_{min} values equal to 0.015 % of cell capacity

8. All capacities in pounds:
500, 1000, 2000, 2500, 4000, 5000, 7500, 10 000, 15 000, 20 000

The following cell models would be selected for evaluation:

- One - 500 lb stainless steel, potted, 3 mV/V, 4-wire bending beam cell
- One - 2500 lb alloy steel, potted, 2 mV/V, 4-wire shear beam cell
- One - 15 000 lb stainless steel, welded, 3 mV/V, 6-wire shear beam cell

Note that Item 2 in Part A above is not applicable in this situation since the metrological characteristics (n_{max} and v_{min} for all of the models are equivalent.

Note that Item 3 in Part A above is met since the 20 000 lb model is less than five times the capacity of the greatest capacity model selected for evaluation (15 000 lb).

Note that Item 4 in Part A above is met since the 2500 lb capacity model of force transducer (load cell) is the closest to the center and is able to meet the requirements in both Item 4 and 5 and therefore was selected for evaluation.

Note that Item 5 in Part A above is met since the ratio between the capacities of the models selected for evaluation does not exceed five.

Note that Item 6 in Part A above is met by having at least one of the models selected of a 4-wire design and at least one of the models selected of a 6-wire design.

Note that Item 7 in Part A above is met by having at least one of the models constructed from each type of materials used.

Note that Item 8 in Part A above is met by having at least one of the selected models with each environmental sealing method employed within the family.

Note that Item 9 in Part A above is met by having at least one of the selected models with a 3 mV/V output and at least one with a 2 mV/V output.

b. Force Transducer (load cell) Family B characteristics:

1. Compression cells constructed from either alloy steel or stainless steel

2. All cells are Class III L

3. Cells from 10 000 lb to 75 000 lb have an n-max of 7500 and cells from 50 000 lb to 200 000 lb have an n_{max} of 10 000

4. All cells are 2 mV/V

5. All cells have the same environmental sealing

6. All cells have v_{min} values equal to 0.018 % of their capacity

7. All cells are of 6-wire design

8. Cell capacities are:
10 000; 25 000; 50 000; 75 000; 100 000; 200 000

The following models would be submitted for evaluation:

- One - 50 000 lb with an n-max of 10 000 in stainless steel
- One - 10 000 lb in alloy steel

Note that Item 2 in Part A above is met with the selection of the 50 000 lb model with an n_{max} of 10 000 since it has the best metrological characteristics.

Note that Item 3 in Part A above is met with the selection of the 10 000 lb model. Selection of the 200 000 lb model could have taken place but the 10 000 lb model was chosen because of the ease of testing.

Note that Item 4 in Part A above is met with the selection of the 10 000 lb model since it is within the 5:1 capacity ratio of the 50 000 lb model initially selected.

Note that Item 5 in Part A above is met with the selection of the 10 000 lb model since the ratio of its capacity to that of the 50 000 lb model does not exceed 5:1.

Note that Item 6 in Part A above does not apply since all models are of 6-wire design.

Note that Item 7 in Part A above is met with the selection of the 10 000 lb model in stainless steel and the 50 000 lb model in alloy steel thus covering both types of material used for construction of the force transducers (load cells) in the family.

Note that Item 8 in Part A above does not apply since all models use the same means of environmental sealing.

Note that Item 9 in Part A above does not apply since all models use the same output level of 2 mV/V.

2. *Evaluation of New Force Transducers (load cells) for OIML R 60 Certificate or OIML R 60 Certificate and NTEP Certificate of Conformance under the DoMC*

Required Information

The information needed for an OIML R 60 evaluation is listed in OIML Recommendation 60. If the manufacturer is seeking an NTEP Certificate of Conformance for the force transducer (load cell) family or individual model, the information shown in Section 1 above shall also be provided along with a properly completed application for NTEP evaluation. All NTEP requirements are to be met in this type of evaluation. The manufacturer must make certain

the issuing participant selected for the evaluation of the force transducer(s) (load cell(s)) is aware that the submittal is for both NTEP and OIML R 60. A completed application and copies of all submitted data must be sent to NTEP. Once the evaluation has been successfully completed, the issuing authority will provide an OIML Evaluation Report that may then be used to secure an OIML R 60 Certificate. This report is also sent to NTEP. NTEP will evaluate the OIML Evaluation Report and issue an NTEP Certificate of Conformance based on this evaluation. Note that issuance of an NTEP Certificate of Conformance may require the conduct of other tests not performed by the issuing participant. If this happens, the costs of these tests are the responsibility of the applicant.

Note: Should the force transducers (load cells) submitted fail to comply with all OIML R 60 requirements and the manufacturer then seeks to secure an NTEP Certificate of Conformance based on the OIML Evaluation Report, additional testing may be required in order to fully determine compliance of the device(s) with NTEP requirements. The costs for any additional testing deemed necessary for completion of the NTEP review will be the responsibility of the applicant.

Selection Criteria

Selection of the force transducers (load cells) for evaluation shall be based on the OIML R 60 selection criteria as described in OIML Recommendation 60.

3. *Amendment of an Existing NTEP Certificate of Conformance to Add Capacities and/or Change Metrological Characteristics in Conjunction with an OIML R 60 Evaluation Under the DoMC*

Required Information

The information needed for an OIML R 60 evaluation is listed in OIML Recommendation 60. If the manufacturer is seeking to amend an existing NTEP Certificate of Conformance for the force transducer (load cell) family or individual model, the information shown in Section 1 above shall also be provided along with a properly completed application for NTEP evaluation. All NTEP requirements are to be met in this type of evaluation.

Successfully completed, this type of evaluation will result in a test report and test certificate that may be used to secure an amended OIML R 60 Certificate. The test report will be reviewed by NTEP and, if the appropriate criteria are met, a NEW NTEP Certificate of Conformance will be issued. Note that the original NTEP Certificate of Conformance will remain active and will not be amended. The new NTEP Certificate of Conformance resulting from this evaluation will list the new capacities added and/or the change in metrological characteristics. Note that the appropriate NTEP Certificate of Conformance number must be marked on the device in compliance with G-S.1. Marking Requirements of NIST Handbook 44.

Note: Should the force transducers (load cells) submitted fail to comply with all OIML R 60 requirements and the manufacturer then seeks to only amend the existing NTEP Certificate of Conformance based on the test report, additional testing may be required in order to fully determine compliance of the device(s) with NTEP requirements. The costs for any additional testing deemed necessary for completion of the NTEP review will be the responsibility of the applicant.

Selection Criteria

The proper models for evaluation will depend upon the nature of the change or addition to be made. Because of this, NTEP personnel shall be contacted and shall determine which model or models of force transducer (load cell) are to be submitted.

