DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

49 CFR Parts 107, 171, 172, 173, 175, 176, 178, and 180

[Docket No. PHMSA–2015–0273 (HM–215N)]

RIN 2137–AF18

Hazardous Materials: Harmonization With International Standards (RRR)

AGENCY: Pipeline and Hazardous Materials Safety Administration (PHMSA), Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: PHMSA is issuing a final rule to amend the Hazardous Materials Regulations (HMR) to maintain consistency with international regulations and standards by incorporating various amendments, including changes to proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, air transport quantity limitations, and vessel stowage requirements. These revisions are necessary to harmonize the HMR with recent changes made to the International Maritime Dangerous Goods Code, the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air, and the United Nations Recommendations on the Transport of Dangerous Goods—Model Regulations. Additionally, PHMSA is adopting several amendments to the HMR that result from coordination with Canada under the U.S.-Canada Regulatory Cooperation Council.

DATES: *Effective date:* This rule is effective March 30, 2017, except for instruction 22, which is effective January 2, 2019.

Voluntary compliance date: January 1, 2017.

Delayed compliance date: Unless otherwise specified, compliance with the amendments adopted in this final rule is required beginning January 1, 2018.

Incorporation by reference date: The incorporation by reference of certain publications listed in this rule is approved by the Director of the Federal Register as of March 30, 2017.

FOR FURTHER INFORMATION CONTACT: Steven Webb International Standards, (202) 366–8553, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue SE., 2nd Floor, Washington, DC 20590–0001.

SUPPLEMENTARY INFORMATION:

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I. Executive Summary

The Pipeline and Hazardous Materials Safety Administration (PHMSA) is amending the Hazardous Materials Regulations (HMR; 49 CFR parts 171 to 180) to maintain consistency with international regulations and standards by incorporating various amendments, including changes to proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, air transport quantity limitations, and vessel stowage requirements. This rulemaking project is part of our ongoing biennial process to harmonize the HMR with international regulations and standards.

Federal law and policy strongly favor the harmonization of domestic and international standards for hazardous materials transportation. The Federal hazardous materials transportation law (Federal hazmat law; 49 U.S.C. 5101 *et seq.*) directs PHMSA to participate in relevant international standard-setting bodies and promotes consistency of the HMR with international transport standards to the extent practicable. Federal hazmat law permits PHMSA to depart from international standards where appropriate, including to promote safety or other overriding public interest. However, Federal hazmat law otherwise encourages domestic and international harmonization (*see* 49 U.S.C. 5120).

Harmonization facilitates international trade by minimizing the costs and other burdens of complying with multiple or inconsistent safety requirements for transportation of hazardous materials. Safety is enhanced by creating a uniform framework for compliance, and as the volume of hazardous materials transported in international commerce continues to grow, harmonization becomes increasingly important.

II. Background

PHMSA published a notice of proposed rulemaking (NPRM) under Docket HM–215N [81 FR 61741 (Sept. 7, 2016)] to incorporate various amendments to harmonize the HMR with recent changes to the International Maritime Dangerous Goods Code (IMDG Code), the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions), and the United Nations Recommendations on the Transport of Dangerous Goods—Model Regulations (UN Model Regulations). When considering alignment of the HMR with international standards, we review and evaluate each amendment on its own merit, on the basis of its overall impact on transportation safety, and on the basis of the economic implications associated with its adoption into the HMR. Our goal is to harmonize without diminishing the level of safety currently provided by the HMR or imposing undue burdens on the regulated community. Based on this review and evaluation, in this final rule, PHMSA is amending the HMR to incorporate changes from the 19th Revised Edition of the UN Model Regulations, Amendment 38–16 of the IMDG Code, and the 2017–2018 ICAO Technical Instructions, which become effective January 1, 2017. (Amendment 38–16 to the IMDG Code may be voluntarily applied on January 1, 2017; however, the previous amendment remains effective through December 31, 2017) Notable amendments to the HMR in this final rule include the following:

- *Incorporation by Reference:* PHMSA incorporates by reference the newest versions of various international hazardous materials standards, including the 2017–2018 Edition of the ICAO Technical Instructions; Amendment 38–16 of the IMDG Code; the 19th Revised Edition of the UN Model Regulations; the 6th Revised Edition of the UN Manual of Tests and Criteria; and the 6th Revised Edition of the Globally Harmonized System of Classification and Labelling of Chemicals. Additionally, we are updating our incorporation by reference of the Canadian Transportation of Dangerous Goods (TDG) Regulations to include SOR/2014–152 and SOR/2014–

159 published July 2, 2014; SOR/2014–159 Erratum published July 16, 2014; SOR/2014–152 Erratum published August 27, 2014; SOR/2014–306 published December 31, 2014; SOR/2014–306 Erratum published January 28, 2015; and SOR/2015–100 published May 20, 2015. Finally, in this final rule, PHMSA adopts various updated International Organization for Standardization (ISO) standards.

• *Hazardous Materials Table (HMT):* PHMSA amends the § 172.101 Hazardous Materials Table (HMT) consistent with recent changes in the Dangerous Goods List of the 19th Revised Edition of the UN Model Regulations, the IMDG Code, and the ICAO Technical Instructions. Specifically, we are making amendments to the HMT to add, revise, or remove certain proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, bulk packaging requirements, and passenger and cargo aircraft maximum quantity limits.

• *Provisions for Polymerizing Substances:* PHMSA includes in the HMT four new Division 4.1 entries for polymerizing substances and adds into the HMR defining criteria, authorized packagings, and safety requirements including, but not limited to, stabilization methods and operational controls. These provisions will be in effect until January 2, 2019. During the interim time period, PHMSA intends to review and research the implications of the polymerizing substance amendments during this two-year timeframe, and readdress the issue in the next international harmonization rulemaking.

• *Modification of the Marine Pollutant List:* PHMSA modifies the list of marine pollutants in appendix B to § 172.101. The HMR maintain this list as the basis for regulating substances toxic to the aquatic environment and allow use of the criteria in the IMDG Code if a listed material does not meet the criteria for a marine pollutant. PHMSA periodically updates this list based on changes to the IMDG Code and evaluation of listed materials.

• *Packaging Requirements for Water-Reactive Materials Transported by Vessel:* PHMSA amends packaging requirements for vessel transportation of water-reactive substances consistent with requirements in the IMDG Code. The amendments include changes to the packaging requirements to require certain commodities to have hermetically sealed packaging and to require other commodities—when packed in flexible, fiberboard, or wooden packagings—to have sift-proof and water-resistant packaging or packaging fitted with a sift-proof and water-resistant liner.

• *Hazard Communication Requirements for Lithium Batteries:* PHMSA revises hazard communication requirements for shipments of lithium batteries consistent with changes adopted in the 19th Revised Edition of the UN Model Regulations. Specifically, PHMSA adopts a new lithium battery label in place of the existing Class 9 label; amends the existing marking requirements for small lithium battery shipments in § 173.185(c) to incorporate a new standard lithium battery mark for use across all modes; [1] removes the documentation requirement in § 173.185(c) for shipments of small lithium cells and batteries; and requires the lithium battery mark be applied to each package containing small lithium cells or batteries contained in equipment when there are more than four lithium cells or two lithium batteries installed in the equipment or where there are more than two packages in the consignment.

• *Engine, Internal Combustion/Machinery, Internal Combustion:* PHMSA harmonizes the HMT proper shipping names utilized for the transportation of engines and machinery containing engines with those in the UN Model Regulations. Additionally, PHMSA harmonizes with the IMDG Code for domestic vessel shipments of engines, internal combustion, and machinery containing combustion engines. Existing requirements and exceptions for the transportation of engines and machinery containing engines transported by road, rail, and aircraft remain unchanged. However, PHMSA is harmonizing the transportation requirements for transportation by vessel, which includes varying degrees of hazard communication based on the type of fuel, amount of fuel, and capacity of the fuel tank.

• *U.S.-Canada Regulatory Cooperation Council (RCC) Amendments:* PHMSA makes amendments to the HMR resulting from coordination with Canada under the U.S.-Canada RCC. Specifically, we are adopting provisions for recognition of Transport Canada (TC) cylinders, equivalency certificates (permit for equivalent level of safety), and inspection and repair of cargo tanks. In a parallel effort, Transport Canada is adopting similar regulatory changes that will provide reciprocal recognition of DOT cylinders and DOT special permits.

[1] Small cells and batteries for the purposes of this rulemaking are a lithium metal cell containing not more than 1 gram of lithium metal, a lithium metal battery containing not more than 2 grams of lithium metal, a lithium ion cell not more than 20 Watt-hours (Wh), and a lithium ion battery not more than 100 Wh (49 CFR 173.185(c) and Section II of Packing Instructions 965 and 968 in the ICAO Technical Instructions).

III. Incorporation by Reference Discussion Under 1 CFR Part 51

The UN Recommendations on the Transport of Dangerous Goods—Model Regulations, Manual of Tests and Criteria, and Globally Harmonized System of Classification and Labelling of Chemicals, as well as all of the Transport Canada Clear Language Amendments, are free and easily accessible to the public on the internet, with access provided through the parent organization Web sites. The ICAO Technical Instructions, IMDG Code, and all ISO references are available for interested parties to purchase in either print or electronic versions through the parent organization Web sites. The price charged for those not freely available references helps to cover the cost of developing, maintaining, hosting, and accessing these standards. The specific standards are discussed at length in the ''Section-by-Section Review'' for § 171.7.

PHMSA received a comment from the Commercial Vehicle Safety Alliance (CVSA) recommending that access (including electronic and print media) to materials, such as technical standards developed by non-governmental organizations and incorporated by reference into regulation, be required at no additional charge for enforcement and government purposes. As noted, many of the standards incorporated by reference in this final rule are available for free through their parent organizations. However, some standards that are essential to ensure shippers offer hazardous materials in accordance with international standards are simply not available for free public access, and PHMSA is unable to provide unrestricted access to these materials. Members of the public may access hard copies of standards incorporated by reference at PHMSA's Hazardous Materials Information Center (HMIC) at DOT Headquarters in Washington, DC. Members of the public may make arrangements to visit the HMIC by visiting HMIC's Web site at *http://www.phmsa.dot.gov/hazmat/standardsrulemaking/hmic* or by telephone at (800) 467–4922. PHMSA staff will work directly with any person requesting access to these standards.

IV. Comment Discussion

In response to the September 7, 2016 NPRM [81 FR 61741], PHMSA received comments from the following organizations and individuals:

- Christopher Adams
- Alaska Airlines
- American Coatings Association (ACA)
- Anonymous
- Arkema Inc.
- Basic Acrylic Monomer Manufacturers, Inc. (BAMM) and the Methacrylate Producers Association, Inc. (MPA)
- Sean Bevan
- Commercial Vehicle Safety Alliance (CVSA)
- Council on Safe Transportation of Hazardous Articles (COSTHA)
- CTC Certified Training Co.
- Dangerous Goods Advisory Council (DGAC)
- Deltech Corporation
- Department of Defense (DOD)
- Dow Chemical (Dow)
- FIBA Technologies, Inc.
- Greg Hudspeth
- The Institute of Makers of Explosives (IME)
- International Vessel Operators Dangerous Goods Association (IVODGA)
- Brent Knoblett
- Labelmaster Services
- National Tank Truck Carriers (NTTC)
- The Rechargeable Battery Association (PRBA)
- Wesley Scott
- Specialty Trailer Leasing Inc.
- United Parcel Service (UPS)
- U.S. Amines
- Western International Gas Cylinders
- Worthington Industries

Notably, Dow requested an additional two-year delayed compliance period for any polymerizing substance amendments made in this final rule. Dow contends that appropriate test methods must be determined, materials must be tested, and if the material is determined to be regulated, appropriate packaging must be selected. PHMSA is sympathetic to the concerns raised by Dow, but in order to ensure the safe and efficient transportation of these commodities, PHMSA will maintain the general one-year transition period for these changes. Additional comments specific to the respective HMR sections are addressed in the ''Section-by-Section Review'' of this document.[2]

PHMSA concluded that comments made by Specialty Trailer Leasing, Inc., Mr. Greg Hudspeth, the American Coating Association, and portions of comments made by Worthington Industries are outside the scope of this rulemaking. Therefore, PHMSA did not address these comments in this rulemaking.

[2] Comments which were outside the scope of this rulemaking are not addressed in this final rule.

Polymerizing Substances

In the NPRM, PHMSA proposed incorporating into the HMT four new Division 4.1 entries for polymerizing substances and adding into the HMR defining criteria, authorized packagings, and safety requirements including, but not limited to, stabilization methods and operational controls for these new entries and existing entries requiring stabilization.

PHMSA received comments from Arkema Inc., BAMM & MPA, Deltech Corporation, DGAC, Dow Chemical, and U.S. Amines concerning our proposed amendments. These comments addressed: Materials assigned SP 387 requiring stabilization; testing methods for determining self-accelerating polymerization temperature (SAPT); questions concerning testing requirements for materials already identified in the HMT as materials requiring stabilization; exclusion from classification as polymerizing substances of materials meeting the definition of another hazard class (including combustible liquids); and the SAPT temperature threshold before temperature control is required for portable tanks transporting polymerizing substances.

U.S. Amines requested that PHMSA reconsider assigning special provision 387 to Dipropylamine (UN2383). U.S. Amines asserts this material does not pose a polymerization risk and provides safety data sheets and other associated technical data to substantiate their claim. Based on a review of the material in question, PHMSA agrees and is not assigning either special provision 387 or stowage code 25 to this material.

PHMSA received comments from Arkema Inc., BAMM & MPA, DGAC, and Deltech raising concerns over PHMSA's proposal to require polymerizing substances intended to be transported in portable tanks or IBC's to undergo the Test Series E heating under confinement testing from the UN Manual of Tests and Criteria. The commenters state that when polymerizing substances react in the test apparatus they often clog the test apparatus orifice. They further state this testing leads to unreliable, overly conservative results suggesting the material poses a greater hazard from heating under confinement that it actually does. Additionally, the commenter requested PHMSA align with the international approach for testing these substances, which only requires testing the substances under Test Series H to determine the substances' SAPT. While testing in accordance with UN Series E does present difficulties, this testing has been performed in the past in support of approval applications for various polymerizing substances. Additionally, while a clogged orifice within the Series E tests could be overly conservative, it is important to note that similar situations may occur during transport. For instance, a polymerizing substance which clogs the orifice during testing could potentially clog the pressure relief device on a portable tank. In such an incident, the testing would provide similar results on what could be expected within a transportation situation. Test Series E and H do not measure and/or predict the same phenomena. PHMSA notes Test Series E (or an equivalent performance measure) provides information on how the material behaves when heated under confinement. Test Series H provides information on the SAPT, and thus the potential need for temperature controls. These two tests are synergistic, and not mutually exclusive. For these reasons, PHMSA is maintaining the testing requirements for polymerizing substances as proposed in the NPRM.

PHMSA received questions from Arkema Inc., BAMM & MPA, and Dow about exclusions from classification as polymerizing substances for combustible liquids and Class 9 substances. These same commenters also ask about testing requirements for materials currently identified in the HMT that may also polymerize. Arkema Inc., BAMM & MPA, and DOW request clarification that as proposed in the NPRM materials meeting the definition of a combustible liquid and a polymerizing substance would not need to be offered as a polymerizing substance. Arkema Inc. and BAMM & MPA similarly ask if substances meeting the definitions of Class 9 and polymerizing substances need to be offered as a polymerizing substance. The definition of polymerizing substance adopted by the UN Model Regulations excludes substances that meet the criteria for inclusion in Classes 1–8. In the NPRM we proposed to exclude all materials that meet the definition of any other hazard class. To further harmonize the HMR definition of polymerizing substances with that found in the Model Regulations, PHMSA is amending § 173.124(a)(4)(iii) to exclude substances that meet the criteria for inclusion in Classes 1–8, including combustible liquids. It is our belief that polymerizing substances that also meet the definition of Class 9 would be limited to environmentally hazardous substances. Much like the UN we believe that the polymerizing

properties of these materials should take precedence in the identification of these materials, and that the applicable additional description elements (*i.e.* marine pollutant or ''RQ'' for hazardous substance) should be appropriately identified by shippers. Substances that meet the defining criteria for combustible liquids and polymerizing substances are only required to be offered for transportation as a combustible liquid.

PHMSA received comments from BAMM & MPA, Deltech Corporation, and DGAC concerning our proposal to maintain a minimum SAPT temperature of 50 °C for portable tanks versus the internationally adopted 45 °C. The commenters cite PHMSA's decision not to harmonize the transport provisions applicable to self-reactive materials and organic peroxides and potential non-compliance concerns for imported materials that were evaluated and offered for transport at different temperatures than the proposal would require in the HMR. PHMSA has, and does still maintain that 50 °C is the maximum temperature reasonable expected to be experienced by any self-reactive, organic peroxide, and/or polymerizing substance. Additionally, we note that this 50 °C (122 °F) temperature is consistent with existing requirements for Division 4.1 (Self-reactive) and Division 5.2 (Organic peroxide) hazardous materials.

PHMSA received comments the proposed inclusion of HMT entries, classification criteria, and transport provisions for polymerizing substances. In light of the commenter's concerns, PHMSA is including ''sunset'' provisions for all amendments concerning polymerizing substances. In each regulatory citation adding or amending requirements for polymerizing substances we are including regulatory text that will sunset the provision after a two-year period from the effective date of this rule. PHMSA intends to review and research the implications of the polymerizing substance amendments during this two-year timeframe, and readdress the issue in the next international harmonization rulemaking. During the next international harmonization rulemaking, we will specifically solicit comments from the public on their experiences utilizing these provisions. If PHMSA does not take subsequent action to amend these provisions, the HMR would revert to the requirements in effect before the issuance of this final rule.

V. Section-by-Section Review

The following is a section-by-section review of the amendments adopted in this final rule:

Part 107

Section 107.502

Section 107.502 provides general requirements for the registration of cargo tanks and cargo tank motor vehicle manufacturers, assemblers, repairers, inspectors, testers, and design certifying engineers. PHMSA is revising paragraph (b) to provide an exception from the registration requirements for certain persons engaged in the repair, as defined in § 180.403, of DOT specification cargo tanks by facilities in Canada in accordance with the requirements of § 180.413(a)(1)(iii) in this final rule. Persons engaged in the repair of cargo tanks in Canada are required to register in accordance with the Transport Canada TDG Regulations, as the Canadian registration requirements are substantially equivalent to those in part 107, subpart F of the HMR. The registration information is available on Transport Canada's Web site at *http://wwwapps.tc.gc.ca/saf-sec-sur/3/fdr-rici/highway/tanks.aspx*. The Transport Canada TDG Regulations except persons repairing TC specification cargo tanks at facilities in the United States from registering in Canada if they are registered in accordance with part 107, subpart F.

Therefore, PHMSA believes that requiring the registration of Canadian cargo tank repair facilities authorized by § 180.413(a)(1)(iii) is unnecessarily duplicative and that excepting them from registering in accordance with part 107 subpart F augments reciprocity without negatively impacting safety. See the § 180.413 entry in the ''Section-by-Section Review'' of this document for additional background and discussion of this change.

Section 107.801

Section 107.801 prescribes approval procedures for persons seeking to engage in a variety of activities regulated by PHMSA (*i.e.,* independent inspection agencies, cylinder requalification). PHMSA is amending paragraph (a)(2) to include provisions for persons seeking approval to engage in the requalification, rebuilding, or repair of a cylinder manufactured in accordance with a Transport Canada (TC), Canadian Transportation Commission (CTC), Board of Transport Commissioners for Canada (BTC), or Canadian Railway Commission (CRC) specification under the Transport Canada TDG Regulations. Persons engaged in the requalification, rebuilding, or repair of TC, CTC, BTC, or CRC specification cylinders in the U.S. are required to register with DOT in accordance with this subpart. PHMSA will issue a new approval or revise an existing one to reflect the applicant's intent to requalify TC cylinders. See the § 107.805 entry in the ''Section-by-Section Review'' of this document for discussion of this change, as well as for additional requirements and exceptions.

Section 107.805

Section 107.805 prescribes the requirements cylinder and pressure receptacle requalifiers must meet in order to be approved by PHMSA. PHMSA is amending paragraph (a) to authorize prospective requalifiers to obtain approval by PHMSA to inspect, test, certify, repair, or rebuild TC specification cylinders; amending paragraph (c)(2) to ensure the types of TC cylinders intended to be inspected, tested, repaired, or rebuilt at the facility are included in the application for approval to PHMSA; and amending paragraph (d) to include various TC cylinders to the list of cylinders requiring issuance of a RIN to requalifiers.

PHMSA is also amending paragraph (f) to recognize facilities authorized by Transport Canada to requalify comparable DOT specification cylinders, as well as DOT RIN holders to requalify comparable Transport Canada cylinders subject to modification of their existing approval. PHMSA recognizes that Transport Canada's approval and registration requirements are substantially equivalent to the requirements in 49 CFR part 107, subpart I, and provide an equivalent level of safety. In addition, traceability is maintained based on Transport Canada's publicly available Web site at *http://wwwapps.tc.gc.ca/saf-sec-sur/3/fdr-rici/cylinder/requalifier.aspx*, which allows tracing of a DOT specification cylinder marked with the registered mark of a Transport Canada assigned requalifier back to the appropriate requalification facility.[3]

The addition of paragraph (f)(2) allows persons who are already registered with PHMSA to perform requalification functions on DOT specification cylinders to register to requalify corresponding TC cylinder

[3] The search function on Transport Canada's Web site allows users to search for the registered mark of requalifiers. Searching by the registered mark found on a cylinder will allow interested parties to verify that the cylinder was requalified by a facility certified by Transport Canada.

specifications without additional review by an independent inspection agency. Table 1 of the § 171.12 entry in the ''Section-by-Section Review'' identifies specifications considered to be equivalent. Applicants will be required to submit all of the information prescribed in § 107.705(a) that identifies the TC, CTC, CRC, or BTC specification cylinder(s) or tube(s) to be inspected; certifies the requalifier will operate in compliance with the applicable TDG Regulations; and certifies the persons performing requalification have been trained in the functions applicable to the requalifier activities.

The addition of paragraph (f)(3) allows persons who are already registered with Transport Canada to requalify corresponding DOT specification cylinders without additional application to PHMSA for approval. This exception will provide cylinder owners with additional access to repair and requalification facilities in Canada, while also broadening reciprocity with Canada.

Part 171

Section 171.2

Section 171.2 prescribes general requirements for each person performing functions covered by this subchapter. PHMSA is amending paragraph (h)(1) by adding the letters ''TC,'' ''CRC,'' and ''BTC'' to the list of specification indications that may not be misrepresented according to § 171.2(g). This is necessary as a result of amendments in § 171.12 authorizing the use of various Transport Canada approved specification cylinders under certain conditions.

Section 171.7

Section 171.7 provides a listing of all voluntary consensus standards incorporated by reference into the HMR, as directed by the National Technology Transfer and Advancement Act of 1996. According to the Office of Management and Budget (OMB), Circular A–119, ''Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities,'' government agencies must use voluntary consensus standards wherever practical in the development of regulations. Agency adoption of industry standards promotes productivity and efficiency in government and industry, expands opportunities for international trade, conserves resources, improves health and safety, and protects the environment.

PHMSA actively participates in the development and updating of consensus standards through representation on more than 20 consensus standard bodies and regularly reviews updated consensus standards and considers their merit for inclusion in the HMR.

For this rulemaking, we evaluated updated international consensus standards pertaining to proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, air transport quantity limitations, and vessel stowage requirements and determined that the revised standards provide an enhanced level of safety without imposing significant compliance burdens. These standards have well-established and documented safety histories, and their adoption will maintain the high safety standard currently achieved under the HMR. Therefore, in this final rule, PHMSA is adding and revising the following incorporation by reference materials:

- Paragraph (t)(1), which incorporates the *International Civil Aviation Organization* Technical Instructions for the Safe Transport of Dangerous Goods by Air, 2015–2016 Edition, is revised to incorporate the 2017–2018 Edition. The International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air contain detailed instructions necessary for the safe international transport of dangerous goods by air. The ICAO Technical Instructions support the broad principles by establishing requirements necessary to ensure hazardous materials are safely transported in aircraft while providing a level of safety that protects the aircraft and its occupants from undue risk.
- Paragraph (v)(2), which incorporates the *International Maritime Organization* International Maritime Dangerous Goods Code, 2014 Edition, Incorporating Amendment 37–14, English Edition, Volumes 1 and 2, is revised to incorporate the 2016 Edition, Amendment 38–16. The IMDG Code is intended to provide for the safe transportation of hazardous materials by vessel, protect crew members, and prevent marine pollution. The IMDG Code is based on the UN Model Regulations, but also includes additional requirements applicable to the transport of hazardous materials by sea (*e.g.,* requirements for marine pollutants; freight container loading procedures; stowage and segregation; and other requirements applicable to shipboard safety and preservation of the marine environment) that are not covered by the UN Model Regulations.
- Paragraph (w), which incorporates various *International Organization for Standardization* entries, is revised to incorporate by reference standards for the specification, design, construction, testing, and use of gas cylinders:

—ISO 3807:2013 Gas cylinders—Acetylene cylinders—Basic requirements and type testing is incorporated in paragraph (w)(16). ISO 3807:2013 specifies the basic and type testing requirements for acetylene cylinders with and without fusible plugs with a maximum nominal water capacity of 150 L (39.62 gallons) and requirements regarding production/batch test procedures for manufacturing of acetylene cylinders with porous material.

—ISO 7866:2012 Gas cylinders—Refillable seamless aluminium alloy gas cylinders—Design, construction and testing; and ISO 7866:2012/Cor 1:2014 Gas cylinders—Refillable seamless aluminium alloy gas cylinders—Design, construction and testing, Technical Corrigendum 1 is incorporated in paragraphs (w)(27) and (28). ISO 7866:2012 specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes and tests at time of manufacture of refillable seamless aluminium alloy gas cylinders of water capacities up to and including 150 L (39.62 gallons) for compressed, liquefied, and dissolved gases for worldwide use. PHMSA received a comment from Western International Gas Cylinders requesting that the previous edition of this standard be referenced with an applicability date. PHMSA notes that the previous edition of this standard was included in the NPRM, but we have amended the language to more clearly indicate that construction to the old standard is authorized until December 31, 2020.

—ISO 9809–4:2014 Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa is incorporated in paragraph (w)(36). ISO 9809–4:2014 specifies the minimum requirements for the material, design, construction and workmanship, manufacturing processes, examinations, and tests at manufacture of refillable seamless stainless steel gas cylinders of water capacities from 0.5 L (.13 gallons) up to and including 150 L (39.62 gallons) for compressed, liquefied, and dissolved gases.

—ISO 10297:2014 Gas cylinders—Cylinder valves—Specification and type testing is incorporated in

paragraph (w)(42). ISO 10297:2014 specifies design, type testing, and marking requirements for: (a) Cylinder valves intended to be fitted to refillable transportable gas cylinders; (b) main valves (excluding ball valves) for cylinder bundles; and (c) cylinder valves or main valves with integrated pressure regulator (VIPR); which convey compressed, liquefied, or dissolved gases.

—ISO 10462:2013 Gas cylinders—Transportable cylinders for dissolved acetylene—Periodic inspection and maintenance is incorporated in paragraph (w)(44). ISO 10462:2013 specifies requirements for the periodic inspection of acetylene cylinders as required for the transport of dangerous goods and for maintenance in connection with periodic inspection. It applies to acetylene cylinders with and without solvent and with a maximum nominal water capacity of 150 L (39.62 gallons).

—ISO 11114–2:2013 Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials is incorporated in paragraph (w)(48). ISO 11114–2:2013 gives guidance in the selection and evaluation of compatibility between non-metallic materials for gas cylinders and valves and the gas contents. It also covers bundles, tubes, and pressure drums.

—ISO 11119–1:2012 Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l; ISO 11119–2:2012 Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners; ISO 11119–2:2012/Amd 1:2014 Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners; and ISO 11119–3:2013 Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners are incorporated in paragraphs (w)(54), (56), (57), and (59), respectively. ISO 11119–1:2012, ISO 11119–2:2012, and ISO 11119–3:2013 specify requirements for composite gas cylinders and tubes between 0.5 L (39.62 gallons) and 450 L (119 gallons) water capacity, for the storage and conveyance of compressed or liquefied gases.

• Paragraph (bb)(1), which incorporates the *Transport Canada* Transportation of Dangerous Goods Regulations, adds paragraphs (bb)(1)(xiii), (xiv), (xv), (xvi), (xvii), (xviii), and (xix) to include SOR/2014–152 and SOR/2014–159 published July 2, 2014; SOR/2014–159 Erratum published July 16, 2014; SOR/2014–152 Erratum published August 27, 2014; SOR/2014–306 published December 31, 2014; SOR/2014–306 Erratum published January 28, 2015; and SOR/2015–100 published May 20, 2015, respectively. The Transport Canada Transportation of Dangerous Goods Regulations incorporated in this final rule are updates to the existing Transportation of Dangerous Goods Regulations and cover all updates made by Transport Canada between January 2014 and May 2015. PHMSA received a comment from COSTHA requesting we also incorporate by reference TDG Regulations, SOR/2016–95 published on June 1, 2016. However, as this standard was not proposed for incorporation in the NPRM, we are unable to adopt it in this final rule.

• Paragraph (dd)(1), which incorporates the *United Nations* Recommendations on the Transport of Dangerous Goods—Model Regulations, 18th Revised Edition (2013), Volumes I and II, is revised to incorporate the 19th Revised Edition (2015), Volumes I and II. The United Nations Model Regulations on the Transport of Dangerous Goods provide a basis for development of harmonized regulations for all modes of transport, in order to facilitate trade and the safe, efficient transport of hazardous materials.

• Paragraph (dd)(2), which incorporates the *United Nations* Recommendations on the Transport of Dangerous Goods—Manual of Tests and Criteria, 5th Revised Edition (2009), is revised to incorporate the 6th Revised Edition (2015). The Manual of Tests and Criteria contains criteria, test methods, and procedures to be used for classification of dangerous goods according to the provisions of Parts 2 and 3 of the United Nations Recommendations on the Transport of Dangerous Goods—Model Regulations, as well as of chemicals presenting physical hazards according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS).

• Paragraph (dd)(3) is added to incorporate the *United Nations* Recommendations on the Transport of Dangerous Goods—Globally Harmonized System of Classification and Labelling of Chemicals (GHS), 6th Revised Edition (2015). Section 172.401 references the incorporation by reference of the GHS in § 171.7; however, this entry does not currently appear in § 171.7. The addition of this paragraph corrects this oversight. The GHS addresses classification of chemicals by types of hazard and proposes harmonized hazard communication elements, including labels and safety data sheets. It aims at ensuring that information on physical hazards and toxicity from chemicals is available in order to enhance the protection of human health and the environment during the handling, transport, and use of these chemicals. GHS also provides a basis for harmonization of rules and regulations on chemicals at national, regional, and worldwide levels, which is an important factor for trade facilitation.

• In the NPRM, PHMSA proposed incorporating ISO 11515:2013 Gas cylinders—Refillable composite reinforced tubes of water capacity between 450 L and 3000 L—Design, construction and testing into the HMR. After further review, and in order to appropriately address comments received, the incorporation by reference of ISO 11515:2013 will be considered under a future rulemaking rather than adopted at this time. We note that ISO 11515:2013 is currently under review by the relevant ISO Technical Committee (*e.g.,* ISO/TC58/SC3). Substantive revisions under consideration include reintroduction of the high velocity impact (gunfire) test and revisions to the blunt impact test. Consideration of this item under a future rulemaking will allow for these safety enhancements to be appropriately considered by ISO. It also provides opportunity to consider comments received such as those requesting consideration of relevant special permits. PHMSA received a comment from FIBA Technologies, Inc. requesting that we expand the volume maximum allowed from 3000 L to 8500 L; reduce the minimum design burst pressure for Type 3 and Type 4 cylinders from 2.0 to 1.6; waive the blunt impact test if the tubes will be mounted inside a structural framework that finite analysis has demonstrated will protect the tubes from damage; and introduce a high velocity impact test. FIBA Technologies, Inc. correctly noted that these requirements, allowances, and tests are currently authorized under

existing special permits for composite tubes. These requests were outside the scope of this rulemaking, but we do note ongoing work at ISO to generate a standard for larger composite tubes.

In the NPRM, PHMSA proposed to incorporate by reference the Transport Canada standards into §§ 107.801 and 805 with the text ''IBR, See 171.7.'' Part 107 is in subchapter A. Section 171.7 is only applicable to subchapter C, therefore the IBR references proposed have in 107.801 and 805 would not have been valid. As a result PHMSA is amending § 171.7(a)(1) as central section for material that is incorporated by reference into subchapters A, B, and C.

Section 171.8

Section 171.8 defines terms generally used throughout the HMR that have broad or multi-modal applicability. PHMSA is adding the following terms and definitions:

- *Design life:* PHMSA adds the term ''design life'' to define the maximum life of composite cylinders and tubes. This term is specifically limited to references in the HMR related to composite cylinders and tubes.
- *SAPT:* PHMSA adds the term ''SAPT,'' which means self-accelerated polymerization temperature, and a reference to § 173.21(f). This is consistent with the similar term ''SADT'' (self-accelerated decomposition temperature). In the absence of further rulemaking actions, this definition will sunset two years from the effective date of this rulemaking. See the ''Comment Discussion'' section of this document for further discussion.
- *Service life:* PHMSA adds the term ''service life'' to define the number of years a composite cylinder or tube is permitted to be in service. This term is specifically limited to references in the HMR related to composite cylinders and tubes.

Additionally, PHMSA amends the definitions for the following terms:

- *Aerosol:* PHMSA revises the definition of ''aerosol'' to clarify that it is an article. Currently under the HMR, an aerosol is considered to be an article, and therefore, the use of inner packagings in a combination package is not necessary; however, practice has shown that an aerosol is often mistaken for the inner packaging of a combination packaging, including both the substance dispensed (liquid, paste, or powder) and the propellant gas itself.
- *Large salvage packaging:* PHMSA revises the definition of ''large salvage packaging'' to add a reference to non-conforming hazardous materials packages to be consistent with the wording in the definition of ''salvage packaging.''
- *UN tube:* PHMSA revises the definition of ''UN tube,'' which describes it as a seamless pressure receptacle, to specify that the term includes composite cylinders.

Section 171.12

Section 171.12 prescribes requirements for the use of the Transport Canada TDG Regulations. Under the U.S.-Canada RCC—which was established in 2011 by the President of the United States and the Canadian Prime Minister—PHMSA and Transport Canada, with input from stakeholders, identified impediments to cross-border transportation of hazardous materials. In this final rule, PHMSA is addressing these barriers by amending the HMR to expand recognition of cylinders, cargo tank repair facilities, and equivalency certificates in accordance with the TDG Regulations.

The HMR in § 171.12(a)(1) provide general authorizations to use the TDG Regulations for hazardous materials transported from Canada to the United States, from the United States to Canada, or through the United States to Canada or a foreign destination. PHMSA is amending § 171.12(a)(1) to authorize the use of a Transport Canada equivalency certificate for such road or rail transportation of a hazardous material shipment. Consistent with existing authorizations to utilize the TDG Regulations for transportation from Canada to the United States, the authorization to use a Transport Canada equivalency certificate only applies until the shipment's initial transportation ends. In other words, once a shipment offered in accordance with a Transport Canada equivalency certificate reaches the destination shown on either a transport document or package markings, transportation under the authorization in § 171.12 has ended. Any subsequent offering of packages imported under a Transport Canada equivalency certificate would have to be done in full compliance with the HMR.

Transport Canada is proposing amendments to the TDG Regulations to authorize similar reciprocal treatment of PHMSA special permits. PHMSA received comments from Dow and DGAC supporting the proposed acceptance of Transport Canada equivalency certificates. These same commenters requested that PHMSA extend the authorization to offer in accordance with an equivalency certificate further than a shipment's initial transportation into or out of the country. The commenters requested PHMSA allow a shipment offered in accordance with a Canadian certificate of equivalency to be reshipped under the provisions of the permit (*e.g.,* original shipment from Canada to a distribution center in the U.S. and then reoffered to other U.S. locations). As previously noted, the intent of this regulatory change is to authorize the use of Canadian certificates of equivalency consistent with the recognition given to shipments made in accordance with the TDG Regulations. PHMSA may continue the expansion of this allowance in future RCC rulemaking activities.

PHMSA received questions from Western International Gas Cylinders concerning ultrasonic requalification of cylinders in accordance with a special permit or certificate of equivalency. Western International Gas Cylinders asked if cylinders that are requalified in accordance with a special permit ultrasonically and then offered for transport to Canada can be refilled and reoffered to the United States. It is our understanding that Transport Canada intends to provide the same reciprocity to PHMSA special permits that we are extending to their certificates of equivalency. Please review the Transport Canada harmonization rulemaking [4] for a better understanding of the Canadian proposals in this area. Changes to § 171.12 would authorize the shipment of a Canadian cylinder in accordance with the provisions in a certificate of equivalency, including the use of ultrasonic examination techniques if so indicated in the certificate. Western International Gas Cylinders further asked if ultrasonic cylinder requalifiers in the U.S. would be allowed to add TC, CTC, BTC, and CRC marked cylinders to their special permits and conduct ultrasonic examinations of these cylinders. Cylinder requalifiers may submit a modification request for their special permit to authorize ultrasonic examination of these Canadian cylinders. Each request will be evaluated on its own merits.

PHMSA is additionally amending § 171.12(a)(1) to authorize the transportation of cylinders and multiple-element gas containers (MEGCs) authorized by the Transport Canada TDG Regulations to be transported from Canada to the United States, from the United States to Canada, or through the United States to Canada or a foreign destination.

The HMR in § 171.12(a)(4) permit the transportation of a cylinder authorized by the Transport Canada TDG

[4] *http://www.gazette.gc.ca/rp-pr/p1/2016/2016-11-26/pdf/g1-15048.pdf.*

Regulations to, from, or within the United States. Currently this authorization is limited to CTC cylinders corresponding to a DOT specification cylinder and UN pressure receptacles marked with ''CAN.'' In this final rule, PHMSA is amending paragraph (a)(4)(ii) to authorize the use of Canadian manufactured cylinders. Specifically, PHMSA is authorizing the transportation of CTC, CRC, BTC, and TC cylinders that have a corresponding DOT specification cylinder prescribed in the HMR.

This final rule does not remove or amend existing requirements for DOT specification cylinders; rather, PHMSA is providing that a shipper may use either a DOT specification cylinder or a TC cylinder as appropriate. The goal of these amendments is to promote flexibility; to permit the use of advanced technology for the requalification and use of pressure receptacles; to provide for a broader selection of authorized pressure receptacles; to reduce the need for special permits; and to facilitate cross-border transportation of these cylinders.

Additionally, PHMSA is amending paragraph (a)(4) to authorize the filling, maintenance, testing, and use of CTC, CRC, BTC, and TC cylinders that have a corresponding DOT specification cylinder as prescribed in HMR. This authorization extends the recognition of cylinders manufactured in Canada to be filled, used, and requalified (including rebuild, repair, reheat-treatment) in the United States in accordance with the TDG Regulations. PHMSA received a comment from CTC Certified Training Co. requesting that we reconsider requiring requalification of all CTC, CRC, BTC, and TC cylinders be done in accordance with the Transport Canada TDG Regulations. CTC Certified Training Co. stated that the current authorization for CTC specification cylinders allows requalification to be done under either a program authorized by the Transport Canada TDG Regulations or requalified in accordance with the requirements in § 180.205. The commenter further noted that CTC, CRC, and BTC all correspond to DOT specification cylinders and that requiring these cylinders to be requalified in accordance with the TDG Regulations is unnecessary. PHMSA agrees and is amending paragraph (a)(4)(ii)(B) to note that Canadian cylinders that have been requalified in accordance with either a program authorized by the TDG Regulations or part 107, subpart I, of the HMR are acceptable. See the § 180.205 entry in the ''Section-by-Section Review'' of this document for specific requalification requirements for Canadian cylinders.

Table 1 lists the Canadian cylinders with the corresponding DOT specification cylinders:

TABLE 1

TC	DOT (some or all of these may also be marked with an ICC prefix)	CTC (some or all of these may also be marked with a BTC and a CRC prefix)
TC–3AM	DOT–3A [ICC–3]	CTC–3A
TC–3AAM	DOT–3AA	CTC–3AA
TC–3ANM	DOT–3BN	CTC–3BN
TC–3EM	DOT–3E	CTC–3E
TC–3HTM	DOT–3HT	CTC–3HT
TC–3ALM	DOT–3AL	CTC–3AL
	DOT–3B	CTC–3B
TC–3AXM	DOT–3AX	CTC–3AX
TC–3AAXM	DOT–3AAX	CTC–3AAX
TC–3TM	DOT–3T	
TC–4AAM33	DOT–4AA480	CTC–4AA480
TC–4BM	DOT–4B	CTC–4B
TC–4BM17ET	DOT–4B240ET	CTC–4B240ET
TC–4BAM	DOT–4BA	CTC–4BA
TC–4BWM	DOT–4BW	CTC–4BW
TC–4DM	DOT–4D	CTC–4D
TC–4DAM	DOT–4DA	CTC–4DA
TC–4DSM	DOT–4DS	CTC–4DS
TC–4EM	DOT–4E	CTC–4E
TC–39M	DOT–39	CTC–39
TC–4LM	DOT–4L	CTC–4L
	DOT–8	CTC–8
	DOT–8AL	CTC–8AL

In accordance with § 171.12(a)(4), when the provisions of subchapter C of the HMR require that either a DOT specification or a UN pressure receptacle must be used for a hazardous material, a packaging authorized by Transport Canada's TDG Regulations may be used only if it corresponds to the DOT specification or UN standard authorized by this subchapter. PHMSA received a comment from COSTHA requesting that the table of Canadian cylinders and the corresponding DOT specification cylinders be included in the HMR. PHMSA agrees that this is useful information and is including the table of corresponding cylinders in new paragraph (a)(4)(iii).