4. *Amendment of an Existing NTEP Certificate of Conformance ONLY*

Required Information

The required information will depend upon the nature of the change being made. If additional models of force transducers (load cells) are being added to a family, then the same information and selection criteria as listed in

Section 1 above apply. If the change is to add another version of the force transducer (load cell) listed on the current NTEP Certificate of Conformance the nature of the change or addition must be fully disclosed in the application.

Selection Criteria

The necessity of an evaluation to implement the requested change will depend upon the nature of the change. In general, addition of new models of force transducers (load cells) with capacities outside the 5:1 ratio of those previously evaluated will require additional evaluation. Addition of a 4-wire design with no change in capacity will require an evaluation while the addition of a 6-wire design with no change in capacity will not. The addition of models constructed from a different material will require the evaluation of at least one model constructed of the new material. NTEP personnel will inform you of what models, if any, require evaluation after review of the application.

Attachment for Agenda Item 6

The Tare Work Group recommended adding the following definitions to the Definitions (as amended by the S&T Committee) already in 2007 S&T Agenda Item 320-9

Calculated weight (gross or tare*) value. Calculated sum or difference of more than one measured weight value and/or calculated net value. *(* TARE WG Comment – This new HB definition is from the revised version of R 76 and is beyond what is currently required by NTEP.)*

Tare-balancing mechanism. A tare mechanism with an indication that tare has been taken and without an indication of the tare value (weight) when the instrument is loaded. A negative net weight is assumed to be the tare value when the weighing instrument is unloaded.

Tare-weighing mechanism. A tare-balancing mechanism that stores the tare value and is capable of displaying (continuously or upon command) or printing the value whether or not the instrument is loaded.

Preset Tare. A numerical value, representing a weight that is entered into a weighing device (e.g., keyboard, recalling from stored data, or entered through an interface) and is intended to be applied to weighings without determining individual tares.

Preset Tare Mechanism. A part of a weighing system for subtracting a preset tare value from a gross or net weight value and indicating the result of the calculation as a net weight. The weighing range for net loads is reduced accordingly.

Types of preset tare mechanisms include:

- **Keyboard Tare.** The operation of keys on a keyboard; e.g., with a typical 10-key keyboard with values 0 through 9, by the pushing of a key numbered 5, the number 5 is entered as a tare value.

- **Digital Tare.** By the repeated operation of a particular key, tare values are entered in amounts equal to the value of a scale division. For example, on a 25 lb x 0.01 lb scale, each time a specifically marked key is depressed; a tare is entered equal to 0.01 lb. If that key were depressed five times, the tare value would be equal to 0.05 lb.

- **Programmable Tare.** Preset (predetermined) tare values that are stored in memory for multiple transactions. They may be part of the product information on PLU (product look-up), preset product, or tare keys.

- **Stored Tare.** Preset (predetermined) tare values that are stored in memory for multiple transactions and are used predominately in vehicle scale applications.

- **Percentage Tare.** A preset tare value, expressed as a percentage (i.e., 5.6 %), that represents the percentage of tare material compared to the gross or net weight of the commodity. A percentage tare is one form of proportional tare.

- **Proportional Tare.** A preset tare value, automatically calculated by the scale, proportional to the gross weight indicated by the scale. A proportional tare can be a percentage tare or a fixed tare value proportional to a range of gross weights (i.e., a 10 g tare for gross weights between 0 and 2 kg, a 20 g tare for gross weights between 2 and 4 kg, etc.). A proportional tare is, therefore, not limited to being a percentage tare.

The Tare Work Group recommends the following changes to Scales Code.

S.2. Design of Balance, Tare, Level, Damping, and Arresting Mechanisms.

S.2.3. ~~Tare~~ Value of Tare Indication and Recorded Representations:

~~On any scale (except a monorail scale equipped with digital indications), the value of the tare division shall be equal to the value of the scale division.*~~ The tare mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. *A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.**
(Amended 1985)

*[Note: On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination]**
*[*Nonretroactive as of January 1, 1983]*

S.2.3.1 Scale Interval. *– The interval of a tare weighing mechanism shall be equal to the scale interval of the* weighing device for any given load.

(a) On any scale (except a monorail scale equipped with digital indications ***and multi-interval scales or multiple range scales when the value of tare is determined in a lower range****), the value of the tare division shall be equal to the value of the scale division.**
*[*Nonretroactive as of January 1, 1983]*

(b) ~~**S.2.3.1.**~~ **Monorail Scales Equipped with Digital Indications. –** On a static monorail weighing system equipped with digital indications, means shall be provided for setting any tare value of less than 5 % of the scale capacity to within 0.02 % of scale capacity. On a dynamic monorail weighing system, means shall be provided to automatically maintain this condition.
(Amended 1999)
(Renumbered 200X)

S.2.3.2. Accuracy. – A tare weighing or balancing mechanism shall permit setting the indication to zero with an accuracy equal to or better than:

± 0.25 d for electronic weighing devices and any weighing device with an analog indication,

± 0.5 d for mechanical weighing devices with a digital indication (e.g., weighbeams with only notched poises and no sliding poises).

On a multi-interval scale, d shall be replaced by d1 (division value of the first weighing segment).

S.2.3.3. Operating Range. – The tare mechanism shall be such that it cannot be used at or below its zero effect or above its maximum indicated effect.

On a single or multiple range scale, the maximum tare capacity can not exceed that maximum capacity of the highest weighing range.

On a multi-interval scale, the maximum tare capacity can not exceed that maximum capacity of the first weighing segment.

S.2.3.4. Visibility of Operation. – Operation of the tare mechanism shall be visibly indicated on the instrument. In the case of instruments with digital indication, this shall be done by marking the indicated net value with the word "NET" or the symbol "N."

Note: NET may be displayed as "NET," "Net," or "net."

Note: If a scale is equipped with an indicator that allows the gross value to be displayed temporarily while a tare mechanism is in operation, the "NET" symbol shall disappear while the gross value is displayed.

S.2.3.5. Subtractive Tare Mechanism. – After any tare operation and while tare is in effect, an indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity after tare has been taken.

(Tare WG Recommenation: Insert into paragraph S.1.7. (a) Capacity Indication "Flashing weight values are not acceptable as and overload indication."

S.2.3.6. Semi-automatic or Automatic Tare* Balancing or Weighing Mechanisms. – These mechanisms shall be operable or accessible only by a tool outside of and separate from this mechanism or it shall be enclosed in a cabinet, or it shall be operable only when the indication is stable within:

(a) ± 3 scale divisions for scales of more than 2000 kg (5000 lb) capacity in service prior to January 1, 1981, and for all axle load, railway track, and vehicle scales; or

(b) ± 1 scale division for all other scales.

*** Automatic Tare Mechanisms are not permitted for direct sales to the public.**

S.2.3.7. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key). – (TWG recommends deleting S.2.1.6. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key) in order to keep all tare requirements together). Scales not intended to be used in direct sales to the public may be equipped with a combined zero and tare function key, provided that the device is clearly marked as to how the key functions. If the semi-automatic zero-setting mechanism and the semi-automatic tare-balancing mechanism are operated by the same key, the following apply at any load:

1) **After zero/tare setting the effect of accuracy of the zero setting shall be not more than ± 0.25 d.**

2) **A "center-of-zero" condition shall either automatically be maintained to ± 0.25 scale division or less, or have an auxiliary or supplemental "center-of-zero" indicator that defines a zero-balance condition to ± 0.25 of a scale division or less.**

3) **A zero-tracking mechanism, if equipped, shall operate only when:**

   - **the indication is at zero, or at a negative net value equivalent to gross zero, and**
   - **the weight indication is stable.**

4) **The scale must also be clearly marked on or adjacent to the weight display with the statement "Not for Direct Sales."**

S.2.3.8. Consecutive Tare Operations. – Repeated operation of a tare mechanism (including preset tare) is permitted. If more than one tare mechanism is operative at the same time, tare weight values shall be clearly designated when indicated or printed.

S.2.3.9. Indication and Printing of Weighing Results.

a) Gross weight values may be printed without any designation or by complete word or symbol. For a designation by a symbol, only "G" is permitted.

b) If only net weight values are printed without corresponding gross or tare values, they may be printed without any designation or by a complete word or symbol. The complete word or symbol "N" shall be used to designate a net weight. This applies also where semi-automatic zero-setting and semi-automatic tare balancing are initiated by the same key.

c) Gross, net, or tare values determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range.

d) If net weight values are printed together with the corresponding gross and/or tare values, the net and tare values shall be identified at least by the corresponding symbols "N" and "T" or by complete words.

e) If net weight values and tare values determined by different tare mechanisms are printed separately, they shall be suitably identified.

f) When gross, net, and tare values are printed together, one of these values may be calculated from two actual determinations of mass. In the case of a multi-interval device the calculated weight gross or tare value may be printed with a smaller scale interval.

g) The printout of a calculated gross or tare weight value shall be clearly identified. This should be done by the symbol "C" in addition to the symbols mentioned above, if applicable, or by complete words.

TARE WG Comment: The requirements in f) and g) are from the revised version of R 76 and is beyond what is currently required by HB 44 and NTEP.

S.2.4. Preset Tare Mechanism.

S.2.4.1. Modes of Operation. – A preset tare mechanism may be operated together with one or more tare devices provided that:

- **the preset tare mechanism complies with paragraph S.2.3.8. Consecutive Tare Operations., and**

- **a preset tare operation cannot be modified or cancelled as long as any tare mechanism operated after the preset tare operation is still in use.**

- **a preset tare associated with a price look-up (PLU) shall be automatically cancelled at the same time a PLU is cancelled.**

Preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., part of the product look-up information).

S.2.4.2 Indication of Operation. – Operation of the preset tare device shall be visibly indicated on the instrument. In the case of instruments with digital indication, this shall be done by marking the indicated net value with the sign "NET," "Net," or "net." If an instrument is equipped with a device that allows the gross value to be displayed temporarily while a tare device is in operation, the "NET" symbol shall disappear while the gross value is displayed. It shall be possible to temporarily indicate the preset tare value.

Paragraph S.2.3.9. Indication and Printing of Weighing Results. applies accordingly provided that the calculated net value is printed and at least the preset tare value is printed, with the exception of:

1. **a class II, or a class III instrument with a maximum capacity not greater than 100 kg used in direct sales to the public, or**

2. **including price computing scales, or**

3. **nonautomatic weigh/price labeling scales.**

- **preset tare values are designated by the symbol "PT"; however, it is permitted to replace the symbol "PT" with complete words.** *(TARE WG Comment – This requirement is from the revised version of R 76 and is beyond what is currently required by HB 44 and NTEP. The Tare WG added the class and capacity exception since they felt that the need for providing the additional type of tare information is greater for larger capacity scales and for vehicle scale applications where preset tares are not allowed by some jurisdictions.)*

Note: Paragraph 2.4.2. also applies to weighing devices with a combined semi-automatic zero-setting device and a semi-automatic tare-balancing device operated by the same key.

Appendix D

National Type Evaluation Technical Committee
Software Sector

October 17 - 18, 2007 – Little Rock, Arkansas
Meeting Summary

Agenda Items

Carryover Items **D2**

1.a. NTETC Software Sector Mission D2
1.b. NCWM/NTEP Policies – Issuing CCs for Software D2
2. Definitions for Software-Based Devices D4
3. Software Identification / Markings D6
4. Identification of Certified Software D7
5. Software Protection / Security D8
6. Software Maintenance and Reconfiguration D16
7. Verification in the Field, By the W&M Inspector D19
8. NTEP Application D19

New Items **D20**

9. Next Meeting D20

Meeting Minutes

Jim Truex called the meeting to order at 8:00 on October 17, 2007. All registered participants attended. Jim explained that the Sector attempts to build consensus and then explained the voting procedures, if needed. He asked everyone to introduce himself or herself.

Carryover Items

1.a. NTETC Software Sector Mission

Source: NCWM Board of Directors

Background: In 2005 the Board of Directors established a National Type Evaluation Technical Committee (NTETC) Software Sector. A mission statement for the Sector was developed at that time.

Mission of the Software Sector:

- Develop a clear understanding of the use of software in today's weighing and measuring instruments.
- Develop NIST Handbook 44 specifications and requirements, as needed, for software incorporated into weighing and measuring devices. This may include tools for field verification, security requirements, identification, etc.
- Develop NCWM Publication 14 checklist criteria, as needed, for the evaluation of software incorporated into weighing and measuring devices, including marking, security, metrologically significant functions, etc.
- Assist in the development of training guidelines for W&M officials in verifying software as compliant to applicable requirements and traceable to a NTEP Certificate. Training aids to educate manufacturers, designers, service technicians and end users may also be considered.

From previous meeting:

Discussion: The Chair asked the question: Is the Sector comfortable with the Mission Statement?