Section 171.23

Section 171.23 prescribes requirements for specific materials and packagings transported under the various international standards authorized by the HMR. PHMSA is amending paragraph (a) to add TC, CTC, BTC, or CRC specification cylinders to the list of cylinders which may be transported to, from, or within the United States.

Part 172

Section 172.101

Section 172.101 provides the Hazardous Materials Table (HMT), as well as instructions for its use. Readers should review all changes for a complete understanding of the amendments. For purposes of the

Government Publishing Office's typesetting procedures, changes to the HMT appear under three sections of the Table: ''remove,'' ''add,'' and ''revise.'' Certain entries in the HMT, such as those with revisions to the proper shipping names, appear as a ''remove'' and ''add.'' In this final rule, PHMSA is amending the HMT for the following:

New HMT Entries

- UN 0510 Rocket Motors, Division 1.4C

This new HMT entry is the result of packaged products of low power ''Rocket motors'' that typically meet test criteria for assignment to Division 1.4, Compatibility Group C, but are assigned to 1.3C (*i.e.,* UN 0186) or the 1.4C n.o.s. classification (*i.e.,* UN 0351). This 1.4 rocket motor entry accurately reflects the product type and hazard of these articles and allows for the assignment of specific packaging instructions.

- UN 3527 Polyester resin kit, *solid base material*

This new HMT entry addresses polyester resin kits with a base material that does not meet the definition of Class 3 (Flammable liquid) and is more appropriately classed as a Division 4.1 (Flammable solid). Presently, polyester resin kits are limited to those with a Class 3 liquid base material component and are assigned under the entry UN 3269. This new entry permits products with a viscous base component containing a flammable solvent that does not meet the definition of a flammable liquid but does meet the definition of a flammable solid.

- UN 3528 Engine, internal combustion, flammable liquid powered *or* Engine, fuel cell, flammable liquid powered *or* Machinery, internal combustion, flammable liquid powered *or* Machinery, fuel cell, flammable liquid powered
- UN 3529 Engine, internal combustion, flammable gas powered *or* Engine, fuel cell, flammable gas powered *or* Machinery, internal combustion, flammable gas powered *or* Machinery, fuel cell, flammable gas powered
- UN 3530 Engine, internal combustion *or* Machinery, internal combustion

These new HMT entries apply to the fuel contained in engines and machinery powered by Class 3 flammable liquids, Division 2.1 gases, and Class 9 environmentally hazardous substances. The previous entry applicable to these articles, UN 3166, is now applicable to vehicles only. As a result of the new ''Engine'' and ''Machinery'' entries, the entries ''UN 3166, Engines, internal combustion, *or* Engines, fuel cell, *flammable gas powered*'' and ''UN 3166, Engines internal combustion, *or* Engines, fuel cell, *flammable liquid powered*'' are removed.

PHMSA received comments from COSTHA and UPS noting that new entries UN 3528, UN 3529, and UN 3530 include reference to special provision 363 in column (7) of the HMT. Both commenters noted that while special provision 363—which is assigned to these entries in the UN Model Regulations—does not exist in the current or proposed § 172.102, its conditions are proposed in § 176.906. PHMSA agrees with the commenters. The assignment of special provision 363 in column (7) of the HMT was inadvertent and as a result, the references to special provision 363 are removed in this final rule.

Additionally, during our review of the proposed changes to the engine HMT entries, we noticed that special provisions 135 and A200 were inadvertently left out of column (7) for these three new engine entries. This omission was not intended, and these provisions are placed back in column (7) in this final rule.

- UN 3531 Polymerizing substance, solid, stabilized, n.o.s.
- UN 3532 Polymerizing substance, liquid, stabilized, n.o.s.
- UN 3533 Polymerizing substance, solid, temperature controlled, n.o.s.
- UN 3534 Polymerizing substance, liquid, temperature controlled, n.o.s.

These new Division 4.1 HMT entries are added for polymerizing substances that do not meet the criteria for inclusion in any other hazard class. In the absence of further rulemaking actions, these entries will cease to have effect two years from the effective date of this rulemaking. See the ''Comment Discussion'' section of this document for further discussion.

- Catecholborane (also known as 1, 3, 2-Benzodioxaborole)

At the October 2015 meeting of the ICAO Dangerous Goods Panel (DGP/25), the Panel was informed of an incident involving Catecholborane (also known as 1, 3, 2-Benzodioxaborole) that resulted in a recommendation to forbid transport of the substance by air unless transported in pressure receptacles and under cooled conditions. The material was classified as ''UN 2924, Flammable liquid, corrosive, n.o.s.'' The product properties indicate (1) that the substance decomposes to borane gas at a rate of 2 percent per week at room temperature, (2) that borane gas could ignite when in contact with moist air, and (3) that catecholborane could react violently with water. The incident occurred after transport of the substance was delayed for nine days as the result of extreme weather conditions with temperatures consistently above 33 °C (91 °F). After being stored for approximately two weeks at a low temperature at the destination, several bottles containing the substance exploded and caught fire. It was concluded that moist air entered the bottles during the long transit time under high temperatures causing a chemical reaction and pressure build up. Panel members suspected a classification problem, but they could not determine whether this was due to shipper error or a limitation in the classification criteria in the regulations. The issue was submitted to the attention of the UN Sub-Committee at the December 2016 meeting for further review and determination if a new classification was required. In the interim, a new light type entry was added to the ICAO Technical Instructions Dangerous Goods List with a new special provision A210 assigned to ''Catecholborane'' and ''1, 3, 2-Benzodioxaborole'' forbidding the substance for transport by air on both passenger-carrying and cargo-only aircraft. Transport on cargo-only aircraft would be possible with the approval of the State of Origin and State of the Operator.

Consistent with the ICAO Technical Instructions, PHMSA is adding new HMT entries in italics for ''Catecholborane'' and ''1, 3, 2-Benzodioxaborole'' and assigning a new special provision A210 clarifying that this material is forbidden for air transport unless approved by the Associate Administrator for the Office of Hazardous Materials Safety. PHMSA received a comment from DGAC supporting the addition of these new entries in the HMT. Additionally, DGAC noted that it is unclear as to how this material is described, classed, packaged, etc. and requests guidance relative to the proper shipping description, class, label, etc. for this material. PHMSA acknowledges that for these two commodities the appropriate proper shipping description to be utilized based on the hazards presented is unclear. Therefore, these two specific technical names are added in italics in the table and not assigned to specific HMT entries.

Amendments to Column (2) Hazardous Materials Descriptions and Proper Shipping Names

Section 172.101(c) describes column (2) of the HMT and the requirements for

hazardous materials descriptions and proper shipping names.

• PHMSA is amending the proper shipping name for ''UN 3269, Polyester resin kit'' by adding the italicized text ''liquid base material.'' This is consistent with the format of the new HMT entry for polyester resin kits with a solid base material.

• PHMSA is amending the proper shipping names for ''UN 3151, Polyhalogenated biphenyls, liquid *or* Polyhalogenated terphenyls, liquid'' and ''UN 3152, Polyhalogenated biphenyls, solid or Polyhalogenated terphenyls, solid'' by adding ''Halogenated monomethyldiphenylmethanes, liquid'' and ''Halogenated monomethyldiphenylmethanes, solid,'' respectively. Noting that halogenated monomethyldiphenylmethanes have similar chemical and ecotoxicological properties as polychlorinated biphenyls (PCBs) and polychlorinated terphenyls (PCTs), this revision ensures that they are considered as PCBs or PCTs for the purposes of transport.

Amendments to Column (3) Hazard Class or Division

Section 172.101(d) describes column (3) of the HMT and the designation of the hazard class or division corresponding to each proper shipping name. PHMSA is revising the hazard class of ''UN 3507, Uranium hexafluoride, radioactive material, excepted package, *less than 0.1 kg per package, non-fissile or fissile-excepted,*'' from Class 8 to Division 6.1 and subsequently adding the Class 8 hazard as a subsidiary hazard label code in column (6). This revision is based on the precedence provisions for classification of materials possessing more than one hazard and is consistent with the 19th Revised Edition of the UN Model Regulations. The presence of a Division 6.1 hazard was determined following a thorough review of literature and test data on uranium hexafluoride. A summary of the data and a proposal to revise the primary hazard class from Class 8 to Division 6.1 was provided in Working Paper ST/SG/AC.10/C.3/2014/60, which was submitted to the 45th session of the UN Sub-Committee of Experts on the Transport of Dangerous Goods (UNSCOE TDG) and is available at *http://www.unece.org/fileadmin/DAM/trans/doc/2013/dgac10c3/ST-SG-AC.10-C.3-2014-60e.pdf*.

Amendments to Column (6) Label(s)

Section 172.101(g) describes column (6) of the HMT and the labels required (primary and subsidiary) for specific entries in the HMT.

Data presented to UNSCOE TDG in this last biennium indicated a need for the addition of a subsidiary hazard of Division 6.1 to be assigned to ''UN 2815, N-Aminoethylpiperazine,'' ''UN 2977, Radioactive material, uranium hexafluoride, fissile,'' and ''UN 2978, Radioactive material, uranium hexafluoride *non fissile or fissile-excepted*.'' PHMSA is making appropriate amendments to the HMT to account for these revisions to the UN Model Regulations.

For the HMT entry, ''UN 3507, Uranium hexafluoride, radioactive material, excepted package, *less than 0.1 kg per package, non-fissile or fissile-excepted,*'' PHMSA is revising the labels for consistency with the change made to the classification of this material under amendments to column (3). See discussion in the ''Amendments to column (3) hazard class or division'' section above. The Class 8 (Corrosive) primary hazard label is revised to a Division 6.1 primary hazard label and a Class 8 subsidiary hazard label in addition to the existing Class 7 (Radioactive) subsidiary hazard label to read ''6.1, 7, 8.''

Amendments to Column (7) Special Provisions

Section 172.101(h) describes column (7) of the HMT whereas § 172.102(c) prescribes the special provisions assigned to specific entries in the HMT. The particular modifications to the entries in the HMT are discussed below. See ''Section 172.102 special provisions'' below for a detailed discussion of the additions, revisions, and deletions to the special provisions addressed in this final rule.

• New special provision 157 is assigned to the HMT entry ''UN 3527, Polyester resin kit, *solid base material*.''

• New special provision 379 is assigned to the HMT entries ''UN 1005, Ammonia, anhydrous'' and ''UN 3516, Adsorbed gas, toxic, corrosive, n.o.s.''

• In the 19th Revised Edition of the UN Model Regulations, new special provision 386 was assigned to the four new ''n.o.s.'' HMT entries for polymerizing substances and to the 52 named substances in the HMT that polymerize, all of which contain the text ''stabilized'' as part of the proper shipping name, except for ''UN 2383, Dipropylamine'' (see Table 2 below). This new special provision includes transport controls to avoid dangerous polymerization reactions including the use of chemical stabilization or temperature control. U.S. Amines requested that PHMSA reconsider assigning special provision 387 to Dipropylamine (UN 2383). They further asserted this material does not pose a polymerization risk and provided safety data sheets and other associated technical data to substantiate their claim. Based on a review of the material in question, PHMSA agrees and is not assigning either special provision 387 or stowage code 25 to this material.

Special provision 387 states that if chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport, temperature control is required. Special provision 387 goes on to provide a non-inclusive list of factors to be considered in determining whether temperature control is necessary, to include an evaluation of any other relevant factors that may impact the ability of the chemical stabilizer to perform its function. BAMM & MPA and Dow stated that they routinely transport stabilized materials in rail cars where no effective means of temperature control exist. Rail car shipments of these stabilized materials are made year round and, during the winter months, are provided to customers and contracted terminals who have demonstrated they have in place the equipment (*i.e.,* typically tempered water/glycol systems) and procedures to safely thaw these monomers before use. BAMM & MPA and Dow requested in their comments that PHMSA clarify that ''any other relevant factors'' at the close of special provision 387 can include use of appropriate methods to safely thaw any shipment that does contain frozen product. The intent of the proposed requirement for temperature control if chemical stabilization becomes ineffective at lower temperatures is that it would only apply if at any point during transportation (including unloading incidental to movement) the chemical stabilizer would be incapable of performing its function. Operational controls to ensure a frozen material is thawed to ensure no polymerizing effect occurs are considered appropriate other relevant factors for the purposes of determining when temperature control is required.

BAMM & MPA further requested that PHMSA amend special provision 387 to more clearly indicate that chemical stabilization must be sufficient to prevent the bulk mean temperature of the package from reaching 50 °C. PHMSA agrees and is making the recommended change.

In this final rule, new special provision 387 (special provision 386 already exists) is assigned to the 51 HMT entries shown in Table 2. In the absence of further rulemaking actions, this special provision will sunset two years from the effective date of this

rulemaking. See the ''Comment Discussion'' section of this document for further discussion.

TABLE 2

Proper shipping name	UN No.
Acrolein dimer, stabilized	UN 2607
Acrolein, stabilized	UN 1092
Acrylic acid, stabilized	UN 2218
Acrylonitrile, stabilized	UN 1093
Allyl isothiocyanate, stabilized	UN 1545
Allyltrichlorosilane, stabilized	UN 1724
Bicyclo [2,2,1] hepta-2,5-diene, stabilized *or* 2,5-Norbornadiene, stabilized	UN 2251
Butadienes, stabilized *or* Butadienes and Hydrocarbon mixture, stabilized *containing more than 40% butadienes*	UN 1010
Butyl acrylates, stabilized	UN 2348
n-Butyl methacrylate, stabilized	UN 2227
Butyl vinyl ether, stabilized	UN 2352
1,2-Butylene oxide, stabilized	UN 3022
Chloroprene, stabilized	UN 1991
Crotonaldehyde *or* Crotonaldehyde, stabilized	UN 1143
Cyanogen chloride, stabilized	UN 1589
Diketene, stabilized	UN 2521
Divinyl ether, stabilized	UN 1167
Ethyl acrylate, stabilized	UN 1917
Ethyl methacrylate, stabilized	UN 2277
Ethylacetylene, stabilized	UN 2452
Ethyleneimine, stabilized	UN 1185
Hydrogen cyanide, stabilized *with less than 3 percent water*	UN 1051
Hydrogen cyanide, stabilized, *with less than 3 percent water and absorbed in a porous inert material*	UN 1614
Isobutyl acrylate, stabilized	UN 2527
Isobutyl methacrylate, stabilized	UN 2283
Isoprene, stabilized	UN 1218
Methacrylaldehyde, stabilized	UN 2396
Methacrylic acid, stabilized	UN 2531
Methacrylonitrile, stabilized	UN 3079
Methyl acetylene and propadiene mixtures, stabilized	UN 1060
Methyl acrylate, stabilized	UN 1919
Methyl isopropenyl ketone, stabilized	UN 1246
Methyl methacrylate monomer, stabilized	UN 1247
Methyl vinyl ketone, stabilized	UN 1251
Propadiene, stabilized	UN 2200
Propyleneimine, stabilized	UN 1921
Styrene monomer, stabilized	UN 2055
Sulfur trioxide, stabilized	UN 1829
Tetrafluoroethylene, stabilized	UN 1081
Trifluorochloroethylene, stabilized *or* Refrigerant gas R 1113	UN 1082
Vinyl acetate, stabilized	UN 1301
Vinyl bromide, stabilized	UN 1085
Vinyl butyrate, stabilized	UN 2838
Vinyl chloride, stabilized	UN 1086
Vinyl ethyl ether, stabilized	UN 1302
Vinyl fluoride, stabilized	UN 1860
Vinyl isobutyl ether, stabilized	UN 1304
Vinyl methyl ether, stabilized	UN 1087
Vinylidene chloride, stabilized	UN 1303
Vinylpyridines, stabilized	UN 3073
Vinyltoluenes, stabilized	UN 2618

• New special provision 422 is assigned to the HMT entries ''UN 3480, Lithium ion batteries *including lithium ion polymer batteries*''; ''UN 3481, Lithium ion batteries contained in equipment *including lithium ion polymer batteries*''*;* ''UN 3481 Lithium ion batteries packed with equipment *including lithium ion polymer batteries*''; ''UN 3090, Lithium metal batteries *including lithium alloy batteries*''; ''UN 3091, Lithium metal batteries contained in equipment *including lithium alloy batteries*''; and ''UN3091, Lithium metal batteries packed with equipment *including lithium alloy batteries*.''

• Special provision 134 is removed from the HMT entry ''UN 3072, Life-saving appliances, not self-inflating *containing dangerous goods as equipment*'' and replaced with new special provision 182 as proposed in the NPRM. In reviewing the assignment of special provision 134 to ''UN 3072'' to make this clarification, PHMSA found that the provisions of special provision 134 are not assigned to ''UN 3072'' in any international standard, but rather to the entry for ''UN 3171, Battery-powered vehicle *or* Battery-powered equipment.'' Although special provision 134 does require that equipment powered only by lithium metal batteries or lithium ion batteries must be consigned under the entries associated with lithium batteries contained in or packed with equipment, the rest of special provision 134 is not applicable

to ''Life-saving appliances, not self-inflating *containing dangerous goods as equipment*.'' As a result, PHMSA is adding a new special provision 182 applicable only to the HMT entry for ''UN 3072, Life-saving appliances, not self-inflating *containing dangerous goods as equipment*'' to clarify that equipment containing only lithium batteries must be classified as either lithium batteries contained in or packed with equipment ''UN 3091'' or ''UN 3481,'' as appropriate.

• New special provision A210 is assigned to the new HMT italicized entries for ''Catecholborane'' and ''1, 3, 2-Benzodioxaborole.''

• New special provision A212 is assigned to the HMT entry for ''UN 2031, Nitric acid *other than red fuming, with more than 20 percent and less than 65 percent nitric acid*.''

• New special provision B134 is assigned to the Packing Group (PG) III entries in Table 3 consistent with revisions to the IMDG Code.

TABLE 3

Proper shipping name	UN No.
Aluminum powder, coated	UN 1309
Ferrous metal borings *or* Ferrous metal shavings *or* Ferrous metal turnings *or* Ferrous metal cuttings *in a form liable to self-heating*	UN 2793
Iron oxide, spent, *or* Iron sponge, spent *obtained from coal gas purification*	UN 1376
Magnesium *or* Magnesium alloys *with more than 50 percent magnesium in pellets, turnings or ribbons*	UN 1869
Peroxides, inorganic, n.o.s	UN 1483
Titanium sponge granules *or* Titanium sponge powders	UN 2878

• New special provision B135 is assigned to the PG III entries in Table 4 consistent with revisions to the IMDG Code.

TABLE 4

Proper shipping name	UN No.
Hafnium powder, dry	UN 2545
Metal catalyst, dry	UN 2881
Metal powder, self-heating, n.o.s	UN 3189
Titanium powder, dry	UN 2546
Zirconium powder, dry	UN 2008
Zirconium scrap	UN 1932

• Special provision TP1 is changed to TP2 for the following entries: ''UN 2672, Ammonia solution, *relative density between 0.880 and 0.957 at 15 degrees C in water, with more than 10 percent but not more than 35 percent ammonia*''; ''UN 2709, Butyl benzenes''; ''UN 2241, Cycloheptane''; ''UN 1206, Heptanes''; ''UN 1208, Hexanes''; ''UN 2294, N-Methylaniline''; ''UN 2296, Methylcyclohexane''; ''UN 1920, Nonanes''; ''UN 1262, Octanes''; ''UN 2368, alpha-Pinene''; ''UN 1272, Pine oil''; ''UN 2850, Propylene tetramer''; ''UN 2325, 1,3,5-Trimethylbenzene''; ''UN 2057, Tripropylene''; ''UN 1299, Turpentine''; and ''UN 1840, Zinc chloride, solution.'' Tank provision TP2 authorizes a slightly lower degree of filling than TP1. The IMDG Code follows a guiding principle that assigns TP2 to materials that are marine pollutants. In a previous harmonization rulemaking [HM–215M; 80 FR 1075 (Jan. 8, 2015)], PHMSA added various hazardous materials to the list of marine pollutants in appendix B to § 172.101, but both the HMT and IMDG Code failed to change the TP code from TP1 to TP2 to authorize a lower degree of filling.

• Special provisions T9, TP7, and TP33 are assigned to the HMT entry ''UN 1415, Lithium.'' This permits UN 1415 for transportation in UN portable tanks consistent with similar Division 4.3, PG I materials.

• New special provisions W31, W32, W40, and W100 are assigned to certain water-reactive substances. The special provisions correspond with special packaging provisions PP31, PP31 ''modified'' (Packing Instruction P403), PP40, and PP100 of the IMDG Code, respectively. Table 5 contains the changes listed in alphabetical order and showing the proper shipping name, UN identification number, and the special provision(s).

TABLE 5

Proper shipping name	UN No.	Addition(s)
Alkali metal alcoholates, self-heating, corrosive, n.o.s	UN 3206	W31
Alkali metal alloys, liquid, n.o.s	UN 1421	W31
Alkali metal amalgam, liquid	UN 1389	W31
Alkali metal amalgam, solid	UN 3401	W32
Alkali metal amides	UN 1390	W31, W40
Alkali metal dispersions, flammable *or* Alkaline earth metal dispersions, flammable	UN 3482	W31
Alkali metal dispersions, *or* Alkaline earth metal dispersions	UN 1391	W31
Alkaline earth metal alcoholates, n.o.s	UN 3205	W31
Alkaline earth metal alloys, n.o.s	UN 1393	W31, W40
Alkaline earth metal amalgams, liquid	UN 1392	W31
Alkaline earth metal amalgams, solid	UN 3402	W32

TABLE 5—Continued

Proper shipping name	UN No.	Addition(s)
Aluminum carbide	UN 1394	W31, W40
Aluminum ferrosilicon powder (PG II)	UN 1395	W31, W40
Aluminum hydride	UN 2463	W32
Aluminum phosphide	UN 1397	W32
Aluminum phosphide pesticides	UN 3048	W31
Aluminum powder, coated	UN 1309	W100
Aluminum powder, uncoated	UN 1396	W31, W40
Aluminum silicon powder, uncoated	UN 1398	W31, W40
Aluminum smelting by-products *or* Aluminum remelting by-products (PG II)	UN 3170	W31, W40
Aluminum smelting by-products *or* Aluminum remelting by-products (PG III)	UN 3170	W31
2-Amino-4,6-Dinitrophenol, wetted *with not less than 20 percent water by mass*	UN 3317	W31
Ammonium picrate, wetted *with not less than 10 percent water, by mass*	UN 1310	W31
Arsenic acid, liquid	UN 1533	W31
Barium	UN 1400	W31, W40
Barium alloys, pyrophoric	UN 1854	W31
Barium azide, wetted *with not less than 50 percent water, by mass*	UN 1571	W31
Barium cyanide	UN 1565	W31
Barium peroxide	UN 1449	W100
Beryllium, powder	UN 1567	W100
Boron trifluoride diethyl etherate	UN 2604	W31
Boron trifluoride dimethyl etherate	UN 2965	W31
Bromobenzyl cyanides, liquid	UN 1694	W31
Bromobenzyl cyanides, solid	UN 3449	W31
Calcium	UN 1401	W31, W40
Calcium carbide (PG I)	UN 1402	W32
Calcium carbide (PG II)	UN 1402	W31, W40
Calcium cyanamide *with more than 0.1 percent of calcium carbide*	UN 1403	W31, W40
Calcium cyanide	UN 1575	W31
Calcium dithionite *or* Calcium hydrosulfite	UN 1923	W31
Calcium hydride	UN 1404	W32
Calcium manganese silicon	UN 2844	W31
Calcium peroxide	UN 1457	W100
Calcium phosphide	UN 1360	W32
Calcium, pyrophoric *or* Calcium alloys, pyrophoric	UN 1855	W31
Calcium silicide (PG II)	UN 1405	W31
Calcium silicide (PG III)	UN 1405	W31, W40
Carbon, activated	UN 1362	W31
Carbon disulfide	UN 1131	W31
Cerium, *slabs, ingots, or rods*	UN 1333	W100
Cerium, *turnings or gritty powder*	UN 3078	W31, W40
Cesium *or* Caesium	UN 1407	W32
Chloric acid aqueous solution, *with not more than 10 percent chloric acid*	UN 2626	W31
Chlorosilanes, water-reactive, flammable, corrosive, n.o.s	UN 2988	W31
Chromium trioxide, anhydrous	UN 1463	W31
Corrosive solids, water-reactive, n.o.s. (PG II)	UN 3096	W100
Cyanogen bromide	UN 1889	W31
Decaborane	UN 1868	W31
Dinitrophenol, wetted *with not less than 15 percent water, by mass*	UN 1320	W31
Dinitrophenolates, wetted *with not less than 15 percent water, by mass*	UN 1321	W31
Dinitroresorcinol, wetted *with not less than 15 percent water, by mass*	UN 1322	W31
Diphenylamine chloroarsine	UN 1698	W31
Diphenylchloroarsine, liquid	UN 1699	W31
Diphenylchloroarsine, solid	UN 3450	W31
Dipicryl sulfide, wetted *with not less than 10 percent water, by mass*	UN 2852	W31
Ethyldichlorosilane	UN 1183	W31
Ferrocerium	UN 1323	W100
Ferrosilicon *with 30 percent or more but less than 90 percent silicon*	UN 1408	W100
Ferrous metal borings *or* Ferrous metal shavings *or* Ferrous metal turnings *or* Ferrous metal cuttings *in a form liable to self-heating*	UN 2793	W100
Fibers *or* Fabrics, animal *or* vegetable *or* Synthetic, n.o.s. *with animal or vegetable oil*	UN 1373	W31
Fish meal, unstabilized *or* Fish scrap, unstabilized	UN 1374	W31, W40
Hafnium powder, dry	UN 2545	W31
Hafnium powder, wetted *with not less than 25 percent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns*	UN 1326	W31, W40
Iron oxide, spent, *or* Iron sponge, spent *obtained from coal gas purification*	UN 1376	W100
Isocyanates, flammable, toxic, n.o.s. *or* Isocyanate solutions, flammable, toxic, n.o.s. *flash point less than 23 degrees C*	UN 2478	W31
Lithium	UN 1415	W32
Lithium aluminum hydride	UN 1410	W32
Lithium borohydride	UN 1413	W32
Lithium ferrosilicon	UN 2830	W31, W40

TABLE 5—Continued

Proper shipping name	UN No.	Addition(s)
Lithium hydride	UN 1414	W32
Lithium hydride, fused solid	UN 2805	W31, W40
Lithium nitride	UN 2806	W32
Lithium peroxide	UN 1472	W100
Lithium silicon	UN 1417	W31, W40
Magnesium aluminum phosphide	UN 1419	W32
Magnesium diamide	UN 2004	W31
Magnesium granules, coated, *particle size not less than 149 microns*	UN 2950	W100
Magnesium hydride	UN 2010	W32
Magnesium *or* Magnesium alloys *with more than 50 percent magnesium in pellets, turnings or ribbons*	UN 1869	W100
Magnesium peroxide	UN 1476	W100
Magnesium phosphide	UN 2011	W32
Magnesium, powder *or* Magnesium alloys, powder (PG I)	UN 1418	W32
Magnesium, powder *or* Magnesium alloys, powder (PG II)	UN 1418	W31, W40
Magnesium, powder *or* Magnesium alloys, powder (PG III)	UN 1418	W31
Magnesium silicide	UN 2624	W31, W40
Maneb *or* Maneb preparations *with not less than 60 percent maneb*	UN 2210	W100
Maneb stabilized *or* Maneb preparations, stabilized *against self-heating*	UN 2968	W100
Mercuric potassium cyanide	UN 1626	W31
Metal catalyst, dry	UN 2881	W31
Metal catalyst, wetted *with a visible excess of liquid*	UN 1378	W31, W40
Metal hydrides, flammable, n.o.s. (PG II)	UN 3182	W31, W40
Metal hydrides, flammable, n.o.s. (PG III)	UN 3182	W31
Metal hydrides, water reactive, n.o.s. (PG I)	UN 1409	W32
Metal hydrides, water reactive, n.o.s. (PG II)	UN 1409	W31, W40
Metal powder, self-heating, n.o.s	UN 3189	W31
Metal powders, flammable, n.o.s	UN 3089	W100
Metal salts of organic compounds, flammable, n.o.s	UN 3181	W31
Metallic substance, water-reactive, n.o.s. (PG I)	UN 3208	W32
Metallic substance, water-reactive, n.o.s. (PG II)	UN 3207	W31
Metallic substance, water-reactive, n.o.s. (PG III)	UN 3208	W31, W40
Metallic substance, water-reactive, self-heating, n.o.s. (PG I and III)	UN 3209	W32
Metallic substance, water-reactive, self-heating, n.o.s. (PG II)	UN 3209	W32, W40
Methyldichlorosilane	UN 1242	W31
Nitrocellulose, *with not more than 12.6 percent nitrogen, by dry mass* mixture with *or* without plasticizer, with *or* without pigment	UN 2557	W31
Nitrocellulose with alcohol *with not less than 25 percent alcohol by mass, and with not more than 12.6 percent nitrogen, by dry mass*	UN 2556	W31
Nitrocellulose with water *with not less than 25 percent water by mass*	UN 2555	W31
Nitroguanidine, wetted *or* Picrite, wetted *with not less than 20 percent water, by mass*	UN 1336	W31
4-Nitrophenylhydrazine, *with not less than 30 percent water, by mass*	UN 3376	W31
Nitrostarch, wetted *with not less than 20 percent water, by mass*	UN 1337	W31
Organometallic substance, liquid, water-reactive	UN 3398	W31
Organometallic substance, liquid, water-reactive, flammable	UN 3399	W31
Organometallic substance, solid, water-reactive	UN 3395	W31
Organometallic substance, solid, water-reactive, flammable	UN 3396	W31
Organometallic substance, solid, water-reactive, self-heating	UN 3397	W31
Osmium tetroxide	UN 2471	W31
Paper, unsaturated oil treated *incompletely dried (including carbon paper)*	UN 1379	W31
Peroxides, inorganic, n.o.s	UN 1483	W100
9-Phosphabicyclononanes *or* Cyclooctadiene phosphines	UN 2940	W31
Phosphorus heptasulfide, *free from yellow or white phosphorus*	UN 1339	W31
Phosphorus pentasulfide, *free from yellow or white phosphorus*	UN 1340	W31, W40
Phosphorus sesquisulfide, *free from yellow or white phosphorus*	UN 1341	W31
Phosphorus trisulfide, *free from yellow or white phosphorus*	UN 1343	W31
Phosphorus, white dry *or* Phosphorus, white, under water *or* Phosphorus white, in solution *or* Phosphorus, yellow dry *or* Phosphorus, yellow, under water *or* Phosphorus, yellow, in solution	UN 1381	W31
Potassium	UN 2257	W32
Potassium borohydride	UN 1870	W32
Potassium cyanide, solid	UN 1680	W31
Potassium cyanide solution	UN 3413	W31
Potassium dithionite *or* Potassium hydrosulfite	UN 1929	W31
Potassium, metal alloys, liquid	UN 1420	W31
Potassium, metal alloys, solid	UN 3403	W32
Potassium phosphide	UN 2012	W32
Potassium sodium alloys, liquid	UN 1422	W31
Potassium sodium alloys, solid	UN 3404	W32
Potassium sulfide, anhydrous *or* Potassium sulfide *with less than 30 percent water of crystallization*	UN 1382	W31, W40
Pyrophoric liquids, organic, n.o.s	UN 2845	W31
Pyrophoric metals, n.o.s., *or* Pyrophoric alloys, n.o.s	UN 1383	W31
Pyrophoric solid, inorganic, n.o.s	UN 3200	W31
Pyrophoric solids, organic, n.o.s	UN 2846	W31

TABLE 5—Continued

Proper shipping name	UN No.	Addition(s)
Rubidium	UN 1423	W32
Self-heating liquid, corrosive, inorganic, n.o.s	UN 3188	W31
Self-heating liquid, corrosive, organic, n.o.s	UN 3185	W31
Self-heating liquid, inorganic, n.o.s	UN 3186	W31
Self-heating liquid, organic, n.o.s	UN 3183	W31
Self-heating liquid, toxic, inorganic, n.o.s	UN 3187	W31
Self-heating liquid, toxic, organic, n.o.s	UN 3184	W31
Self-heating solid, inorganic, n.o.s	UN 3190	W31
Self-heating solid, organic, n.o.s	UN 3088	W31
Silver picrate, wetted *with not less than 30 percent water, by mass*	UN 1347	W31
Sodium	UN 1428	W32
Sodium aluminum hydride	UN 2835	W31, W40
Sodium borohydride	UN 1426	W32
Sodium cyanide, solid	UN 1689	W31
Sodium cyanide solution	UN 3414	W31
Sodium dinitro-o-cresolate, wetted *with not less than 10% water, by mass*	UN 3369	W31
Sodium dinitro-o-cresolate, wetted *with not less than 15 percent water, by mass*	UN 1348	W31
Sodium dithionite *or* Sodium hydrosulfite	UN 1384	W31
Sodium hydride	UN 1427	W32
Sodium hydrosulfide, *with less than 25 percent water of crystallization*	UN 2318	W31
Sodium methylate	UN 1431	W31
Sodium phosphide	UN 1432	W32
Sodium picramate, *wetted with not less than 20 percent water, by mass*	UN 1349	W31
Sodium sulfide, anhydrous *or* Sodium sulfide *with less than 30 percent water of crystallization*	UN 1385	W31, W40
Stannic phosphide	UN 1433	W32
Strontium peroxide	UN 1509	W100
Strontium phosphide	UN 2013	W32
Tear gas substances, liquid, n.o.s	UN 1693	W31
Tear gas substance, solid, n.o.s	UN 3448	W31
4-Thiapentanal	UN 2785	W31
Thiourea dioxide	UN 3341	W31
Titanium disulphide	UN 3174	W31
Titanium hydride	UN 1871	W31, W40
Titanium powder, dry	UN 2546	W31
Titanium powder, wetted *with not less than 25 percent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns*	UN 1352	W31, W40
Titanium sponge granules *or* Titanium sponge powders	UN 2878	W100
Titanium trichloride, pyrophoric *or* Titanium trichloride mixtures, pyrophoric	UN 2441	W31
Toxic solids, water-reactive, n.o.s	UN 3125	W100
Trichlorosilane	UN 1295	W31
Trinitrobenzene, wetted, *with not less than 10% water, by mass*	UN 3367	W31
Trinitrobenzene, wetted *with not less than 30 percent water, by mass*	UN 1354	W31
Trinitrobenzoic acid, wetted *with not less than 10% water by mass*	UN 3368	W31
Trinitrobenzoic acid, wetted *with not less than 30 percent water, by mass*	UN 1355	W31
Trinitrochlorobenzene (picryl chloride), wetted, *with not less than 10% water by mass*	UN 3365	W31
Trinitrophenol (picric acid), wetted, *with not less than 10 percent water by mass*	UN 3364	W31
Trinitrophenol, wetted *with not less than 30 percent water, by mass*	UN 1344	W31
Trinitrotoluene (TNT), wetted, *with not less than 10 percent water by mass*	UN 3366	W31
Trinitrotoluene, wetted *or* TNT, wetted, *with not less than 30 percent water by mass*	UN 1356	W31
Urea nitrate, wetted, *with not less than 10 percent water by mass*	UN 3370	W31
Urea nitrate, wetted *with not less than 20 percent water, by mass*	UN 1357	W31
Water-reactive liquid, n.o.s	UN 3148	W31
Water-reactive solid, corrosive, n.o.s. (PG I and III)	UN 3131	W31
Water-reactive solid, corrosive, n.o.s. (PG II)	UN 3131	W31, W40
Water-reactive solid, flammable, n.o.s. (PG I and III)	UN 3132	W31
Water-reactive solid, flammable, n.o.s. (PG II)	UN 3132	W31, W40
Water-reactive solid, n.o.s. (PG I)	UN 2813	W32
Water-reactive solid, n.o.s. (PG II)	UN 2813	W31, W40
Water-reactive solid, n.o.s. (PG III)	UN 2813	W31
Water-reactive solid, self-heating, n.o.s. (PG I and III)	UN 3135	W31
Water-reactive solid, self-heating, n.o.s. (PG II)	UN 3135	W31, W40
Water-reactive solid, toxic, n.o.s. (PG I and III)	UN 3134	W31
Water-reactive solid, toxic, n.o.s. (PG II)	UN 3134	W31, W40
Xanthates	UN 3342	W31
Xylyl bromide, liquid	UN 1701	W31
Zinc ashes	UN 1435	W100
Zinc peroxide	UN 1516	W100
Zinc phosphide	UN 1714	W32
Zinc powder *or* Zinc dust (PG I and III)	UN 1436	W31
Zinc powder *or* Zinc dust (PG II)	UN 1436	W31, W40
Zirconium hydride	UN 1437	W31, W40

TABLE 5—Continued

Proper shipping name	UN No.	Addition(s)
Zirconium, dry, *coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)*	UN 2858	W100
Zirconium, dry, *finished sheets, strip or coiled wire*	UN 2009	W31
Zirconium picramate, wetted *with not less than 20 percent water, by mass*	UN 1517	W31
Zirconium powder, dry	UN 2008	W31
Zirconium powder, wetted *with not less than 25 percent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns*	UN 1358	W31, W40
Zirconium scrap	UN 1932	W31

PHMSA received comment from DGAC noting for UN Numbers 1309, 1376, 1390, 1394, 1396, 1400, 1401, 1402 (PG II), 1405, 1417, 1483 (PG III), 1869, 1932, 2545 (PG III), 2546 (PG III), 2624, 2793, 2813 (PG II and III), 2830, 2878, 2881 (PG III), 3078, 3170, and 3208 (PG II and III), special provision IP4 was assigned in the regulatory text without corresponding discussion in the preamble. DGAC is correct that the assignment of these IP Codes was not discussed in the preamble; however, this omission was unintentional. The assignment of IP4 to these HMT entries was a result of aligning the HMR with the water-reactive packaging provisions for IBCs prescribed in the IMDG Code. Specifically, the provisions of IP4 are consistent with Special packing provision B4 of the IMDG Code. Special provision IP4 states, ''Flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.'' Based on further review of the implementation effects of this issue, a new special provision IP21, applicable only to vessel transport but with the same provisions as IP4, is assigned.

PHMSA received one comment from DGAC noting for the entry ''UN 2793'' that special provision IP3 is missing from column (7) in the proposed HMT. This was an inadvertent omission. Special provision IP3 has been reestablished.

Amendments to Column (9) Quantity Limitations

Section 172.101(j) describes column (9) of the HMT and the quantity limitations for specific entries. Furthermore, columns (9A) and (9B) specify the maximum quantities that may be offered for transportation in one package by passenger-carrying aircraft or passenger-carrying rail car (column (9A)) or by cargo-only aircraft (column (9B)). The indication of ''forbidden'' means the material may not be offered for transportation or transported in the applicable mode of transport.

In this final rule, PHMSA is amending for column (9B) a quantity limit of 75 kg for ''UN 0501, Propellant, solid, Division 1.4C.'' Previously, column (9B) forbade the transport of UN 0501 by cargo-only aircraft as proposed in the NPRM. This new quantity limit is consistent with the authorized quantity limit found in the ICAO Technical Instructions.

Amendments to Column (10) Vessel Stowage Requirements

Section 172.101(k) explains the purpose of column (10) of the HMT and prescribes the vessel stowage and segregation requirements for specific entries. Column (10) is divided into two columns: Column (10A) [Vessel stowage] specifies the authorized stowage locations on board cargo and passenger vessels, and column (10B) [Other provisions] specifies special stowage and segregation provisions. The meaning of each code in column (10B) is set forth in § 176.84.

Consistent with changes to Amendment 38–16 of the IMDG Code, PHMSA is making numerous changes to the vessel stowage location codes shown in column (10A) of the HMT. The majority of these changes are a result of those made to the IMDG Code to ensure the safe transportation of substances requiring stabilization when transported by vessel. Table 6 contains the changes listed in alphabetical order and showing the proper shipping name, UN identification number, current vessel stowage location code, and new vessel stowage location.