The Sector discussed the process of other NTETC sectors, the NCWM structure and how/why, the Software Sector was developed. After some lengthy discussion by the Sector, there was consensus among the Sector members that the Mission Statement is correct. However, the Sector noted that there is a very broad range of items listed in the Statement. The Sector agreed that the steps in the Mission Statement are correct. The steps appear to build on each other in an orderly progression. It was further agreed that whenever possible items will be addressed in the sequence of the Mission Statement.

The Chair noted that the scope of this Sector is somewhat broader than some other sectors. The work of this Sector is more closely aligned to that of the Grain Analyzer Sector in that focus is on development of possible language for:

- NIST Handbook 44,
- checklist criteria for NCWM Publication 14, and
- appropriate field guidelines.

Comments from October meeting:
Jim Truex noted there would be an attempt to follow the four bullet items above in order from the top down when discussing agenda items. Focus should begin with any possible impact on NIST Handbook 44.

1.b. NCWM/NTEP Policies – Issuing CCs for Software

Source: NCWM Reports

Background: Excerpts of reports from the 1995-1998 Executive Committee were provided to NTETC Software Sector members at their April 2006 meeting. The chair asked the Sector to review the following NTEP policy decision adopted by the NCWM in 1998 relative to the issuance of a separate Certificate of Conformance (CC) for software.

> The NCWM has struggled with software issues for many years. Prior to 1995, NTEP had evaluated stand alone software (e.g., weigh-in/weigh-out, POS, and batch controller software) and, in some cases, had issued CCs for stand alone software. The Board established a software work group to study the issues and make recommendations.
>
> Many issues were discussed by the work group, including: first indication of the final quantity, metrologically significant software, definitions, software marking, software checklist evaluation, a software EPO for the field inspector, user programmable software, and third party software. According to conference reports, it seems in 1997 some concerns were raised about the direction of the work group. In 1997, after the Annual Meeting, a new Software Work Group was appointed by the NCWM chair.
>
> **During the 1998 NCWM, 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 Certificate of Conformance from the National Type Evaluation Program."**
> - **"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."**

The policy is still in effect today.

Also noteworthy is a statement in Section C of NCWM Publication 14, Administrative Policy. It states: "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."

Discussion: At this point in time, NTEP evaluates a "software-based device" as a functional device. The performance of the device is evaluated.

There was a suggestion from the floor that the 1998 policy be amended. If this is done, then the Sector can move toward the other steps in the process.

Discussion from the floor is on how to or if there needs to be a change to the device type in the FOR box.

The consensus of the Sector is that the current NCWM/NTEP policy should be changed.

From previous meeting:

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 to be a main element of the system requiring a separate CC. (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 Sector recommendation will be submitted to the NTEP Committee.
This item has not yet been submitted to the NTEP Committee for review. It is planned for this to happen during the NCWM Interim Meeting in January 2008.

October Meeting Discussion:
Some concerns were raised by the California laboratory regarding this recommendation. During the course of the discussion, these concerns were addressed and resolved.

Don Onwiler indicated that this may be a technical policy that needs to be inserted into each different volume or chapter of NCWM Publication 14 or it may need to be placed in the Administrative Policy volume.

It was agreed that overall, there would be no change to what is currently being done by NTEP and the labs to certify devices, however; the device type or name of the device certified would be changed.

Recommendation from the Sector to the NTEP Committee:

The Sector recommended the following language to be submitted to the NTEP Committee as a policy change.

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.

2. Definitions for Software-Based Devices

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)

There was also the suggestion to use the definitions from the WELMEC document for Type P and Type U instruments. They were modified by the Sector. It was also suggested that a list of examples be provided.

Draft definitions for consideration:

Built-for-purpose weighing or measuring instrument (device) (type P): A weighing or *measuring Instrument (device)* designed and built specially for the task in-hand. Accordingly the embedded software is assumed to be designed for the specific task. It may contain many components also used in PCs, e.g., motherboard, memory card, etc.

A weighing or measuring instrument (device) using a universal Computer (type U): *A weighing or measuring Instrument (device)* that uses a general-purpose computer, usually a PC-based system, for performing metrologically significant functions.

Examples:
Type U
Weigh-in, Weigh-out
Open Architecture

Discussion: The Sector agrees that the NTEP CC should reflect "software" is a separate main element. If this is true then there needs to be definition.

The Sector agrees that this change in policy and appearance on CC's does not have a major impact on our current type evaluation process.

MC cites three main areas of software: sensing physical phenomena (mass or volume), computational, controlling the system.

After a lengthy discussion related to the terms "built-for-purpose" and "not-built-for-purpose", the Sector agreed that these terms were not clear and should be replaced with the terminology proposed below.

A main reference point that the Sector used in this discussion was OIML R 76 *Non-automatic weighing instruments* sub-sections 5.5.1. (Type P) and 5.5.2. (Type U).

New Definition:

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).** 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).** 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.

October Meeting Discussion:
After some discussion on this item the Sector agreed to forward the recommendation to the S&T Committee.

Recommendation from the Sector to the S&T Committee:

The Sector recommended that the following definitions be submitted to the S&T Committee as a developing item and be considered for inclusion in NIST Handbook 44.

Electronic devices, software-based. Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:

(c) **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

(d) **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.

3. Software Identification/Markings

Source: NTETC Software Sector

Background: At the last meeting there was discussion on specific sections of the WELMEC document that deal with TYPE P and TYPE U requirements. The comments and recommendations under consideration are contained in the following.

Discussion: There was lengthy discussion on the value and merits of markings. This included the possible differences in some types of devices and marking requirements. After hearing several proposals the Sector agreed to the following recommendation.

Technical changes represented below:

1. CC No. must be continuously displayed or marked,
2. Version must be software generated, not hard marked,
3. Version required for embedded (Type P),
4. Print option created,
5. Command or operator action option created,
6. Type P must display or hard mark make, model, S.N.

From Previous Meeting:
The Sector will forward these items, when completed, to the Regional S&T committees for consideration.

October Meeting Comments:
This section needs to be completed with the actual changes to HB 44 sections. There is some concern with the note that is contained below Type P device.

There may be the need to have a delineation of devices with "firmware." An exception may need to be made for a device that is "integral and blind." It is possible that NTEP needs to determine if the "software" is integral and does not need to be identified. Need to know the rules up front.

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.

Measurement Canada commented on "primary sensing elements" and exemption from certain requirements (digital load cells and devices with correction methods). This is needed to prevent a "black box" which could be added in between other main elements and then be exempt from certain requirements.

Difference may be that the Digital Load Cell has been evaluated integral, while the digital J-Box can be modified or built with various components and characterized in the field.

One manufacturer still has a problem with the exemption, (footnote 3 below) and as an example used a smart J-box.

The "Via Menu (display) or Print option" may be supplemental for devices that use the hard-marked or continuously displayed identification method for the NTEP CC Make/Model, Serial No. information.

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.

Currently there is no specification for permanence of the marking for software (the CC No. on the screen). This will need to be addressed by the Sector.

Developing Recommendation from the Sector to the S&T Committee:

The Sector recommended that the following marking information be submitted to the S&T Committee as a developing item and be considered for inclusion in NIST Handbook 44.

TYPE P shall meet at least one of the methods in each column:

Method	NTEP CC No.	Make/Model/Serial No.	Software Version/Revision[3]
Hard-Marked	X	X	Not Acceptable
Continuously Displayed	X	X	X
By Command or Operator Action	Not Acceptable	Not Acceptable	X[4]

[3] If the manufacture 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.

Example: primary sensing element may be P.D. meter with correction, digital load cell. (only for reference, not limiting)

[4] Information on how to obtain the Version/Revision shall be included on the NTEP CC.

TYPE U shall meet at least one of the methods in each column:

Method	NTEP CC No.	Make/Model	Software Version/Revision
Hard-Marked	X[1]	X	Not Acceptable
Continuously Displayed	X	X	X
Via Menu (Display) or Print Option	Not Acceptable	X[2]	X[2]

[1] Only if no means of displaying this information is available.

[2] Information on how to obtain Make/Model, Version/Revision shall be included on the NTEP CC.

4. Identification of Certified Software

Source: NTETC Software Sector

Previous meeting notes:

Separation of software
Separation of metrological and application software as described in the OIML documents is maintained.

5.2.1.2. Separation of software parts

Requirement (a): All software modules (programs, 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 this part (see 5.2.5.) and it shall be made identifiable as described in 5.1.1.

If the separation of the software is not possible or needed, the software is metrologically significant as a whole. Segregation of parameters is currently allowed. (see table of sealable parameters)

October Meeting Discussion:
The sector agreed that the title of this item needs to be changed to "Identification of Certified Software. Currently, used are version no., ID no., and serial no. However; there is no physical tie to the actual software. Some international documents, like the WELMEC document tell how to tie the ID to the software. These include:

Possible methods: (not limited to)
- CRC (cyclical redundancy check)
- Checksum
- Inextricably Linked version no.
- Encryption

The question remains is there some method to give the W&M inspector information that something has changed? How can the W&M inspector easily identify an NTEP Certified version?

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**.**

NTEP strongly recommends that metrological software be separated from non-metrological software for ease of identification and evaluation.

Separation of software parts
All software modules (programs, 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)

Conclusion from the October Meeting: The Sector will continue to develop this item.

5. Software Protection/Security

The Sector spent a significant amount of time reviewing and revamping previous work. OIML and WELMEC documents were researched. The following are draft Publication 14 checklist criteria for consideration at the next meeting.

Building Publication 14 Checklist information:

(Reference Information taken from OIML R 76-2 Draft Document)

Section YY: Additional requirements for software-controlled electronic devices

YY.1. Devices with embedded software: Type P (Built for purpose)

For instruments and modules with embedded software, the manufacturer shall describe or declare that the software of the instrument or module is embedded, i.e., it is used in a fixed hardware and software environment and cannot be modified or uploaded via any interface or by other means after securing and/or verification.

In addition to all other required documentation the manufacturer shall submit the following documentation:
- description of the metrologically significant functions,
- software identification that is clearly assigned to the metrologically significant functions, and
- securing measures foreseen to provide for evidence of an intervention.

The software identification shall be provided by the instrument and listed in the NTEP Certificate of Conformance.

Acceptable solution:

The software identification is provided by either:
- in the normal operation mode a clearly identified operation of a physical or soft key, button, or switch, or
- in the normal operation mode a continuously displayed version number or checksum, etc., accompanied in both cases by clear instructions how to check the actual software identification against the reference number (as listed in the NTEP CC) marked on or displayed by the instrument.

YY.2. Personal computers, instruments with PC components, and other instruments, devices, modules, and elements with programmable or loadable metrologically significant software: Type U (not built for purpose)

Personal computers and other instruments/devices with programmable or loadable software may be used as indicators, terminals, data storage devices, peripheral devices, etc. if the following additional requirements are met.

Note: *Although these devices may be complete weighing instruments with loadable software or PC-based modules and components, etc. they will in the following simply be called "PC". A "PC" is always assumed if the conditions for embedded software are not fulfilled.*

YY.2.1. Hardware requirements

PCs as modules incorporating the metrologically relevant analogue component(s) shall be treated according to Table ZZ, categories 1 and 2.

PCs acting as a purely digital module without incorporating metrologically relevant analogue components (e.g., used as terminals or price-computing point-of-sale devices) shall be treated according to Table ZZ, categories 3 and 4.

PCs used as purely digital peripheral devices shall be treated according to Table ZZ, category 5.

Table ZZ also specifies how detailed the documentation to be submitted for both analogue and digital components of the PC shall be depending on the respective category (description of power supply, type of interfaces, motherboard, housing, etc.).

Table ZZ: Tests and required documentation for PCs used as modules or peripheral devices

Table ZZ. Tests and Required Documentation for PCs Used as Modules or Peripheral Devices

Category		Necessary Tests	Documentation	Remarks
No.	**Description**		**Hardware Components**	
1	PC as a module, primary indications on the monitor, PC incorporates the metrologically relevant analogue components (ADC) on a slot mounted circuit print board that is not shielded ("open device"), power supply device for the ADC from the PC or PC-bus system	ADC and PC tested as unit: tests as for indicators according to Annex C; the pattern shall be equipped with the maximum possible configuration (maximum power consumption)	ADC: detailed as for instruments and modules (circuit diagrams, layouts, descriptions etc.) PC: detailed as for instruments and modules (manufacturer, type of PC, type of housing, types of all modules, electronic devices and components including power supply device, data sheets, manuals, etc.)	Influences on the ADC from the PC possible (temperature, electromagnetic interference (EMC))
2	PC as a module, primary indications on the monitor, PC incorporates the ADC, but the built-in ADC has a shielded housing ("closed device"), power supply device for the ADC from the PC, but not via the PC-bus system	ADC and PC as unit: tests as for indicators according to Annex C; the pattern shall be equipped with the maximum possible configuration (maximum power consumption)	ADC: detailed as for instruments and modules (circuit diagrams, layouts, descriptions etc.) PC: Power supply device: detailed as for instruments and modules (manufacturer, type, data sheet) Other parts: only general description or information necessary concerning the form of housing, motherboard, processor type, RAM, floppy and hard disk drives, controller boards, video controller, interfaces, monitor, keyboard, etc.	Influences on the ADC from the power supply device of the PC possible (temperature, EMC), other influences from the PC not critical, new EMC tests (PC) necessary if the power supply device is changed
3	PC as purely digital module, primary indications on the monitor, ADC outside the PC in a separate housing, power supply device for the ADC from the PC	ADC: tests as for indicators according to Annex C using the monitor of the PC for the primary indications PC: according to 3.10.2	ADC: as for category 2 PC: Power supply device as for category 2, other parts as for category 4	Influence (only EMC) on the ADC from the power supply device of the PC possible Other influences from the PC not possible or not critical New EMC tests (PC) necessary if the power supply device is changed
4	PC as purely digital module, primary indication on the monitor, ADC outside the PC in a separate housing having its own power supply device	ADC: as for category 3 PC: as for category 3	ADC: as for category 2 PC: Only general description or information necessary, e.g., concerning type of motherboard, processor type, RAM, floppy and hard disk drives, controller boards, video controller, interfaces, monitor, keyboard	Influences (temperature, EMC) on the ADC from the PC not possible
5	PC as purely digital peripheral device	PC: according to 3.10.3	PC: as for category 4	