TABLE 6

Proper shipping name	UN No.	Current vessel stowage code	New vessel stowage code
Acrolein dimer, stabilized	2607	A	C
Acrylonitrile, stabilized	1093	E	D
N-Aminoethylpiperazine	2815	A	B
Butyl acrylates, stabilized	2348	A	C
n-Butyl methacrylate, stabilized	2227	A	C
Butyl vinyl ether, stabilized	2352	B	C
1,2-Butylene oxide, stabilized	3022	B	C
Ethyl acrylate, stabilized	1917	B	C
Ethyl methacrylate, stabilized	2277	B	C
Isobutyl acrylate, stabilized	2527	A	C
Isobutyl methacrylate, stabilized	2283	A	C
Isoprene, stabilized	1218	E	D
Methacrylaldehyde, stabilized	2396	E	D
Methyl acrylate, stabilized	1919	B	C
Methyl isopropenyl ketone, stabilized	1246	B	C
Methyl methacrylate monomer, stabilized	1247	B	C
Potassium superoxide	2466	E	D
Propyleneimine, stabilized	1921	B	D
Radioactive material, uranium hexafluoride *non fissile or fissile-excepted*	2978	A	B

TABLE 6—Continued

Proper shipping name	UN No.	Current vessel stowage code	New vessel stowage code
Radioactive material, uranium hexafluoride, fissile	2977	A	B
Styrene monomer, stabilized	2055	A	C
Vinyl acetate, stabilized	1301	B	C
Vinyl butyrate, stabilized	2838	B	C
Vinyl isobutyl ether, stabilized	1304	B	C
Vinylidene chloride, stabilized	1303	E	D
Vinyltoluenes, stabilized	2618	A	C

With the addition of a Division 6.1 subsidiary hazard to ''UN 2815, N-Aminoethylpiperazine,'' ''UN 2977, Radioactive material, uranium hexafluoride, fissile,'' and ''UN 2978, Radioactive material, uranium hexafluoride *non fissile or fissile-excepted,*'' PHMSA is adding code ''40,'' which indicates that the material must be stowed clear of living quarters, to column (10B) for these entries to remain consistent with the IMDG Code.

As a consequence of adding special provision 387, which addresses stabilization requirements to 51 existing entries in the HMT that are identified as requiring such, the IMO amended vessel stowage requirements for these entries. PHMSA is adding code ''25'' to column (10B) for the same 51 entries identified in Table 2. We note that the IMDG Code did not assign stowage provisions equivalent to code ''25'' to ''UN 1167, Divinyl ether, stabilized.'' Stowage code ''25'' requires these materials to be protected from sources of heat. PHMSA believes the omission of this stowage requirement in the IMDG Code to be an oversight, and we are adding stowage code ''25'' to this HMR entry. In the NPRM, we had proposed assigning stowage code ''25'' to UN 2383, Dipropylamine, but based on comments received from U.S. Amines indicating the material is not a polymerizing substance, we are not adding stowage code ''25'' to this entry. In the absence of further rulemaking actions, these provisions will sunset two years from the effective date of this rulemaking. See the ''Comment Discussion'' section of this document for further discussion.

Code ''28'' requires materials to which this code is assigned to be stowed away from flammable liquids. In this final rule, consistent with changes to the IMDG Code, PHMSA is removing code ''28'' from column (10B) for the following HMT entries: ''UN 2965, Boron trifluoride dimethyl etherate''; ''UN 2988, Chlorosilanes, water-reactive, flammable, corrosive, n.o.s''; ''UN 1183, Ethyldichlorosilane''; ''UN 1242, Methyldichlorosilane''; ''UN 3490, Toxic by inhalation liquid, water-reactive, flammable, n.o.s. *with an LC50 lower than or equal to 200 ml/m3 and saturated vapor concentration greater than or equal to 500 LC50*''; and ''UN 1295, Trichlorosilane.''

PHMSA received comments from two commenters concerning amendments to column (10). Sean Bevan provided general support for harmonization in this area, while DGAC provided multiple editorial comments related to the assignment of various vessel stowage codes. The DGAC comments are summarized as follows:

- ''*UN 3402, Alkaline earth metal amalgams, solid,*'' *lists vessel stowage code* ''*14*'' *in column (10B).* DGAC believes the code should be ''148.'' PHMSA agrees and has amended column (10B) accordingly.
- ''*UN 2968, Maneb stabilized or Maneb preparations, stabilized against self-heating,*'' *lists vessel stowage code* ''*25*'' *in column (10B).* DGAC states the current entry does not have this code and there is no discussion in the preamble of the NPRM regarding its addition. PHMSA agrees that code ''25'' should not have been proposed in association with this entry and has removed it accordingly.
- ''*UN 3395, Organometallic substance, solid, water-reactive,*'' *the PGI entry lists vessel stowage code* ''*14*'' *in column (10B).* DGAC believes the code should be ''148.'' PHMSA agrees and has amended column (10B) accordingly.
- ''*UN 3397, Organometallic substance, solid, water-reactive, self-heating,*'' *the PGII and III entries list vessel stowage code* ''*14*'' *in column (10B).* DGAC believes the code should be ''148.'' PHMSA agrees and has amended column (10B) accordingly.
- ''*UN 2257, Potassium,*'' *vessel stowage codes* ''*13*'' *and* ''*148*'' *do not appear in column (10B).* DGAC believes these codes were inadvertently omitted and should be shown. PHMSA agrees that codes ''13'' and ''148'' should not have been proposed for removal in association with this entry and has reinserted them into the HMT.
- ''*UN 3367, Trinitrobenzene, wetted, with not less than 10% water, by mass,*'' *lists vessel stowage code* ''*3*'' *in column (10B).* DGAC believes the code should be ''36.'' PHMSA agrees and has amended column (10B) accordingly.
- ''*UN1085, Vinyl bromide, stabilized,*'' *lists stowage location* ''*C*'' *in column (10A).* DGAC believes the code should be ''B.'' PHMSA agrees and has amended column (10A) accordingly.

Appendix B to § 172.101:

Appendix B to § 172.101 lists marine pollutants regulated under the HMR. PHMSA is revising the list of marine pollutants by adding five new entries to remain consistent with the IMDG Code. These changes include those substances that were either assigned a ''P'' in the dangerous goods list or identified in the alphabetical index to Amendment 38–16 of the IMDG Code—based on review of evaluations for each individual material, and associated isomers where appropriate, performed by the Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) and the GESAMP defining criteria for marine pollutants. The following entries are added to the list of marine pollutants in appendix B to § 172.101: Hypochlorite solutions; Isoprene, stabilized; N-Methylaniline; Methylcyclohexane; and Tripropylene. DGAC commented that there already exists an entry in the list of marine pollutants for ''hexane,'' so there is no need to add the entry ''hexanes.'' PHMSA agrees and is not adding a duplicative entry for ''hexanes.'' IVODGA commented with general support for the addition of these entries.

Section 172.102 special provisions:

Section 172.102 lists special provisions applicable to the transportation of specific hazardous materials. Special provisions contain packaging requirements, prohibitions, and exceptions applicable to particular quantities or forms of hazardous materials. In this final rule, PHMSA is making the following revisions to § 172.102 special provisions:

- *Special Provision 40:* Special provision 40 prescribes the criteria for classification of a ''Polyester resin kit.''

PHMSA is revising special provision 40 by authorizing a polyester resin kit to contain a Division 4.1 base material consistent with the new HMT entry ''UN 3527, Polyester resin kit, *solid base material,* 4.1.''

• *Special Provision 134:* Special provision 134 prescribes the applicability of the HMT entry ''UN 3171, Battery-powered vehicle *or* Battery-powered equipment.'' PHMSA is revising special provision 134 by amending the list of battery-powered vehicle examples to include trucks, locomotives, bicycles (pedal cycles with an electric motor) and other vehicles of this type (*e.g.,* self-balancing vehicles or vehicles not equipped with at least one seating position), and self-propelled farming and construction equipment. In addition, PHMSA is organizing the structure of the special provision into paragraph form for ease of reading. PHMSA received a comment from UPS stating that the amendment to special provision 134 categorizes hoverboards as battery-powered vehicles and not lithium batteries contained in equipment. UPS argued that this classification obscures to carriers the presence of lithium batteries with no indication in the proper shipping name that lithium batteries are present and requested that the United Nations reconsider this amendment during the next biennium. PHMSA notes these concerns and will consider whether the issue should be reconsidered during the next UN biennium. In the interest of ensuring proper shipping names utilized by shippers are consistent in all transport modes, we are adopting the amendments to special provision 134 as proposed in the NPRM.

• *Special Provision 135:* Special provision 135 specifies that an internal combustion engine installed in a vehicle must be consigned to the entries ''Vehicle, flammable gas powered'' or ''Vehicle, flammable liquid powered,'' as appropriate. PHMSA is revising special provision 135 by clarifying that vehicles powered by both a flammable liquid and a flammable gas internal combustion engine must be consigned to the entry ''Vehicle, flammable gas powered.'' In addition, PHMSA is revising special provision 135 by clarifying that for the purpose of this special provision, a ''vehicle'' is a self-propelled apparatus designed to carry one or more persons or goods. A list of examples is provided.

• *Special Provision 157:* PHMSA is adding new special provision 157 and assigning it to ''UN 3527, Polyester resin kit, *solid base material.*'' The special provision allows the maximum net capacity for inner packagings of flammable solids in PG II to be increased to no more than 5 kg (11 pounds) when the material is transported as a limited quantity.

• *Special Provision 181:* PHMSA is adding new special provision 181 and assigning it to ''UN 3481, Lithium ion batteries contained in equipment''; ''UN 3481, Lithium ion batteries packed with equipment''; ''UN 3091, Lithium metal batteries contained in equipment''; and ''UN 3091, Lithium metal batteries packed with equipment.'' The special provision specifies that when lithium cells or batteries packed with equipment and lithium cells or batteries contained in equipment are packed in the same package, the shipping paper (if used) and the package must use the ''packed with'' proper shipping name and UN number. Further, all packaging requirements applicable to both proper shipping names must be met and the total mass of cells or batteries in the package must not exceed the quantity limits specified in columns (9A) and (9B), as applicable.

• *Special Provision 182:* PHMSA is adding new special provision 182 and assigning it to ''UN 3072, Life-saving appliances, not self-inflating *containing dangerous goods as equipment*'' to clarify that equipment containing only lithium batteries must be classified as either UN 3091 or UN 3481, as appropriate.

• *Special Provision 238:* Special provision 238 addresses the shipment of neutron radiation detectors. PHMSA is revising special provision 238 to align with the UN Model Regulations special provision 373 by permitting the packaging to contain ''absorbent'' or ''adsorbent'' material where the previous requirement permitted ''absorbent'' material only.

• *Special Provision 369:* Special provision 369 prescribes classification criteria, consignment instructions and transport conditions for ''UN 3507, Uranium hexafluoride, radioactive material, excepted package, *less than 0.1 kg per package, non-fissile or fissile-excepted.*'' PHMSA is revising special provision 369 in conjunction with revising the primary classification for UN 3507 from Class 8 to Division 6.1. Specifically, PHMSA is clarifying that this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Division 6.1 with radioactive and corrosive subsidiary risks.

• *Special Provision 379:* PHMSA is adding new special provision 379 and assigning it to the HMT entries ''UN 1005, Ammonia, anhydrous'' and ''UN 3516, Adsorbed gas, toxic, corrosive, n.o.s.'' This special provision is applicable to ammonia dispensers containing adsorbed ammonia, which are used to reduce polluting nitrogen oxide emissions from automobiles. The UN Sub-Committee found that the substance contained in the receptacles did not meet any criteria for classification in the Model Regulations, but it acknowledged that the substance did fit the recent definition of an adsorbed gas. Based on the stability of adsorption under normal transport conditions, an exception for these dispensers was adopted subject to appropriate packaging conditions. These materials are normally forbidden for transport by air on passenger-carrying and cargo-only aircraft; however, consistent with the ICAO Technical Instructions, PHMSA is authorizing them on cargo-only aircraft subject to the transport conditions prescribed in the special provision with additional approval of the Associate Administrator.

• *Special Provision 387:* PHMSA is adding new special provision 387 and assigning it to the four new ''n.o.s.'' polymerizing substance HMT entries and to the 52 existing HMT entries that are identified as requiring stabilization. This special provision sets forth the transport conditions when stabilization, or prevention of polymerization, is provided through the use of a chemical inhibitor. When a substance is stabilized via use of a chemical inhibitor, it is important to ensure that the level of stabilization is sufficient to prevent the onset of a dangerous reaction under conditions normally incident to transportation. This special provision requires a determination that the degree of chemical stabilization employed at the time the package, IBC, or tank is offered for transport must be suitable to ensure that the sustained bulk mean temperature of the substance in the package, IBC, or tank will not exceed 50 °C (122 °F), under conditions normally incident to transportation. The special provision also specifies that temperature control is required at the point where chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport. Consistent with the ICAO Technical Instructions, PHMSA is clarifying in special provision 387 that these substances are forbidden for transport by air when temperature control is required. U.S. Amines requests that PHMSA reconsider assigning special provision 387 to Dipropylamine (UN 2383), further asserting that this material does not pose a polymerization risk. They provided safety data sheets and other associated technical data to substantiate the claim. Based on a

review of the technical information provided and the physical properties of the substance in question, PHMSA agrees and is not assigning special provision 387 to this substance. In the absence of further rulemaking actions, this provision will sunset two years from the effective date of this rulemaking. See the ''Comment Discussion'' section of this document for further discussion.

• *Special Provision 420:* PHMSA is adding new special provision 420 and assigning it to the HMT entry ''UN 2000, Celluloid.'' This special provision states that table tennis balls are not subject to the requirements of the HMR. The 19th Revised Edition of the UN Model Regulations includes a special provision assigned to ''UN 2000, Celluloid'' that excepts table tennis balls made of celluloid from the requirements of the Model Regulations if the total net mass of each table tennis ball does not exceed 3 grams and the net mass of table tennis balls does not exceed 500 grams per package. In the NPRM, PHMSA discussed not including this special provision (*see* Section V, ''Amendments Not Being Considered for Adoption in This NPRM'') as it is unnecessary based on our position—as stated in the letter of interpretation (Ref. No. 14–0141)—that table tennis balls are not subject to the requirements of the HMR and that the ''UN 2000, Celluloid'' entry only applies when the material is in a pre-manufactured state (*i.e.,* blocks rod, rolls, sheets, tubes, etc.). PHMSA received three comments from COSTHA, DGAC, and IVODGA requesting that PHMSA reconsider the position to omit the special provision. DGAC specifically commented that while they fully agree with PHMSA's view that celluloid table tennis balls are not subject to the HMR and that the HMT entry ''UN 2000, Celluloid'' only applies when celluloid is in a pre-manufactured state, this position is not universally held by other governmental transport authorities. The commenters asserted that while the letter of interpretation is helpful, as it is not formally included in the HMR, including a special provision stating that table tennis balls are not subject to the HMR would be beneficial. PHMSA agrees with the commenters that adding a special provision to clarify table tennis balls are not subject to the requirements of the HMR is warranted and may lead to a reduction in the number of shipments rejected or frustrated by carriers. The special provision 420 added in this final rule differs from special provision 383 of the Model Regulations in that it excepts articles manufactured of celluloid, such as table tennis balls, without a limit on the size of the ball or the quantity per package.

• *Special Provision 421:* PHMSA is adding new special provision 421 and assigning it to the four new polymerizing substance, n.o.s. entries. This special provision is added to indicate that after January 2, 2019 shipments may not be offered for transportation under these basic descriptions. This special provision is added as a result of sunset provisions for polymerizing substance amendments. See the ''Comment Discussion'' section of this document for a discussion on the sunset provision.

• *Special Provision 422:* PHMSA is adding new special provision 422 and assigning it to the following HMT entries: ''UN 3480, Lithium ion batteries *including lithium ion polymer batteries*''; ''UN 3481, Lithium ion batteries contained in equipment *including lithium ion polymer batteries*''; ''UN 3481, Lithium ion batteries packed with equipment *including lithium ion polymer batteries*''; ''UN 3090, Lithium metal batteries *including lithium alloy batteries*''; ''UN 3091, Lithium metal batteries contained in equipment *including lithium alloy batteries*''; and ''Lithium metal batteries packed with equipment *including lithium alloy batteries.*'' Special provision 422 states that the new lithium battery Class 9 label shown in § 172.447 is to be used for packages containing lithium batteries that require labels. Consistent with the UN Model Regulations, PHMSA is providing a transition period that would authorize labels conforming to requirements in place on December 31, 2016 to continue to be used until December 31, 2018. Class 9 placards, when used, must conform to the existing requirements in § 172.560.

• *Special Provision A210:* PHMSA is adding new special provision A210 and assigning it to the new italicized HMT entries ''Catecholborane'' and its synonym ''1, 3, 2-Benzodioxaborole.'' Consistent with the ICAO Technical Instructions, this special provision clarifies that this substance is forbidden for transport by air and may only be transported on cargo-only aircraft with the approval of the Associate Administrator.

• *Special Provision A212:* PHMSA is adding new special provision A212 and assigning it to the to the HMT entry ''UN 2031, Nitric acid *other than red fuming, with more than 20 percent and less than 65 percent nitric acid.*'' Consistent with the ICAO Technical Instructions, this special provision allows sterilization devices containing nitric acid conforming to the conditions in the special provision to be offered for transportation by passenger-carrying aircraft irrespective of column (9A) of the § 172.101 HMT listing the material as forbidden.

• *Special Provision B134:* PHMSA is adding new special provision B134 and assigning it to UN Numbers 1309, 1376, 1483, 1869, 2793, and 2878. This special provision states that when in Large Packagings offered for transport by vessel, flexible or fiber inner packages containing these materials would need to be sift-proof and water-resistant, or fitted with a sift-proof and water-resistant liner. Consistent with the IMDG Code, these provisions will increase the ability of these packages to perform their containment function and reduce the likelihood of a fire on board cargo vessels when used to transport substances that either generate large amounts of heat or give off flammable or corrosive toxic gases on contact with water or moisture.

• *Special Provision B135:* PHMSA is adding new special provision B135 and assigning it to UN Numbers 1932, 2008, 2545, 2546, 2881, and 3189. This special provision states that when in Large Packagings offered for transport by vessel, flexible or fiber inner packages containing these materials would need to be hermetically sealed. Consistent with the IMDG Code, these provisions will increase the ability of these packages to perform their containment function and reduce the likelihood of a fire on board cargo vessels when used to transport substances that either generate large amounts of heat or give off flammable or corrosive toxic gases on contact with water or moisture.

• *IP Code 19:* PHMSA is adding a new IP Code 19 and assigning it to UN 3531, UN 3532, UN 3553, and UN 3534. Consistent with international regulations, this special provision requires that IBCs are designed and constructed to permit the release of gas or vapor, thereby preventing a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.

• *IP Code 21:* PHMSA is adding a new IP Code 21 and assigning it to UN Numbers 1309, 1376, 1390, 1394, 1396, 1400, 1401, 1402 (PG II), 1405, 1417, 1483 (PG III), 1869, 1932, 2545 (PG III), 2546 (PG III), 2624, 2793, 2813 (PG II and III), 2830, 2878, 2881 (PG III), 3078, 3170, and 3208 (PG II and III). Consistent with the IMDG Code, this special provision requires that flexible, fiberboard, or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.

• *Special Provision N90:* Special provision N90 is assigned to the HMT entry ''UN 3474, 1-Hydroxybenzotriazole, monohydrate'' and prohibits the use of metal packages. Consistent with the UN Model Regulations, PHMSA is revising special provision N90 by clarifying that the prohibition of metal packages does not include packagings constructed of other material with a small amount of metal (*e.g.,* metal closures or other metal fittings). However, packagings constructed with a small amount of metal must be designed such that the hazardous material does not contact the metal.

• *Special Provision N92:* PHMSA is adding special provision N92 to the four new polymerizing substance, n.o.s. entries. This special provision requires packages that are utilized for the transportation of polymerizing substances to be designed and constructed to permit the release of gas or vapor to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.

• *Special Provision W31:* PHMSA is adding new special provision W31 and assigning it to the 155 HMT entries identified in Table 5 in the ''Amendments to column (7) special provisions'' section of this rulemaking. With the addition of this special provision, PHMSA is requiring packages assigned as such to be hermetically sealed when offered for transportation by vessel.

The addition of W31 to these commodities harmonizes the HMR with changes made in Amendment 38–16 of the IMDG Code, as well as the transportation requirements of the HMR with the IMDG Code for other commodities where they were not previously harmonized. The IMDG Code has had provisions in place equivalent to proposed W31 (PP31) for certain commodities since at least 1998.[5] Other hazardous materials regulations (ICAO Technical Instructions, HMR, and UN Model Regulations) do not currently contain provisions similar to W31. Amendment 38–16 of the IMDG Code is adding this hermetically sealed packaging requirement to 15 entries in its Dangerous Goods List (some with multiple packing groups).

The amendments would reduce the risk of fire on board cargo vessels carrying hazardous materials that can react dangerously with the ship's available water and carbon dioxide fire extinguishing systems. Some of the hazardous materials for which PHMSA is amending the vessel transportation packaging requirements react with water or moisture generating excessive heat or releasing toxic or flammable gases. Common causes for water entering into the container are: Water entering through ventilation or structural flaws in the container; water entering into the containers placed on deck or in the hold in heavy seas; and water entering into the cargo space upon a ship collision or leak. If water has already entered the container, the packaging is the only protection from a potential fire.

In this final rule, PHMSA is strengthening the ability of these packages transporting water-reactive substances. PHMSA received one comment from DGAC noting that the proposed text for W31 would apply to both ''non-bulk'' and ''bulk'' packagings as defined in the HMR. DGAC commented that the analogous special provision in IMDG code (PP31) only applies to what the HMR defines as ''non-bulk'' packagings. As a result, DGAC requested that special provision W31 be limited in its applicability to ''non-bulk'' packagings. PHMSA agrees with DGAC, and in this final rule, special provision W31 is added with applicability limited to non-bulk packagings.

• *Special Provision W32:* PHMSA is adding new special provision W32 and assigning it to 38 HMT entries identified in Table 5 in the ''Amendments to column (7) special provisions'' section of this rulemaking. With the addition of this special provision, PHMSA is requiring packages assigned this special provision to be hermetically sealed, except for solid fused material, when offered for transportation by vessel. The 38 entries to which this addition is made are already required to be packaged in this manner in accordance with the IMDG Code through a modified PP31 (when compared to the PP31 mentioned in the W31 discussion above) assigned to various packing instructions. See the comments in the W31 discussion above for more discussion on the reasons for this amendment.

• *Special Provision W40:* PHMSA is adding new special provision W40 and assigning it to 38 HMT entries identified in Table 5 in the ''Amendments to column (7) special provisions'' section of this rulemaking. With the addition of this special provision, PHMSA is prohibiting the use of non-bulk bags when offered for transportation by vessel. See the comments in the W31 discussion above for more discussion on the reasons for this amendment.

• *Special Provision W100:* PHMSA is adding new special provision W100 and assigning it to 27 HMT entries identified in Table 5 in the ''Amendments to column (7) special provisions'' section of this rulemaking. With the addition of this special provision, PHMSA is requiring non-bulk flexible, fiberboard, or wooden packagings that are assigned this special provision to be sift-proof and water-resistant, or to be fitted with a sift-proof and water-resistant liner. These amendments are intended to ensure that water-reactive materials transported by vessel are in packages that provide an appropriate level of protection from the ingress of water. See the comments in the W31 discussion above for more discussion on the reasons for this amendment.

Section 172.202

Section 172.202 details the requirements for the description of hazardous materials on shipping papers. PHMSA received a comment from COSTHA requesting an amendment to the transportation description requirements for consumer commodities offered for transportation by aircraft. COSTHA stated the notification of the pilot-in-command is created using information provided on the shipping papers and requested PHMSA allow a shipper offering consumer commodities to show on the shipping paper either the actual gross mass of each package or the average gross mass of all packages in the consignment. PHMSA agrees with COSTHA that without the consequential amendment they proposed in their comment, it would be difficult for airlines to implement our change to § 175.33 as proposed in the NPRM. Therefore, we are adding a new paragraph (a)(6)(viii) to provide an allowance for shippers of consumer commodities to show on the shipping paper either the actual gross mass of each package or the average gross mass of all packages in the consignment.

Section 172.407

Section 172.407 prescribes specifications for labels. On January 8, 2015, PHMSA published a final rule [Docket No. PHMSA–2013–0260 (HM–215M); 80 FR 1075] that required labels to have a solid line forming the inner border 5 mm from the outside edge of the label and a minimum line width of 2 mm. Transitional exceptions were provided allowing labels authorized prior to this rulemaking to be used until December 31, 2016.

The rulemaking authorized a reduction in label dimensions and

[5] These provisions have potentially been in place before 1998. PHMSA reviewed hard copy IMDG Codes dating back to 1998 but was unable to locate the origin of these provisions.

features if the size of the packaging so requires. This allowance for reduction in label dimensions, consistent with the requirements for standard size labels, was contingent on the solid line forming the inner border remaining 5 mm from the outside edge of the label and the minimum width of the line remaining 2 mm. PHMSA has become aware that maintaining these inner border size requirements, while reducing the size of other label elements, may potentially result in the symbols on the reduced size labels no longer being identifiable. Consequently, we are revising paragraph (c)(i) to remove the existing inner border size requirements for reduced dimension labels and authorizing the entire label to be reduced proportionally.

In the same January 8, 2015 final rule, PHMSA authorized the continued use of a label in conformance with the requirements of this paragraph in effect on December 31, 2014, until December 31, 2016. PHMSA has been made aware that the transition period provided may not be sufficient to allow the regulated community to implement necessary changes to business practices or to deplete inventories of previously authorized labels. PHMSA is extending the transition date provided in paragraph (c)(1)(iii) until December 31, 2018 for domestic transportation in order to provide additional time for implementation and depletion of existing stocks of labels. PHMSA received a comment of support for this amendment from Arkema Inc. and is adopting this transition date as proposed.

Section 172.447

PHMSA is creating a new section containing a new Class 9 hazard warning label for lithium batteries. The label consists of the existing Class 9 label with the addition of a figure depicting a group of batteries with one broken and emitting a flame in the lower half. This label will appear on packages containing lithium batteries required to display hazard warning labels and is intended to better communicate the specific hazards posed by lithium batteries. This action is consistent with the most recent editions of the UN Model Regulations, the ICAO Technical Instructions, and the IMDG Code. Packages of lithium batteries displaying the existing Class 9 label may continue to be used until December 31, 2018. We are adopting this transition period to allow shippers time to exhaust existing stocks of labels and pre-printed packagings. However, we are not adopting any modifications to the existing Class 9 placard or the creation of a Class 9 placard specifically for cargo transport units transporting lithium batteries. PHMSA received a comment from UPS providing support for this amendment.

Section 172.505

Section 172.505 details the transport situations that require subsidiary placarding. Uranium hexafluoride is a volatile solid that may present both chemical and radiological hazards. It is one of the most highly soluble industrial uranium compounds and, when airborne, hydrolyzes rapidly on contact with water to form hydrofluoric acid (HF) and uranyl fluoride (UO_2F_2).[6]

As previously discussed in the review of changes to § 172.102, the UN Sub-Committee determined it necessary that a 6.1 subsidiary hazard be added to the Dangerous Goods List of uranium hexafluoride entries. Currently, in addition to the radioactive placard that may be required by § 172.504(e), each transport vehicle, portable tank, or freight container that contains 454 kg (1,001 pounds) or more gross weight of non-fissile, fissile-excepted, or fissile uranium hexafluoride must be placarded with a corrosive placard on each side and each end. PHMSA is adding a requirement for these shipments currently requiring corrosive subsidiary placards to also placard with 6.1 poison or toxic placards.

Part 173

Section 173.4a

Section 173.4a prescribes transportation requirements for excepted packages. In this final rule, consistent with changes to the UN Model Regulations, PHMSA is amending paragraph (e)(3) to allow required absorbent materials to be placed in either the intermediate or outer packaging.

Section 173.9

Section 173.9 prescribes requirements for the fumigant marking. In this final rule, PHMSA is amending § 173.9 to require that the fumigant marking and its required information are capable of withstanding a 30-day exposure to open weather conditions. This requirement is consistent with the survivability requirements for placards found in § 172.519. Therefore, we are making amendments to this section consistent with the survivability requirements for placards as proposed in the NPRM.

[6] *https://www.epa.gov/sites/production/files/2014-11/documents/tsd58.pdf.*

Section 173.21

Section 173.21 describes situations in which the offering for transport or transportation of materials or packages is forbidden. Examples include materials designated as ''Forbidden'' in column (3) of the HMT; electrical devices that are likely to generate sparks and/or a dangerous amount of heat; and materials that are likely to decompose or polymerize and generate dangerous quantities of heat or gas during decomposition or polymerization. In § 173.21, PHMSA is lowering the temperature threshold at which a polymerizing substance is forbidden for transport, unless the material is stabilized or inhibited, from 54 °C (130 °F) to 50 °C (122 °F) and amending the table in paragraph (f)(1) to accommodate the specific temperature controls applicable to polymerizing substances. This 50 °C (122 °F) temperature is consistent with existing requirements for Division 4.1 (self-reactive) and Division 5.2 (Organic peroxide) hazardous materials, as well as the 19th Revised Edition of UN Model Regulations for the transport of polymerizing substances in packages and IBCs, which requires temperature control in transport if the SAPT is 45 °C (113 °F) only for polymerizing substances offered for transport in portable tanks.

PHMSA received comments from DGAC and Dow proposing an editorial amendment to paragraph (f) to distinguish between a material that is likely to decompose with a self-accelerated decomposition temperature and a material that will polymerize. PHMSA agrees with the commenters and is revising paragraph (f) to clarify that materials with a SADT decompose and those with a SAPT polymerize. Additionally, PHMSA received a comment from Arkema Inc. asking if there are equivalent or alternative test methods that may be utilized other than the four test methods described in Part II of the UN Manual of Tests and Criteria for determining classification as a polymerizing substance. The only tests authorized to determine SAPT in § 173.21 are the Test Series H tests described in Part II of the UN Manual of Tests and Criteria.

We are not adopting a different temperature threshold before temperature control is required for portable tanks transporting polymerizing substances. At this time, we believe there is not sufficient data to support a different threshold for polymerizing substances in portable tanks.

PHMSA received comments from BAMM & MPA, Deltech Corporation, and DGAC concerning our proposal to maintain a minimum SAPT temperature of 50 °C for portable tanks versus the internationally adopted 45 °C. The commenters cited PHMSA's failure to harmonize in the past for transport provisions applicable to self-reactive materials and organic peroxides, as well as potential non-compliance concerns for imported materials that were evaluated and offered for transport at different temperatures than the proposal would require in the HMR. PHMSA continues to maintain that 50 °C is the maximum temperature reasonably expected to be experienced by any self-reactive, organic peroxide, and/or polymerizing substance. This 50 °C (122 °F) temperature is consistent with existing requirements for Division 4.1 (self-reactive) and Division 5.2 (organic peroxide) hazardous materials. In the absence of further rulemaking actions, these provisions will sunset two years from the effective date of this rulemaking. See the ''Comment Discussion'' section of this document for a discussion on the sunset provision. See the ''Comment Discussion'' section of this document for full discussion.

Section 173.40

Section 173.40 provides general packaging requirements for toxic materials packaged in cylinders. In this final rule, PHMSA is revising paragraph (a)(1) to clarify that TC, CTC, CRC, and BTC cylinders authorized in § 171.12, except for acetylene cylinders, may be used for toxic materials. PHMSA received a comment from COSTHA stating that the current § 173.40(a)(1) prohibits acetylene cylinders and non-refillable cylinders from carrying toxic by inhalation gases, and that ''non-refillable cylinders'' seem to have been inadvertently deleted from the proposed regulatory text in the NPRM. PHMSA agrees and is adding non-refillable cylinders to this prohibition in paragraph (a)(1).

Section 173.50

Section 173.50 provides definitions for the various divisions of Class 1 (Explosive) materials referenced in part 173, subpart C. Paragraph (b) of this section notes that Class 1 (Explosive) materials are divided into six divisions and that the current definition of Division 1.6 states that ''this division comprises articles which contain only extremely insensitive substances.'' PHMSA is amending the definition of Division 1.6 to note that the division is made up of articles that predominately contain extremely insensitive substances. Consistent with the recent changes to the UN Model Regulations, the new definition means that an article does not need to contain solely extremely insensitive substances to be classified as a Division 1.6 material.

Section 173.52

Section 173.52 contains descriptions of classification codes for explosives assigned by the Associate Administrator. These compatibility codes consist of the division number followed by the compatibility group letter. Consistent with changes proposed to § 173.50 and those made in the UN Model Regulations, PHMSA is amending the descriptive text for the 1.6N classification code entry in the existing table in this section to indicate that these explosives are articles predominantly containing extremely insensitive substances.

Section 173.62

Section 173.62 provides specific packaging requirements for explosives. Consistent with the UN Model Regulations, PHMSA is revising § 173.62 relating to specific packaging requirements for explosives.

In paragraph (b), in the Explosives Table, the entry for ''UN 0510, Rocket motors'' is added and assigned Packing Instruction 130 consistent with other rocket motor entries.

In paragraph (c), in the Table of Packing Methods, Packing Instruction 112(c) is revised by adding a particular packaging requirement applicable to UN 0504 requiring that metal packagings must not be used. It is also clarified that the prohibition of metal packagings does not include packagings constructed of other material with a small amount of metal (*e.g.,* metal closures or other metal fittings). Packing Instruction 114(b) is revised to clarify in the particular packaging requirement applicable to UN 0508 and UN 0509 that the prohibition of metal packagings does not include packagings constructed of other material with a small amount of metal (*i.e.,* metal closures or other metal fittings). Packing Instruction 130 is revised by adding UN 0510 to the list of large and robust explosives articles that may be transported unpackaged. PHMSA received a comment from Brent Knoblett asking if a rocket motor could be classified as a 1.4C article and qualify as large and robust. Given weight to power ratios, it is unlikely that a rocket motor would have the minimal energetics that would lead to a Division 1.4C classification. However, in the interest of harmonization and the inability to rule out the possibility of a large and robust rocket motor meeting the criteria for classification as a 1.4C article, PHMSA is adopting this unpackaged article authorization as proposed.

PHMSA is adding UN 0502 to Packing Instruction P130. This addition corrects an existing error in the HMR. Packing Instruction 130 is referenced for UN 0502 but contains no mention of UN 0502 in the actual instruction. In the NPRM, we proposed amending Packing Instruction 137 by amending the particular packaging instruction applicable to UN Numbers 0059, 0439, 0440, and 0441 by replacing the marking requirement ''THIS SIDE UP'' with a reference to the package orientation marking prescribed in § 172.312(b). PHMSA received comments from COSTHA, DOD, and IME noting that § 172.312(b) only provides a limitation on the use of orientation arrows and does not provide details for the manner in which they are to be displayed. PHMSA agrees that the paragraph referenced in the NPRM does not provide shippers of shape charges with an indication of the appropriate marking. Therefore, in this final rule, we are changing the reference to orientation markings meeting the requirements of § 172.312(a)(2).

Section 173.121

Section 173.121 provides criteria for the assignment of packing groups to Class 3 materials. Paragraph (b)(1)(iv) provides criteria for viscous flammable liquids of Class 3—such as paints, enamels, lacquers and varnishes—to be placed in PG III on the basis of their viscosity, coupled with other criteria. In this final rule and consistent with the changes to the UN Model regulations, PHMSA is amending paragraph (b)(1)(iv) to include additional viscosity criteria that can be used as an alternative where a flow cup test is unsuitable. PHMSA received a comment from the ACA providing support for this amendment.

Section 173.124

Section 173.124 outlines defining criteria for Divisions 4.1 (Flammable solid), 4.2 (Spontaneously combustible), and 4.3 (Dangerous when wet material). Division 4.1 (Flammable solid) includes desensitized explosives, self-reactive materials, and readily combustible solids. The UN Model Regulations adopted amendments to include polymerizing materials to the list of materials that meet the definition of Division 4.1. Transport conditions for polymerizing materials are not new under the HMR.

PHMSA received questions from Arkema Inc., BAMM & MPA, and Dow about exclusions from classification as

polymerizing substances for combustible liquids and Class 9 substances. These commenters further asked about testing requirements for materials currently identified in the HMT that may also polymerize and requested clarification that—as proposed in the NPRM—it would not be necessary to offer materials meeting the definition of a combustible liquid and a polymerizing substance as a polymerizing substance. Arkema Inc. and BAMM & MPA similarly asked if substances meeting the definitions of Class 9 and polymerizing substances need to be offered as a polymerizing substance. The definition of polymerizing substance adopted by the UN Model Regulations excludes substances that meet the criteria for inclusion in Classes 1–8. In the NPRM, we proposed to exclude all materials that meet the definition of any other hazard class. To further harmonize the HMR definition of polymerizing substances with that found in the Model Regulations, PHMSA is amending § 173.124(a)(4)(iii) to exclude substances that meet the criteria for inclusion in Classes 1–8, including combustible liquids. It is our belief that polymerizing substances that also meet the definition of Class 9 would be limited to environmentally hazardous substances. Much like the UN, we believe that the polymerizing properties of these materials should take precedence in the identification of these materials and that the applicable additional description elements (*i.e.,* marine pollutant or ''RQ'' for hazardous substance) should be appropriately identified by shippers. Substances that meet the defining criteria for combustible liquids and polymerizing substances are only required to be offered for transportation as a combustible liquid.

Section 173.21 presently contains approval provisions for the transport of polymerizing materials. Unlike the present HMR requirements, the classification requirements adopted in the UN Model Regulations do not require testing to determine the rate of vapor production when heated under confinement. This rate should be the deciding factor when determining whether a polymerizing substance should be authorized for transportation in an IBC or portable tank. PHMSA is adding polymerizing materials to the list of materials that meet the definition of Division 4.1 with the additional requirement that that polymerizing substances are only authorized for transport if they pass the UN Test Series E at the ''None'' or ''Low'' level when tested for heating under confinement, or other equivalent test methods.

Specifically, we are adding a new paragraph (a)(4) that defines polymerizing materials generally and specifies defining criteria. Polymerizing materials are materials that are liable to undergo an exothermic reaction resulting in the formation of polymers under conditions normally encountered in transport. Additionally, polymerizing materials in Division 4.1 have a self-accelerating polymerization temperature of 75 °C (167 °F) or less; have an appropriate packaging determined by successfully passing the UN Test Series E at the ''None'' or ''Low'' level or by an equivalent test method; exhibit a heat of reaction of more than 300 J/g; and do not meet the definition of any other hazard class. PHMSA received questions from Arkema Inc. and Dow requesting clarification that for materials specifically listed by name in the HMT no testing is required to determine SAPT or appropriate transport provisions. Additionally, Arkema Inc. requested PHMSA more closely align our definition with that in the UN Model Regulations by including the phrase ''which, without stabilization'' in paragraph (a). Arkema Inc. and Dow are correct in their understanding that for materials specifically identified in the HMT by name (including n.o.s. entries) no additional testing is required to determine if the material is polymerizing. PHMSA agrees that the text as noted by Arkema Inc. is helpful in determining the applicability of the defining criteria for polymerizing substances and is making the recommended change to the definition of polymerizing substances.

PHMSA received comments from Arkema Inc., BAMM & MPA, Deltech, and DGAC raising concerns over PHMSA's proposal to require polymerizing substances intended to be transported in portable tanks or IBCs to undergo the Test Series E heating under confinement testing from the UN Manual of Tests and Criteria. The commenters stated that when polymerizing substances react in the test apparatus they often clog its orifice. They further stated this testing leads to unreliable, overly conservative results that suggest the material under test poses a greater hazard from heating under confinement than it actually does. Additionally, the commenters requested PHMSA align with the international approach for testing these substances, which only requires testing the substances under Test Series H to determine the substances SAPT.

While testing in accordance with UN Series E does present difficulties, this testing has been performed in the past in support of approval applications for various polymerizing substances. Additionally, while a clogged orifice within the Series E tests could be overly conservative, it is important to note that similar situations may occur during transport. For instance, a polymerizing substance that clogs the orifice during testing could potentially clog the pressure relief device on a portable tank. In such an incident, the testing would provide similar results to what could be expected within a transportation situation. Test Series E and H do not measure and/or predict the same phenomena. PHMSA notes Test Series E (or an equivalent performance measure) provides information on how the material behaves when heated under confinement. Test Series H provides information on the SAPT, and thus the potential need for temperature controls. These two tests are synergistic and not mutually exclusive. For these reasons, PHMSA is maintaining the testing requirements for polymerizing substances as proposed in the NPRM.

In the NPRM, PHMSA proposed to allow ''equivalent test methods'' to the Test Series E and specifically solicited comments on this topic. The only comment received concerning equivalent test methods was from BAMM & MPA, who noted their belief that Test Series H plus modeling could potentially provide equivalent results to Test Series E. In this final rule, PHMSA is authorizing additional test methods for determining heating under confinement with the approval of the Associate Administrator. In the absence of further rulemaking actions, this definition will sunset two years from the effective date of this rulemaking. See the ''Comment Discussion'' section of this document for further discussion.

Section 173.165

Section 173.165 prescribes the transport and packaging requirements for polyester resin kits. PHMSA is revising § 173.165 by adding the requirements for polyester resin kits with a flammable solid base consistent with the new HMT entry ''UN 3527, Polyester resin kit, solid base material, 4.1.''