Meaning of the abbreviations used in Table ZZ: PC – Personal Computer, ADC – Relevant analogue component(s), including Analogue/Digital-Converter (see Figure 1), EMC – Electromagnetic Compatibility.

YY.2.2. Software requirements

The metrologically significant software of a PC, i.e., the software that is critical for measurement characteristics, measurement data and metrologically important parameters stored or transmitted, is considered as an essential part of a weighing instrument and shall be examined according to Annex G.2. The metrologically significant software shall meet the following requirements.

a. The metrologically significant software shall be adequately protected against accidental or intentional changes. Evidence of an intervention such as changing, uploading or circumventing the metrologically significant software shall be available until the next verification or comparable official inspection. This requirement implies that:

   The protection against intentional changes with special software tools is not the object of these requirements, because this is considered as criminal action. It can normally be assumed that it is not possible to influence metrologically significant parameters and data – especially processed variable values – as long as they are processed by a program which fulfils these requirements. However, if metrologically significant parameters and data – especially final variable values – will be transmitted out of the protected software part for applications or functions subject to legal control, they shall be secured to meet the requirements of 5.3.6.3.

   The metrologically significant software with all data, parameters, variable values, etc., will be regarded as sufficiently protected, if they cannot be changed with common software tools. At the moment, for example, all kinds of text editors are regarded as common software tools.

   Acceptable solution:

   After program start automatic calculation of a checksum over the machine code of the complete metrologically significant software (at least a CRC-16 checksum with hidden polynomial) and comparison of the result with a stored fixed value. No start if the machine code is falsified.

b. When there is associated software which provides other functions besides the measuring function(s), the metrologically significant software shall be identifiable and shall not be inadmissibly influenced by the associated software.

   This requirement implies that:

   Associated software is separated from the metrologically significant software in a sense that they communicate via a software interface.

   A software interface is regarded as being protective if:
   - in accordance with 5.3.6.1 only a defined and allowed set of parameters, functions and data can be exchanged via this interface, and
   - if both parts cannot exchange information via any other link.

   Software interfaces are part of the metrologically significant software. Circumventing the protective interface by the user is considered as a criminal action.

   Acceptable solution:

   Definition of all functions, commands, data, etc., which are exchanged via the protective interface from the metrologically significant software to all other connected software or hardware parts. Checking whether all functions, commands and data are allowed.

c. Metrologically significant software shall be identified as such and shall be secured. Its identification shall be easily provided by the device for metrological controls or inspections.

This requirement implies that:

The operating system or similar auxiliary standard software, such as video drivers, printer drivers or hard disk drivers, need not be included in the software identification.

Acceptable solution:

Calculation of a checksum over the machine code of the metrologically significant software at runtime and indication on manual command. This checksum represents the metrologically significant software and can be compared to the checksum defined at type approval.

d. In addition to all other required documentation, the special software documentation shall include:

- A description of the system hardware, e.g., block diagram, type of computer(s), type of network, if not described in the operating manual (see also Table ZZ)
- A description of the software environment for the metrologically significant software, e.g., the operating system, required drivers, etc.
- A description of all metrologically significant software functions, metrologically significant parameters, switches and keys that determine the functionality of the instrument, including a declaration of the completeness of this description
- A description of the relevant measuring algorithms (e.g., stable equilibrium, price calculation, rounding algorithms)
- A description of the relevant menus and dialogues
- The securing measures foreseen (e.g., checksum, signature, audit trail)
- The complete set of commands and parameters – including a short description of each command and parameter – that can be exchanged between the metrologically significant software and the associated software via the protective software interface, including a declaration of the completeness of the list
- The software identification foreseen for the metrologically significant software
- If downloading of software via modem or internet is foreseen: a detailed description of the loading procedure and the securing measures against accidental or intentional changes
- If downloading of software via modem or internet is not foreseen: a description of the measures taken to prevent inadmissible uploading of metrologically significant software
- In case of long-term storage or transmission of data via networks: a description of the data sets and protection measures (see 5.5.3)

YY.3. Data storage devices (DSD).
If there is a device, whether incorporated in the instrument or being part of the instrument as software solution or connected to it externally, that is intended to be used for long-term storage of weighing data (in the sense of T.2.8.5), the following additional requirements apply.

YY.3.1. The DSD must have a storage capacity which is sufficient for the intended purpose.
Note: The regulation concerning the minimum duration for keeping information is outside the requirements concerning instruments and probably left to national rules concerning trade. It is the responsibility of the owner of the instrument to have an instrument that has sufficient capacity of storage to fulfill the requirements applicable to his activity. At type examination it will only be checked that the data are stored and given back correctly, and that there are adequate means foreseen to prevent the loss of data if the storage capacity is exhausted before the duration foreseen.

YY.3.2. The metrologically significant data stored must include all relevant information necessary to reconstruct an earlier weighing.
Note: Metrologically significant data are (see also T.2.8.1): gross or net values and tare values (if applicable, together with a distinction of tare and preset tare), the decimal sign(s), the unit(s) (may be encoded), the

identification of the data stored, the identification number of the instrument or load receptor if several instruments or load receptors are connected to the data storage device, and a checksum or other signature of the data stored.