Section 173.185

Section 173.185 prescribes transportation requirements for lithium batteries. Paragraph (c) describes alternative packaging and alternative hazard communication for shipments of up to 8 small lithium cells or 2 small batteries per package (up to 1 gram per

lithium metal cell, 2 grams per lithium metal battery, 20 Wh per lithium ion cell, and 100 Wh per lithium ion battery). Specifically, PHMSA is amending paragraph (c) to require strong outer packagings for small lithium cells or batteries to be rigid and to replace the current text markings that communicate the presence of lithium batteries and the flammability hazard that exists if damaged with a single lithium battery mark. The package must be of adequate size that the lithium battery mark can be displayed on one side of the package without folding. In addition, the lithium battery mark will be required to appear on packages containing lithium cells or batteries, or lithium cells or batteries packed with, or contained in, equipment when there are more than two packages in the consignment. This requirement would not apply to a package containing button cell batteries installed in equipment (including circuit boards) or when no more than four lithium cells or two lithium batteries are installed in the equipment. We are further clarifying what is meant by the term ''consignment'' by defining the term used in § 173.185 as one or more packages of hazardous materials accepted by an operator from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

PRBA submitted a comment to the NPRM noting that PHMSA's proposed definition for ''consignment'' would be applied to all modes of transport and that, while ICAO's definition applies only to air transportation, the proposed text is consistent with that found in the ICAO Technical Instructions. The ICAO Technical Instructions, IMDG Code, and UN Model Regulations do not have the same definition for ''consignment.'' Therefore, PRBA requested PHMSA amend the definition of consignment to indicate that it is only applicable to transportation by air. PRBA is correct that the definitions for ''consignment'' vary slightly between the various international standards. However, we note that the UN Model Regulations, IMDG Code, and ICAO Technical Instructions all include the term ''consignment'' when referencing exceptions from the lithium battery mark. The intent of these standards is to require the marking when multiple packages are offered from one shipper to one consignee. The definition as proposed in the NPRM best represents this requirement and allows for consistent application across all modes of transportation. PHMSA notes that under the HMR this definition is limited to its usage in § 173.185. Therefore, we are amending the definition of ''consignment'' as proposed in the NPRM.

Under current HMR requirements, a package of cells or batteries that meets the requirements of § 173.185(c) may be packed in strong outer packagings that meet the general requirements of §§ 173.24 and 173.24a instead of the standard UN performance packaging. Lithium batteries packed in accordance with § 173.185(c) must be packed in strong outer packagings that meet the general packaging requirements of §§ 173.24 and 173.24a and be capable of withstanding a 1.2 meter (3.9 ft) drop test without damage to the cells or batteries contained in the package, shifting of the contents that would allow battery-to-battery or cell-to-cell contact, or release of contents. Alternative hazard communication requirements also apply. The Class 9 label is replaced with text indicating the presence of lithium batteries; an indication that the package must be handled with care and that a flammability hazard exists if damaged; procedures to take in the event of damage; and a telephone number for additional information. Instead of a shipping paper, the shipper can provide the carrier with an alternative document that includes the same information as provided on the package.

In this rulemaking, PHMSA is replacing the existing text for marking requirements in § 173.185(c)(3) with a standard lithium battery mark for use in all transport modes and to remove the requirement in § 173.185(c)(3) for shippers to provide an alternative document. The lithium battery mark communicates key information (*i.e.,* the package contents and that a flammability hazard exists if damaged). The mark utilizes recognizable symbols that permit transport workers and emergency responders to quickly ascertain the package contents and take appropriate action. A single mark that is understood and accepted for all transport modes will increase the effectiveness. A transition period until December 31, 2018, is provided to allow adequate time for shippers to transition the new lithium battery mark and exhaust existing stocks of preprinted packagings or markings. UPS asks if the transition period also includes the requirement to mark packages when there are more than two packages per consignment of lithium ion or metal batteries contained in equipment. As proposed this transition was only intended to apply to the requirements for the mark itself and not to the exception from marking. After reviewing the international standards this rulemaking is harmonizing the HMR with, PHMSA has determined that for modes of transportation other than air an additional year was provided for consignment limit changes. In this final rule, PHMSA is amending § 173.185(c)(3(ii) to state that for modes of transportation other than by aircraft the provisions in paragraph (c)(3), including the exceptions from marking, in effect on December 31, 2016 may continue to be used until December 31, 2018. For transportation by aircraft only the provisions concerning the lithium battery handling marking itself in paragraph (c)(3)(ii) may be used until December 31, 2018. The current documentation requirement is redundant given the existing marking requirement and provides minimal additional safety value to that provided by the mark.

At the 49th session of the UN Sub-Committee, a late design revision to the lithium battery mark was adopted to authorize the mark on a background of ''suitable contrasting color'' in addition to white. This is consistent with design requirements for limited quantity marks and other marks in the Model Regulations. In this rulemaking, PHMSA is allowing the mark on a background of suitable contrasting color in addition to white.

Additionally, PHMSA is amending § 173.185(c)(2) and (c)(3)(i) to specify that outer packagings used to contain small lithium batteries must be rigid and of adequate size so the handling mark can be affixed on one side without the mark being folded. The HMR currently do not prescribe minimum package dimensions or specific requirements for package performance other than the requirements described in §§ 173.24 and 173.24a. We are aware of several instances in which either the package dimensions were not adequate to accommodate the required marks and labels or the package was not sufficiently strong to withstand the rigors of transport. These amendments will enhance the communication and recognition of lithium batteries and better ensure that packaging is strong enough to withstand normal transport conditions. PHMSA received comments from COSTHA, DGAC, Labelmaster Services, and PRBA requesting that an exception from the requirement for rigid packaging for batteries contained in equipment be provided if the equipment that contains the battery offers an equivalent level of protection. COSTHA noted some key fobs and remote control devices as examples of equipment that generally provide an equivalent level of

protection to a rigid packaging, further noting that these devices are currently shipped in padded envelopes safely. PHMSA agrees that rigid packaging is not necessary if the equipment containing lithium batteries provides a level of protection that is equivalent to rigid packaging and is therefore amending paragraph (c)(2) to address these comments.

PHMSA is amending § 173.185(e) to permit the transport of prototype and low production runs of lithium batteries contained in equipment. These amendments are mostly consistent with amendments adopted into the 19th Revised Edition of the UN Model Regulations and Amendment 38–16 of the IMDG Code, which authorize the transportation of prototype and low production runs of lithium batteries contained in equipment in packaging tested to the PG II level. The ICAO Technical Instructions authorize the transportation of prototype and low production runs of lithium batteries contained in equipment in packaging tested to the PG I level. In the NPRM, PHMSA proposed to continue to require prototype and low production batteries to be placed in packaging tested to the PG I performance level. We believe that the higher integrity packaging provides an additional layer of protection for cells and batteries not otherwise subjected to the UN design tests.

PRBA stated in their comment that PHMSA proposed to require PG I packaging and prohibit the use of fiberboard boxes when shipping prototype and low production lithium batteries by motor vehicle or vessel. PRBA noted this change is not consistent with the UN Model Regulations and IMDG Code because both standards authorize the use of PG II packaging and 4G fiberboard boxes. They further stated this lack of harmonization, particularly with the IMDG Code, will create compliance problems for our members shipping prototype or low production lithium batteries into the U.S. in accordance with the IMDG Code. Nothing in subpart C of part 171 would prohibit prototype or low production run batteries from being transported in accordance with the packaging authorizations in the IMDG Code (*i.e.,* a 4G fiberboard box at the PG II performance level) as authorized by § 171.22. PRBA requests PHMSA authorize a PG II 4G fiberboard box for shipments offered for transportation by motor vehicle and vessel and a PG I 4G fiberboard box for transportation by aircraft.

PHMSA notes that the proposals in the NPRM were primarily to provide authorizations for prototype or low production run batteries contained in equipment and additional flexibility in packaging multiple batteries and equipment in tested packaging, using existing packaging authorizations for the batteries to determine appropriate packaging. PRBA further noted that if PHMSA prohibits the use of PG I 4G fiberboard boxes for shipping prototype or low production lithium batteries by air, the HMR will conflict with the requirements of the ICAO Technical Instructions and will not comply with Section 828 of the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012. Shipments of prototype batteries require an approval for air transport. If the shipper wishes to offer by air in a PG I 4G fiberboard box, they may request such authorization in their approval request. Each request will be examined on its own merits.

Consistent with changes to the UN Model Regulations, the IMDG Code, and the ICAO Technical Instructions, PHMSA is adding a new paragraph (e)(7) to require shipments of low production runs and prototype lithium batteries to note conformance with the requirements of § 173.185(e) on shipping papers.

Additionally, PHMSA is amending § 173.185(f)(4) to harmonize with a requirement in the 19th Revised Edition of the UN Model Regulations that the ''Damaged/defective lithium ion battery'' and/or ''Damaged/defective lithium metal battery'' marking as appropriate be in characters at least 12 mm (0.47 inches) high.

Section 173.217

Section 173.217 establishes packaging requirements for dry ice (carbon dioxide, solid). Paragraph (c) prescribes additional packaging requirements for air transport. Consistent with the ICAO Technical Instructions, PHMSA is removing the term ''other type of pallet'' in paragraph (c)(3) that excepts dry ice being used as a refrigerant for other non-hazardous materials from the quantity limits per package shown in columns (9A) and (9B) of the § 172.101 HMT.

Section 173.220

Section 173.220 prescribes transportation requirements and exceptions for internal combustion engines, vehicles, machinery containing internal combustion engines, battery-powered equipment or machinery, and fuel cell-powered equipment or machinery. The UN Model Regulations adopted amendments to the existing UN 3166 engine and vehicle entries during the last biennium. These changes are continuations of efforts undertaken by the UN Sub-Committee to ensure appropriate hazard communication is provided for engines containing large quantities of fuels.

The 17th Edition of the UN Model Regulations added special provision 363, which required varying levels of hazard communication depending on the type and quantity of fuel present, in attempts to ensure the hazards associated with engines containing large quantities of fuel were sufficiently communicated. PHMSA did not adopt the provisions found in special provision 363 at the time they were introduced.

As previously discussed in the review of the new HMT entries, the existing UN 3166 identification number was maintained for the various vehicle entries in the Model Regulations, and three new UN identification numbers and proper shipping names were created for engines or machinery internal combustion and assigned a hazard classification based on the type of fuel used. The three new UN numbers and proper shipping names are as follows: A Class 3 entry ''UN 3528, Engine, internal combustion engine, flammable liquid powered, *or* Engine fuel cell, flammable liquid powered, *or* Machinery, internal combustion, flammable liquid powered, *or* Machinery, fuel cell, flammable liquid powered''; a Division 2.1 entry ''UN 3529, Engine, internal combustion engine, flammable gas powered, *or* Engine fuel cell, flammable gas powered, *or* Machinery, internal combustion, flammable gas powered, *or* Machinery, fuel cell, flammable gas powered''; and a Class 9 entry ''UN 3530, Engine, internal combustion, *or* Machinery, internal combustion.''

Consistent with the UN Model Regulations, PHMSA is adding to the HMR the new UN identification numbers and proper shipping names for engines and machinery. PHMSA is maintaining the existing transportation requirements and exceptions for engines and machinery found in § 173.220 for all modes of transportation other than vessel. To harmonize as closely as possible with Amendment 38–16 of the IMDG Code, PHMSA is making the following amendments to § 173.220: (1) Amending paragraph (b)(1)(ii) to include a reference to engines powered by fuels that are marine pollutants but do not meet the criteria of any other Class or Division; (2) amending paragraph (b)(4)(ii) to include a reference to the proposed new § 176.906 containing requirements for shipments of engines or machinery offered for transportation by vessel; (3) amending paragraph (d) to authorize the

transportation of securely installed prototype or low production run lithium batteries in engines and machinery by modes of transportation other than air; and (4) adding paragraph (h)(3) to include references to existing and amended exceptions for vehicles, engines, and machinery in §§ 176.905 and 176.906.

ICAO adopted a provision that requires battery-powered vehicles that could be handled in other than an upright position to be placed into a strong rigid outer package. This provision better ensures that small vehicles—particularly those powered by lithium batteries—are adequately protected from damage during transport. In this final rule, PHMSA is amending paragraphs (c) and (d) consistent with this requirement. However, while ICAO's requirement is specific to air transport, we are further applying this requirement to transportation by all transport modes for greater overall benefit.

Section 173.221

Section 173.221 prescribes the packaging requirements for Polymeric beads (or granules), expandable, *evolving flammable vapor*. PHMSA is adding a procedure for declassification of polymeric beads, expandable. PHMSA received a comment from UPS supporting this amendment and is adopting it as proposed in the NPRM.

Section 173.225

Section 173.225 prescribes packaging requirements and other provisions for organic peroxides. Consistent with the UN Model Regulations, PHMSA is revising the Organic Peroxide Table in paragraph (c) by amending the entries for: ''Dibenzoyl peroxide,'' ''tert-Butyl cumyl peroxide,'' ''Dicetyl peroxydicarbonate,'' and ''tert-Butyl peroxy-3,5,5-trimethylhexanoate.'' PHMSA received one comment from DGAC noting two editorial errors in the proposed Organic Peroxide Table in paragraph (c). In this final rule, the entry ''Di-2,4-dichlorobenzoyl peroxide [as a paste]'' is revised by moving the text in columns (5), (6), and (7) by one position to the right into columns (6), (7), and (8); and the entry ''1,1-Di-(tert-butylperoxy)cyclohexane + tert-Butyl peroxy-2-ethylhexanoate'' is added for consistency with the UN Model Regulations. We are revising the Organic Peroxide IBC Table in paragraph (e) to maintain alignment with the UN Model Regulations by adding new entries for ''tert-Butyl cumyl peroxide'' and ''1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate, not more than 67%, in diluent type A'' and adding a type 31HA1 IBC authorization to the existing entry for ''Di-(2-ethylhexyl) peroxydicarbonate, not more than 62%, stable dispersion, in water.'' We are republishing the complete Organic Peroxide and Organic Peroxide IBC tables to ensure the revisions are correctly inserted and adding the missing ''UN'' code to several identification numbers assigned to existing entries in the Organic Peroxide Table.

Section 173.301

Section 173.301 prescribes general requirements for shipment of compressed gases and other hazardous materials in cylinders, UN pressure receptacles, and spherical pressure vessels. PHMSA is amending the list of authorized packaging specifications in paragraph (a)(1) by adding a new footnote (1) and assigning it to the ''packagings'' heading. This footnote directs readers to § 171.12(a)(4)(iii) to determine authorized Canadian cylinders that correspond with DOT specification cylinders. Additionally, PHMSA is amending paragraph (a)(2) to address filling of TC cylinders. As TC cylinders are metric marked and their filling requirements vary slightly between the TDG Regulations and the HMR, PHMSA is requiring that TC cylinders be filled in accordance with the TDG Regulations. The remaining Canadian cylinders authorized in this rulemaking must be filled in accordance with the requirements of part 173. In a comment to the NPRM, Worthington Cylinder Corporation stated that TC cylinders have the service pressure marked in bar while DOT cylinders are marked in psi. They further noted that TC marked cylinders for liquefied gases have the tare weight and water capacity metric marked (kg and liter) and asked what action PHMSA has taken to assure fillers know how to convert these metric units to U.S. standard units. PHMSA is aware of the differences in metric markings on TC cylinders compared to DOT specification cylinders. In this final rule, we are requiring that TC cylinders be filled in accordance with the TDG requirements. There is a table of conversion factors in § 171.10 to assist fillers in appropriately converting from metric to U.S. standard. Additionally, PHMSA plans to produce guidance material shortly after publication of this rulemaking for both fillers and requalifiers of Canadian cylinders.

Additionally, Worthington Cylinder Corporation stated the National Fire Protection Association (NFPA) document NFPA–58 presently does not permit TC cylinders to be filled with LP-Gas and asked if PHMSA considered this a conflict in regulations. PHMSA does not see an authorization to requalify, fill, or transport a Canadian cylinder with liquefied petroleum gas as a conflict with the requirements of NFPA–58. However, PHMSA may consult with NFPA on the appropriateness of updating their standard to include references to Canadian cylinders in the future.

Section 173.301b

Section 173.301b contains additional general requirements for shipment of UN pressure receptacles. PHMSA is amending paragraph (a)(2) to include the most recent ISO standard for UN pressure receptacles and valve materials for non-metallic materials in ISO 11114–2:2013. Additionally, we are amending paragraph (c)(1) to include the most recent ISO standard on cylinder valves ISO 10297:2014. This paragraph also contains end dates for when the manufacture of cylinders and service equipment is no longer authorized in accordance with the outdated ISO standard. Finally, we are revising § 173.301b(g) to amend a reference to marking requirements for composite cylinders used for underwater applications. The current reference to the ''UW'' marking in § 173.301b(g) direct readers to § 178.71(o)(17), while the correct reference for the ''UW'' marking is actually § 178.71(q)(18).

Section 173.303

Section 173.303 prescribes requirements for the charging of cylinders with compressed gas in solution (acetylene). PHMSA is amending paragraph (f)(1) to require UN cylinders for acetylene use to comply with the current ISO standard ISO 3807:2013. This paragraph also contains end dates for when the manufacture of cylinders and service equipment is no longer authorized in accordance with the outdated ISO standard.

Section 173.304b

Section 173.304b prescribes filling requirements for liquefied gases in UN pressure receptacles. The UN Model Regulations amended packing instruction P200 by adding requirements for liquefied gases charged with compressed gases. In this rulemaking, PHMSA is amending § 173.304b specifically by adding a new paragraph (b)(5) to include filling limits when a UN cylinder filled with a liquefied gas is charged with a compressed gas. We are not including similar filling limits for DOT specification cylinders filled with a

liquefied gas and charged with a compressed gas, as we feel the situation is adequately addressed by the requirements found in § 173.301(a)(8).

Section 173.310

Section 173.310 provides the transport conditions for certain specially designed radiation detectors containing a Division 2.2 (Non-flammable) gas. The 19th Revised Edition of the UN Model Regulations added a new special provision 378 applicable to radiation detectors containing certain Division 2.2 gases. Special provision 378 outlines conditions for the use of a non-specification pressure receptacle and strong outer packaging requirements. As § 173.310 currently prescribes similar transport conditions for radiation detectors containing Division 2.2 gases, we are not adding a new special provision.

Consistent with special provision 378 of the UN Model Regulations, PHMSA is making the following revisions to the transport conditions in § 173.310: [1] In the section header, clarify that Division 2.2 gases must be in non-refillable cylinders; [2] in paragraph (b), increase the maximum design pressure from 4.83 MPa (700 psig) to 5.00 MPa (725 psig) and increase the capacity from 355 fluid ounces (641 cubic inches) to 405 fluid ounces (731 cubic inches); [3] in new paragraph (d), require specific emergency response information to accompany each shipment and be available from the associated emergency response telephone number; [4] in new paragraph (e), require that transport in accordance with this section be noted on the shipping paper; and [5] in new paragraph (f), except radiation detectors, including detectors in radiation detection systems, containing less than 50 ml (1.7 fluid ounces) capacity, from the requirements of the subchapter if they conform to paragraphs (a) through (d) of this section.

PHMSA received one comment from UPS suggesting a revision to paragraphs (e) and (f) to clarify that radiation detectors, including detectors in radiation detection systems, containing less than 50 ml (1.7 fluid ounces) capacity are not subject to shipping paper requirements. Although consistent with special provision 378 of the UN Model Regulations, PHMSA agrees that the proposed text in paragraph (e) requiring that transport in accordance with this section must be noted on the shipping paper may be misinterpreted to also apply to radiation detectors excepted from the requirements of the subchapter in paragraph (e). Therefore, in efforts to avoid confusion, PHMSA is revising paragraphs (e) and (f) as suggested by UPS.

In the NPRM, the proposed text for the conversion from 50 ml to fluid ounces was 1.69. Consistent with other 50 ml provisions in the HMR we are indicating the conversion at 1.7 ounces.

Section 173.335

Section 173.335 contains requirements for cylinders filled with chemicals under pressure. The 19th Revised Edition of the UN Recommendations includes new instructions in P200 and P206 on how to calculate the filling ratio and test pressure when a liquid phase of a fluid is charged with a compressed gas. PHMSA is revising the requirements of § 173.335 for chemical under pressure n.o.s. to include a reference to § 173.304b, which specifies additional requirements for liquefied compressed gases in UN pressure receptacles. PHMSA is further amending § 173.304b specifically by adding a new paragraph (b)(5) to include these filling and test pressure requirements consistent with the UN Recommendations. See ''Section 173.304b'' for further discussion.

Part 175

Section 175.10

Section 175.10 specifies the conditions for which passengers, crew members, or an operator may carry hazardous materials aboard an aircraft. Paragraph (a)(7) permits the carriage of medical or clinical mercury thermometers, when carried in a protective case in carry-on or checked baggage. Consistent with revisions to the ICAO Technical Instructions, in this final rule, PHMSA is revising paragraph (a)(7) by limiting thermometers containing mercury to checked baggage only. PHMSA received no comments on this proposed amendment and is adopting the changes as proposed in the NPRM.

Section 175.25

Section 175.25 prescribes the notification that operators must provide to passengers regarding restrictions on the types of hazardous material they may or may not carry aboard an aircraft either on their person or in checked or carry-on baggage. Passenger notification of hazardous materials restrictions addresses the potential risks that passengers can introduce on board aircraft. PHMSA's predecessor, the Materials Transportation Bureau, introduced passenger notification requirements in 1980 [Docket No. HM–166B; 45 FR 13087]. Although this section had been previously amended to account for ticket purchase or check-in via the internet, new technological innovations have continued to outpace these provisions. Notwithstanding the several rounds of revisions, the rule remains unduly prescriptive.

The 2017–2018 ICAO Technical Instructions have removed prescriptive requirements concerning the manners in which information concerning dangerous goods that passengers are forbidden to transport must be conveyed to passengers. Specifically, they have done so by removing references to the phrases ''prominently displayed'' and ''in sufficient numbers.'' Additional changes to the ICAO Technical Instructions include removal of prescriptive requirements that the information be in ''text or pictorial form'' when checking in remotely, or ''pictorial form'' when not checking in remotely. ICAO's decision to move to a performance-based requirement will account for changes in technology as well as the unique characteristics of some air carrier operations. ICAO noted that these provisions lagged behind the latest technology and could sometimes hinder the effectiveness and efficiency of notifying passengers about hazardous materials. To account for the utilization of different technologies as well as air carrier specific differences in operating or business practices, ICAO adopted changes that require air carriers to describe their procedures for informing passengers about dangerous goods in their operations manual and/or other appropriate manuals.

PHMSA agrees with this approach and is harmonizing with the amendments made to the ICAO Technical Instructions part 7; 5.1. Harmonization is appropriate not only to account for evolving technologies or air carrier specific conditions, but also because we believe that this amendment will result in a more effective notification to passengers.

Under the revisions to § 175.25, in accordance with 14 CFR parts 121 and 135, air carriers operating under 14 CFR part 121 or 135 will need to describe their procedures in an operations manual and/or other appropriate manuals in accordance with the applicable provisions of 14 CFR. The manual(s) will be required to provide procedures and information necessary to allow personnel to implement and maintain their air carrier's specific passenger notification system. Aside from the manual provisions, all persons engaging in for hire air transportation of passengers will continue to be subject to § 175.25.

PHMSA received a comment from COSTHA stating that existing requirements provide a clear standard to which all air operators are held. Removal of this requirement, while giving air operators flexibility in providing such notification, may lead to various interpretations of what is required for notification. Operational manuals are subject to review and approval by different FAA regions. It is the opinion of the commenter that varying interpretations could lead operators to have different requirements in their operational manuals, thereby putting other operators in different regions at a competitive disadvantage. COSTHA further noted an FAA-sponsored Aviation Rulemaking Committee (ARC) for Passenger Notification of Hazardous Materials Regulations that resulted in a report and draft Advisory Circular (AC) finalized in November 2013. The AC was not issued by the FAA. COSTHA maintained that the recommendations on passenger notification systems contained in the AC are valid and would provide a better option than simply removing the prescriptive text from the HMR. COSTHA requested PHMSA discuss the results of the ARC with FAA before modifying the current language in § 175.25. PHMSA is aware of the recommendations resulting from the ARC meetings. The FAA intends to produce and distribute guidance material to assist operators and the FAA in determining an effective passenger notification system. The FAA will utilize the ARC report recommendations, ICAO Technical Instructions Supplement information, and any other available information in the drafting of the guidance material.

Section 175.33

Section 175.33 establishes requirements for shipping papers and the notification of the pilot-in-command when hazardous materials are transported by aircraft. The pilot notification requirements of part 7; 4.1.1.1 of the ICAO Technical Instructions include an exception for consumer commodities (ID8000) to allow for the average gross mass of the packages to be shown instead of the actual gross mass of each individual package. This exception is limited to consumer commodities offered to the operator by the shipper in a unit load device (ULD). Consistent with the ICAO Technical Instructions packing instruction applicable to consumer commodities (PI Y963), which permits the shipper to show on the shipping paper either the actual gross mass of each package or the average gross mass of all packages in the consignment, the notification to the pilot-in-command requirement for consumer commodities was revised to remove the exception applicability to ULDs only. This exception did not previously exist under the HMR. In this final rule, PHMSA is revising § 175.33(a)(3) by adding the text ''For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the shipping paper.'' This revision aligns the consumer commodity notification of the pilot-in-command requirements in the HMR with the ICAO Technical Instructions. PHMSA received a comment from UPS providing general support for this amendment. See ''Section 172.202'' for related changes in this final rule.

Section 175.75

Section 175.75 prescribes quantity limitation and cargo location requirements for hazardous materials carried aboard passenger-carrying and cargo-only aircraft. PHMSA received comments from Alaska Airlines, COSTHA, UPS, and an anonymous commenter noting impacts on aircraft loading requirements as a result of incorporating new UN identification numbers and proper shipping names for engines and machinery. In accordance with § 175.75(c), an aircraft operator must not load more than 25 kg (55 lbs) of hazardous materials in an inaccessible manner on a passenger-carrying aircraft; however, there is an exception for Class 9 materials. In addition, paragraph (e)(1) excepts Class 9 materials from the 25 kg limitation when loaded in an inaccessible manner aboard cargo-only aircraft. The commenters noted that as a result of separating engines and machinery from the Class 9 entry for vehicles (UN 3166) and creating new hazardous materials table entries in Class 2.1 (UN 3529) and Class 3 (UN 3528), these materials that have historically been excepted from the 25 kg limit when loaded in an inaccessible manner would now be subject to this restriction. The commenters also noted that paragraph (e)(1) excepts Class 3, PG III materials (unless also labeled as a corrosive) from the 25 kg limit; however, the new entry UN 3528 is not assigned to a packing group and therefore not eligible for the exception. COSTHA also commented, ''Aircraft operators routinely ship engines for overhaul and repair. As Class 9 materials, these have been transported safely without incident for years.''

Consistent with the UN Model Regulations, PHMSA is adding to the HMR the new UN identification numbers and proper shipping names for engines and machinery while maintaining the existing transportation requirements and exceptions for engines and machinery for all modes of transportation other than vessel. It was never our intent to subject these articles that have historically received relief from the accessibility requirements of § 175.75 to these requirements. An article with identification numbers UN 3528 or UN 3529—and properly packaged accordance with § 173.220—is excepted from the requirements of § 175.75(c) and (e)(1). In this final rule, we are making clarifying amendments to paragraphs § 175.75(c) and (e)(1) and adding a new provision to Note 1 in paragraph (f), in the QUANTITY AND LOADING TABLE.

Section 175.900

Section 175.900 prescribes the handling requirements for air carriers that transport dry ice. Consistent with the ICAO Technical Instructions, PHMSA is removing the phrase ''other type of pallet'' with regard to packages containing dry ice prepared by a single shipper. See ''Section 173.217'' of this rulemaking for a detailed discussion of the revision.

Part 176

Section 176.83

Section 176.83 prescribes segregation requirements applicable to all cargo spaces on all types of vessels and to all cargo transport units. Paragraph (a)(4)(ii) has several groups of hazardous materials of different classes, which comprise a group of substances that do not react dangerously with each other and that are excepted from the segregation requirements of § 176.83. Consistent with changes made in Amendment 38–16 of the IMDG Code, PHMSA is adding a new group of hazardous materials that do not react dangerously with each other to this paragraph. The following materials are added in a new paragraph (a)(4)(ii)(C): ''UN 3391, Organometallic substance, solid, pyrophoric''; ''UN 3392, Organometallic substance, liquid, pyrophoric''; ''UN 3393, Organometallic substance, solid, pyrophoric, water-reactive''; ''UN 3394, Organometallic substance, liquid, pyrophoric, water-reactive''; ''UN 3395, Organometallic substance, solid, water-reactive''; ''UN 3396, Organometallic substance, solid, water-reactive, flammable''; ''UN 3397, Organometallic substance, solid, water-reactive, self-heating''; ''UN 3398,

Organometallic substance, liquid, water-reactive''; ''UN 3399, Organometallic substance, liquid, water-reactive, flammable''; and ''UN 3400, Organometallic substance, solid, self-heating.''

Section 176.84

Section 176.84 prescribes the meanings and requirements for numbered or alpha-numeric stowage provisions for vessel shipments listed in column (10B) of the § 172.101 HMT. The provisions in § 176.84 are broken down into general stowage provisions, which are defined in the ''table of provisions'' in paragraph (b), and the stowage provisions applicable to vessel shipments of Class 1 explosives, which are defined in the table to paragraph (c)(2). PHMSA is creating a new stowage provision 149 and assigning it to the new UN 3528 engines or machinery powered by internal combustion engine flammable liquid entry. This new stowage provision requires engines or machinery containing fuels with a flash point equal or greater than 23 °C (73.4 °F) to be stowed in accordance with the stowage requirements of stowage Category A. Engines and machinery containing fuels with a flash point less than 23 °C (73.4 °F) are required to comply with the requirements of stowage Category E.

Additionally, consistent with Amendment 38–16 of the IMDG Code, PHMSA is creating a new stowage provision 150 to replace existing stowage provision 129 for ''UN 3323, Radioactive material, low specific activity (LSA–III) *non fissile or fissile excepted.*'' This new stowage provision requires that any material that is classified as UN 3323, which is either uranium metal pyrophoric or thorium metal pyrophoric, be stowed in accordance with stowage Category D requirements.

Section 176.905

Section 176.905 prescribes transportation requirements and exceptions for vessel transportation of motor vehicles and mechanical equipment. PHMSA is revising § 176.905 to update the transport requirements and exceptions for vehicles transported by vessel. These changes are necessary to remove references to machinery (see ''Section 176.906'') and to maintain consistency with changes made in Amendment 38–16 of the IMDG Code.

The changes being made to the transport requirements for vehicles transported by vessel are as follows: [1] In paragraph (a)(2) for flammable liquid powered vehicles, the requirement that flammable liquid must not exceed 250 L (66 gal) unless otherwise approved by the Associate Administrator; [2] in paragraph (a)(4), the authorization to transport vehicles containing prototype or low production run batteries securely installed in vehicles; [3] also in paragraph (a)(4), the requirement that damaged or defective lithium batteries must be removed and transported in accordance with § 173.185(f); and [4] in paragraph (i)(1)(i), the inclusion of text to ensure the lithium batteries in vehicles stowed in a hold or compartment designated by the administration of the country in which the vessel is registered as specially designed and approved for vehicles have successfully passed the tests found in the UN Manual of Tests and Criteria (except for prototypes and low production runs).

Section 176.906

Consistent with changes made in Amendment 38–16 of the IMDG Code, PHMSA is creating a new section § 176.906 to prescribe transportation requirements for engines and machinery. Requirements found in paragraphs (a)–(h) are identical to existing requirements for engines and machinery contained in § 176.905, and their reproduction in this section is made necessary by the splitting of the provisions for engines/machinery and vehicles. Paragraph (i) contains exceptions that are divided into two separate categories: [1] Engines and machinery meeting one of the conditions provided in (i)(1), which are not subject to the requirements of subchapter C of the HMR; and [2] engines and machinery not meeting the conditions provided in (i)(1), which are subject to the requirements found in (i)(2) that prescribe general conditions for transport and varying degrees of hazard communication required for engines and machinery based on the actual fuel contents and capacity of the engine or machinery. IVODGA noted in their comment that § 172.203(i)(2) requires a flashpoint be provided on shipping papers for hazardous materials with a flashpoint at or below 140 °F and requested that PHMSA add a reference to this requirement in paragraph (i)(2)(v) to ensure shippers are aware that they must provide this information. PHMSA believes the requirement is sufficiently clear. The creation of the new Class 3 entries will enhance hazard communication of engines offered for transportation by vessel as well as ensure this flashpoint information is conveyed to carriers.

Tables 7 and 8 provide a summary of the hazard communication requirements for vessel transportation of engines and machinery that are not empty of fuel based on fuel content and capacity. The column titled ''Additional Hazard Communication Requirements'' indicates requirements that will differ from existing hazard communication requirements for engines or machinery.

TABLE 7—LIQUID FUELS CLASS 3 (UN 3528) AND CLASS 9 (UN 3530)

Contents	Capacity	Additional hazard communication requirements
≤60 L	Unlimited	Transport Document.
>60 L	Not more than 450 L	Label, Transport Document.
>60 L	More than 450 L but not more than 3000 L	Labeled on two opposing sides, Transport Document.
>60 L	More than 3000 L	Placarded on two opposing sides, Transport Document.

TABLE 8—GASEOUS FUELS DIVISION 2.1 (UN 3529)

Water Capacity	Additional hazard communication requirements
Not more than 450 L	Label, Transport Document.
More than 450 L but not more than 1000 L	Labeled on two opposing sides, Transport Document.
More than 1000 L	Placarded on two opposing sides, Transport Document.

Part 178

Section 178.71

Section 178.71 prescribes specifications for UN pressure receptacles. Consistent with the UN Model Regulations, PHMSA is amending paragraphs (d)(2), (h), (k)(2), and (l)(1) to reflect the adoption of the latest ISO standards for the design, construction, and testing of gas cylinders and their associated service equipment. Paragraph (l)(1) will require that composite cylinders be designed for a design life of not less than 15 years, as well as that composite cylinders and tubes with a design life longer than 15 years must not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test program. The service life test program must be part of the initial design type approval and must specify inspections and tests to demonstrate that cylinders manufactured accordingly remain safe to the end of their design life. The service life test program and the results must be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder or tube must not be extended beyond its initial approved design life. These paragraphs also contain end dates for when the manufacture of cylinders and service equipment is no longer authorized in accordance with the outdated ISO standard.

PHMSA received a comment from Western International Gas Cylinders asking several questions about the requirements for service life test programs. Specifically, they asked: (1) Whether DOT would maintain a database of service life extensions that a requalifier will be able to search or if we plan to mandate the cylinder manufacturers maintain the information; and (2) if DOT will require the manufacturers to post this information on their Web sites. Information concerning service life extensions will be available from both PHMSA and the manufactures.

Additionally, consistent with the UN Model Regulations, PHMSA is revising paragraph (o)(2) to adopt the current ISO standard relating to material compatibility and adding paragraph (g)(4) to adopt the current ISO standard relating to design, construction, and testing of stainless steel cylinders with an Rm value of less than 1,100 MPa.

Finally, paragraphs (q) and (r) are revised to indicate the required markings for composite cylinders and tubes with a limited design life of 15 years or for cylinders and tubes with a design life greater than 15 years, or a non-limited design life.

PHMSA received a comment from Christopher Adams asking if we intended to replace the authorization to use a valve conforming to the requirements in ISO 10297:1999 with the transition date for the use of valves conforming to ISO 10297:2006. PHMSA intentionally left the references to all three ISO 10297 standards to mirror the authorizations shown in the UN Model Regulations. Additionally, PHMSA received comments from Wesley Scott and Western International Gas Cylinders requesting that the current § 178.71(h) prohibition on the use of aluminum alloy 6351–T6 or equivalent be extended to alloy 6082 for cylinders authorized under ISO 7866:1999. The commenters stated that alloy 6082 is known to ISO Working Group 11 and that it develops sustained load cracks similar in manner to those developed when using aluminum alloy 6351–T6. PHMSA is not aware of anyone manufacturing with this particular alloy but will continue to monitor the ongoing work at ISO and consider changes as addressed by the international community.

Section 178.75

Section 178.75 contains specifications for Multiple-element gas containers (MEGCs). Consistent with the UN Model Regulations, PHMSA is renumbering existing paragraph (d)(3)(iv) as (d)(3)(v) and adding a new paragraph (d)(3)(iv) to incorporate ISO 9809–4:2014 for stainless steel cylinders with an Rm value of less than 1,100 MPa.

Section 178.1015

Section 178.1015 prescribes general standards for the use of flexible bulk containers (FBCs). Consistent with changes to the UN Model Regulations, PHMSA is revising paragraph (f) to require that FBCs be fitted with a vent that is designed to prevent the ingress of water in situations where a dangerous accumulation of gases may develop absent such a vent. It is our understanding that only one particular material authorized for transportation in FBCs—UN 3378, Sodium carbonate peroxyhydrate—is known to decompose causing a dangerous accumulation of gas.

Part 180

Section 180.205

Section 180.205 outlines general requirements for requalification of specification cylinders. In the NPRM, PHMSA proposed amending paragraph (c) to require that Transport Canada cylinders be requalified and marked in accordance with the Transport Canada TDG Regulations. CTC Certified Training Co. commented stating that CRC, BTC, and CTC are the same as DOT specification cylinders and should be allowed to be requalified to either the Transport Canada TDG Regulations or under the provisions of the HMR. PHMSA agrees and is amending paragraph (c) to require CRC, BTC, or CTC cylinders be requalified and marked as specified in the Requalification Table in this subpart or requalified and marked by a facility registered by Transport Canada in accordance with the TDG Regulations. Canadian specification cylinders marked solely with TC must be requalified in accordance with the Transport Canada TDG Regulations. Cylinders that are dual marked with both TC and a corresponding DOT specification marking may be requalified to either the Transport Canada TDG Regulations or the provisions of the HMR.

PHMSA received a comment from Christopher Adams noting a typographical error in paragraph (c)(4). Mr. Adams noted that the current HMR text has ''3AXX'' instead of ''3AAX'' and requested PHMSA make this correction. We agree with the commenter that this is a typographical error and are making the suggested change. CTC Training Co. commented stating the TDG Regulations reference CSA B339, which references CGA C–1 (not referenced in the HMR) for the testing of cylinders, and other different versions of CGA pamphlets for visual inspection of cylinders not referenced by the HMR. The commenter further stated that requiring a DOT RIN holder to requalify a cylinder in accordance with the TDG Regulations places an unnecessary financial burden on the retester to purchase all of these differing versions of CGA pamphlets, as well as the challenge to try to determine which version to use for which cylinder they are requalifying. PHMSA notes that while the TDG Regulations do incorporate some cylinder requalification standards that are not in the HMR, there is no requirement for a requalifier to requalify TC cylinders. In fact, in order to begin requalifying TC cylinders, requalifiers will have to register with PHMSA and indicate—among other things—that they have all the necessary standards. This business decision will therefore be made by individual companies.

Section 180.207

Section 180.207 prescribes requirements for requalification of UN

pressure receptacles. Consistent with changes to the UN Model Regulations, PHMSA is revising paragraph (d)(3) to incorporate ISO 10462:2013 concerning requalification of dissolved acetylene cylinders. This paragraph also includes an authorization to requalify acetylene cylinders in accordance with the current ISO standard until December 31, 2018.

Section 180.211

Section 180.211 prescribes requirements for the repair, rebuilding, and reheat treatment of DOT–4 series specification cylinders. In the NPRM preamble, PHMSA clearly indicated an intention to authorize DOT RIN holders to perform repair, rebuilding, and reheat treatment of Canadian cylinders (see ''Section 107.805'' and ''Section 171.12''). However, PHMSA did not specifically propose the authorization of reciprocal treatment to facilities registered in Canada in accordance with the Transport Canada TDG Regulations. In line with the reciprocal treatment provided for requalification of Canadian cylinders, PHMSA is amending paragraph (a) and adding a new paragraph (g) to authorize the repair, rebuilding, and reheat treatment of DOT–4 series specification cylinders by authorized facilities registered in Canada and in accordance with the Transport Canada TDG Regulations.

Section 180.212

Section 180.212 prescribes requirements for the repair of seamless DOT–3 series specification cylinders and seamless UN pressure receptacles. PHMSA is amending paragraph (a)(1)(ii) to authorize repairs of DOT–3series cylinders by a facility registered by Transport Canada in accordance with the Transport Canada TDG Regulations.

Section 180.413

Section 180.413 provides the requirements for the repair, modification, stretching, rebarrelling, or mounting of specification cargo tanks. Currently, § 180.413(a)(1) requires that each repair of a specification cargo tank must be performed by a repair facility holding a valid National Board Certificate of Authorization for use of the National Board ''R'' stamp and must be made in accordance with the edition of the National Board Inspection Code in effect at the time the work is performed. ''Repair'' is defined in § 180.403 as ''any welding on a cargo tank wall done to return a cargo tank or a cargo tank motor vehicle to its original design and construction specification, or to a condition prescribed for a later equivalent specification in effect at the time of the repair.'' As previously discussed in this final rule, stakeholders participating in the U.S.-Canada RCC identified this requirement as being burdensome to United States carriers who also operate in Canada. In accordance with the Transport Canada TDG Regulations, a facility in Canada can perform a repair on a specification cargo tank if it holds either a valid National Board Certificate of Authorization for use of the National Board ''R'' stamp or a valid Certificate of Authorization from a provincial pressure vessel jurisdiction for repair. The latter authorization becomes problematic for United States carriers requiring the repair of a DOT specification cargo tank while in Canada. Section 180.413 currently only authorizes the repair of a DOT specification cargo tank by a facility holding a valid National Board Certificate of Authorization for use of the National Board ''R'' stamp. If a DOT specification cargo tank is repaired in Canada at a facility holding a Certificate of Authorization from a provincial pressure vessel jurisdiction for repair and not a National Board Certificate of Authorization for use of the National Board ''R'' stamp, the DOT specification of the cargo tank is placed in jeopardy.