YY.3.3. The metrologically significant data stored shall be adequately protected against accidental or intentional changes.
Examples of acceptable solutions:

a. A simple parity check is considered sufficient in order to protect the data against accidental changes during transmission.

b. The data storage device may be realized as an external software-controlled device using, for instance, the hard disk of a PC as the storage medium. In this case the respective software shall meet the software requirements in 5.5.2.2. If the stored data are either encrypted or secured by a signature (at least 2 bytes, e.g., a CRC-16 checksum with hidden polynomial) this will be considered sufficient in order to protect the data against intentional changes.

YY.3.4. The metrologically significant data stored shall be capable of being identified and displayed, where the identification number(s) shall be stored for later use and recorded on the official transaction medium. In case of a printout the identification number(s) shall be printed.
Example of an acceptable solution:

The identification may be realized as consecutive numbers or as the respective date and time (mm:dd:hh:mm:ss) of the transaction.

YY.3.5. The metrologically significant data shall be stored automatically.
Note: This requirement means that the storing function must not depend on the decision of the operating person. It is accepted, however, if intermediate weighings that are not used for the transaction are not stored.

YY.3.6. Stored metrologically significant data sets which are to be verified by means of the identification must be displayed or printed on a device subject to legal control.

YY.3.7. Data Storage Devices are identified as a feature, option, or parameter on an NTEP CC if they are incorporated in the instrument or form part of the instrument as software solution.

October Meeting Discussion:
The Sector agreed that Handbook 44 already has audit trail and physical seal, but these may need to be enhanced.

From WELMEC document:

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 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.

Proposed checklist for Publication 14 numbering will still need to be added. This is based roughly on R 76 – 2 checklist and discussion at October Sector Meeting.

Devices with Embedded Software TYPE P (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 metrologically significant 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 of 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 (not built-for-purpose)			
	The *metrologically significant* software is:		
		documented with all relevant 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 (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 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** ☐

From previous notes this may be part of another section in the publication.

Software Identification			
	The metrologically significant software is identified by a software identification		**Yes** ☐ **No** ☐ **N/A** ☐
	The software identification:		
		covers all program modules of the metrologically significant software and the type-specific parameters at runtime of the instrument	**Yes** ☐ **No** ☐ **N/A** ☐
		is easily provided by the instrument	**Yes** ☐ **No** ☐ **N/A** ☐
		can be compared with the reference identification fixed at type approval	**Yes** ☐ **No** ☐ **N/A** ☐
		spot checks whether the checksums (signatures) are generated and work as documented	**Yes** ☐ **No** ☐ **N/A** ☐
		there exists an effective audit trail	**Yes** ☐ **No** ☐ **N/A** ☐

Data Storage Devices (DSD) **From the previous meeting, this was tabled (This checklist was not reworked at this time)**					
5.5.3	G.3.1	DSD realised with embedded software (examine software acc. to G.1)			Yes ☐ No ☐
		DSD realised with programmable/loadable software (examine software acc. to G.1)			Yes ☐ No ☐
		documentation with all relevant information			Yes ☐ No ☐
5.5.3.1	**G.3.2**	sufficient storage capacity for the intended purpose			
		data are stored and given back correctly			
		sufficient description of measures to prevent data loss			
5.5.3.2	**G.3.3**	storage of all relevant information necessary to reconstruct an earlier weighing, i.e., gross, net, tare values, decimal signs, units, identifications of the data set, instrument number, load receptor, (if applicable), checksum/signature of the data set stored.			
5.5.3.3	**G.3.4**	protection of the stored metrologically significant data against accidental or intentional changes			
		protection of the stored metrologically significant data at least with a parity check during transmission to the storage device			
		protection of the stored metrologically significant data at least with a parity check of a storage device with embedded software (5.5.1)			
		protection of the stored metrologically significant data by an adequate checksum or of a storage device with programmable or loadable software (5.5.2)			
5.5.3.4	**G.3.5**	identification and indication of the stored metrologically significant data with an identification number			
		record of the identification number on the official transaction medium, i.e., on the print-out			
5.5.3.5	**G.3.6**	automatic storage of the metrologically significant data			
5.5.3.6	**G.3.7**	a device subject to legal control prints or displays the stored metrologically significant data for verifying			

6. Software Maintenance and Reconfiguration

After the software is completed, what do the manufacturers use to secure their software?

Source: NTETC Software Sector

From Previous Meeting:
Traced means audit trail record – requires Category 3 audit trail.

Verified means evaluator verified – requires breaking a seal and placing back into service by registered agent or W&M official. (D-SW requires agent to be present to verify the update.) It was noted that in some jurisdiction, this role may be performed by a registered service agent.

October Meeting discussion:

(This section taken from Document OIML D-SW Working Draft 1 WD and provided as background.)

Maintenance and re-configuration
Only versions of metrologically significant software that conform with the approved type are allowed for use.

Verified update

The software to be updated can be loaded locally (e.g., directly) on the weighing or measuring device or remotely via a network. Loading and installation may be two different steps (as shown in Fig. 5.1) or combined to one, depending on the needs of the technical solution. After update of the metrologically significant software of a weighing or measuring device (exchange with another approved version or re-installation), the weighing or measuring device is not allowed to be used for legal purposes before a (subsequent) verification of the instrument has been performed and the securing means have been renewed. A person responsible for verification must be at place. (NOTE: This may need to be in the HB under user requirement.)

Traced update

The software is implemented into the instrument according to the requirements for traced update. Traced update is the procedure of changing software in a verified instrument or device after which the subsequent verification by a responsible person at place is not necessary. The software to be updated can be loaded locally (e.g., directly) on the weighing or measuring device or remotely via a network. The software update is recorded in an audit trail. The procedure of a traced update comprises several steps: loading, integrity checking, checking of the origin (authentication), installation, logging and activation.

Traced update of software shall be automatic. On completion of the update procedure the software protection environment shall be at the same level as required by the type approval.

The target measuring instrument (device, sub-assembly) shall have fixed metrologically significant software that cannot be updated and that contains all of the checking functions necessary for fulfilling traced update requirements.

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 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 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 use the previous version of the software **or become inoperative.**

It shall be guaranteed by technical means that software may only be updated with the explicit consent of the user or owner of the measuring instrument.

If the requirements above cannot be fulfilled, it is still possible to update the legally non-relevant software part. In this case the following requirements shall be met:

- There is a distinct separation between the metrologically significant and non-relevant software.
- The whole metrologically significant software part cannot be updated without breaking a seal.
- It is stated in the type approval certificate that updating of the legally non-relevant part is acceptable.