Based on this input from RCC stakeholders, PHMSA conducted a comparison of the HMR requirements for the repair of specification cargo tanks and the corresponding requirements of the Transport Canada TDG Regulations. In consultation with FMCSA, PHMSA determined that the requirements for the repair of a specification cargo tank conducted in accordance with the Transport Canada TDG Regulations by a facility in Canada holding a valid Certificate of Authorization from a provincial pressure vessel jurisdiction for repair provide for at least an equivalent level of safety as those provided by the HMR. Further, the Transport Canada TDG Regulations authorize the repair of TC specification cargo tanks by facilities in the U.S. that are registered in accordance with part 107 subpart F.

Accordingly, PHMSA is expanding the authorization for the repair of DOT specification cargo tanks by revising § 180.413(a)(1). Specifically, PHMSA is adding a new paragraph (a)(1)(iii) authorizing a repair, as defined in § 180.403, of a DOT specification cargo tank used for the transportation of hazardous materials in the United States performed by a facility in Canada in accordance with the Transport Canada TDG Regulations, provided the [1] facility holds a valid Certificate of Authorization from a provincial pressure vessel jurisdiction for repair; [2] the facility is registered in accordance with the Transport Canada TDG Regulations to repair the corresponding TC specification; and [3] all repairs are performed using the quality control procedures used to obtain the Certificate of Authorization. PHMSA received a comment from FIBA stating that we are only including an authorization for a Canadian facility that holds a valid Certificate of Authorization from a provincial pressure vessel jurisdiction and not a Canadian facility holding a valid National Board Certificate of Authorization for the use of the National Board ''R'' stamp. FIBA requested that we authorize either type of repair facility. PHMSA notes that the use of the ''R'' Stamp by Canadian facilities is currently authorized in § 180.413(a)(1), and no changes to this authorization were proposed or adopted.

PHMSA is also making an incidental revision to § 180.413(b) to except facilities in Canada that perform a repair in accordance with the new § 180.413(a)(1)(iii) from the requirement that each repair of a cargo tank involving welding on the shell or head must be certified by a Registered Inspector. The Transport Canada TDG Regulations provide requirements for the oversight of welding repairs and do not use the term ''Registered Inspector.''

These provisions would not place any additional financial or reporting burden on U.S. companies. Rather, the enhanced regulatory reciprocity between the United States and Canada as a result of these provisions would provide the companies with additional flexibility and cost savings due to opportunities for obtaining repairs to DOT specification cargo tanks in Canada. PHMSA received a comment of general support for this effort from NTTC.

Section 180.605

Section 180.605 prescribes requirements for the qualification of portable tanks. Consistent with the UN Model Regulations, PHMSA is amending paragraph (g)(1) to require as a part of internal and external examination that the wall thickness must be verified by appropriate measurement if this inspection indicates a reduction of wall thickness. This amendment will require the inspector to verify that the shell thickness is equal to or greater than the minimum shell thickness indicated on the portable tanks metal plate (see § 178.274(i)(1)).

VI. Regulatory Analyses and Notices

A. Statutory/Legal Authority for This Rulemaking

This final rule is published under the statutory authority of Federal hazardous materials transportation law (Federal hazmat law; 49 U.S.C. 5101 *et seq.*). Section 5103(b) of Federal hazmat law authorizes the Secretary of Transportation (Secretary) to prescribe regulations for the safe transportation, including security, of hazardous materials in intrastate, interstate, and foreign commerce. This final rule amends regulations to maintain alignment with international standards by incorporating various amendments, including changes to proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, air transport quantity limitations, and vessel stowage requirements. To this end, the final rule amends the HMR to more fully align with the biennial updates of the UN Model Regulations, the IMDG Code, and the ICAO Technical Instructions.

Harmonization serves to facilitate international commerce, while also promoting the safety of people, property, and the environment by reducing the potential for confusion and misunderstanding that could result if shippers and transporters were required to comply with two or more conflicting sets of regulatory requirements. While the intent of this rulemaking is to align the HMR with international standards, we review and consider each amendment based on its own merit, on its overall impact on transportation safety, and on the economic implications associated with its adoption into the HMR. Our goal is to harmonize internationally without sacrificing the current level of safety or imposing undue burdens on the regulated community. Thus, as explained in the corresponding sections above, we are not harmonizing with certain specific provisions of the UN Model Regulations, the IMDG Code, and the ICAO Technical Instructions. Moreover, we are maintaining a number of current exceptions for domestic transportation that should minimize the compliance burden on the regulated community. The following external agencies were consulted in the development of this rule: Federal Aviation Administration, Federal Motor Carrier Safety Administration, Federal Railroad Administration, and U.S. Coast Guard.

Section 49 U.S.C. 5120(b) of Federal hazardous materials law authorizes the Secretary to ensure that, to the extent practicable, regulations governing the transportation of hazardous materials in commerce are consistent with standards adopted by international authorities. The large volume of hazardous materials transported in international commerce warrants the harmonization of domestic and international requirements to the greatest extent possible. This final rule amends the HMR to maintain alignment with international standards by incorporating various amendments to facilitate the transport of hazardous material in international commerce. To this end, as discussed in detail above, PHMSA is incorporating changes into the HMR based on the 19th Revised Edition of the UN Model Regulations, Amendment 38–16 of the IMDG Code, and the 2017–2018 Edition of the ICAO Technical Instructions, which become effective January 1, 2017 (Amendment 38–16 to the IMDG Code may be voluntarily applied on January 1, 2017; however, the previous amendment remains effective through December 31, 2017).

B. Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures

This final rule is not considered a significant regulatory action under section 3(f) of Executive Order 12866, ''Regulatory Planning and Review,'' [58 FR 51735 (Oct. 4, 1993)] and therefore was not reviewed by the Office of Management and Budget. Accordingly, this final rule is not considered a significant rule under the Regulatory Policies and Procedures of the Department of Transportation of February 26, 1979. *See* 44 FR 11034. Executive Order 13563, ''Improving Regulation and Regulatory Review,'' supplements and reaffirms Executive Order 12866, stressing that, to the extent permitted by law, an agency rulemaking action must be based on benefits that justify its costs, impose the least burden, consider cumulative burdens, maximize benefits, use performance objectives, and assess available alternatives. *See* 76 FR 3821 (Jan. 21, 2011).

The HM–215N NPRM and the associated RIA (Docket ID: PHMSA–2015–0273) requested stakeholder comments and data on the benefit and cost estimates of the NPRM. While some commenters questioned the benefits and costs of individual provisions, no comments specifically provided data or alternative analysis to change our original analysis of benefits and costs. In addition, PHMSA has not identified additional data or analysis to change the costs and benefits presented in the NPRM and the associated RIA. As a result, PHMSA adopts the benefits and costs presented in the RIA of the NPRM for this final rule. The following table summarizes the benefits and costs as found in the RIA for the following amendments as discussed in detail above: 1. Updates to references in HMT; 2. Revising HMT for polymerizing substances; 3. Amending HMT to update certain proper shipping names, packing groups, special provisions, packaging authorizations, bulk packaging requirements, and vessel stowage requirements; 4. Adding various substances to the list of marine pollutants; 5. Modifying part 173 packaging requirements and authorizations; 6. Amending packaging requirements for vessel transportation of water-reactive substances; 7. Revising hazardous communication requirements for shipments of lithium batteries; and, 8. Recognizing Transport Canada cylinders, certificates of equivalencies, and inspection and repair of cargo tanks.

SUMMARY OF ESTIMATED BENEFITS AND COSTS

Category	Year 1	Each subsequent year
Benefits		
Quantified Benefits:		
Amendment 1	$73.3 million	$73.3 million.
Amendment 8	$693,804–$6,555,234	$693,804–$6,555,234.
Paperwork Reduction Act	$887,635	$887,635.
Non-Quantified Benefits:		
Amendment 2	Potential prevention of fire aboard vessels carrying certain polymerized substances.	Potential prevention of fire aboard vessels carrying certain polymerized substances.

SUMMARY OF ESTIMATED BENEFITS AND COSTS—Continued

Category	Year 1	Each subsequent year
Amendment 3	Allow shippers of polyester resin kits to use one proper shipping name. Standard classification of low-power rocket motors. Benefit to public from placarding uranium hexafluoride toxicity. Appropriate hazard communication for engines and machines with large amounts of fuel.	Allow shippers of polyester resin kits to use one proper shipping name. Standard classification of low-power rocket motors. Benefit to public from placarding uranium hexafluoride toxicity. Appropriate hazard communication for engines and machines with large amounts of fuel.
Amendment 4	Facilitate consistent communication of presence of certain marine pollutants.	Facilitate consistent communication of presence of certain marine pollutants.
Amendment 5	Allow flexibility in packaging for leaking or deteriorated cylinders.	Allow flexibility in packaging for leaking or deteriorated cylinders.
Amendment 6	Reduce risk of fire aboard domestic vessels carrying certain hazardous materials that react dangerously with water.	Reduce risk of fire aboard domestic vessels carrying certain hazardous materials that react dangerously with water.
Amendment 7	Facilitate intermodal movements of certain consignments of lithium batteries packed in or with equipment. Elimination of document for packages of small lithium batteries.	Facilitate intermodal movements of certain consignments of lithium batteries packed in or with equipment. Elimination of document for packages of small lithium batteries.
Total Quantified Benefits	$74,881,439–$80,742,869	$74,881,439–$80,742,869.
Costs		
Quantified Costs:		
Amendment 1	$11,701,506	None.
Amendment 3	$288–$39,312	$288–$39,312.
Amendment 7	None	Up to $4.9 million (beginning with Year 3 due to transition period).
Non-Quantified Costs:		
Amendment 2	Additional costs for temperature control or stabilization of certain polymerized substances.	Additional costs for temperature control or stabilization of certain polymerized substances.
Amendment 3	Additional costs of hazard communication for some large engines containing fuel.	Additional costs of hazard communication for some large engines containing fuel.
Amendment 4	Notation on shipping papers and display of marine pollutant mark on certain international air or vessel transportation of certain quantities of six marine pollutants.	Notation on shipping papers and display of marine pollutant mark on certain international air or vessel transportation of certain quantities of six marine pollutants.
Amendment 5	None	None.
Amendment 6	Require shippers of certain water-reactive substances to use sift-proof or water-resistant packaging when transporting by domestic vessel.	Require shippers of certain water-reactive substances to use sift-proof or water-resistant packaging when transporting by domestic vessel.
Amendment 8	None	None.
Total Quantified Costs	$11,701,794–$11,740,818	$4,900,288–$4,939,312.
Total Quantified Net Benefits	$63,179,645–$69,002,051	$69,981,151–$75,803,557.

C. Executive Order 13132

This final rule has been analyzed in accordance with the principles and criteria contained in Executive Order 13132, ''Federalism,'' which requires agencies to assure meaningful and timely input by State and local officials in the development of regulatory policies that may have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.'' *See* 64 FR 43255 (Aug. 10, 1999). The regulatory changes in this rule preempt State, local, and Indian tribe requirements but do not have substantial direct effects on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

The Federal hazmat law, 49 U.S.C. 5101–5128, contains an express preemption provision (49 U.S.C. 5125(b)) that preempts State, local, and Indian tribe requirements on certain covered subjects, as follows:

(1) The designation, description, and classification of hazardous material;

(2) The packing, repacking, handling, labeling, marking, and placarding of hazardous material;

(3) The preparation, execution, and use of shipping documents related to hazardous material and requirements related to the number, contents, and placement of those documents;

(4) The written notification, recording, and reporting of the unintentional release in transportation of hazardous material; and

(5) The design, manufacture, fabrication, inspection, marking, maintenance, recondition, repair, or testing of a packaging or container represented, marked, certified, or sold as qualified for use in transporting hazardous material in commerce.

This final rule addresses covered subject items (1), (2), (3), (4), and (5) above and preempts State, local, and

Indian tribe requirements not meeting the ''substantively the same'' standard. This final rule is necessary to incorporate changes adopted in international standards, effective January 1, 2017. If the changes are not adopted in the HMR, U.S. companies—including numerous small entities competing in foreign markets—would be at an economic disadvantage because of their need to comply with a dual system of regulations. The changes in this rulemaking are intended to avoid this result. Federal hazmat law provides at 49 U.S.C. 5125(b)(2) that, if DOT issues a regulation concerning any of the covered subjects, DOT must determine and publish in the **Federal Register** the effective date of Federal preemption. The effective date may not be earlier than the 90th day following the date of issuance of the final rule and not later than two years after the date of issuance. PHMSA is setting the effective date of Federal preemption to be 90 days from publication of this final rule.

D. Executive Order 13175

This final rule was analyzed in accordance with the principles and criteria contained in Executive Order 13175, ''Consultation and Coordination with Indian Tribal Governments,'' which requires agencies to assure meaningful and timely input from Indian tribal government representatives in the development of rules that significantly or uniquely affect Indian communities by imposing ''substantial direct compliance costs'' or ''substantial direct effects'' on such communities or the relationship and distribution of power between the Federal Government and Indian tribes. *See* 65 FR 67249 (Nov. 9, 2000). Because this final rule does not have tribal implications, does not impose substantial direct compliance costs, upon tribes, and does not affect the relationship or power distribution between the Federal Government and Indian tribes, the funding and consultation requirements of Executive Order 13175 do not apply.

E. Regulatory Flexibility Act, Executive Order 13272, and DOT Policies and Procedures

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires an agency to review regulations to assess their impact on small entities, unless the agency determines that a rule is not expected to have a significant impact on a substantial number of small entities. This final rule facilitates the transportation of hazardous materials in international commerce by providing consistency with international standards. It applies to offerors and carriers of hazardous materials, some of whom are small entities, such as chemical manufacturers, users and suppliers, packaging manufacturers, distributors, and training companies. As previously discussed under ''Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures,'' the majority of amendments in this final rule should result in cost savings and ease the regulatory compliance burden for shippers engaged in domestic and international commerce, including trans-border shipments within North America.

Many companies will realize economic benefits as a result of these amendments. Additionally, the changes effected by this final rule will relieve U.S. companies, including small entities competing in foreign markets, from the burden of complying with a dual system of regulations. Therefore, we certify that these amendments will not have a significant economic impact on a substantial number of small entities.

This final rule has been developed in accordance with Executive Order 13272, ''Proper Consideration of Small Entities in Agency Rulemaking,'' [67 FR 53461 (Aug. 16, 2002)], as well as DOT's Policies and Procedures, to promote compliance with the Regulatory Flexibility Act to ensure that potential impacts of draft rules on small entities are properly considered.

F. Paperwork Reduction Act

PHMSA currently has approved information collections under Office of Management and Budget (OMB) Control Number 2137–0557, ''Approvals for Hazardous Materials,'' and OMB Control Number 2137–0034, ''Hazardous Materials Shipping Papers & Emergency Response Information.'' We anticipate that this final rule will result in an increase in the annual burden for OMB Control Number 2137–0034 due to an increase in the number of applications for modifications to existing holders of DOT-issued RINs. PHMSA is amending § 107.805(f)(2) to allow RIN holders to submit an application containing all the required information prescribed in § 107.705(a); identifying the TC, CTC, CRC, or BTC specification cylinder(s) or tube(s) to be inspected; certifying the requalifier will operate in compliance with the applicable TDG Regulations; and certifying the persons performing requalification have been trained and have the information contained in the TDG Regulations. This application is in addition to any existing application and burden encountered during the initial RIN application.

We anticipate this final rule will result in a decrease in the annual burden and costs of OMB Control Number 2137–0034. This burden and cost decrease is primarily attributable to the removal of the alternative document currently required for lithium cells or batteries offered in accordance with § 173.185(c). Additional increased burdens and costs to OMB Control Number 2137–0034 in this final rule are attributable to a new indication on shipping papers that a shipment of prototype or low production run lithium batteries or cells is in accordance with § 173.185(e)(7) and the addition of new marine pollutant entries.

This rulemaking identifies revised information collection requests that PHMSA will submit to OMB for approval based on the requirements in this final rule. PHMSA has developed burden estimates to reflect changes in this final rule and estimates the information collection and recordkeeping burdens in this rule are as follows:

OMB Control Number 2137–0557

Annual Increase in Number of Respondents: 3,600.

Annual Increase in Annual Number of Responses: 3,600.

Annual Increase in Annual Burden Hours: 1,800.

Annual Increase in Annual Burden Costs: $63,000.

OMB Control Number 2137–0034

Annual Decrease in Number of Respondents: 972,551.

Annual Decrease in Annual Number of Responses: 9,765,507.

Annual Decrease in Annual Burden Hours: 27,161.

Annual Decrease in Annual Burden Costs: $950,635.

PHMSA will submit the revised information collection and recordkeeping requirements to OMB for approval.

G. Regulation Identifier Number (RIN)

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

H. Unfunded Mandates Reform Act of 1995

This final rule does not impose unfunded mandates under the Unfunded Mandates Reform Act of

1995. It does not result in costs of $141.3 million or more, adjusted for inflation, to either State, local, or Tribal governments, in the aggregate, or to the private sector in any one year, and is the least burdensome alternative that achieves the objective of the rule.

I. Environmental Assessment

The National Environmental Policy Act of 1969, 42 U.S.C. 4321–4375, requires that Federal agencies analyze actions to determine whether the action will have a significant impact on the human environment. The Council on Environmental Quality (CEQ) regulations that implement NEPA (40 CFR parts 1500 through 1508) require Federal agencies to conduct an environmental review considering (1) the need for the action, (2) alternatives to the action, (3) probable environmental impacts of the action and alternatives, and (4) the agencies and persons consulted during the consideration process.

1. Purpose and Need

This action is necessary to incorporate changes adopted in the IMDG Code, the ICAO Technical Instructions, and the UN Model Regulations, effective January 1, 2017. If the changes in this final rule are not adopted in the HMR by this effective date, U.S. companies—including numerous small entities competing in foreign markets—would be at an economic disadvantage because of their need to comply with a dual system of regulations. The changes to the HMR contained in this rulemaking are intended to avoid this result.

The intended effect of this action is to harmonize the HMR with international transport standards and requirements to the extent practicable in accordance with Federal hazmat law (*see* 49 U.S.C. 5120). When considering the adoption of international standards under the HMR, PHMSA reviews and evaluates each amendment on its own merit, on its overall impact on transportation safety, and on the economic implications associated with its adoption. Our goal is to harmonize internationally without diminishing the level of safety currently provided by the HMR or imposing undue burdens on the regulated public. PHMSA has provided a brief summary of each revision, the justification for the revision, and a preliminary estimate of economic impact.

2. Alternatives

In developing this rulemaking, PHMSA considered the following alternatives:

No Action Alternative

If PHMSA had selected the No Action Alternative, current regulations would remain in place and no new provisions would be added. However, efficiencies gained through harmonization in updates to transport standards, lists of regulated substances, definitions, packagings, stowage requirements/codes, flexibilities allowed, enhanced markings, segregation requirements, etc., would not be realized. Foregone efficiencies in the No Action Alternative include freeing up limited resources to concentrate on vessel transport hazard communication (hazcom) issues of potentially much greater environmental impact. Adopting the No Action Alternative would result in a lost opportunity for reducing environmental and safety-related incidents.

Preferred Alternative

This alternative is the current rule. The amendments included in this alternative are more fully addressed in the preamble and regulatory text sections of this final rule.

3. Probable Environmental Impact of the Alternatives

No Action Alternative

If PHMSA had selected select the No Action Alternative, current regulations would remain in place and no new provisions would be added. However, efficiencies gained through harmonization in updates to transport standards, lists of regulated substances, definitions, packagings, stowage requirements/codes, flexibilities allowed, enhanced markings, segregation requirements, etc., would not be realized. Foregone efficiencies in the No Action Alternative include freeing up limited resources to concentrate on vessel transport hazcom issues of potentially much greater environmental impact.

Additionally, the Preferred Alternative encompasses enhanced and clarified regulatory requirements, which would result in increased compliance and a decreased number of environmental and safety incidents. Not adopting the environmental and safety requirements in the final rule under the No Action Alternative would result in a lost opportunity for reducing environmental and safety-related incidents.

Preferred Alternative

PHMSA selected the preferred alternative. Potential environmental impacts of each proposed amendment in the preferred alternative are discussed as follows:

- *Incorporation by Reference:* PHMSA is updating references to various international hazardous materials transport standards, including the 2017–2018 ICAO Technical Instructions; Amendment 38–16 of the IMDG Code; the 19th Revised Edition of the UN Model Regulations; the 6th Revised Edition of the UN Manual of Tests and Criteria; and the latest amendments to the Canadian TDG Regulations. In addition, PHMSA is adding one new reference and updating eight other references to standards applicable to the manufacture, use, and requalification of pressure vessels published by the International Organization for Standardization.

The HMR authorize shipments prepared in accordance with the ICAO Technical Instructions and by motor vehicle either before or after being transported by aircraft. Similarly, the HMR authorize shipments prepared in accordance with the IMDG Code if all or part of the transportation is by vessel. The authorizations to use the ICAO Technical Instructions and the IMDG Code are subject to certain conditions and limitations outlined in part 171 subpart C.

- *Hazardous Materials Table (HMT):* PHMSA is adopting amendments to the HMT to add, revise, or remove certain proper shipping names, packing groups, special provisions, packaging authorizations, bulk packaging requirements, and vessel stowage requirements. Amendments to HMT proper shipping names include: assigning the existing ''Engines, internal combustion'' entries to their own new UN numbers and provisions; amending existing ''Uranium Hexafluoride'' entries to include a new Division 6.1 subsidiary hazard class designation; adding a new entry for ''Polyester resin kit, solid base material; and adding a Division 1.4C new entry for ''Rocket motors.'' Additionally, we are adding and revising special provisions, large packaging authorizations, and IBC authorizations consistent with the UN Model Regulations to provide a wider range of packaging options to shippers of hazardous materials.

New and revised entries to the HMT reflect emerging technologies and a need to better describe or differentiate between existing entries. These changes mirror those made to the Dangerous Goods List of the 19th Revised Edition of the UN Model Regulations, the 2017–2018 ICAO Technical Instructions, and Amendment 38–16 of the IMDG Code. It is extremely important for the domestic HMR to mirror these international standards regarding the entries in the HMT to allow for consistent naming

conventions across modes and international borders.

Inclusion of entries in the HMT reflects a degree of danger associated with a particular material and identifies appropriate packaging. This change provides a level of consistency for all articles specifically listed in the HMT, without diminishing environmental protection and safety.

• *Provisions for Polymerizing Substances:* Consistent with amendments adopted into the UN Model Regulations, PHMSA is revising the HMT in § 172.101 to include four new Division 4.1 entries for polymerizing substances. Additionally, we are adding into the HMR defining criteria, authorized packagings, and safety requirements including, but not limited to, stabilization methods and operational controls.

New and revised entries to the HMT reflect emerging technologies and a need to better describe or differentiate between existing entries. These changes mirror those made to the Dangerous Goods List of the 19th Revised Edition of the UN Model Regulations, the 2017–2018 ICAO Technical Instructions, and Amendment 38–16 of the IMDG Code. It is extremely important for the domestic HMR to mirror these international standards regarding the entries in the HMT to allow for consistent naming conventions across modes and international borders.

Inclusion of entries in the HMT reflects a degree of danger associated with a particular material and identifies appropriate packaging. This change provides a level of consistency for all articles specifically listed in the HMT, without diminishing environmental protection and safety.

• *Modification of the Marine Pollutant List:* PHMSA is adding the following substances to the list of marine pollutants in appendix B to § 172.101: Hypochlorite solutions; Isoprene, stabilized; N-Methylaniline; Methylcyclohexane; and Tripropylene. These additions are based on the criteria contained in the IMDG Code for substances classified as toxic to the aquatic environment. The HMR maintain a list as the basis for regulating substances toxic to the aquatic environment and allow use of the criteria in the IMDG Code if a listed material does not meet the criteria for a marine pollutant. PHMSA periodically updates this list based on changes to the IMDG Code and evaluation of listed materials against the IMDG Code criteria. Amending the marine pollutant list facilitates consistent communication of the presence of marine pollutants, as well as safe and efficient transportation, without imposing significant burden associated with characterizing mixtures as marine pollutants.

• *Packaging Revisions:* These changes include design, construction, and performance testing criteria of composite reinforced tubes between 450 L and 3,000 L water capacity.

These amendments permit additional flexibility for authorized packages without compromising environmental protection or safety. Manufacturing and performance standards for gas pressure receptacles strengthen the packaging without being overly prescriptive. Increased flexibility will also add to environmental protection by increasing the ease of regulatory compliance.

• *Packaging Requirements for Water-Reactive Materials Transported by Vessel:* PHMSA is adopting various amendments to packaging requirements for the vessel transportation of water-reactive substances. The amendments include requiring certain commodities to have hermetically sealed packaging and requiring other commodities—when packed in flexible, fiberboard, or wooden packagings—to have sift-proof and water-resistant packaging or packaging fitted with a sift-proof and water-resistant liner. This amendment reduces the risk of fire on board cargo vessels carrying hazardous materials that can react dangerously with the ship's available water and carbon dioxide fire extinguishing systems.

PHMSA is amending the packaging requirements for vessel transportation of hazardous materials that react with water or moisture to generate excessive heat or release toxic or flammable gases. Common causes for water entering into the container are: Water entering through ventilation or structural flaws in the container; water entering into the containers placed on deck or in the hold in heavy seas; and water entering into the cargo space upon a ship collision or leak. If water has already entered the container, the packaging is the only protection from the fire. In this final rule, PHMSA is strengthening the ability of these packages transporting water-reactive substances. This amendment will allow for a net increase in environmental protection and safety by keeping reactive substances in their packages, thus preventing release and damage to human health and the natural environment.

• *Hazard Communication Requirements for Lithium Batteries:* PHMSA is revising hazard communication requirements for shipments of lithium batteries. Specifically, PHMSA is: Adopting a new lithium battery label in place of the existing Class 9 label; amending the existing marking requirements for small lithium battery shipments in § 173.185(c) to incorporate a new standard lithium battery mark for use across all modes; deleting the documentation requirement in § 173.185(c) for shipments of small lithium cells and batteries; and amending the exception for small lithium cells and batteries requiring the lithium battery mark from the current applicability of ''no more than four lithium cells or two lithium batteries installed in the equipment'' to ''no more than four lithium cells or two lithium batteries installed in equipment, where there are not more than two packages in the consignment.''

Greenhouse gas emissions would remain the same under this amendment.

• *U.S.-Canada Regulatory Cooperation Council (RCC) Amendments:* PHMSA is making amendments to the HMR resulting from coordination with Canada under the U.S.-Canada RCC. We are adopting provisions for recognition of TC cylinders, equivalency certificates, and inspection and repair of cargo tanks. The additions intend to provide reciprocal treatment of DOT Special Permits and TC equivalency certificates, DOT cylinders and TC cylinders, and cargo tank repair capabilities in both countries. Amending the HMR facilitates consistent communication for substances transported by cylinders and cargo tanks, thus decreasing not only incident response time, but the number and severity of environmental and safety incidents. The action is consistent with concurrent actions by Transport Canada to amend the TDG Regulations.

4. Agencies Consulted

PHMSA has coordinated with the U.S. Federal Aviation Administration, the Federal Motor Carrier Safety Administration, the Federal Railroad Administration, and the U.S. Coast Guard, in the development of this final rule. PHMSA has considered the views expressed in comments to the NPRM.

5. Conclusion

The provisions of this final rule build on current regulatory requirements to enhance the transportation safety and security of shipments of hazardous materials transported by highway, rail, aircraft, and vessel, thereby reducing the risks of an accidental or intentional release of hazardous materials and consequent environmental damage. PHMSA concludes that the net environmental impact will be positive and that there are no significant environmental impacts associated with this final rule.

J. Privacy Act

Anyone is able to search the electronic form of any written communications and comments received into any of our dockets by the name of the individual submitting the document (or signing the document, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (65 FR 19477), or you may visit *http://www.dot.gov/privacy.html*.

K. Executive Order 13609 and International Trade Analysis

Under Executive Order 13609, ''Promoting International Regulatory Cooperation'', agencies must consider whether the impacts associated with significant variations between domestic and international regulatory approaches are unnecessary or may impair the ability of American business to export and compete internationally. *See* 77 FR 26413 (May 4, 2012). In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

Similarly, the Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465), prohibits Federal agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. For purposes of these requirements, Federal agencies may participate in the establishment of international standards, so long as the standards have a legitimate domestic objective, such as providing for safety, and do not operate to exclude imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

PHMSA participates in the establishment of international standards to protect the safety of the American public. PHMSA has assessed the effects of this rulemaking and determined that it does not cause unnecessary obstacles to foreign trade. In fact, the rule is designed to facilitate international trade. Accordingly, this rulemaking is consistent with Executive Order 13609 and PHMSA's obligations under the Trade Agreement Act, as amended.

L. National Technology Transfer and Advancement Act

The National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) directs Federal agencies to use voluntary consensus standards in their regulatory activities unless doing so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (*e.g.,* specification of materials, test methods, or performance requirements) that are developed or adopted by voluntary consensus standard bodies. This final rule involves multiple voluntary consensus standards which are discussed at length in the ''Section-by-Section Review'' for § 171.7.

List of Subjects

49 CFR Part 107

Administrative practice and procedure, Hazardous materials transportation, Incorporation by reference, Packaging and containers, Penalties, Reporting and recordkeeping requirements.

49 CFR Part 171

Exports, Hazardous materials transportation, Hazardous waste, Imports, Incorporation by reference, Reporting and recordkeeping requirements.

49 CFR Part 172

Education, Hazardous materials transportation, Hazardous waste, Incorporation by reference, Labeling, Markings, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 173

Hazardous materials transportation, Incorporation by reference, Packaging and containers, Radioactive materials, Reporting and recordkeeping requirements, Uranium.

49 CFR Part 175

Air carriers, Hazardous materials transportation, Radioactive materials, Incorporation by reference, Reporting and recordkeeping requirements.

49 CFR Part 176

Maritime carriers, Hazardous materials transportation, Incorporation by reference, Radioactive materials, Reporting and recordkeeping requirements.

49 CFR Part 178

Hazardous materials transportation, Incorporation by reference, Motor vehicle safety, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 180

Hazardous materials transportation, Motor carriers, Motor vehicle safety, Packaging and containers, Railroad safety, Reporting and recordkeeping requirements.

In consideration of the foregoing, PHMSA amends 49 CFR chapter I as follows:

PART 107—HAZARDOUS MATERIALS PROGRAM PROCEDURES

■ 1. The authority citation for part 107 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; Pub. L. 101–410 section 4; Pub. L. 104–121, sections 212–213; Pub. L. 104–134, section 31001; Pub. L. 114–74 section 4 (28 U.S.C. 2461 note); 49 CFR 1.81 and 1.97.

■ 2. In § 107.502, paragraph (b) is revised to read as follows:

§ 107.502 General registration requirements.

* * * * *

(b) No person may engage in the manufacture, assembly, certification, inspection or repair of a cargo tank or cargo tank motor vehicle manufactured under the terms of a DOT specification under subchapter C of this chapter or a special permit issued under this part unless the person is registered with the Department in accordance with the provisions of this subpart. A person employed as an inspector or design certifying engineer is considered to be registered if the person's employer is registered. The requirements of this paragraph (b) do not apply to a person engaged in the repair of a DOT specification cargo tank used in the transportation of hazardous materials in the United States in accordance with § 180.413(a)(1)(iii) of this chapter.

* * * * *

■ 3. In § 107.801, paragraph (a)(2) is revised to read as follows:

§ 107.801 Purpose and scope.

(a) * * *

(2) A person who seeks approval to engage in the requalification (*e.g.* inspection, testing, or certification), rebuilding, or repair of a cylinder manufactured in accordance with a DOT specification or a pressure receptacle in accordance with a UN standard under subchapter C of this chapter or under the terms of a special permit issued

under this part, or a cylinder or tube manufactured in accordance with a TC, CTC, CRC, or BTC specification under the Transport Canada TDG Regulations (IBR; *see* § 171.7 of this chapter);

* * * * *

■ 4. In § 107.805, paragraphs (a), (c)(2), (d), and (f) are revised to read as follows:

§ 107.805 Approval of cylinder and pressure receptacle requalifiers.

(a) *General.* A person must meet the requirements of this section to be approved to inspect, test, certify, repair, or rebuild a cylinder in accordance with a DOT specification or a UN pressure receptacle under subpart C of part 178 or subpart C of part 180 of this chapter, or under the terms of a special permit issued under this part, or a TC, CTC, CRC, or BTC specification cylinder or tube manufactured in accordance with the TDG Regulations (IBR, see § 171.7 of this chapter).

* * * * *

(c) * * *

(2) The types of DOT specification or special permit cylinders, UN pressure receptacles, or TC, CTC, CRC, or BTC specification cylinders or tubes that will be inspected, tested, repaired, or rebuilt at the facility;

* * * * *

(d) *Issuance of requalifier identification number (RIN).* The Associate Administrator issues a RIN as evidence of approval to requalify DOT specification or special permit cylinders, or TC, CTC, CRC, or BTC specification cylinders or tubes, or UN pressure receptacles if it is determined, based on the applicant's submission and other available information, that the applicant's qualifications and, when applicable, facility are adequate to perform the requested functions in accordance with the criteria prescribed in subpart C of part 180 of this subchapter or TDG Regulations, as applicable.

* * * * *

(f) *Exceptions.* The requirements in paragraphs (b) and (c) of this section do not apply to:

(1) A person who only performs inspections in accordance with § 180.209(g) of this chapter provided the application contains the following, in addition to the information prescribed in § 107.705(a): Identifies the DOT specification/special permit cylinders to be inspected; certifies the requalifier will operate in compliance with the applicable requirements of subchapter C of this chapter; certifies the persons performing inspections have been trained and have the information contained in each applicable CGA publication incorporated by reference in § 171.7 of this chapter applicable to the requalifiers' activities; and includes the signature of the person making the certification and the date on which it was signed. Each person must comply with the applicable requirements in this subpart. In addition, the procedural requirements in subpart H of this part apply to the filing, processing and termination of an approval issued under this subpart; or

(2) A person holding a DOT-issued RIN to perform the requalification (inspect, test, certify), repair, or rebuild of DOT specification cylinders, that wishes to perform any of these actions on corresponding TC, CTC, CRC, or BTC cylinders or tubes may submit an application that, in addition to the information prescribed in § 107.705(a): Identifies the TC, CTC, CRC, or BTC specification cylinder(s) or tube(s) to be inspected; certifies the requalifier will operate in compliance with the applicable TDG Regulations; certifies the persons performing requalification have been trained in the functions applicable to the requalifiers' activities; and includes the signature of the person making the certification and the date on which it was signed. In addition, the procedural requirements in subpart H of this part apply to the filing, processing and termination of an approval issued under this subpart.

(3) A person holding a certificate of registration issued by Transport Canada in accordance with the TDG Regulations to perform the requalification (inspect, test, certify), repair, or rebuild of a TC, CTC, CRC, or BTC cylinder who performs any of these actions on corresponding DOT specification cylinders.

* * * * *

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

■ 5. The authority citation for part 171 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; Pub. L. 101–410 section 4; Pub. L. 104–134, section 31001; Pub. L. 114–74 section 4 (28 U.S.C. 2461 note); 49 CFR 1.81 and 1.97.

■ 6. In § 171.2, paragraph (h)(1) is revised to read as follows:

§ 171.2 General requirements.

* * * * *

(h) * * *

(1) Specification identifications that include the letters ''ICC'', ''DOT'', ''TC'', ''CTC'', ''CRC'', ''BTC'', ''MC'', or ''UN'';

* * * * *

■ 7. In § 171.7:

■ a. Revise paragraphs (a)(1), (h)(44), (t), (v) introductory text, (v)(2), (w), (bb) introductory text, and (bb)(1) introductory text;

■ b, Add paragraphs (bb)(1)(xiii) through (xix); and

■ c. Revise paragraphs (dd).

The revisions and additions read as follows:

§ 171.7 Reference material.

(a) *Matter incorporated by reference*—(1) *General.* Certain material is incorporated by reference into subchapters A, B, and C with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, PHMSA must publish a document in the **Federal Register** and the material must be available to the public. Matters referenced by footnote are included as part of the regulations of this subchapter.

* * * * *

(h) * * *

(44) ASTM D 4359–90 Standard Test Method for Determining Whether a Material is a Liquid or a Solid, 1990 into §§ 130.5, 171.8.

* * * * *

(t) *International Civil Aviation Organization (''ICAO''),* 999 Robert-Bourassa Boulevard, Montréal, Quebec H3C 5H7, Canada, 1–514–954–8219, *http://www.icao.int.* ICAO Technical Instructions available from: ICAO Document Sales Unit, *sales@icao.int.*

(1) Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions), 2017–2018 Edition, copyright 2016, into §§ 171.8; 171.22; 171.23; 171.24; 172.101; 172.202; 172.401; 172.512; 172.519; 172.602; 173.56; 173.320; 175.10, 175.33; 178.3.

(2) [Reserved]

* * * * *

(v) *International Maritime Organization (''IMO''),* 4 Albert Embankment, London, SE1 7SR, United Kingdom, + 44 (0) 20 7735 7611, *http://www.imo.org.* IMDG Code available from: IMO Publishing, *sales@imo.org.*

* * * * *

(2) International Maritime Dangerous Goods Code (IMDG Code), Incorporating Amendment 38–16 (English Edition), 2016 Edition, into §§ 171.22; 171.23; 171.25; 172.101; 172.202; 172.203 172.401; 172.502; 172.519; 172.602; 173.21; 173.56; 176.2; 176.5; 176.11; 176.27; 176.30; 176.83; 176.84; 176.140; 176.720; 176.906; 178.3; 178.274.

(w) *International Organization for Standardization,* Case Postale 56, CH–1211, Geneve 20, Switzerland, *http://*

www.iso.org. Also available from: ANSI 25, West 43rd Street, New York, NY 10036, 1–212–642–4900, *http://www.ansi.org*.

(1) ISO 535–1991(E) Paper and board—Determination of water absorptiveness—Cobb method, 1991, into §§ 178.707; 178.708; 178.516.

(2) ISO 1496–1: 1990 (E)—Series 1 freight containers—Specification and testing, Part 1: General cargo containers. Fifth Edition, (August 15, 1990), into § 173.411.

(3) ISO 1496–3(E)—Series 1 freight containers—Specification and testing—Part 3: Tank containers for liquids, gases and pressurized dry bulk, Fourth edition, March 1995, into §§ 178.74; 178.75; 178.274.

(4) ISO 1516:2002(E), Determination of flash/no flash—Closed cup equilibrium method, Third Edition, 2002–03–01, into § 173.120.

(5) ISO 1523:2002(E), Determination of flash point—Closed cup equilibrium method, Third Edition, 2002–03–01, into § 173.120.

(6) ISO 2431–1984(E) Standard Cup Method, 1984, into § 173.121.

(7) ISO 2592:2000(E), Determination of flash and fire points—Cleveland open cup method, Second Edition, 2000–09–15, into § 173.120.

(8) ISO 2719:2002(E), Determination of flash point—Pensky-Martens closed cup method, Third Edition, 2002–11–15, into § 173.120.

(9) ISO 2919:1999(E), Radiation Protection—Sealed radioactive sources—General requirements and classification, (ISO 2919), second edition, February 15, 1999, into § 173.469.

(10) ISO 3036–1975(E) Board—Determination of puncture resistance, 1975, into § 178.708.

(11) ISO 3405:2000(E), Petroleum products—Determination of distillation characteristics at atmospheric pressure, Third Edition, 2000–03–01, into § 173.121.

(12) ISO 3574–1986(E) Cold-reduced carbon steel sheet of commercial and drawing qualities, into § 178.503; part 178, appendix C.

(13) ISO 3679:2004(E), Determination of flash point—Rapid equilibrium closed cup method, Third Edition, 2004–04–01, into § 173.120.

(14) ISO 3680:2004(E), Determination of flash/no flash—Rapid equilibrium closed cup method, Fourth Edition, 2004–04–01, into § 173.120.

(15) ISO 3807–2(E), Cylinders for acetylene—Basic requirements—Part 2: Cylinders with fusible plugs, First edition, March 2000, into §§ 173.303; 178.71.

(16) ISO 3807:2013(E), Gas cylinders—Acetylene cylinders—Basic requirements and type testing, Second edition, 2013–09–01, into §§ 173.303; 178.71.

(17) ISO 3924:1999(E), Petroleum products—Determination of boiling range distribution—Gas chromatography method, Second Edition, 1999–08–01, into § 173.121.

(18) ISO 4126–1:2004(E): Safety devices for protection against excessive pressure—Part 1: Safety valves, Second edition 2004–02–15, into § 178.274.

(19) ISO 4126–7:2004(E): Safety devices for protection against excessive pressure—Part 7: Common data, First Edition 2004–02–15 into § 178.274.