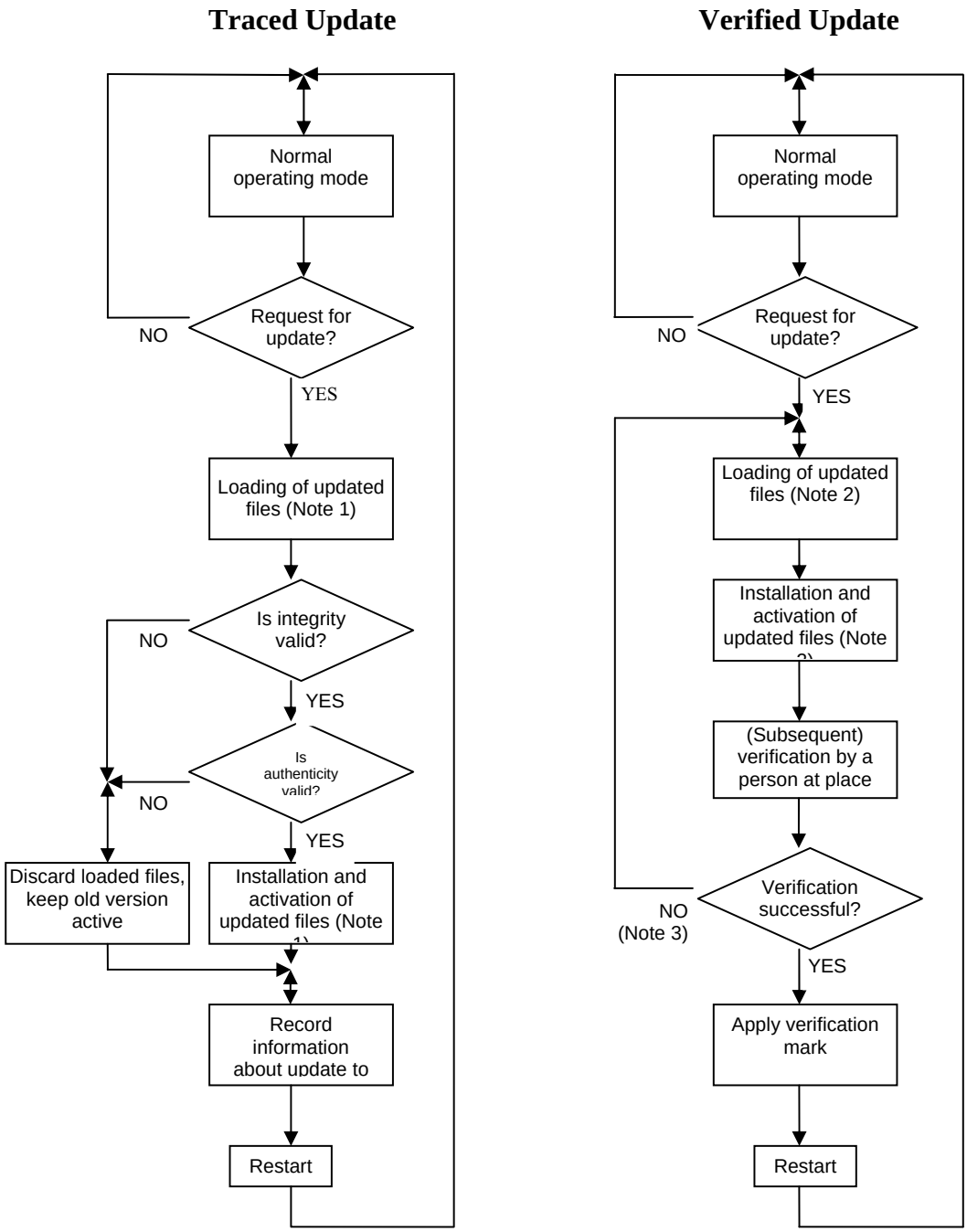

Figure 5-1: Software Update Procedures

Notes to

Figure 5-1:

1. In case of *Traced update*, updating is separated into the 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 fall back to the old version, if the checks fail **or become inoperative.**
2. In case of *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 failing of the verification because of the software update is considered. Failing because of other reasons doesn't require re-loading and re-installing of the software, symbolised by the NO-branch.

End of background information

Conclusions from October meeting discussion:
These four items are the accepted checklist questions:

1. Verify that the update process is documented
2. Software to be installed is authenticated and checked for integrity
3. Verify that the sealing requirements are met
4. 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).

An entry is generated for each update.
The audit trail shall contain the following information:
- notification of the update procedure,
- software identification of the installed version,
- time stamp of the event,
- identification of the downloading party.

The traceability means and records are part of the metrologically significant software and should be protected as such. 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 manufacturers' concerns about where the software that displays the audit trail information is located and who has access if this feature is provided.***

The Sector will continue to develop this item.

7. Verification in the Field, by the W&M Inspector

Source: NTETC Software Sector

October Meeting Comments:
Question: What tools does the field inspector need?

Possible Answers:
- Have NTEP CC No. continuously displayed (needs some type of protection) during the normal weighing or measuring operation
- Clear and simple instructions on NTEP CC to get to the other Inspection Information
- The CRC, checksum, version no. etc., needs to be easily accessible from operator console.
- How to access audit trail
- System information is easily accessible (RAM, OS, etc.)
- System parameters are easily accessible (AZT, motion, time outs, etc.)

Conclusion from the October meeting:
The Sector will continue to develop this item.

8. NTEP Application

Source: NTETC Software Sector

Conclusion from the October meeting:
No direct discussion on this item took place at the October 2007 meeting.

New Items

9. Next Meeting

Conclusion from the October meeting:
The next meeting could be scheduled in conjunction with the NTEP Lab Meeting which is planned for Ottawa, Canada toward the end of April. Information regarding dates and location is now being gathered. The Sector will be notified as soon as additional information is available.

Report of the Nominating Committee

Don Onwiler, Chairman
Program Manager, Division of Weights and Measures
Nebraska Department of Agriculture

Reference
Key Number

800 INTRODUCTION

The Nominating Committee met during the Interim Meeting at the Hyatt Regency Hotel, Albuquerque, New Mexico, at which time the Committee nominated the persons listed below to be officers of the 94th 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:

CHAIRMAN-ELECT:	Randy Jennings, State of Tennessee
BOARD OF DIRECTORS SOUTHERN REGION:	Stephen Benjamin, State of North Carolina
BOARD OF DIRECTORS AT LARGE:	Stephen Langford, Cardinal Scale Manufacturing Co.
TREASURER:	Will Wotthlie, State of Maryland

Don Onwiler, Nebraska, Chairman

Ross Andersen, New York
Dennis Ehrhart, Arizona
Tom Geiler, Barnstable, Massachusetts
Max Gray, Florida
Steve Malone, Nebraska, Chairman
Jim Truex, Ohio

Nominating Committee

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