(20) ISO 4126–7:2004/Cor.1:2006(E): Safety devices for protection against excessive pressure—Part 7: Common data, Technical Corrigendum 1, 2006–11–01, into § 178.274.

(21) ISO 4626:1980(E), Volatile organic liquids—Determination of boiling range of organic solvents used as raw materials, First Edition, 1980–03–01, into § 173.121.

(22) ISO 4706:2008(E), Gas cylinders—Refillable welded steel cylinders—Test pressure 60 bar and below, First Edition, 2008–07–014, Corrected Version, 2008–07–01, into § 178.71.

(23) ISO 6406(E), Gas cylinders—Seamless steel gas cylinders—Periodic inspection and testing, Second edition, February 2005, into § 180.207.

(24) ISO 6892 Metallic materials—Tensile testing, July 15, 1984, First Edition, into § 178.274.

(25) ISO 7225(E), Gas cylinders—Precautionary labels, Second Edition, July 2005, into § 178.71.

(26) ISO 7866(E), Gas cylinders—Refillable seamless aluminum alloy gas cylinders—Design, construction and testing, First edition, June 1999, into § 178.71.

(27) ISO 7866:2012(E), Gas cylinders—Refillable seamless aluminium alloy gas cylinders—Design, construction and testing, Second edition, 2012–09–01, into § 178.71.

(28) ISO 7866:2012/Cor.1:2014(E), Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing, Technical Corrigendum 1, 2014–04–15, into § 178.71.

(29) ISO 8115 Cotton bales—Dimensions and density, 1986 Edition, into § 172.102.

(30) ISO 9809–1:1999(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with tensile strength less than 1100 MPa., First edition, June 1999, into §§ 178.37; 178.71; 178.75.

(31) ISO 9809–1:2010(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa., Second edition, 2010–04–15, into §§ 178.37; 178.71; 178.75.

(32) ISO 9809–2:2000(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa., First edition, June 2000, into §§ 178.71; 178.75.

(33) ISO 9809–2:2010(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1100 MPa., Second edition, 2010–04–15, into §§ 178.71; 178.75.

(34) ISO 9809–3:2000(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 3: Normalized steel cylinders, First edition, December 2000, into §§ 178.71; 178.75.

(35) ISO 9809–3:2010(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 3: Normalized steel cylinders, Second edition, 2010–04–15, into §§ 178.71; 178.75.

(36) ISO 9809–4:2014(E), Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa, First edition, 2014–07–15, into §§ 178.71; 178.75.

(37) ISO 9978:1992(E)—Radiation protection—Sealed radioactive sources—Leakage test methods. First Edition, (February 15, 1992), into § 173.469.

(38) ISO 10156:2010(E): Gases and gas mixtures—Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets, Third edition, 2010–04–01, into § 173.115.

(39) ISO 10156:2010/Cor.1:2010(E): Gases and gas mixtures—Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets, Technical Corrigendum 1, 2010–09–01, into § 173.115.

(40) ISO 10297:1999(E), Gas cylinders—Refillable gas cylinder valves—Specification and type testing, First Edition, 1995–05–01, into §§ 173.301b; 178.71.

(41) ISO 10297:2006(E), Transportable gas cylinders—Cylinder valves—Specification and type testing, Second Edition, 2006–01–15, into §§ 173.301b; 178.71.

(42) ISO 10297:2014(E), Gas cylinders—Cylinder valves—Specification and type testing, Third Edition, 20014–07–15, into §§ 173.301b; 178.71.

(43) ISO 10461:2005(E), Gas cylinders—Seamless aluminum-alloy gas cylinders—Periodic inspection and testing, Second Edition, 2005–02–15 and Amendment 1, 2006–07–15, into § 180.207.

(44) ISO 10462 (E), Gas cylinders—Transportable cylinders for dissolved acetylene—Periodic inspection and maintenance, Second edition, February 2005, into § 180.207.

(45) ISO 10462:2013(E), Gas cylinders—Acetylene cylinders—Periodic inspection and maintenance, Third edition, 2013–12–15, into § 180.207.

(46) ISO 10692–2:2001(E), Gas cylinders—Gas cylinder valve connections for use in the micro-electronics industry—Part 2: Specification and type testing for valve to cylinder connections, First Edition, 2001–08–01, into §§ 173.40; 173.302c.

(47) ISO 11114–1:2012(E), Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials, Second edition, 2012–03–15, into §§ 172.102; 173.301b; 178.71.

(48) ISO 11114–2:2013(E), Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials, Second edition, 2013–04–01, into §§ 173.301b; 178.71.

(49) ISO 11117:1998(E): Gas cylinders—Valve protection caps and valve guards for industrial and medical gas cylinders.—Design, construction and tests, First edition, 1998–08–01, into § 173.301b.

(50) ISO 11117:2008(E): Gas cylinders—Valve protection caps and valve guards—Design, construction and tests, Second edition, 2008–09–01, into § 173.301b.

(51) ISO 11117:2008/Cor.1:2009(E): Gas cylinders—Valve protection caps and valve guards—Design, construction and tests, Technical Corrigendum 1, 2009–05–01, into § 173.301b.

(52) ISO 11118(E), Gas cylinders—Non-refillable metallic gas cylinders—Specification and test methods, First edition, October 1999, into § 178.71.

(53) ISO 11119–1(E), Gas cylinders—Gas cylinders of composite construction—Specification and test methods—Part 1: Hoop-wrapped composite gas cylinders, First edition, May 2002, into § 178.71.

(54) ISO 11119–1:2012(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing— Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l, Second edition, 2012–08–01, into § 178.71.

(55) ISO 11119–2(E), Gas cylinders—Gas cylinders of composite construction—Specification and test methods—Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners, First edition, May 2002, into § 178.71.

(56) ISO 11119–2:2012(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners, Second edition, 2012–07–15, into § 178.71.

(57) ISO 11119–2:2012/Amd.1:2014(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners, Amendment 1, 2014–08–15, into § 178.71.

(58) ISO 11119–3(E), Gas cylinders of composite construction—Specification and test methods—Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners, First edition, September 2002, into § 178.71.

(59) ISO 11119–3:2013(E), Gas cylinders— Refillable composite gas cylinders and tubes—Design, construction and testing—Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners, Second edition, 2013–04–15, into § 178.71.

(60) ISO 11120(E), Gas cylinders—Refillable seamless steel tubes of water capacity between 150 L and 3000 L—Design, construction and testing, First edition, March 1999, into §§ 178.71; 178.75.

(61) ISO 11513:2011(E), Gas cylinders—Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene)—Design, construction, testing, use and periodic inspection, First edition, 2011–09–12, into §§ 173.302c; 178.71; 180.207.

(62) ISO 11621(E), Gas cylinders—Procedures for change of gas service, First edition, April 1997, into §§ 173.302, 173.336, 173.337.

(63) ISO 11623(E), Transportable gas cylinders—Periodic inspection and testing of composite gas cylinders, First edition, March 2002, into § 180.207.

(64) ISO 13340:2001(E) Transportable gas cylinders—Cylinder valves for non-refillable cylinders—Specification and prototype testing, First edition, 2004–04–01, into §§ 173.301b; 178.71.

(65) ISO 13736:2008(E), Determination of flash point—Abel closed-cup method, Second Edition, 2008–09–15, into § 173.120.

(66) ISO 16111:2008(E), Transportable gas storage devices—Hydrogen absorbed in reversible metal hydride, First Edition, 2008–11–15, into §§ 173.301b; 173.311; 178.71.

(67) ISO 18172–1:2007(E), Gas cylinders—Refillable welded stainless steel cylinders—Part 1: Test pressure 6 MPa and below, First Edition, 2007–03–01, into § 178.71.

(68) ISO 20703:2006(E), Gas cylinders—Refillable welded aluminum-alloy cylinders—Design, construction and testing, First Edition, 2006–05–01, into § 178.71.

* * * * *

(bb) *Transport Canada,* Transport Dangerous Goods. Mailstop: ASD 330 Sparks Street, Ottawa, Ontario, Canada K1A 0N5, 416–973–1868, *http://www.tc.gc.ca*.

(1) Transportation of Dangerous Goods Regulations (Transport Canada TDG Regulations), into §§ 107.801; 107.805; 171.12; 171.22; 171.23; 172.401; 172.502; 172.519; 172.602; 173.31; 173.32; 173.33; 173.301; 180.205; 180.211; 180.212; 180.413.

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(xiii) SOR/2014–152 July 2, 2014.

(xiv) SOR/2014–159 July 2, 2014.

(xv) SOR/2014–159 Erratum July 16, 2014.

(xvi) SOR/2014–152 Erratum August 27, 2014.

(xvii) SOR/2014–306 December 31, 2014.

(xviii) SOR/2014–306 Erratum January 28, 2015.

(xix) SOR/2015–100 May 20, 2015.

* * * * *

(dd) *United Nations,* Bookshop, GA–1B–103, New York, NY 10017, 1–212–963–7680, *https://shop.un.org* or *bookshop@un.org.*

(1) UN Recommendations on the Transport of Dangerous Goods, Model Regulations (UN Recommendations), 19th revised edition, Volumes I and II (2015), into §§ 171.8; 171.12; 172.202; 172.401; 172.407; 172.502; 173.22; 173.24; 173.24b; 173.40; 173.56; 173.192; 173.302b; 173.304b; 178.75; 178.274.

(2) UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, (Manual of Tests and Criteria), Sixth revised edition (2015), into §§ 171.24, 172.102; 173.21; 173.56; 173.57; 173.58; 173.60; 173.115; 173.124; 173.125; 173.127; 173.128; 173.137; 173.185; 173.220; 173.221;

173.225, part 173, appendix H; 176.905; 178.274.

(3) UN Recommendations on the Transport of Dangerous Goods, Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Sixth revised edition (2015), into § 172.401.

* * * * *

■ 8. In § 171.8:

■ a. Revise the definition of ''Aerosol'';

■ b. Add a definition for ''Design life'' in alphabetical order;

■ c. Revise the definition of ''Large salvage packaging'';

■ d. Add definitions for ''SAPT'' and ''Service life'' in alphabetical order; and

■ e. Revise the definition of ''UN tube.''

The revisions and additions read as follows:

§ 171.8 Definitions and abbreviations.

* * * * *

Aerosol means an article consisting of any non-refillable receptacle containing a gas compressed, liquefied or dissolved under pressure, the sole purpose of which is to expel a nonpoisonous (other than a Division 6.1 Packing Group III material) liquid, paste, or powder and fitted with a self-closing release device allowing the contents to be ejected by the gas.

* * * * *

Design life, for composite cylinders and tubes, means the maximum life (in number of years) to which the cylinder or tube is designed and approved in accordance with the applicable standard.

* * * * *

Large salvage packaging means a special packaging into which damaged, defective, leaking or non-conforming hazardous materials packages, or hazardous materials that have spilled or leaked are placed for the purpose of transport for recovery or disposal, that—

(1) Is designed for mechanical handling; and

(2) Has a net mass greater than 400 kg (882 pounds) or a capacity of greater than 450 L (119 gallons), but has a volume of not more than 3 cubic meters (106 cubic feet).

* * * * *

SAPT means self-accelerated polymerization temperature. See § 173.21(f) of this subchapter. This definition will be effective until January 2, 2019.

* * * * *

Service life, for composite cylinders and tubes, means the number of years the cylinder or tube is permitted to be in service.

* * * * *

UN tube means a transportable pressure receptacle of seamless or composite construction having with a water capacity exceeding 150 L (39.6 gallons) but not more than 3,000 L (792.5 gallons) that has been marked and certified as conforming to the requirements in part 178 of this subchapter.

* * * * *

■ 9. In § 171.12, paragraphs (a)(1) and (4) are revised to read as follows:

§ 171.12 North American Shipments.

(a) * * *

(1) A hazardous material transported from Canada to the United States, from the United States to Canada, or transiting the United States to Canada or a foreign destination may be offered for transportation or transported by motor carrier and rail in accordance with the Transport Canada TDG Regulations (IBR, *see* § 171.7) or an equivalency certificate (permit for equivalent level of safety) issued under the TDG Regulations, as authorized in § 171.22, provided the requirements in §§ 171.22 and 171.23, as applicable, and this section are met. In addition, a cylinder, MEGC, cargo tank motor vehicle, portable tank or rail tank car authorized by the Transport Canada TDG Regulations may be used for transportation to, from, or within the United States provided the cylinder, MEGC, cargo tank motor vehicle, portable tank or rail tank car conforms to the applicable requirements of this section. Except as otherwise provided in this subpart and subpart C of this part, the requirements in parts 172, 173, and 178 of this subchapter do not apply for a material transported in accordance with the Transport Canada TDG Regulations.

* * * * *

(4) *Cylinders and MEGCs.* When the provisions of this subchapter require that a DOT specification or a UN pressure receptacle must be used for a hazardous material, a packaging authorized by the Transport Canada TDG Regulations may be used only if it corresponds to the DOT specification or UN standard authorized by this subchapter. Unless otherwise excepted in this subchapter, a cylinder (including a UN pressure receptacle) or MEGC may not be transported unless—

(i) The packaging is a UN pressure receptacle or MEGC marked with the letters ''CAN'' for Canada as a country of manufacture or a country of approval or is a cylinder that was manufactured, inspected and tested in accordance with a DOT specification or a UN standard prescribed in part 178 of this subchapter, except that cylinders not conforming to these requirements must meet the requirements in § 171.23. Each cylinder must conform to the applicable requirements in part 173 of this subchapter for the hazardous material involved.

(ii) A Canadian Railway Commission (CRC), Board of Transport Commissioners for Canada (BTC), Canadian Transport Commission (CTC) or Transport Canada (TC) specification cylinder manufactured, originally marked, and approved in accordance with the TDG Regulations, and in full conformance with the TDG Regulations is authorized for transportation to, from or within the United States provided:

(A) The CRC, BTC, CTC or TC specification cylinder corresponds with a DOT specification cylinder and the markings are the same as those specified in this subchapter, except that the original markings were ''CRC'', ''BTC'', ''CTC'', or ''TC'';

(B) The cylinder has been requalified under a program authorized by the TDG Regulations or subpart I of part 107 of this chapter;

(C) When the regulations authorize a cylinder for a specific hazardous material with a specification marking prefix of ''DOT,'' a cylinder marked ''CRC'', ''BTC'', ''CTC'', or ''TC'' otherwise bearing the same markings required of the specified ''DOT'' cylinder may be used; and

(D) Transport of the cylinder and the material it contains is in all other respects in conformance with the requirements of this subchapter (*e.g.* valve protection, filling requirements, operational requirements, etc.).

(iii) Authorized CRC, BTC, CTC or TC specification cylinders that correspond with a DOT specification cylinder are as follows:

TC	DOT (some or all of these specifications may instead be marked with the prefix ICC)	CTC (some or all of these specifications may instead be marked with the prefix BTC or CRC)
TC–3AM	DOT–3A [ICC–3]	CTC–3A

TC	DOT (some or all of these specifications may instead be marked with the prefix ICC)	CTC (some or all of these specifications may instead be marked with the prefix BTC or CRC)
TC–3AAM	DOT–3AA	CTC–3AA
TC–3ANM	DOT–3BN	CTC–3BN
TC–3EM	DOT–3E	CTC–3E
TC–3HTM	DOT–3HT	CTC–3HT
TC–3ALM	DOT–3AL	CTC–3AL
	DOT–3B	CTC–3B
TC–3AXM	DOT–3AX	CTC–3AX
TC–3AAXM	DOT–3AAX	CTC–3AAX
	DOT–3A480X	CTC–3A480X
TC–3TM	DOT–3T	
TC–4AAM33	DOT–4AA480	CTC–4AA480
TC–4BM	DOT–4B	CTC–4B
TC–4BM17ET	DOT–4B240ET	CTC–4B240ET
TC–4BAM	DOT–4BA	CTC–4BA
TC–4BWM	DOT–4BW	CTC–4BW
TC–4DM	DOT–4D	CTC–4D
TC–4DAM	DOT–4DA	CTC–4DA
TC–4DSM	DOT–4DS	CTC–4DS
TC–4EM	DOT–4E	CTC–4E
TC–39M	DOT–39	CTC–39
TC–4LM	DOT–4L	CTC–4L
	DOT–8	CTC–8
	DOT–8AL	CTC–8AL

* * * * *

■ 10. In § 171.23, paragraph (a) is revised to read as follows:

§ 171.23 Requirements for specific materials and packagings transported under the ICAO Technical Instructions, IMDG Code, Transport Canada TDG Regulations, or the IAEA Regulations.

* * * * *

(a) *Conditions and requirements for cylinders.* (1) Except as provided in this paragraph (a), a filled cylinder (pressure receptacle) manufactured to other than a DOT specification or a UN standard in accordance with part 178 of this subchapter, a DOT exemption or special permit cylinder, a TC, CTC, CRC, or BTC cylinder authorized under § 171.12, or a cylinder used as a fire extinguisher in conformance with § 173.309(a) of this subchapter, may not be transported to, from, or within the United States.

(2) Cylinders (including UN pressure receptacles) transported to, from, or within the United States must conform to the applicable requirements of this subchapter. Unless otherwise excepted in this subchapter, a cylinder must not be transported unless—

(i) The cylinder is manufactured, inspected and tested in accordance with a DOT specification or a UN standard prescribed in part 178 of this subchapter, or a TC, CTC, CRC, or BTC specification set out in the Transport Canada TDG Regulations (IBR, see § 171.7), except that cylinders not conforming to these requirements must meet the requirements in paragraph (a)(3), (4), or (5) of this section;

(ii) The cylinder is equipped with a pressure relief device in accordance with § 173.301(f) of this subchapter and conforms to the applicable requirements in part 173 of this subchapter for the hazardous material involved;

(iii) The openings on an aluminum cylinder in oxygen service conform to the requirements of this paragraph, except when the cylinder is used for aircraft parts or used aboard an aircraft in accordance with the applicable airworthiness requirements and operating regulations. An aluminum DOT specification cylinder must have an opening configured with straight (parallel) threads. A UN pressure receptacle may have straight (parallel) or tapered threads provided the UN pressure receptacle is marked with the thread type, *e.g.* ''17E, 25E, 18P, or 25P'' and fitted with the properly marked valve; and

(iv) A UN pressure receptacle is marked with ''USA'' as a country of approval in conformance with §§ 178.69 and 178.70 of this subchapter, or ''CAN'' for Canada.

(3) *Importation of cylinders for discharge within a single port area.* A cylinder manufactured to other than a DOT specification or UN standard in accordance with part 178 of this subchapter, or a TC, CTC, BTC, or CRC specification cylinder set out in the Transport Canada TDG Regulations (IBR, see § 171.7), and certified as being in conformance with the transportation regulations of another country may be authorized, upon written request to and approval by the Associate Administrator, for transportation within a single port area, provided—

(i) The cylinder is transported in a closed freight container;

(ii) The cylinder is certified by the importer to provide a level of safety at least equivalent to that required by the regulations in this subchapter for a comparable DOT, TC, CTC, BTC, or CRC specification or UN cylinder; and

(iii) The cylinder is not refilled for export unless in compliance with paragraph (a)(4) of this section.

(4) *Filling of cylinders for export or for use on board a vessel.* A cylinder not manufactured, inspected, tested and marked in accordance with part 178 of this subchapter, or a cylinder manufactured to other than a UN standard, DOT specification, exemption or special permit, or other than a TC, CTC, BTC, or CRC specification, may be filled with a gas in the United States and offered for transportation and transported for export or alternatively, for use on board a vessel, if the following conditions are met:

(i) The cylinder has been requalified and marked with the month and year of requalification in accordance with subpart C of part 180 of this subchapter, or has been requalified as authorized by the Associate Administrator;

(ii) In addition to other requirements of this subchapter, the maximum filling density, service pressure, and pressure relief device for each cylinder conform to the requirements of this part for the gas involved; and

(iii) The bill of lading or other shipping paper identifies the cylinder and includes the following certification: ''This cylinder has (These cylinders have) been qualified, as required, and filled in accordance with the DOT requirements for export.''

(5) *Cylinders not equipped with pressure relief devices.* A DOT specification or a UN cylinder manufactured, inspected, tested and marked in accordance with part 178 of this subchapter and otherwise conforms to the requirements of part 173 of this subchapter for the gas involved, except that the cylinder is not equipped with a pressure relief device may be filled with a gas and offered for transportation and transported for export if the following conditions are met:

(i) Each DOT specification cylinder or UN pressure receptacle must be plainly and durably marked ''For Export Only'';

(ii) The shipping paper must carry the following certification: ''This cylinder has (These cylinders have) been retested and refilled in accordance with the DOT requirements for export.''; and

(iii) The emergency response information provided with the shipment and available from the emergency response telephone contact person must indicate that the pressure receptacles are not fitted with pressure relief devices and provide appropriate guidance for exposure to fire.

* * * * *

PART 172—HAZARDOUS MATERIALS TABLE, SPECIAL PROVISIONS, HAZARDOUS MATERIALS COMMUNICATIONS, EMERGENCY RESPONSE INFORMATION, TRAINING REQUIREMENTS, AND SECURITY PLANS

■ 11. The authority citation for part 172 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.96 and 1.97.

■ 12. In § 172.101:

■ a. The Hazardous Materials Table is amended by removing the entries under ''[REMOVE]'' and by adding the entries under ''[ADD]'' and revising the entries under ''[REVISE]'' in the appropriate alphabetical sequence; and

■ b. In appendix B to § 172.101, the List of Marine Pollutants is amended by adding five (5) entries in appropriate alphabetical order.

The additions and revisions read as follows:

§ 172.101 Purpose and use of the hazardous materials table.

* * * * *

§ 172.101 Hazardous Materials Table

BILLING CODE 4910–60–P

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification Numbers	PG	Label Codes	Special Provisions (§ 172.102)	(8) Packaging (§ 173.***)			(9) Quantity limitations (see §§ 173.27 and 175.75)		(10) Vessel stowage	
							Exceptions	Non-bulk	Bulk	Passenger aircraft/rail	Cargo aircraft only	Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	[REMOVE]												
	*		*		*		*		*		*		*
	Engines, internal combustion, or Engines, fuel cell, flammable gas powered	9	UN3166		9	135, A200	220	220	220	Forbidden	No limit	A	
	Engines internal combustion, or Engines, fuel cell, flammable liquid powered	9	UN3166		9	135, A200	220	220	220	No limit	No limit	A	
	*		*		*		*		*		*		*
	Polyester resin kit	3	UN3269		3	40, 149	165	165	None	5 kg	5 kg	B	
	*		*		*		*		*		*		*
	[ADD]												
	*		*		*		*		*		*		*
	1, 3, 2-Benzodioxaborole					A210							
	*		*		*		*		*		*		*
	Catecholborane					A210							
	*		*		*		*		*		*		*
	Engine, internal combustion, flammable gas powered or Engine, fuel cell, flammable gas powered or Machinery, internal combustion, flammable gas powered or Machinery,	2.1	UN3529		2.1	135, A200	220	220	220	Forbidden	No limit	E	

	fuel cell, flammable gas powered												
	Engine, internal combustion, flammable liquid powered or Engine, fuel cell, flammable liquid powered or Machinery, internal combustion, flammable liquid powered or Machinery, fuel cell, flammable liquid powered	3	UN3528		3	135, A200	220	220	220	No limit	No limit	E	149
	Engine, internal combustion or Machinery, internal combustion	9	UN3530		9	135, A200	220	220	220	No limit	No limit	A	
	*		*		*		*		*		*		*
	Polyester resin kit, liquid base material	3	UN3269		3	40, 149	165	165	None	5 kg	5 kg	B	
	Polyester resin kit, solid base material	4.1	UN3527		4.1	40, 157	165	165	None	5 kg	5 kg	B	
	*		*		*		*		*		*		*
G	Polymerizing substance, liquid, stabilized, n.o.s.	4.1	UN3532	III	4.1	387, 421, IB3, IP19, N92, T7, TP4, TP6	None	203	241	10 L	25 L	D	25, 52, 53
G	Polymerizing substance, liquid, temperature controlled, n.o.s.	4.1	UN3534	III	4.1	387, 421, IB3, IP19, N92, T7, TP4, TP6	None	203	241	Forbidden	Forbidden	D	2, 25, 52, 53
G	Polymerizing substance, solid, stabilized, n.o.s.	4.1	UN3531	III	4.1	387, 421, IB7, IP19, N92, T7, TP4, TP6, TP33	None	213	240	10 kg	25 kg	D	25, 52, 53
G	Polymerizing substance, solid, temperature controlled, n.o.s.	4.1	UN3533	III	4.1	387, 421, IB7, IP19, N92, T7, TP4, TP6, TP33	None	213	240	Forbidden	Forbidden	D	2, 25, 52, 53
	*		*		*		*		*		*		*
	Rocket motors	1.4C	UN0510		1.4C	109	None	62	62	Forbidden	75 kg	02	25
	*		*		*		*		*		*		*
	[REVISE]												
	*		*		*		*		*		*		*
	Acrolein dimer, stabilized	3	UN2607	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25, 40

	Acrolein, stabilized	6.1	UN1092	I	6.1, 3	1, 380, 387, B9, B14, B30, B42, B77, T22, TP2, TP7, TP13, TP38, TP44	None	226	244	Forbidden	Forbidden	D	25, 40
	*		*		*		*		*		*		*
	Acrylic acid, stabilized	8	UN2218	II	8, 3	387, B2, IB2, T7, TP2	154	202	243	1 L	30 L	C	25, 40
	Acrylonitrile, stabilized	3	UN1093	I	3, 6.1	387, B9, T14, TP2, TP13	None	201	243	Forbidden	30 L	D	25, 40
	*		*		*		*		*		*		*
G	Adsorbed gas, toxic, corrosive, n.o.s. Inhalation hazard zone A	2.3	UN3516		2.3, 8	1, 379	None	302c	None	Forbidden	Forbidden	D	40
G	Adsorbed gas, toxic, corrosive, n.o.s. Inhalation hazard zone B	2.3	UN3516		2.3, 8	2, 379, B9, B14	None	302c	None	Forbidden	Forbidden	D	40
G	Adsorbed gas, toxic, corrosive, n.o.s. Inhalation hazard zone C	2.3	UN3516		2.3, 8	3, 379, B14	None	302c	None	Forbidden	Forbidden	D	40
G	Adsorbed gas, toxic, corrosive, n.o.s. Inhalation hazard zone D	2.3	UN3516		2.3, 8	4, 379	None	302c	None	Forbidden	Forbidden	D	40
	*		*		*		*		*		*		*
G	Alkali metal alcoholates, self-heating, corrosive, n.o.s.	4.2	UN3206	II	4.2, 8	64, A7, IB5, IP2, T3, TP33, W31	None	212	242	15 kg	50 kg	B	
				III	4.2, 8	64, A7, IB8, IP3, T1, TP33, W31	None	213	242	25 kg	100 kg	B	
	Alkali metal alloys, liquid, n.o.s	4.3	UN1421	I	4.3	A2, A3, A7, B48, N34, W31	None	201	244	Forbidden	1 L	D	13, 52, 148
	Alkali metal amalgam, liquid	4.3	UN1389	I	4.3	A2, A3, A7, N34, W31	None	201	244	Forbidden	1 L	D	13, 40, 52, 148
	Alkali metal amalgam, solid	4.3	UN3401	I	4.3	IB4, IP1, N40, T9, TP7, TP33, W32	None	211	242	Forbidden	15 kg	D	13, 52, 148
	Alkali metal amides	4.3	UN1390	II	4.3	A6, A7, A8, A19, A20, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	E	13, 40, 52, 148
	Alkali metal dispersions, flammable or Alkaline earth metal dispersions, flammable	4.3	UN3482	I	4.3, 3	A2, A3, A7, W31	None	201	244	Forbidden	1 L	D	13, 52, 148
	Alkali metal dispersions, or Alkaline earth metal dispersions	4.3	UN1391	I	4.3	A2, A3, A7, W31	None	201	244	Forbidden	1 L	D	13, 52, 148
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G	Alkaline earth metal alcoholates, n.o.s.	4.2	UN3205	II	4.2	65, A7, IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	B	
				III	4.2	65, A7, IB8, IP3, T1, TP33, W31	None	213	241	25 kg	100 kg	B	
	Alkaline earth metal alloys, n.o.s	4.3	UN1393	II	4.3	A19, IB7, IP2, IP4, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	E	13, 52, 148
	Alkaline earth metal amalgams, liquid	4.3	UN1392	I	4.3	A19, N34, N40, W31	None	201	244	Forbidden	1 L	E	13, 40, 52, 148
	Alkaline earth metal amalgams, solid	4.3	UN3402	I	4.3	A19, N34, N40, T9, TP7, TP33, W32	None	211	242	Forbidden	15 kg	D	13, 52, 148
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	Allyl isothiocyanate, stabilized	6.1	UN1545	II	6.1, 3	387, A3, A7, IB2, T7, TP2	None	202	243	Forbidden	60 L	D	25, 40
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	Allyltrichlorosilane, stabilized	8	UN1724	II	8, 3	387, A7, B2, B6, N34, T10, TP2, TP7, TP13	None	206	243	Forbidden	30 L	C	25, 40
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	Aluminum carbide	4.3	UN1394	II	4.3	A20, IB7, IP2, IP21, N41, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	A	13, 52, 148
	*		*		*		*		*		*		*
	Aluminum ferrosilicon powder	4.3	UN1395	II	4.3, 6.1	A19, IB5, IP2, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	A	13, 39, 40, 52, 53, 85, 103, 148
				III	4.3, 6.1	A19, A20, IB4	151	213	241	25 kg	100 kg	A	13, 39, 40, 52, 53, 85, 103, 148
	Aluminum hydride	4.3	UN2463	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 148
	*		*		*		*		*		*		*
	Aluminum phosphide	4.3	UN1397	I	4.3, 6.1	A8, A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 40, 52, 85, 148
	Aluminum phosphide pesticides	6.1	UN3048	I	6.1	A8, IB7, IP1, T6, TP33, W31	None	211	242	Forbidden	15 kg	E	40, 85
	Aluminum powder, coated	4.1	UN1309	II	4.1	IB8, IP2, IP21, T3, TP33, W100	151	212	240	15 kg	50 kg	A	13, 39, 52, 53, 74, 101, 147, 148
				III	4.1	B134, IB8, IP21, T1, TP33, W100	151	213	240	25 kg	100 kg	A	13, 39, 52, 53, 74, 101, 147,

													148
	Aluminum powder, uncoated	4.3	UN1396	II	4.3	A19, A20, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	A	13, 39, 52, 53, 148
				III	4.3	A19, A20, IB8, IP21, T1, TP33, W31, W40	151	213	241	25 kg	100 kg	A	13, 39, 52, 53, 148
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	Aluminum silicon powder, uncoated	4.3	UN1398	III	4.3	A1, A19, IB8, IP4, T1, TP33, W31, W40	151	213	241	25 kg	100 kg	A	13, 39, 40, 52, 53, 85, 103, 148
	Aluminum smelting by-products or Aluminum remelting by-products	4.3	UN3170	II	4.3	128, B115, IB7, IP2, IP21, T3, TP33, W31, W40	None	212	242	15 kg	50 kg	B	13, 85, 103, 148
				III	4.3	128, B115, IB8, IP21, T1, TP33, W31	None	213	241	25 kg	100 kg	B	13, 85, 103, 148
	*		*		*		*		*		*		*
	2-Amino-4,6-Dinitrophenol, wetted with not less than 20 percent water by mass	4.1	UN3317	I	4.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	N-Aminoethylpiperazine	8	UN2815	III	8, 6.1	IB3, T4, TP1	154	203	241	5 L	60 L	B	12, 25, 40
	*		*		*		*		*		*		*
I	Ammonia, anhydrous	2.3	UN1005		2.3, 8	4, 379, N87, T50	None	304	314, 315	Forbidden	Forbidden	D	40, 52, 57
D	Ammonia, anhydrous	2.2	UN1005		2.2	13, 379, T50	None	304	314, 315	Forbidden	Forbidden	D	40, 52, 57
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	Ammonia solution, relative density between 0.880 and 0.957 at 15 degrees C in water, with more than 10 percent but not more than 35 percent ammonia	8	UN2672	III	8	336, IB3, IP8, T7, TP2	154	203	241	5L	60L	A	40, 52, 85
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	Ammonium picrate, wetted with not less than 10 percent water, by mass	4.1	UN1310	I	4.1	23, A2, N41, W31	None	211	None	0.5 kg	0.5 kg	D	28, 36
	*		*		*		*		*		*		*

	Arsenic acid, liquid	6.1	UN1553	I	6.1	T20, TP2, TP7, TP13, W31	None	201	243	1 L	30 L	B	46
	*		*		*		*		*		*		*
	Barium	4.3	UN1400	II	4.3	A19, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	E	13, 52, 148
	Barium alloys, pyrophoric	4.2	UN1854	I	4.2	T21, TP7, TP33, W31	None	181	None	Forbidden	Forbidden	D	13, 148
	*		*		*		*		*		*		*
	Barium azide, wetted with not less than 50 percent water, by mass	4.1	UN1571	I	4.1, 6.1	162, A2, W31	None	182	None	Forbidden	0.5 kg	D	28, 36
	*		*		*		*		*		*		*
	Barium cyanide	6.1	UN1565	I	6.1	IB7, IP1, N74, N75, T6, TP33, W31	None	211	242	5 kg	50 kg	A	40, 52
	*		*		*		*		*		*		*
	Barium peroxide	5.1	UN1449	II	5.1, 6.1	A9, IB6, IP2, T3, TP33, W100	152	212	242	5 kg	25 kg	C	13, 52, 66, 75, 148
	*		*		*		*		*		*		*
	Beryllium, powder	6.1	UN1567	II	6.1, 4.1	IB8, IP2, IP4, T3, TP33, W100	153	212	242	15 kg	50 kg	A	13, 147, 148
	Bicyclo [2,2,1] hepta-2,5-diene, stabilized or 2,5-Norbornadiene, stabilized	3	UN2251	II	3	387, IB2, T7, TP2	150	202	242	5 L	60 L	D	25
	*		*		*		*		*		*		*
	Boron trifluoride diethyl etherate	8	UN2604	I	8, 3	A3, A19, T10, TP2, W31	None	201	243	0.5 L	2.5 L	D	40
	*		*		*		*		*		*		*
	Boron trifluoride dimethyl etherate	4.3	UN2965	I	4.3, 8, 3	A19, T10, TP2, TP7, TP13, W31	None	201	243	Forbidden	1 L	D	21, 25, 40, 49, 100
	*		*		*		*		*		*		*
	Bromobenzyl cyanides, liquid	6.1	UN1694	I	6.1	T14, TP2, TP13, W31	None	201	243	Forbidden	30 L	D	12, 25, 40, 52
	Bromobenzyl cyanides, solid	6.1	UN3449	I	6.1	T6, TP33, W31	None	211	242	5 kg	50 kg	D	12, 25, 40, 52

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	Butadienes, stabilized or Butadienes and Hydrocarbon mixture, stabilized containing more than 40% butadienes	2.1	UN1010		2.1	387, T50	306	304	314, 315	Forbidden	150 kg	B	25, 40
	*		*		*		*		*		*		*
	Butyl acrylates, stabilized	3	UN2348	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25
	*		*		*		*		*		*		*
	Butyl benzenes	3	UN2709	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	n-Butyl methacrylate, stabilized	3	UN2227	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25
	*		*		*		*		*		*		*
	Butyl vinyl ether, stabilized	3	UN2352	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25, 40
	*		*		*		*		*		*		*
	1,2-Butylene oxide, stabilized	3	UN3022	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25, 27, 49
	*		*		*		*		*		*		*
	Calcium	4.3	UN1401	II	4.3	IB7, IP2, IP21, T3, TP33, W31, W40	151	212	241	15 kg	50kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Calcium carbide	4.3	UN1402	I	4.3	A1, A8, B55, B59, IB4, IP1, N34, T9, TP7, TP33, W32	None	211	242	Forbidden	15 kg	B	13, 52, 148
				II	4.3	A1, A8, B55, B59, IB7, IP2, IP21, N34, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	B	13, 52, 148
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	Calcium cyanamide with more than 0.1 percent of calcium carbide	4.3	UN1403	III	4.3	A1, A19, IB8, IP4, T1, TP33, W31, W40	151	213	241	25 kg	100 kg	A	13, 52, 148
	Calcium cyanide	6.1	UN1575	I	6.1	IB7, IP1, N79, N80, T6, TP33, W31	None	211	242	5 kg	50 kg	A	40, 52

	Calcium dithionite or Calcium hydrosulfite	4.2	UN1923	II	4.2	A19, A20, IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	E	13
	Calcium hydride	4.3	UN1404	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Calcium manganese silicon	4.3	UN2844	III	4.3	A1, A19, IB8, IP4, T1, TP33, W31	151	213	241	25 kg	100 kg	A	13, 52, 85, 103, 148
	*		*		*		*		*		*		*
	Calcium peroxide	5.1	UN1457	II	5.1	IB6, IP2, T3, TP33, W100	152	212	242	5 kg	25 kg	C	13, 52, 66, 75, 148
	Calcium phosphide	4.3	UN1360	I	4.3, 6.1	A8, A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 40, 52, 85, 148
	Calcium, pyrophoric or Calcium alloys, pyrophoric	4.2	UN1855	I	4.2	W31	None	187	None	Forbidden	Forbidden	D	13, 148
	*		*		*		*		*		*		*
	Calcium silicide	4.3	UN1405	II	4.3	A19, IB7, IP2, IP21, T3, TP33, W31	151	212	241	15 kg	50 kg	B	13, 52, 85, 103, 148
				III	4.3	A1, A19, IB8, IP21, T1, TP33, W31, W40	151	213	241	25 kg	100 kg	B	13, 52, 85, 103, 148
	*		*		*		*		*		*		*
I	Carbon, activated	4.2	UN1362	III	4.2	IB8, IP3, T1, TP33, W31	None	213	241	0.5 kg	0.5 kg	A	12, 25
	*		*		*		*		*		*		*
	Carbon disulfide	3	UN1131	I	3, 6.1	B16, T14, TP2, TP7, TP13, W31	None	201	243	Forbidden	Forbidden	D	40, 78, 115
	*		*		*		*		*		*		*
	Celluloid, in block, rods, rolls, sheets, tubes, etc., except scrap	4.1	UN2000	III	4.1	420	None	213	240	25 kg	100 kg	A	
	*		*		*		*		*		*		*
	Cerium, slabs, ingots, or rods	4.1	UN1333	II	4.1	IB8, IP2, IP4, N34, W100	None	212	240	15 kg	50 kg	A	13, 74, 91, 147, 148
	Cerium, turnings or gritty powder	4.3	UN3078	II	4.3	A1, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	E	13, 52, 148
	Cesium or Caesium	4.3	UN1407	I	4.3	A7, A19, IB4, IP1, N34, N40, W32	None	211	242	Forbidden	15 kg	D	13, 52, 148

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	Chloric acid aqueous solution, with not more than 10 percent chloric acid	5.1	UN2626	II	5.1	IB2, T4, TP1, W31	None	229	None	Forbidden	Forbidden	D	56, 58
	*		*		*		*		*		*		*
	Chloroprene, stabilized	3	UN1991	I	3, 6.1	387, B57, T14, TP2, TP13	None	201	243	Forbidden	30 L	D	25, 40
	*		*		*		*		*		*		*
	Chlorosilanes, water-reactive, flammable, corrosive, n.o.s	4.3	UN2988	I	4.3, 3, 8	A2, T14, TP2, TP7, TP13, W31	None	201	244	Forbidden	1 L	D	13, 21, 40, 49, 100, 147, 148
	*		*		*		*		*		*		*
	Chromium trioxide, anhydrous	5.1	UN1463	II	5.1, 6.1, 8	IB8, IP2, IP4, T3, TP33, W31	None	212	242	5 kg	25 kg	A	66, 90
	*		*		*		*		*		*		*
G	Corrosive solids, water-reactive, n.o.s	8	UN3096	I	8, 4.3	IB4, IP1, T6, TP33	None	211	243	1 kg	25 kg	D	13, 148
				II	8, 4.3	IB6, IP2, T3, TP33, W100	None	212	242	15 kg	50 kg	D	13, 148
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	Crotonaldehyde or Crotonaldehyde, stabilized	6.1	UN1143	I	6.1, 3	2, 175, 387, B9, B14, B32, B77, T20, TP2, TP13, TP38, TP45	None	227	244	Forbidden	Forbidden	D	25, 40
	*		*		*		*		*		*		*
	Cyanogen bromide	6.1	UN1889	I	6.1, 8	A6, A8, T6, TP33, W31	None	211	242	1 kg	15 kg	D	40, 52
	Cyanogen chloride, stabilized	2.3	UN1589		2.3, 8	1, 387	None	192	245	Forbidden	Forbidden	D	25, 40
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	Cycloheptane	3	UN2241	II	3	IB2, T4, TP2	150	202	242	5 L	60 L	B	40

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	Decaborane	4.1	UN1868	II	4.1, 6.1	A19, A20, IB6, IP2, T3, TP33, W31	None	212	None	Forbidden	50 kg	A	74
	*		*		*		*		*		*		*
	Diketene, stabilized	6.1	UN2521	I	6.1, 3	2, 387, B9, B14, B32, T20, TP2, TP13, TP38, TP45	None	227	244	Forbidden	Forbidden	D	25, 26, 27, 40
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	Dinitrophenol, wetted with not less than 15 percent water, by mass	4.1	UN1320	I	4.1, 6.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
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	Dinitrophenolates, wetted with not less than 15 percent water, by mass	4.1	UN1321	I	4.1, 6.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Dinitroresorcinol, wetted with not less than 15 percent water, by mass	4.1	UN1322	I	4.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Diphenylamine chloroarsine	6.1	UN1698	I	6.1	T6, TP33, W31	None	201	None	Forbidden	Forbidden	D	40
	Diphenylchloroarsine, liquid	6.1	UN1699	I	6.1	A8, B14, B32, N33, N34, T14, TP2, TP13, TP27, W31	None	201	243	Forbidden	30 L	D	40
	Diphenylchloroarsine, solid	6.1	UN3450	I	6.1	IB7, IP1, T6, TP33, W31	None	211	242	5 kg	50 kg	D	40
	*		*		*		*		*		*		*
	Dipicryl sulfide, wetted with not less than 10 percent water, by mass	4.1	UN2852	I	4.1	162, A2, N41, N84, W31	None	211	None	Forbidden	0.5 kg	D	28, 36
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	Divinyl ether, stabilized	3	UN1167	I	3	387, A7, T11, TP2	None	201	243	1 L	30 L	E	25, 40
	*		*		*		*		*		*		*
	Ethyl acrylate, stabilized	3	UN1917	II	3	387, IB2, T4, TP1, TP13	150	202	242	5 L	60 L	C	25, 40

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	Ethyl methacrylate, stabilized	3	UN2277	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25
	*		*		*		*		*		*		*
	Ethylacetylene, stabilized	2.1	UN2452		2.1	387, N88	None	304	314, 315	Forbidden	150 kg	B	25, 40
	*		*		*		*		*		*		*
	Ethyldichlorosilane	4.3	UN1183	I	4.3, 8, 3	A2, A3, A7, N34, T14, TP2, TP7, TP13, W31	None	201	244	Forbidden	1 L	D	21, 40, 49, 100
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	Ethyleneimine, stabilized	6.1	UN1185	I	6.1, 3	1, 387, B9, B14, B30, B77, N25, N32, T22, TP2, TP13, TP38, TP44	None	226	244	Forbidden	Forbidden	D	25, 40
	*		*		*		*		*		*		*
	Ferrocerium	4.1	UN1323	II	4.1	59, A19, IB8, IP2, IP4, T3, TP33, W100	151	212	240	15 kg	50 kg	A	13, 147, 148
	Ferrosilicon with 30 percent or more but less than 90 percent silicon	4.3	UN1408	III	4.3, 6.1	A1, A19, B6, IB8, IP4, IP7, T1, TP33, W100	151	213	240	25 kg	100 kg	A	13, 40, 52, 53, 85, 103, 148
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	Ferrous metal borings or Ferrous metal shavings or Ferrous metal turnings or Ferrous metal cuttings in a form liable to self-heating	4.2	UN2793	III	4.2	A1, A19, B134, IB8, IP3, IP21, IP7, W100	None	213	241	25 kg	100 kg	A	13, 148
	*		*		*		*		*		*		*
A W	Fibers or Fabrics, animal or vegetable or Synthetic, n.o.s. with animal or vegetable oil	4.2	UN1373	III	4.2	137, IB8, IP3, T1, TP33, W31	None	213	241	Forbidden	Forbidden	A	
	*		*		*		*		*		*		*
	Fish meal, unstablized or Fish scrap, unstabilized	4.2	UN1374	II	4.2	155, A1, A19, IB8, IP2, IP4, T3, TP33, W31, W40	None	212	241	Forbidden	Forbidden	B	18, 25, 128
	*		*		*		*		*		*		*

	Hafnium powder, dry	4.2	UN2545	I	4.2	W31	None	211	242	Forbidden	Forbidden	D	13, 148
				II	4.2	A19, A20, IB6, IP2, N34, T3, TP33, W31	None	212	241	15 kg	50 kg	D	13, 148
				III	4.2	B135, IB8, IP21, T1, TP33, W31	None	213	241	25 kg	100 kg	D	13, 148
	Hafnium powder, wetted with not less than 25 percent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns	4.1	UN1326	II	4.1	A6, A19, A20, IB6, IP2, N34, T3, TP33, W31, W40	None	212	241	15 kg	50 kg	E	74
	*		*		*		*		*		*		*
	Heptanes	3	UN1206	II	3	IB2, T4, TP2	150	202	242	5 L	60 L	B	
	*		*		*		*		*		*		*
	Hexanes	3	UN1208	II	3	IB2, T4, TP2	150	202	242	5 L	60 L	E	
	*		*		*		*		*		*		*
	Hydrogen cyanide, stabilized with less than 3 percent water	6.1	UN1051	I	6.1, 3	1, 387, B35, B61, B65, B77, B82	None	195	244	Forbidden	Forbidden	D	25, 40
	Hydrogen cyanide, stabilized, with less than 3 percent water and absorbed in a porous inert material	6.1	UN1614	I	6.1	5, 387	None	195	None	Forbidden	Forbidden	D	25, 40
	*		*		*		*		*		*		*
	Iron oxide, spent, or Iron sponge, spent obtained from coal gas purification	4.2	UN1376	III	4.2	B18, B134, IB8, IP21, T1, TP33, W100	None	213	240	Forbidden	Forbidden	E	13, 148

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	Isobutyl acrylate, stabilized	3	UN2527	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25
	*		*		*		*		*		*		*
	Isobutyl methacrylate, stabilized	3	UN2283	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25
	*		*		*		*		*		*		*
G	Isocyanates, flammable, toxic, n.o.s. <u>or</u> Isocyanate solutions, flammable, toxic, n.o.s. <u>flash point less than 23 degrees C</u>	3	UN2478	II	3, 6.1	5, A3, A7, IB2, T11, TP2, TP13, TP27, W31	150	202	243	1 L	60 L	D	40
				III	3, 6.1	5, A3, A7, IB3, T7, TP1, TP13, TP28, W31	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Isoprene, stabilized	3	UN1218	I	3	387, T11, TP2	150	201	243	1 L	30 L	D	25
	*		*		*		*		*		*		*
	Life-saving appliances, not self inflating <u>containing dangerous goods as equipment</u>	9	UN3072		None	182	None	219	None	No limit	No limit	A	122
	*		*		*		*		*		*		*
	Lithium	4.3	UN1415	I	4.3	A7, A19, IB4, IP1, N45, T9, TP7, TP33, W32	151	211	244	Forbidden	15 kg	D	13, 52, 148
	*		*		*		*		*		*		*
	Lithium aluminum hydride	4.3	UN1410	I	4.3	A19, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Lithium borohydride	4.3	UN1413	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148
	Lithium ferrosilicon	4.3	UN2830	II	4.3	A19, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	E	13, 40, 85, 103, 148
	Lithium hydride	4.3	UN1414	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148

	Lithium hydride, fused solid	4.3	UN2805	II	4.3	A8, A19, A20, IB4, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Lithium ion batteries including lithium ion polymer batteries	9	UN3480		9	422, A51, A54	185	185	185	5 kg	35 kg	A	
	Lithium ion batteries contained in equipment including lithium ion polymer batteries	9	UN3481		9	181, 422, A54	185	185	185	5 kg	35 kg	A	
	Lithium ion batteries packed with equipment including lithium ion polymer batteries	9	UN3481		9	181, 422, A54	185	185	185	5 kg	35 kg	A	
	Lithium metal batteries including lithium alloy batteries	9	UN3090		9	422, A54	185	185	185	Forbidden	35 kg	A	
	Lithium metal batteries contained in equipment including lithium alloy batteries	9	UN3091		9	181, 422, A54, A101	185	185	185	5 kg	35 kg	A	
	Lithium metal batteries packed with equipment including lithium alloy batteries	9	UN3091		9	181, 422, A54	185	185	185	5 kg	35 kg	A	
	*		*		*		*		*		*		*
	Lithium nitride	4.3	UN2806	I	4.3	A19, IB4, IP1, N40, W32	None	211	242	Forbidden	15 kg	E	
	Lithium peroxide	5.1	UN1472	II	5.1	A9, IB6, IP2, N34, T3, TP33, W100	152	212	None	5 kg	25 kg	C	13, 52, 66, 75, 148
	Lithium silicon	4.3	UN1417	II	4.3	A19, A20, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	A	13, 85, 103, 148
	*		*		*		*		*		*		*
	Magnesium aluminum phosphide	4.3	UN1419	I	4.3, 6.1	A19, N34, N40, W32	None	211	242	Forbidden	15 kg	E	13, 40, 52, 85, 148
	*		*		*		*		*		*		*
	Magnesium diamide	4.2	UN2004	II	4.2	A8, A19, A20, IB6, T3, TP33, W31	None	212	241	15 kg	50 kg	C	13, 148
	*		*		*		*		*		*		*
	Magnesium granules, coated, particle size not less than 149 microns	4.3	UN2950	III	4.3	A1, A19, IB8, IP4, T1, TP33, W100	151	213	240	25 kg	100 kg	A	13, 52, 148
	Magnesium hydride	4.3	UN2010	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148

	Magnesium or Magnesium alloys with more than 50 percent magnesium in pellets, turnings or ribbons	4.1	UN1869	III	4.1	A1, B134, IB8, IP21, T1, TP33, W100	151	213	240	25 kg	100 kg	A	13, 39, 52, 53, 74, 101, 147, 148
	*		*		*		*		*		*		*
	Magnesium peroxide	5.1	UN1476	II	5.1	IB6, IP2, T3, TP33, W100	152	212	242	5 kg	25 kg	C	13, 52, 66, 75, 148
	Magnesium phosphide	4.3	UN2011	I	4.3, 6.1	A19, N40, W32	None	211	None	Forbidden	15 kg	E	13, 40, 52, 85, 148
	Magnesium, powder or Magnesium alloys, powder	4.3	UN1418	I	4.3, 4.2	A19, B56, W32	None	211	244	Forbidden	15 kg	A	13, 39, 52, 148
				II	4.3, 4.2	A19, B56, IB5, IP2, T3, TP33, W31, W40	None	212	241	15 kg	50 kg	A	13, 39, 52, 148
				III	4.3, 4.2	A19, B56, IB8, IP4, T1, TP33, W31	None	213	241	25 kg	100 kg	A	13, 39, 52, 148
	*		*		*		*		*		*		*
	Magnesium silicide	4.3	UN2624	II	4.3	A19, A20, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	B	13, 85, 103, 148
	*		*		*		*		*		*		*
	Maneb or Maneb preparations with not less than 60 percent maneb	4.2	UN2210	III	4.2, 4.3	57, A1, A19, IB6, T1, TP33, W100	None	213	242	25 kg	100 kg	A	13, 34, 148
	Maneb stabilized or Maneb preparations, stabilized against self-heating	4.3	UN2968	III	4.3	54, A1, A19, IB8, IP4, T1, TP33, W100	151	213	242	25 kg	100 kg	B	13, 34, 52, 148
	*		*		*		*		*		*		*
+	Mercuric potassium cyanide	6.1	UN1626	I	6.1	IB7, IP1, N74, N75, T6, TP33, W31	None	211	242	5 kg	50 kg	A	52
	*		*		*		*		*		*		*
G	Metal catalyst, dry	4.2	UN2881	I	4.2	N34, T21, TP7, TP33, W31	None	187	None	Forbidden	Forbidden	C	13, 147, 148
				II	4.2	IB6, IP2, N34, T3, TP33, W31	None	187	242	Forbidden	50 kg	C	13, 147, 148
				III	4.2	B135, IB8, IP21, N34, T1, TP33, W31	None	187	241	25 kg	100 kg	C	13, 147, 148
G	Metal catalyst, wetted with a visible excess of liquid	4.2	UN1378	II	4.2	A2, A8, IB1, N34, T3, TP33, W31, W40	None	212	None	Forbidden	50 kg	C	
	Metal hydrides, flammable, n.o.s.	4.1	UN3182	II	4.1	A1, IB4, T3, TP33, W31, W40	151	212	240	15 kg	50 kg	E	

				III	4.1	A1, IB4, T1, TP33, W31	151	213	240	25 kg	100 kg	E	
	Metal hydrides, water reactive, n.o.s	4.3	UN1409	I	4.3	A19, N34, N40, W32	None	211	242	Forbidden	15 kg	D	13, 52, 148
				II	4.3	A19, IB4, N34, N40, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	D	13, 52, 148
	Metal powder, self-heating, n.o.s	4.2	UN3189	II	4.2	IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	C	13, 148
				III	4.2	B135, IB8, IP4, T1, TP33, W31	None	213	241	25 kg	100 kg	C	13, 148
	Metal powders, flammable, n.o.s	4.1	UN3089	II	4.1	IB8, IP2, IP4, T3, TP33, W100	151	212	240	15 kg	50 kg	B	13, 74, 147, 148
				III	4.1	IB8, IP2, IP4, T1, TP33, W100	151	213	240	25 kg	100 kg	B	13, 74, 147, 148
	*		*		*		*		*		*		*
G	Metal salts of organic compounds, flammable, n.o.s.	4.1	UN3181	II	4.1	A1, IB8, IP2, IP4, T3, TP33, W31	151	212	240	15 kg	50 kg	B	40
				III	4.1	A1, IB8, IP3, T1, TP33, W31	151	213	240	25 kg	100 kg	B	40
	*		*		*		*		*		*		*
G	Metallic substance, water-reactive, n.o.s	4.3	UN3208	I	4.3	A7, IB4, W32	None	211	242	Forbidden	15 kg	E	13, 40, 148
				II	4.3	A7, IB7, IP2, IP21, T3, TP33, W31	151	212	242	15 kg	50 kg	E	13, 40, 148
				III	4.3	A7, IB8, IP21, T1, TP33, W31, W40	151	213	241	25 kg	100 kg	E	13, 40, 148
G	Metallic substance, water-reactive, self-heating, n.o.s	4.3	UN3209	I	4.3, 4.2	A7, W32	None	211	242	Forbidden	15 kg	E	13, 40, 148
				II	4.3, 4.2	A7, IB5, IP2, T3, TP33, W32, W40	None	212	242	15 kg	50 kg	E	13, 40, 148
				III	4.3, 4.2	A7, IB8, IP4, T1, TP33, W32	None	213	242	25 kg	100 kg	E	13, 40, 148
	Methacrylaldehyde, stabilized	3	UN2396	II	3, 6.1	45, 387, IB2, T7, TP1, TP13	150	202	243	1 L	60 L	D	25, 40
	Methacrylic acid, stabilized	8	UN2531	II	8	41, 387, IB2, T7, TP1, TP18, TP30	154	202	242	1 L	30 L	C	25, 40
+	Methacrylonitrile, stabilized	6.1	UN3079	I	6.1, 3	2, 387, B9, B14, B32, T20, TP2, TP13, TP38, TP45	None	227	244	Forbidden	Forbidden	D	12, 25, 40

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	Methyl acetylene and propadiene mixtures, stabilized	2.1	UN1060		2.1	387, N88, T50	306	304	314, 315	Forbidden	150 kg	B	25, 40
	Methyl acrylate, stabilized	3	UN1919	II	3	387, IB2, T4, TP1, TP13	150	202	242	5 L	60 L	C	25
	*		*		*		*		*		*		*
	Methyl isopropenyl ketone, stabilized	3	UN1246	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25
	*		*		*		*		*		*		*
	Methyl methacrylate monomer, stabilized	3	UN1247	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25, 40
	*		*		*		*		*		*		*
	Methyl vinyl ketone, stabilized	6.1	UN1251	I	6.1, 3, 8	1, 387, B9, B14, B30, T22, TP2, TP13, TP38, TP44	None	226	244	Forbidden	Forbidden	B	21, 25, 40, 100
	*		*		*		*		*		*		*
	N-Methylaniline	6.1	UN2294	III	6.1	IB3, T4, TP2	153	203	241	60 L	220 L	A	
	*		*		*		*		*		*		*
	Methylcyclohexane	3	UN2296	II	3	B1, IB2, T4, TP2	150	202	242	5 L	60 L	B	
	*		*		*		*		*		*		*
	Methyldichlorosilane	4.3	UN1242	I	4.3, 8, 3	A2, A3, A7, B6, B77, N34, T14, TP2, TP7, TP13, W31	None	201	243	Forbidden	1 L	D	21, 40, 49, 100
	Nitric acid other than red fuming, with more than 20 percent and less than 65 percent nitric acid	8	UN2031	II	8	A6, A212, B2, B47, B53, IB2, IP15, T8, TP2	None	158	242	Forbidden	30 L	D	44, 66, 74, 89, 90
	*		*		*		*		*		*		*
	Nitrocellulose, with not more than 12.6 percent nitrogen, by dry mass mixture with or without plasticizer, with or without pigment	4.1	UN2557	II	4.1	44, W31	151	212	240	1 kg	15 kg	D	28, 36
	*		*		*		*		*		*		*

	Nitrocellulose with alcohol with not less than 25 percent alcohol by mass, and with not more than 12.6 percent nitrogen, by dry mass	4.1	UN2556	II	4.1	W31	151	212	None	1 kg	15 kg	D	28, 36
	Nitrocellulose with water with not less than 25 percent water by mass	4.1	UN2555	II	4.1	W31	151	212	None	15 kg	50 kg	E	28, 36
	*		*		*		*		*		*		*
	Nitroguanidine, wetted or Picrite, wetted with not less than 20 percent water, by mass	4.1	UN1336	I	4.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	4-Nitrophenylhydrazine, with not less than 30 percent water, by mass	4.1	UN3376	I	4.1	162, A8, A19, A20, N41, W31	None	211	None	Forbidden	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Nitrostarch, wetted with not less than 20 percent water, by mass	4.1	UN1337	I	4.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	D	28, 36
	*		*		*		*		*		*		*
	Nonanes	3	UN1920	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Octanes	3	UN1262	II	3	IB2, T4, TP2	150	202	242	5 L	60 L	B	
	*		*		*		*		*		*		*
G	Organometallic substance, liquid, water-reactive	4.3	UN3398	I	4.3	T13, TP2, TP7, TP36, TP47, W31	None	201	244	Forbidden	1 L	D	13, 40, 52, 148
				II	4.3	IB1, IP2, T7, TP2, TP7, TP36, TP47, W31	None	202	243	1 L	5 L	D	13, 40, 52, 148
				III	4.3	IB2, IP4, T7, TP2, TP7, TP36, TP47, W31	None	203	242	5 L	60 L	E	13, 40, 52, 148
G	Organometallic substance, liquid, water-reactive, flammable	4.3	UN3399	I	4.3, 3	T13, TP2, TP7, TP36, TP47, W31	None	201	244	Forbidden	1 L	D	13, 40, 52, 148
				II	4.3, 3	IB1, IP2, T7, TP2, TP7, TP36, TP47, W31	None	202	243	1 L	5 L	D	13, 40, 52, 148

				III	4.3, 3	IB2, IP4, T7, TP2, TP7, TP36, TP47, W31	None	203	242	5 L	60 L	E	13, 40, 52, 148
	*		*		*		*		*		*		*
G	Organometallic substance, solid, water-reactive	4.3	UN3395	I	4.3	N40, T9, TP7, TP33, TP36, TP47, W31	None	211	242	Forbidden	15 kg	E	13, 40, 52, 148
				II	4.3	IB4, T3, TP33, TP36, TP47, W31	151	212	242	15 kg	50 kg	E	13, 40, 52, 148
				III	4.3	IB6, T1, TP33, TP36, TP47, W31	151	213	241	25 kg	100 kg	E	13, 40, 52, 148
G	Organometallic substance, solid, water-reactive, flammable	4.3	UN3396	I	4.3, 4.1	N40, T9, TP7, TP33, TP36, TP47, W31	None	211	242	Forbidden	15 kg	E	13, 40, 52, 148
				II	4.3, 4.1	IB4, T3, TP33, TP36, TP47, W31	151	212	242	15 kg	50 kg	E	13, 40, 52, 148
				III	4.3, 4.1	IB6, T1, TP33, TP36, TP47, W31	151	213	241	25 kg	100 kg	E	13, 40, 52, 148
G	Organometallic substance, solid, water-reactive, self-heating	4.3	UN3397	I	4.3, 4.2	N40, T9, TP7, TP33, TP36, TP47, W31	None	211	242	Forbidden	15 kg	E	13, 40, 52, 148
				II	4.3, 4.2	IB4, T3, TP33, TP36, TP47, W31	None	212	242	15 kg	50 kg	E	13, 40, 52, 148
				III	4.3, 4.2	IB6, T1, TP33, TP36, TP47, W31	None	213	241	25 kg	100 kg	E	13, 40, 52, 148
	*		*		*		*		*		*		*
	Osmium tetroxide	6.1	UN2471	I	6.1	A8, IB7, IP1, N33, N34, T6, TP33, W31	None	211	242	5 kg	50 kg	B	40
	*		*		*		*		*		*		*
	Paper, unsaturated oil treated incompletely dried (including carbon paper)	4.2	UN1379	III	4.2	IB8, IP3, W31	None	213	241	Forbidden	Forbidden	A	
	*		*		*		*		*		*		*
	Peroxides, inorganic, n.o.s	5.1	UN1483	II	5.1	A7, A20, IB6, IP2, N34, T3, TP33, W100	None	212	242	5 kg	25 kg	C	13, 52, 66, 75, 148
				III	5.1	A7, A20, B134, IB8, IP21, N34, T1, TP33, W100	152	213	240	25 kg	100 kg	C	13, 52, 66, 75, 148
	*		*		*		*		*		*		*

	9-Phosphabicyclononanes or Cyclooctadiene phosphines	4.2	UN2940	II	4.2	A19, IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	A	
	*		*		*		*		*		*		*
	Phosphorus heptasulfide, free from yellow or white phosphorus	4.1	UN1339	II	4.1	A20, IB4, N34, T3, TP33, W31	None	212	240	15 kg	50 kg	B	13, 74, 147, 148
	*		*		*		*		*		*		*
	Phosphorus pentasulfide, free from yellow or white phosphorus	4.3	UN1340	II	4.3, 4.1	A20, B59, IB4, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	B	13, 74, 148
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	Phosphorus sesquisulfide, free from yellow or white phosphorus	4.1	UN1341	II	4.1	A20, IB4, N34, T3, TP33, W31	None	212	240	15 kg	50 kg	B	74
	*		*		*		*		*		*		*
	Phosphorus trisulfide, free from yellow or white phosphorus	4.1	UN1343	II	4.1	A20, IB4, N34, T3, TP33, W31	None	212	240	15 kg	50 kg	B	13, 74, 147, 148
	Phosphorus, white dry or Phosphorus, white, under water or Phosphorus white, in solution or Phosphorus, yellow dry or Phosphorus, yellow, under water or Phosphorus, yellow, in solution	4.2	UN1381	I	4.2, 6.1	B9, B26, N34, T9, TP3, TP31, W31	None	188	243	Forbidden	Forbidden	E	
	*		*		*		*		*		*		*
	Pine oil	3	UN1272	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	alpha-Pinene	3	UN2368	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Polyhalogenated biphenyls, liquid or Halogenated monomethyldiphenyl-methanes, liquid or Polyhalogenated terphenyls, liquid	9	UN3151	II	9	IB2	155	204	241	100 L	220 L	A	95
	Polyhalogenated biphenyls, solid or Halogenated monomethyldiphenyl-methanes, solid or Polyhalogenated terphenyls, solid	9	UN3152	II	9	IB8, IP2, IP4, T3, TP33	155	204	241	100 kg	200 kg	A	95
	*		*		*		*		*		*		*

	Potassium	4.3	UN2257	I	4.3	A7, A19, A20, B27, IB4, IP1, N6, N34, T9, TP7, TP33, W32	151	211	244	Forbidden	15 kg	D	13, 52, 148
	*		*		*		*		*		*		*
	Potassium borohydride	4.3	UN1870	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Potassium cyanide, solid	6.1	UN1680	I	6.1	B69, B77, IB7, IP1, N74, N75, T6, TP33, W31	None	211	242	5 kg	50 kg	B	52
	*		*		*		*		*		*		*
	Potassium cyanide solution	6.1	UN3413	I	6.1	B69, B77, N74, N75, T14, TP2, TP13, W31	None	201	243	1 L	30 L	B	52
				II	6.1	B69, B77, IB2, N74, N75, T11, TP2, TP13, TP27, W31	153	202	243	5 L	60 L	B	52
				III	6.1	B69, B77, IB3, N74, N75, T7, TP2, TP13, TP28, W31	153	203	241	60 L	220 L	A	52
	*		*		*		*		*		*		*
	Potassium dithionite <u>or</u> Potassium hydrosulfite	4.2	UN1929	II	4.2	A8, A19, A20, IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	E	13
	*		*		*		*		*		*		*
	Potassium, metal alloys, liquid	4.3	UN1420	I	4.3	A7, A19, A20, B27, W31	None	201	244	Forbidden	1 L	E	13, 40, 52, 148
	Potassium, metal alloys, solid	4.3	UN3403	I	4.3	A19, A20, B27, IB4, IP1, T9, TP7, TP33, W32	None	211	244	Forbidden	15 kg	D	13, 52, 148
	*		*		*		*		*		*		*
	Potassium phosphide	4.3	UN2012	I	4.3, 6.1	A19, N40, W32	None	211	None	Forbidden	15 kg	E	13, 40, 52, 85, 148
	*		*		*		*		*		*		*
	Potassium sodium alloys, liquid	4.3	UN1422	I	4.3	A7, A19, B27, N34, N40, T9, TP3, TP7, TP31, W31	None	201	244	Forbidden	1 L	E	13, 40, 52, 148
	Potassium sodium alloys, solid	4.3	UN3404	I	4.3	A19, B27, N34, N40, T9, TP7, TP33, W32	None	211	244	Forbidden	15 kg	D	13, 52, 148

	Potassium sulfide, anhydrous <u>or</u> Potassium sulfide <u>with less than 30 percent water of crystallization</u>	4.2	UN1382	II	4.2	A19, A20, B16, IB6, IP2, N34, T3, TP33, W31, W40	None	212	241	15 kg	50 kg	A	52
	*		*		*		*		*		*		*
	Potassium superoxide	5.1	UN2466	I	5.1	A20, IB6, IP1	None	211	None	Forbidden	15 kg	D	13, 52, 66, 75, 148
	*		*		*		*		*		*		*
	Propadiene, stabilized	2.1	UN2200		2.1	387	None	304	314, 315	Forbidden	150 kg	B	25, 40
	*		*		*		*		*		*		*
	Propellant, solid	1.4C	UN0501	II	1.4C		None	62	None	Forbidden	75 kg	2	25
	*		*		*		*		*		*		*
	Propylene tetramer	3	UN2850	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Propyleneimine, stabilized	3	UN1921	I	3, 6.1	387, A3, N34, T14, TP2, TP13	None	201	243	1 L	30 L	D	25, 40
	*		*		*		*		*		*		*
G	Pyrophoric liquids, organic, n.o.s	4.2	UN2845	I	4.2	B11, T22, TP2, TP7, W31	None	187	244	Forbidden	Forbidden	D	13, 78, 148
G	Pyrophoric metals, n.o.s., <u>or</u> Pyrophoric alloys, n.o.s	4.2	UN1383	I	4.2	B11, T21, TP7, TP33, W31	None	187	242	Forbidden	Forbidden	D	13, 148
G	Pyrophoric solid, inorganic, n.o.s	4.2	UN3200	I	4.2	T21, TP7, TP33, W31	None	187	242	Forbidden	Forbidden	D	13, 148
G	Pyrophoric solids, organic, n.o.s	4.2	UN2846	I	4.2	W31	None	187	242	Forbidden	Forbidden	D	13, 148
	*		*		*		*		*		*		*
	Radioactive material, low specific activity (LSA-III) <u>non fissile or fissile excepted</u>	7	UN3322		7	A56, T5, TP4, W7	421, 422, 428	427	427			A	95, 150
	*		*		*		*		*		*		*
	Radioactive material, uranium hexafluoride <u>non fissile or fissile-excepted</u>	7	UN2978		7, 6.1, 8		423	420, 427	420, 427			B	40, 95, 132

	Radioactive material, uranium hexafluoride, fissile	7	UN2977		7, 6.1, 8		453	417, 420	417, 420			B	40, 95, 132
	*		*		*		*		*		*		*
	Rubidium	4.3	UN1423	I	4.3	22, A7, A19, IB4, IP1, N34, N40, N45, W32	None	211	242	Forbidden	15 kg	D	13, 52, 148
	*		*		*		*		*		*		*
G	Self-heating liquid, corrosive, inorganic, n.o.s.	4.2	UN3188	II	4.2, 8	IB2, W31	None	202	243	1 L	5 L	C	
				III	4.2, 8	IB2, W31	None	203	241	5 L	60 L	C	
G	Self-heating liquid, corrosive, organic, n.o.s.	4.2	UN3185	II	4.2, 8	IB2, W31	None	202	243	1 L	5 L	C	
				III	4.2, 8	IB2, W31	None	203	241	5 L	60 L	C	
G	Self-heating liquid, inorganic, n.o.s.	4.2	UN3186	II	4.2	IB2, W31	None	202	242	1 L	5 L	C	
				III	4.2	IB2, W31	None	203	241	5 L	60 L	C	
G	Self-heating liquid, organic, n.o.s.	4.2	UN3183	II	4.2	IB2, W31	None	202	242	1 L	5 L	C	
				III	4.2	IB2, W31	None	203	241	5 L	60 L	C	
G	Self-heating liquid, toxic, inorganic, n.o.s.	4.2	UN3187	II	4.2, 6.1	IB2, W31	None	202	243	1 L	5 L	C	
				III	4.2, 6.1	IB2, W31	None	203	241	5 L	60 L	C	
G	Self-heating liquid, toxic, organic, n.o.s.	4.2	UN3184	II	4.2, 6.1	IB2, W31	None	202	243	1 L	5 L	C	
				III	4.2, 6.1	IB2, W31	None	203	241	5 L	60 L	C	
	*		*		*		*		*		*		*
G	Self-heating solid, inorganic, n.o.s.	4.2	UN3190	II	4.2	IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	C	
				III	4.2	IB8, IP3, T1, TP33, W31	None	213	241	25 kg	100 kg	C	
G	Self-heating solid, organic, n.o.s	4.2	UN3088	II	4.2	IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	C	

				III	4.2	B116, B130, IB8, IP3, T1, TP33, W31	None	213	241	25 kg	100 kg	C	
	*		*		*		*		*		*		*
	Silver picrate, wetted with not less than 30 percent water, by mass	4.1	UN1347	I	4.1	23, W31	None	211	None	Forbidden	Forbidden	D	28, 36
	*		*		*		*		*		*		*
	Sodium	4.3	UN1428	I	4.3	A7, A8, A19, A20, B9, B48, B68, IB4, IP1, N34, T9, TP7, TP33, TP46, W32	151	211	244	Forbidden	15 kg	D	13, 52, 148
	*		*		*		*		*		*		*
	Sodium aluminum hydride	4.3	UN2835	II	4.3	A8, A19, A20, IB4, T3, TP33, W31, W40	151	212	242	Forbidden	50 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Sodium borohydride	4.3	UN1426	I	4.3	N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Sodium cyanide, solid	6.1	UN1689	I	6.1	B69, B77, IB7, N74, N75, T6, TP33, W31	None	211	242	5 kg	50 kg	B	52
	Sodium cyanide solution	6.1	UN3414	I	6.1	B69, B77, N74, N75, T14, TP2, TP13, W31	None	201	243	1 L	30 L	B	52
				II	6.1	B69, B77, IB2, N74, N75, T11, TP2, TP13, TP27, W31	153	202	243	5 L	60 L	B	52
				III	6.1	B69, B77, IB3, N74, N75, T7, TP2, TP13, TP28, W31	153	203	241	60 L	220 L	A	52
	*		*		*		*		*		*		*
	Sodium dinitro-o-cresolate, wetted with not less than 10% water, by mass	4.1	UN3369	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	Sodium dinitro-o-cresolate, wetted with not less than 15 percent water, by mass	4.1	UN1348	I	4.1, 6.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	Sodium dithionite or Sodium hydrosulfite	4.2	UN1384	II	4.2	A19, A20, IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	E	13
	*		*		*		*		*		*		*

	Sodium hydride	4.3	UN1427	I	4.3	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 52, 148
	*		*		*		*		*		*		*
	Sodium hydrosulfide, with less than 25 percent water of crystallization	4.2	UN2318	II	4.2	A7, A19, A20, IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	A	52
	*		*		*		*		*		*		*
	Sodium methylate	4.2	UN1431	II	4.2, 8	A7, A19, IB5, IP2, T3, TP33, W31	None	212	242	15 kg	50 kg	B	
	*		*		*		*		*		*		*
	Sodium phosphide	4.3	UN1432	I	4.3, 6.1	A19, N40, W32	None	211	None	Forbidden	15 kg	E	13, 40, 52, 85, 148
	*		*		*		*		*		*		*
	Sodium picramate, wetted with not less than 20 percent water, by mass	4.1	UN1349	I	4.1	23, A8, A19, N41, W31	None	211	None	Forbidden	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Sodium sulfide, anhydrous or Sodium sulfide with less than 30 percent water of crystallization	4.2	UN1385	II	4.2	A19, A20, IB6, IP2, N34, T3, TP33, W31, W40	None	212	241	15 kg	50 kg	A	52
	*		*		*		*		*		*		*
	Stannic phosphide	4.3	UN1433	I	4.3, 6.1	A19, N40, W32	None	211	242	Forbidden	15 kg	E	13, 40, 52, 85, 148
	*		*		*		*		*		*		*
	Strontium peroxide	5.1	UN1509	II	5.1	IB6, IP2, T3, TP33, W100	152	212	242	5 kg	25 kg	C	13, 52, 66, 75, 148
	Strontium phosphide	4.3	UN2013	I	4.3, 6.1	A19, N40, W32	None	211	None	Forbidden	15 kg	E	13, 40, 52, 85, 148
	*		*		*		*		*		*		*
	Styrene monomer, stabilized	3	UN2055	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25
	*		*		*		*		*		*		*
+	Sulfur trioxide, stabilized	8	UN1829	I	8, 6.1	2, 387, B9, B14, B32, B49, B77, N34, T20, TP4, TP13, TP25, TP26, TP38, TP45	None	227	244	Forbidden	Forbidden	A	25, 40

	*		*		*		*		*		*		*
G	Tear gas substances, liquid, n.o.s.	6.1	UN1693	I	6.1	W31	None	201	None	Forbidden	Forbidden	D	40
				II	6.1	IB2, W31	None	202	None	Forbidden	5 L	D	40
G	Tear gas substance, solid, n.o.s.	6.1	UN3448	I	6.1	T6, TP33, W31	None	211	242	Forbidden	Forbidden	D	40
				II	6.1	IB8, IP2, IP4, T3, TP33, W31	None	212	242	Forbidden	25 kg	D	40
	*		*		*		*		*		*		*
	Tetrafluoroethylene, stabilized	2.1	UN1081		2.1	387	306	304	None	Forbidden	150 kg	E	25, 40
	*		*		*		*		*		*		*
	4-Thiapentanal	6.1	UN2785	III	6.1	IB3, T4, TP1, W31	153	203	241	60 L	220 L	D	25, 49
	*		*		*		*		*		*		*
	Thiourea dioxide	4.2	UN3341	II	4.2	IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	D	
				III	4.2	IB8, IP3, T1, TP33, W31	None	213	241	25 kg	100 kg	D	
	*		*		*		*		*		*		*
	Titanium disulphide	4.2	UN3174	III	4.2	IB8, IP3, T1, TP33, W31	None	213	241	25 kg	100 kg	A	
	Titanium hydride	4.1	UN1871	II	4.1	A19, A20, IB4, N34, T3, TP33, W31, W40	None	212	241	15 kg	50 kg	E	
	Titanium powder, dry	4.2	UN2546	I	4.2	W31	None	211	242	Forbidden	Forbidden	D	13, 148
				II	4.2	A19, A20, IB6, IP2, N5, N34, T3, TP33, W31	None	212	241	15 kg	50 kg	D	13, 148
				III	4.2	B135, IB8, IP21, T1, TP33, W31	None	213	241	25 kg	100 kg	D	13, 148
	Titanium powder, wetted with not less than 25 percent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840	4.1	UN1352	II	4.1	A19, A20, IB6, IP2, N34, T3, TP33, W31, W40	None	212	240	15 kg	50 kg	E	74

	microns												
	Titanium sponge granules or Titanium sponge powders	4.1	UN2878	III	4.1	A1, B134, IB8, IP21, T1, TP33, W100	None	213	240	25 kg	100 kg	D	13, 74, 147, 148
	*		*		*		*		*		*		*
	Titanium trichloride, pyrophoric or Titanium trichloride mixtures, pyrophoric	4.2	UN2441	I	4.2, 8	N34, W31	None	181	244	Forbidden	Forbidden	D	13, 40, 148
	*		*		*		*		*		*		*
G	Toxic by inhalation liquid, water-reactive, flammable, n.o.s. with an LC50 lower than or equal to 200 ml/m3 and saturated vapor concentration greater than or equal to 500 LC50	6.1	UN3490	I	6.1, 4.3, 3	1, B9, B14, B30, T22, TP2, TP13, TP27, TP38, TP44	None	226	244	Forbidden	Forbidden	D	13, 21, 40, 49, 148
	*		*		*		*		*		*		*
G	Toxic solids, water-reactive, n.o.s	6.1	UN3125	I	6.1, 4.3	A5, T6, TP33, W100	None	211	242	5 kg	15 kg	D	13, 40, 148
	*		*		*		*		*		*		*
	Trichlorosilane	4.3	UN1295	I	4.3, 3, 8	N34, T14, TP2, TP7, TP13, W31	None	201	244	Forbidden	Forbidden	D	21, 40, 49, 100
	*		*		*		*		*		*		*
	Trifluorochloroethylene, stabilized or Refrigerant gas R 1113	2.3	UN1082		2.3, 2.1	3, 387, B14, T50	None	304	314, 315	Forbidden	Forbidden	D	25, 40
	*		*		*		*		*		*		*
	1,3,5-Trimethylbenzene	3	UN2325	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Trinitrobenzene, wetted, with not less than 10% water, by mass	4.1	UN3367	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	Trinitrobenzene, wetted with not less than 30 percent water, by mass	4.1	UN1354	I	4.1	23, A2, A8, A19, N41, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	*		*		*		*		*		*		*

	Trinitrobenzoic acid, wetted with not less than 10% water by mass	4.1	UN3368	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	Trinitrobenzoic acid, wetted with not less than 30 percent water, by mass	4.1	UN1355	I	4.1	23, A2, A8, A19, N41, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	*		*		*		*		*		*		*
	Trinitrochlorobenzene (picryl chloride), wetted, with not less than 10% water by mass	4.1	UN3365	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	*		*		*		*		*		*		*
	Trinitrophenol (picric acid), wetted, with not less than 10 percent water by mass	4.1	UN3364	I	4.1	23, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	*		*		*		*		*		*		*
	Trinitrophenol, wetted with not less than 30 percent water, by mass	4.1	UN1344	I	4.1	162, A8, A19, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Trinitrotoluene (TNT), wetted, with not less than 10 percent water by mass	4.1	UN3366	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	Trinitrotoluene, wetted or TNT, wetted, with not less than 30 percent water by mass	4.1	UN1356	I	4.1	23, A2, A8, A19, N41, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	*		*		*		*		*		*		*
	Tripropylene	3	UN2057	II	3	IB2, T4, TP2	150	202	242	5 L	60 L	B	
				III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Turpentine	3	UN1299	III	3	B1, IB3, T2, TP2	150	203	242	60 L	220 L	A	
	*		*		*		*		*		*		*
	Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted	6.1	UN3507	I	6.1, 7, 8	369	420	None	None	Less than .1 kg	Less than .1 kg	A	132
	*		*		*		*		*		*		*

	Urea nitrate, wetted, with not less than 10 percent water by mass	4.1	UN3370	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36
	Urea nitrate, wetted with not less than 20 percent water, by mass	4.1	UN1357	I	4.1	23, 39, A8, A19, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Vinyl acetate, stabilized	3	UN1301	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25
	Vinyl bromide, stabilized	2.1	UN1085		2.1	387, N86, T50	306	304	314, 315	Forbidden	150 kg	B	25, 40
	Vinyl butyrate, stabilized	3	UN2838	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25
	Vinyl chloride, stabilized	2.1	UN1086		2.1	21, 387, B44, N86, T50	306	304	314, 315	Forbidden	150 kg	B	25, 40
	Vinyl ethyl ether, stabilized	3	UN1302	I	3	387, A3, T11, TP2	None	201	243	1 L	30 L	D	25
	Vinyl fluoride, stabilized	2.1	UN1860		2.1	387, N86	306	304	314, 315	Forbidden	150 kg	E	25, 40
	Vinyl isobutyl ether, stabilized	3	UN1304	II	3	387, IB2, T4, TP1	150	202	242	5 L	60 L	C	25
	Vinyl methyl ether, stabilized	2.1	UN1087		2.1	387, B44, T50	306	304	314, 315	Forbidden	150 kg	B	25, 40
	*		*		*		*		*		*		*
	Vinylidene chloride, stabilized	3	UN1303	I	3	387, T12, TP2, TP7	150	201	243	1 L	30 L	D	25, 40
	Vinylpyridines, stabilized	6.1	UN3073	II	6.1, 3, 8	387, IB1, T7, TP2, TP13	153	202	243	1 L	30 L	B	21, 25, 40, 52, 100
	Vinyltoluenes, stabilized	3	UN2618	III	3	387, B1, IB3, T2, TP1	150	203	242	60 L	220 L	C	25
	*		*		*		*		*		*		*
G	Water-reactive liquid, n.o.s	4.3	UN3148	I	4.3	T13, TP2, TP7, TP41, W31	None	201	244	Forbidden	1 L	E	13, 40, 148
				II	4.3	IB1, T7, TP2, TP7, W31	None	202	243	1 L	5 L	E	13, 40, 148
				III	4.3	IB2, T7, TP2, TP7, W31	None	203	242	5 L	60 L	E	13, 40, 148
	*		*		*		*		*		*		*
G	Water-reactive solid, corrosive, n.o.s	4.3	UN3131	I	4.3, 8	IB4, IP1, N40, T9, TP7, TP33, W31	None	211	242	Forbidden	15 kg	D	13, 148

				II	4.3, 8	IB6, IP2, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	E	13, 85, 148
				III	4.3, 8	IB8, IP4, T1, TP33, W31	151	213	241	25 kg	100 kg	E	13, 85, 148
G	Water-reactive solid, flammable, n.o.s	4.3	UN3132	I	4.3, 4.1	IB4, N40, W31	None	211	242	Forbidden	15 kg	D	13, 148
				II	4.3, 4.1	IB4, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	E	13, 148
				III	4.3, 4.1	IB6, T1, TP33, W31	151	213	241	25 kg	100 kg	E	13, 148
G	Water-reactive solid, n.o.s	4.3	UN2813	I	4.3	IB4, N40, T9, TP7, TP33, W32	None	211	242	Forbidden	15 kg	E	13, 40, 148
				II	4.3	B132, IB7, IP2, IP21, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	E	13, 40, 148
				III	4.3	B132, IB8, IP21, T1, TP33, W31	151	213	241	25 kg	100 kg	E	13, 40, 148
	*		*		*		*		*		*		*
G	Water-reactive solid, self-heating, n.o.s	4.3	UN3135	I	4.3, 4.2	N40, W31	None	211	242	Forbidden	15 kg	E	13, 148
				II	4.3, 4.2	IB5, IP2, T3, TP33, W31, W40	None	212	242	15 kg	50 kg	E	13, 148
				III	4.3, 4.2	IB8, IP4, T1, TP33, W31	None	213	241	25 kg	100 kg	E	13, 148
G	Water-reactive solid, toxic, n.o.s	4.3	UN3134	I	4.3, 6.1	A8, IB4, IP1, N40, W31	None	211	242	Forbidden	15 kg	D	13, 148
				II	4.3, 6.1	IB5, IP2, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	E	13, 85, 148
				III	4.3, 6.1	IB8, IP4, T1, TP33, W31	151	213	241	25 kg	100 kg	E	13, 85, 148
	*		*		*		*		*		*		*
	Xanthates	4.2	UN3342	II	4.2	IB6, IP2, T3, TP33, W31	None	212	241	15 kg	50 kg	D	40
				III	4.2	IB8, IP3, T1, TP33, W31	None	213	241	25 kg	100 kg	D	40
	*		*		*		*		*		*		*
	Xylyl bromide, liquid	6.1	UN1701	II	6.1	A3, A6, A7, IB2, N33, T7, TP2, TP13, W31	None	340	None	Forbidden	60 L	D	40

	*		*		*		*		*		*		*
	Zinc ashes	4.3	UN1435	III	4.3	A1, A19, IB8, IP4, T1, TP33, W100	151	213	241	25 kg	100 kg	A	13, 148
	*		*		*		*		*		*		*
	Zinc chloride, solution	8	UN1840	III	8	IB3, T4, TP2	154	203	241	5 L	60 L	A	
	*		*		*		*		*		*		*
	Zinc peroxide	5.1	UN1516	II	5.1	IB6, IP2, T3, TP33, W100	152	212	242	5 kg	25 kg	C	13, 52, 66, 75, 148
	Zinc phosphide	4.3	UN1714	I	4.3, 6.1	A19, N40, W32	None	211	None	Forbidden	15 kg	E	13, 40, 52, 85, 148
	Zinc powder or Zinc dust	4.3	UN1436	I	4.3, 4.2	A19, IB4, IP1, N40, W31	None	211	242	Forbidden	15 kg	A	13, 52, 53, 148
				II	4.3, 4.2	A19, IB7, IP2, T3, TP33, W31, W40	None	212	242	15 kg	50 kg	A	13, 52, 53, 148
				III	4.3, 4.2	IB8, IP4, T1, TP33, W31	None	213	242	25 kg	100 kg	A	13, 52, 53, 148
	*		*		*		*		*		*		*
	Zirconium hydride	4.1	UN1437	II	4.1	A19, A20, IB4, N34, T3, TP33, W31, W40	None	212	240	15 kg	50 kg	E	
	*		*		*		*		*		*		*
	Zirconium, dry, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)	4.1	UN2858	III	4.1	A1, W100	151	213	240	25 kg	100 kg	A	13, 147, 148
	Zirconium, dry, finished sheets, strip or coiled wire	4.2	UN2009	III	4.2	A1, A19, W31	None	213	240	25 kg	100 kg	D	13, 148
	*		*		*		*		*		*		*
	Zirconium picramate, wetted with not less than 20 percent water, by mass	4.1	UN1517	I	4.1	23, N41, W31	None	211	None	1 kg	15 kg	D	28, 36
	Zirconium powder, dry	4.2	UN2008	I	4.2	T21, TP7, TP33, W31	None	211	242	Forbidden	Forbidden	D	13, 148
				II	4.2	A19, A20, IB6, IP2, N5, N34, T3, TP33, W31	None	212	241	15 kg	50 kg	D	13, 148
				III	4.2	B135, IB8, IP4, T1, TP33, W31	None	213	241	25 kg	100 kg	D	13, 148

	Zirconium powder, wetted with not less than 25 percent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns	4.1	UN1358	II	4.1	A19, A20, IB6, IP2, N34, T3, TP33, W31, W40	None	212	241	15 kg		E	13, 74, 147, 148	
	Zirconium scrap	4.2	UN1932	III	4.2	B135, IB8, IP21, N34, T1, TP33, W31	None	213	240	Forbidden	50 kg	D		13, 148

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Appendix B to § 172.101—List of Marine Pollutants.

* * * * *

LIST OF MARINE POLLUTANTS

S. M. P. (1)	Marine pollutant (2)
* * * * *	
	Hypochlorite solutions
* * * * *	
	Isoprene, stabilized
* * * * *	
	N-Methylaniline
* * * * *	
	Methylcyclohexane
* * * * *	
	Tripropylene
* * * * *	

■ 13. In § 172.102:
■ a. In paragraph (c)(1):
■ i. Revise special provisions 40, 134, and 135;
■ ii. Add special provisions 157, 181, and 182 in numerical order;
■ iii. Revise special provisions 238 and 369; and
■ iv. Add special provisions, 379, 387, 420, 421 and 422 in numerical order.
■ b. In paragraph (c)(2), special provisions A210 and A212 are added in numerical order.
■ c. In paragraph (c)(3), special provisions B134 and B135 are added in numerical order.
■ d. In paragraph (c)(4), Table 2—IP Codes is revised.
■ e. In paragraph (c)(5), special provision N90 is revised and N92 is added in numerical order.
■ f. In paragraph (c)(9), special provisions W31, W32, W40, and W100 are added in numerical order.

The additions and revisions read as follows:

§ 172.102 Special Provisions.

* * * * *

(c) * * *

(1) * * *

40 Polyester resin kits consist of two components: A base material (either Class 3 or Division 4.1, Packing Group II or III) and an activator (organic peroxide), each separately packed in an inner packaging. The organic peroxide must be type D, E, or F, not requiring temperature control. The components may be placed in the same outer packaging provided they will not interact dangerously in the event of leakage. The Packing Group assigned will be II or III, according to the classification criteria for either Class 3 or Division 4.1, as appropriate, applied to the base material. Additionally, unless otherwise excepted in this subchapter, polyester resin kits must be packaged in specification combination packagings based on the performance level of the base material contained within the kit.

* * * * *

134 This entry only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries that are transported with these batteries installed.

a. For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are electrically-powered cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with an electric motor) and other vehicles of this type (*e.g.* self-balancing vehicles or vehicles not equipped with at least one seating position), lawn tractors, self-propelled farming and construction equipment, boats, aircraft, wheelchairs and other mobility aids. This includes vehicles transported in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.

b. Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be consigned under the entries ''Lithium metal batteries contained in equipment'' or ''Lithium metal batteries packed with equipment'' or ''Lithium ion batteries contained in equipment'' or ''Lithium ion batteries packed with equipment'' as appropriate.

c. Self-propelled vehicles or equipment that also contain an internal combustion engine must be consigned under the entries ''Engine, internal combustion, flammable gas powered'' or ''Engine, internal combustion, flammable liquid powered'' or ''Vehicle, flammable gas powered'' or ''Vehicle, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and batteries. Additionally, self-propelled vehicles or equipment that contain a fuel cell engine must be consigned under the entries ''Engine, fuel cell, flammable gas powered'' or ''Engine, fuel cell, flammable liquid powered'' or ''Vehicle, fuel cell, flammable gas

powered'' or ''Vehicle, fuel cell, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by a fuel cell engine, an internal combustion engine, and batteries.

135 Internal combustion engines installed in a vehicle must be consigned under the entries ''Vehicle, flammable gas powered'' or ''Vehicle, flammable liquid powered,'' as appropriate. If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be consigned under the entry ''Vehicle, flammable gas powered.'' These entries include hybrid electric vehicles powered by both an internal combustion engine and wet, sodium or lithium batteries installed. If a fuel cell engine is installed in a vehicle, the vehicle must be consigned using the entries ''Vehicle, fuel cell, flammable gas powered'' or ''Vehicle, fuel cell, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by a fuel cell, an internal combustion engine, and wet, sodium or lithium batteries installed. For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, trucks, locomotives, scooters, three- and four-wheeled vehicles or motorcycles, lawn tractors, self-propelled farming and construction equipment, boats and aircraft.

* * * * *

157 When transported as a limited quantity or a consumer commodity, the maximum net capacity specified in § 173.151(b)(1)(i) of this subchapter for inner packagings may be increased to 5 kg (11 pounds).

* * * * *

181 When a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment, the following requirements apply:

a. The shipper must ensure that all applicable requirements of § 173.185 of this subchapter are met. The total mass of lithium batteries contained in any package must not exceed the quantity limits in columns (9A) and (9B) for passenger aircraft or cargo aircraft, as applicable;

b. Except as provided in § 173.185(c)(3) of this subchapter, the package must be marked ''UN 3091 Lithium metal batteries packed with equipment'', or ''UN 3481 Lithium ion batteries packed with equipment,'' as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, the package must be marked as required for both battery types. However, button cell batteries installed in equipment (including circuit boards) need not be considered; and

c. The shipping paper must indicate ''UN 3091 Lithium metal batteries packed with equipment'' or ''UN 3481 Lithium ion batteries packed with equipment,'' as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, then the shipping paper must indicate both ''UN 3091 Lithium metal batteries packed with equipment'' and ''UN 3481 Lithium ion batteries packed with equipment.''

182 Equipment containing only lithium batteries must be classified as either UN 3091 or UN 3481.

* * * * *

238 Neutron radiation detectors: a. Neutron radiation detectors containing non-pressurized boron trifluoride gas in excess of 1 gram (0.035 ounces) and radiation detection systems containing such neutron radiation detectors as components may be transported by highway, rail, vessel, or cargo aircraft in accordance with the following:

a. Each radiation detector must meet the following conditions:

(1) The pressure in each neutron radiation detector must not exceed 105 kPa absolute at 20 °C (68 °F);

(2) The amount of gas must not exceed 13 grams (0.45 ounces) per detector; and

(3) Each neutron radiation detector must be of welded metal construction with brazed metal to ceramic feed through assemblies. These detectors must have a minimum burst pressure of 1800 kPa as demonstrated by design type qualification testing; and

(4) Each detector must be tested to a 1×10^{-10} cm^3/s leaktightness standard before filling.

b. Radiation detectors transported as individual components must be transported as follows:

(1) They must be packed in a sealed intermediate plastic liner with sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents.

(2) They must be packed in strong outer packagings and the completed package must be capable of withstanding a 1.8 meter (5.9 feet) drop without leakage of gas contents from detectors.

(3) The total amount of gas from all detectors per outer packaging must not exceed 52 grams (1.83 ounces).

c. Completed neutron radiation detection systems containing detectors meeting the conditions of paragraph a(1) of this special provision must be transported as follows:

(1) The detectors must be contained in a strong sealed outer casing;

(2) The casing must contain include sufficient absorbent or adsorbent material to absorb or adsorb the entire gas contents;

(3) The completed system must be packed in strong outer packagings capable of withstanding a 1.8 meter (5.9 feet) drop test without leakage unless a system's outer casing affords equivalent protection.

d. Except for transportation by aircraft, neutron radiation detectors and radiation detection systems containing such detectors transported in accordance with paragraph a. of this special provision are not subject to the labeling and placarding requirements of part 172 of this subchapter.

e. When transported by highway, rail, vessel, or as cargo on an aircraft, neutron radiation detectors containing not more than 1 gram of boron trifluoride, including those with solder glass joints are not subject to any other requirements of this subchapter provided they meet the requirements in paragraph a(1) of this special provision and are packed in accordance with paragraph a(2) of this special provision. Radiation detection systems containing such detectors are not subject to any other requirements of this subchapter provided they are packed in accordance with paragraph a(3) of this special provision.

* * * * *

369 In accordance with § 173.2a of this subchapter, this radioactive material in an excepted package possessing corrosive properties is classified in Division 6.1 with a radioactive material and corrosive subsidiary risk. Uranium hexafluoride may be classified under this entry only if the conditions of §§ 173.420(a)(4) and (6) and (d) and 173.421(b) and (d) of this subchapter, and, for fissile-excepted material, the conditions of § 173.453 of this subchapter are met. In addition to the provisions applicable to the transport of Division 6.1 substances, the provisions of §§ 173.421(c) and 173.443(a) of this subchapter apply. In addition, packages shall be legibly and durably marked with an identification of the consignor, the consignee, or both. No Class 7 label is required to be displayed. The consignor shall be in possession of a copy of each applicable certificate when packages include fissile material excepted by competent authority approval. When a consignment is undeliverable, the

consignment shall be placed in a safe location and the appropriate competent authority shall be informed as soon as possible and a request made for instructions on further action. If it is evident that a package of radioactive material, or conveyance carrying unpackaged radioactive material, is leaking, or if it is suspected that the package, or conveyance carrying unpackaged material, may have leaked, the requirements of § 173.443(e) of this subchapter apply.

* * * * *

379 When offered for transport by highway, rail, or cargo vessel, anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems is not subject to the requirements of this subchapter if the following conditions in this provision are met. In addition to meeting the conditions in this provision, transport on cargo aircraft only may be authorized with prior approval of the Associate Administrator.

a. The adsorption or absorption presents the following properties:

(1) The pressure at a temperature of 20 °C (68 °F) in the receptacle is less than 0.6 bar (60 kPa);

(2) The pressure at a temperature of 35 °C (95 °F) in the receptacle is less than 1 bar (100 kPa);

(3) The pressure at a temperature of 85 °C (185 °F) in the receptacle is less than 12 bar (1200 kPa).

b. The adsorbent or absorbent material shall not meet the definition or criteria for inclusion in Classes 1 to 8;

c. The maximum contents of a receptacle shall be 10 kg of ammonia; and

d. Receptacles containing adsorbed or absorbed ammonia shall meet the following conditions:

(1) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114–1:2012 (IBR, see § 171.7 of this subchapter);

(2) Receptacles and their means of closure shall be hermetically sealed and able to contain the generated ammonia;

(3) Each receptacle shall be able to withstand the pressure generated at 85 °C (185 °F) with a volumetric expansion no greater than 0.1%;

(4) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar (1500 kPa) without violent rupture, explosion or projection; and

(5) Each receptacle shall be able to withstand a pressure of 20 bar (2000 kPa) without leakage when the pressure relief device is deactivated.

e. When offered for transport in an ammonia dispenser, the receptacles shall be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single receptacle.

f. The properties of mechanical strength mentioned in this special provision shall be tested using a prototype of a receptacle and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

g. The test results shall be documented, shall be traceable, and shall be made available to a representative of the Department upon request.

* * * * *

387 When materials are stabilized by temperature control, the provisions of § 173.21(f) of this subchapter apply. When chemical stabilization is employed, the person offering the material for transport shall ensure that the level of stabilization is sufficient to prevent the material as packaged from dangerous polymerization at 50 °C (122 °F). If chemical stabilization becomes ineffective at lower temperatures within the anticipated duration of transport, temperature control is required and is forbidden by aircraft. In making this determination factors to be taken into consideration include, but are not limited to, the capacity and geometry of the packaging and the effect of any insulation present, the temperature of the material when offered for transport, the duration of the journey, and the ambient temperature conditions typically encountered in the journey (considering also the season of year), the effectiveness and other properties of the stabilizer employed, applicable operational controls imposed by regulation (*e.g.* requirements to protect from sources of heat, including other cargo carried at a temperature above ambient) and any other relevant factors. The provisions of this special provision will be effective until January 2, 2019, unless we terminate them earlier or extend them beyond that date by notice of a final rule in the **Federal Register**.

420 This entry does not apply to manufactured articles (such as table tennis balls).

421 This entry will no longer be effective on January 2, 2019 unless we terminate it earlier or extend it beyond that date by notice of a final rule in the **Federal Register**.

422 When labelling is required, the label to be used must be the label shown in § 172.447. Labels conforming to requirements in place on December 31, 2016 may continue to be used until December 31, 2018. When a placard is displayed, the placard must be the placard shown in § 172.560.

(2) * * *

A210 This substance is forbidden for transport by air. It may be transported on cargo aircraft only with the prior approval of the Associate Administrator.

A212 ''UN 2031, Nitric acid, *other than red fuming, with more than 20% and less than 65% nitric acid*'' intended for use in sterilization devices only, may be transported on passenger aircraft irrespective of the indication of ''forbidden'' in columns (9A) of the § 172.101 table provided that:

a. Each inner packaging contains not more than 30 mL;

b. Each inner packaging is contained in a sealed leak-proof intermediate packaging with sufficient absorbent material capable of containing the contents of the inner packaging;

c. Intermediate packagings are securely packed in an outer packaging of a type permitted by § 173.158(g) of this subchapter which meet the requirements of part 178 of this subchapter at the Packing Group I performance level;

d. The maximum quantity of nitric acid in the package does not exceed 300 mL; and

e. Transport in accordance with this special provision must be noted on the shipping paper.

(3) * * *

B134 For Large Packagings offered for transport by vessel, flexible or fibre inner packagings shall be sift-proof and water-resistant or shall be fitted with a sift-proof and water-resistant liner.

B135 For Large Packagings offered for transport by vessel, flexible or fibre inner packagings shall be hermetically sealed.

(4) * * *

TABLE 2—IP CODES

IP code	
IP1	IBCs must be packed in closed freight containers or a closed transport vehicle.
IP2	When IBCs other than metal or rigid plastics IBCs are used, they must be offered for transportation in a closed freight container or a closed transport vehicle.
IP3	Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.
IP4	Flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.
IP5	IBCs must have a device to allow venting. The inlet to the venting device must be located in the vapor space of the IBC under maximum filling conditions.
IP6	Non-specification bulk bins are authorized.
IP7	For UN identification numbers 1327, 1363, 1364, 1365, 1386, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC performance tests specified in part 178, subpart N, of this subchapter.
IP8	Ammonia solutions may be transported in rigid or composite plastic IBCs (31H1, 31H2 and 31HZ1) that have successfully passed, without leakage or permanent deformation, the hydrostatic test specified in § 178.814 of this subchapter at a test pressure that is not less than 1.5 times the vapor pressure of the contents at 55 °C (131 °F).
IP13	Transportation by vessel in IBCs is prohibited.
IP14	Air must be eliminated from the vapor space by nitrogen or other means.
IP15	For UN2031 with more than 55% nitric acid, rigid plastic IBCs and composite IBCs with a rigid plastic inner receptacle are authorized for two years from the date of IBC manufacture.
IP16	IBCs of type 31A and 31N are only authorized if approved by the Associate Administrator.
IP19	For UN identification numbers 3531, 3532, 3533, and 3534, IBCs must be designed and constructed to permit the release of gas or vapor to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.
IP20	Dry sodium cyanide or potassium cyanide is also permitted in siftproof, water-resistant, fiberboard IBCs when transported in closed freight containers or transport vehicles.
IP21	When transported by vessel, flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.

* * * * *

(5) * * *

N90 Metal packagings are not authorized. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in part 178 of this subchapter, are not considered metal packagings. Packagings of other material constructed with a small amount of metal must be designed such that the hazardous material does not contact the metal.

* * * * *

N92 Notwithstanding the provisions of § 173.24(g) of this subchapter, packagings shall be designed and constructed to permit the release of gas or vapor to prevent a build-up of pressure that could rupture the packagings in the event of loss of stabilization.

* * * * *

(9) * * *

W31 Non-bulk packagings must be hermetically sealed.

W32 Non-bulk packagings shall be hermetically sealed, except for solid fused material.

W40 Non-bulk bags are not allowed.

* * * * *

W100 Non-bulk flexible, fibreboard or wooden packagings must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.

■ 14. Section 172.202(a)(6)(viii) is added to read as follows:

§ 172.202 Description of hazardous material on shipping papers.

(a) * * *

(6) * * *

(viii) For authorized consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages.

* * * * *

■ 15. In § 172.407, paragraphs (c)(1)(i) and (iii) are revised to read as follows:

§ 172.407 Label specifications.

* * * * *

(c) * * *

(1) * * *

(i) If the size of the package so requires, the dimensions of the label and its features may be reduced proportionally provided the symbol and other elements of the label remain clearly visible.

* * * * *

(iii) *Transitional exception.* For domestic transportation, a label in conformance with the requirements of 49 CFR 172.407(c)(1) (revised as of October 1, 2014), may continue to be used until December 31, 2018.

* * * * *

■ 16. Section 172.447 is added to read as follows:

§ 172.447 LITHIUM BATTERY label.

(a) Except for size and color, the LITHIUM BATTERY label must be as follows:

BILLING CODE 4910–60–P

BILLING CODE 4910–60–C

(b) In addition to complying with § 172.407, the background on the LITHIUM BATTERY label must be white with seven black vertical stripes on the top half. The black vertical stripes must be spaced, so that, visually, they appear equal in width to the six white spaces between them. The lower half of the label must be white with the symbol (battery group, one broken and emitting flame) and class number ''9'' underlined and centered at the bottom in black.

(c) Labels conforming to requirements in place on December 31, 2016 may continue to be used until December 31, 2018.

■ 17. In § 172.505, paragraph (b) is revised to read as follows:

§ 172.505 Placarding for subsidiary hazards.

* * * * *

(b) In addition to the RADIOACTIVE placard which may be required by § 172.504(e), each transport vehicle, portable tank or freight container that contains 454 kg (1,001 pounds) or more gross weight of non-fissile, fissile-excepted, or fissile uranium hexafluoride must be placarded with a CORROSIVE placard and a POISON placard on each side and each end.

* * * * *

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

■ 18. The authority citation for part 173 continues to read as follows:

Authority: 49 U.S.C. 5101–5128, 44701; 49 CFR 1.81, 1.96 and 1.97.

■ 19. In § 173.4a, paragraph (e)(3) is revised to read as follows:

§ 173.4a Excepted quantities.

* * * * *

(e) * * *

(3) Each inner packaging must be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of transport, it cannot break, be punctured or leak its contents. The completed package as prepared for transport must completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid hazardous materials, the intermediate or outer packaging must contain sufficient absorbent material that:

(i) Will absorb the entire contents of the inner packaging.

(ii) Will not react dangerously with the material or reduce the integrity or function of the packaging materials.

(iii) When placed in the intermediate packaging, the absorbent material may be the cushioning material.

* * * * *

■ 20. In § 173.9, paragraph (e) is revised to read as follows:

§ 173.9 Transport vehicles or freight containers containing lading which has been fumigated.

* * * * *

(e) *FUMIGANT marking.* (1) The FUMIGANT marking must consist of black letters on a white background that is a rectangle at least 400 mm (15.75 inches) wide and at least 300 mm (11.8 inches) high as measured to the outside of the lines forming the border of the marking. The minimum width of the line forming the border must be 2 mm and the text on the marking must not be less than 25 mm high. Except for size and color, the FUMIGANT marking must be as shown in the following figure. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

(i) The marking, and all required information, must be capable of withstanding, without deterioration or a substantial reduction in effectiveness, a 30-day exposure to open weather conditions.

(ii) [Reserved]

BILLING CODE 4910–60–P

BILLING CODE 4910–60–C

(2) The ''*'' shall be replaced with the technical name of the fumigant.

* * * * *

■ 21. In § 173.21, paragraphs (f) introductory text and (f)(1) are revised to read as follows:

§ 173.21 Forbidden materials and packages.

* * * * *

(f) A package containing a material which is likely to decompose with a self-accelerated decomposition temperature (SADT) or polymerize with a self-accelerated polymerization temperature (SAPT) of 50 °C (122 °F) or less, with an evolution of a dangerous quantity of heat or gas when decomposing or polymerizing, unless the material is stabilized or inhibited in a manner to preclude such evolution. The SADT and SAPT may be determined by any of the test methods described in Part II of the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter).

(1) A package meeting the criteria of paragraph (f) of this section may be required to be shipped under controlled temperature conditions. The control temperature and emergency temperature for a package shall be as specified in the table in this paragraph (f)(1) based upon the SADT or SAPT of the material. The control temperature is the temperature above which a package of the material may not be offered for transportation or transported. The emergency temperature is the temperature at which, due to imminent danger, emergency measures must be initiated.

§ 173.21 TABLE—DERIVATION OF CONTROL AND EMERGENCY TEMPERATURE

SADT/SAPT [1]	Control temperatures	Emergency temperature
SADT/SAPT ≤20 °C (68 °F)	20 °C (36 °F) below SADT/SAPT	10 °C (18 °F) below SADT/SAPT.
20 °C (68 °F) SADT/SAPT ≤35 °C (95 °F)	15 °C (27 °F) below SADT/SAPT	10 °C (18 °F) below SADT/SAPT.
35 °C (95 °F) SADT/SAPT ≤50 °C (122 °F)	10 °C (18 °F) below SADT/SAPT	5 °C (9 °F) below SADT/SAPT.

§ 173.21 TABLE—DERIVATION OF CONTROL AND EMERGENCY TEMPERATURE—Continued

SADT/SAPT [1]	Control temperatures	Emergency temperature
50 °C (122 °F) SADT/SAPT	([2])	([2])

[1] Self-accelerating decomposition temperature or Self-accelerating polymerization temperature.
[2] Temperature control not required.

(i) The provisions concerning polymerizing substances in paragraph (f) will be effective until January 2, 2019.

(ii) [Reserved]

* * * * *

■ 22. Effective January 2, 2019, in § 173.21, paragraphs (f) introductory text and (f)(1) are revised to read as follows:

§ 173.21 Forbidden materials and packages.

* * * * *

(f) A package containing a material which is likely to decompose with a self-accelerated decomposition temperature (SADT) of 50 °C (122 °F) or less, or polymerize at a temperature of 54 °C (130 °F) or less with an evolution of a dangerous quantity of heat or gas when decomposing or polymerizing, unless the material is stabilized or inhibited in a manner to preclude such evolution. The SADT may be determined by any of the test methods described in Part II of the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter).

(1) A package meeting the criteria of paragraph (f) of this section may be required to be shipped under controlled temperature conditions. The control temperature and emergency temperature for a package shall be as specified in the table in this paragraph based upon the SADT of the material. The control temperature is the temperature above which a package of the material may not be offered for transportation or transported. The emergency temperature is the temperature at which, due to imminent danger, emergency measures must be initiated.

§ 173.21 TABLE—METHOD OF DETERMINING CONTROL AND EMERGENCY TEMPERATURE

SADT [1]	Control temperatures	Emergency temperature
SADT ≤20 °C (68 °F)	20 °C (36 °F) below SADT	10 °C (18 °F) below SADT.
20 °C (68 °F) SADT ≤35 °C (95 °F)	15 °C (27 °F) below SADT	10 °C (18 °F) below SADT.
35 °C (95 °F) SADT ≤50 °C (122 °F)	10 °C (18 °F) below SADT	5 °C (9 °F) below SADT.
50 °C (122 °F) SADT	([2])	([2])

[1] Self-accelerating decomposition temperature.
[2] Temperature control not required.

* * * * *

■ 23. In § 173.40, paragraph (a)(1) is revised to read as follows:

§ 173.40 General packaging requirements for toxic materials packaged in cylinders.

* * * * *

(a) * * *

(1) A cylinder must conform to a DOT specification or UN standard prescribed in subpart C of part 178 of this subchapter, or a TC, CTC, CRC, or BTC cylinder authorized in § 171.12 of this subchapter, except that acetylene cylinders and non-refillable cylinders are not authorized. The use of UN tubes and MEGCs is prohibited for Hazard Zone A materials.

* * * * *

■ 24. In § 173.50, paragraph (b)(6) is revised to read as follows:

§ 173.50 Class 1—Definitions.

* * * * *

(b) * * *

(6) *Division 1.6* [2] consists of extremely insensitive articles that do not have a mass explosion hazard. This division is comprised of articles which predominately contain extremely insensitive substances and that demonstrate a negligible probability of accidental initiation or propagation.

[2] The risk from articles of Division 1.6 is limited to the explosion of a single article.

■ 25. In § 173.52, in paragraph (b), in Table 1, remove the entry ''Articles containing only extremely insensitive substances'' and add the entry ''Articles predominantly containing extremely insensitive substances'' in its place to read as follows:

§ 173.52 Classification codes and compatibility groups of explosives.

(b) * * *

TABLE 1—CLASSIFICATION CODES

Description of substances or article to be classified	Compatibility group	Classification code
* * * * *	*	*
Articles predominantly containing extremely insensitive substances	N	1.6N
* * * * *	*	*

* * * * *

■ 26. In § 173.62:

■ a. In paragraph (b), in the Explosives Table, the entry for UN0510 is added after UN0509; and

■ b. In paragraph (c), in the Table of Packing Methods, Packing Instructions 112(c), 114(b), 130, and 137 are revised.

The addition and revisions read as follows:

§ 173.62 Specific packaging requirements for explosives.

* * * * *

(b) * * *

EXPLOSIVES TABLE

ID #	PI
* * * * *	
UN0510	130

EXPLOSIVES TABLE—Continued

ID #	PI
* * * * *	

(c) * * *

TABLE OF PACKING METHODS

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
* *	* *	* *	* *
112(c) This packing instruction applies to solid dry powders.	Bags	Bags	Boxes.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:			
1. For UN 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings must be lead free.	paper, multiwall, water resistant plastics, woven plastics, Receptacles, fiberboard, metal, plastics, wood.	paper, multiwall, water resistant with inner lining, plastics, Receptacles, metal, plastics, wood.	steel (4A). aluminum (4B). other metal (4N). natural wood, ordinary (4C1). natural wood, sift proof (4C2). plywood (4D). reconstituted wood (4F). fiberboard (4G). plastics, solid (4H2). Drums. plastics (1H1 or 1H2). steel (1A1 or 1A2). aluminum (1B1 or 1B2). other metal (1N1 or 1N2). plywood (1D). fiber (1G).
2. For UN0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state. Bags must not exceed a maximum net mass of 30 kg.			
3. Inner packagings are not required if drums are used as the outer packaging.			
4. At least one of the packagings must be sift-proof.			
5. For UN 0504, metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in part 178 of this subchapter, are not considered metal packagings.			
* *	* *	* *	* *
114(b)	Bags	Not necessary	Boxes.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:			
1. For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings must be lead free.	paper, kraft, plastics, textile, sift-proof, woven plastics, sift-proof, Receptacles, fiberboard, metal, paper, plastics, wood, plastics, sift-proof.		natural wood, ordinary (4C1). natural wood, sift-proof walls (4C2). plywood (4D). reconstituted wood (4F). fiberboard (4G). Drums. steel (1A1 or 1A2). aluminum (1B1 or 1B2). other metal (1N1 or 1N2). plywood (1D). fiber (1G). plastics (1H1 or 1H2).
2. For UN0160 and UN0161, when metal drums (1A2, 1B2 or 1N2) are used as the outer packaging, metal packagings must be so constructed that the risk of explosion, by reason of increased internal pressure from internal or external causes, is prevented.			
3. For UN0160, UN0161, and UN0508, inner packagings are not necessary if drums are used as the outer packaging.			
4. For UN0508 and UN0509, metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in part 178 of this subchapter, are not considered metal packagings.			
* *	* *	* *	* *
130	Not necessary	Not necessary	Boxes.
Particular Packaging Requirements:			

TABLE OF PACKING METHODS—Continued

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
1. The following applies to UN 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0238, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0459, 0488, 0502 and 0510. Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems must be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices. 2. Subject to approval by the Associate Administrator, large explosive articles, as part of their operational safety and suitability tests, subjected to testing that meets the intentions of Test Series 4 of the UN Manual of Tests and Criteria with successful test results, may be offered for transportation in accordance with the requirements of this subchapter.	.....	.....	Steel (4A). Aluminum (4B). Other metal (4N). Wood natural, ordinary (4C1). Wood natural, sift-proof walls 4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics, expanded (4H1). Plastics, solid (4H2). Drums. Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2). Large Packagings. Steel (50A). Aluminum (50B). Metal other than steel or aluminum (50N). Rigid lastics (50H). Natural wood (50C). Plywood (50D). Reconstituted wood (50F). Rigid fiberboard (50G).
* *	* *	* *	* *
137	Bags	Not necessary	Boxes.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked with orientation markings meeting the requirements of § 172.312(a)(2) of this subchapter. When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.	plastics, Boxes, fiberboard, wood, Tubes, fiberboard, metal, plastics, Dividing partitions in the outer packagings.	.....	steel (4A). aluminum (4B). other metal (4N). wood, natural, ordinary (4C1). wood, natural, sift proof walls (4C2). plastics, solid (4H2). plywood (4D). reconstituted wood (4F). fiberboard (4G). Drums. steel (1A1 or 1A2).aluminum (1B1 or 1B2). other metal (1N1 or 1N2). plywood (1D). fiber (1G). plastics (1H1 or 1H2).
* *	* *	* *	* *

■ 27. In § 173.121, paragraph (b)(1)(iv) is revised to read as follows:

§ 173.121 Class 3—Assignment of packing group.

* * * * *

(b) * * *

(1) * * *

(iv) The viscosity [1] and flash point are in accordance with the following table:

Kinematic viscosity (extrapolated) ν (at near-zero shear rate) mm2/s at 23 °C (73.4 °F)	Flow-time t in seconds	Jet diameter in mm	Flash point c.c.
20 < ν ≤ 80	20 < t ≤ 60	4	above 17 °C (62.6 °F).
80 < ν ≤ 135	60 < t ≤ 100	4	above 10 °C (50 °F).
135 < ν ≤ 220	20 < t ≤ 32	6	above 5 °C (41 °F).
220 < ν ≤ 300	32 < t ≤ 44	6	above −1 °C (31.2 °F).
300 < ν ≤ 700	44 < t ≤ 100	6	above −5 °C (23 °F).
700 < ν	100 < t	6	No limit.

[1] *Viscosity determination:* Where the substance concerned is non-Newtonian, or where a flow-cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer shall be used to determine the dynamic viscosity coefficient of the substance, at 23 °C (73.4 °F), at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.

* * * * *

■ 28. Section 173.124 is revised to read as follows:

§ 173.124 Class 4, Divisions 4.1, 4.2 and 4.3—Definitions.

(a) *Division 4.1 (Flammable Solid).* For the purposes of this subchapter, *flammable solid* (Division 4.1) means any of the following four types of materials:

(1) Desensitized explosives that—

(i) When dry are Explosives of Class 1 other than those of compatibility group A, which are wetted with sufficient water, alcohol, or plasticizer to suppress explosive properties; and

(ii) Are specifically authorized by name either in the Hazardous Materials Table in § 172.101 of this subchapter or have been assigned a shipping name and hazard class by the Associate Administrator under the provisions of—

(A) A special permit issued under subchapter A of this chapter; or

(B) An approval issued under § 173.56(i).

(2)(i) Self-reactive materials that are thermally unstable and can undergo an exothermic decomposition even without participation of oxygen (air). A material is excluded from this definition if any of the following applies:

(A) The material meets the definition of an explosive as prescribed in subpart C of this part, in which case it must be classed as an explosive;

(B) The material is forbidden from being offered for transportation according to § 172.101 of this subchapter or § 173.21;

(C) The material meets the definition of an oxidizer or organic peroxide as prescribed in this subpart, in which case it must be so classed;

(D) The material meets one of the following conditions:

(*1*) Its heat of decomposition is less than 300 J/g; or

(*2*) Its self-accelerating decomposition temperature (SADT) is greater than 75 °C (167 °F) for a 50 kg package; or

(*3*) It is an oxidizing substance in Division 5.1 containing less than 5.0% combustible organic substances; or

(E) The Associate Administrator has determined that the material does not present a hazard which is associated with a Division 4.1 material.

(ii) *Generic types.* Division 4.1 self-reactive materials are assigned to a generic system consisting of seven types. A self-reactive substance identified by technical name in the Self-Reactive Materials Table in § 173.224 is assigned to a generic type in accordance with that table. Self-reactive materials not identified in the Self-Reactive Materials Table in § 173.224 are assigned to generic types under the procedures of paragraph (a)(2)(iii) of this section.

(A) *Type A.* Self-reactive material type A is a self-reactive material which, as packaged for transportation, can detonate or deflagrate rapidly. Transportation of type A self-reactive material is forbidden.

(B) *Type B.* Self-reactive material type B is a self-reactive material which, as packaged for transportation, neither detonates nor deflagrates rapidly, but is liable to undergo a thermal explosion in a package.

(C) *Type C.* Self-reactive material type C is a self-reactive material which, as packaged for transportation, neither detonates nor deflagrates rapidly and cannot undergo a thermal explosion.

(D) *Type D.* Self-reactive material type D is a self-reactive material which—

(*1*) Detonates partially, does not deflagrate rapidly and shows no violent effect when heated under confinement;

(*2*) Does not detonate at all, deflagrates slowly and shows no violent effect when heated under confinement; or

(*3*) Does not detonate or deflagrate at all and shows a medium effect when heated under confinement.

(E) *Type E.* Self-reactive material type E is a self-reactive material which, in laboratory testing, neither detonates nor deflagrates at all and shows only a low or no effect when heated under confinement.

(F) *Type F.* Self-reactive material type F is a self-reactive material which, in laboratory testing, neither detonates in the cavitated state nor deflagrates at all and shows only a low or no effect when heated under confinement as well as low or no explosive power.

(G) *Type G.* Self-reactive material type G is a self-reactive material which, in laboratory testing, does not detonate in the cavitated state, will not deflagrate at all, shows no effect when heated under confinement, nor shows any explosive power. A type G self-reactive material is not subject to the requirements of this subchapter for self-reactive material of Division 4.1 provided that it is thermally stable (self-accelerating decomposition temperature is 50 °C (122 °F) or higher for a 50 kg (110 pounds) package). A self-reactive material meeting all characteristics of type G except thermal stability is classed as a type F self-reactive, temperature control material.

(iii) *Procedures for assigning a self-reactive material to a generic type.* A self-reactive material must be assigned to a generic type based on—

(A) Its physical state (*i.e.* liquid or solid), in accordance with the definition of liquid and solid in § 171.8 of this subchapter;

(B) A determination as to its control temperature and emergency temperature, if any, under the provisions of § 173.21(f);

(C) Performance of the self-reactive material under the test procedures specified in the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter) and the provisions of paragraph (a)(2)(iii) of this section; and

(D) Except for a self-reactive material which is identified by technical name in the Self-Reactive Materials Table in § 173.224(b) or a self-reactive material which may be shipped as a sample under the provisions of § 173.224, the self-reactive material is approved in writing by the Associate Administrator. The person requesting approval shall submit to the Associate Administrator the tentative shipping description and generic type and—

(*1*) All relevant data concerning physical state, temperature controls, and tests results; or

(*2*) An approval issued for the self-reactive material by the competent authority of a foreign government.

(iv) *Tests.* The generic type for a self-reactive material must be determined using the testing protocol from Figure 20.1 (a) and (b) (Flow Chart Scheme for Self-Reactive Substances and Organic Peroxides) from the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter).

(3) Readily combustible solids are materials that—

(i) Are solids which may cause a fire through friction, such as matches;

(ii) Show a burning rate faster than 2.2 mm (0.087 inches) per second when tested in accordance with the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter); or

(iii) Any metal powders that can be ignited and react over the whole length of a sample in 10 minutes or less, when tested in accordance with the UN Manual of Tests and Criteria.

(4) Polymerizing materials are materials which, without stabilization, are liable to undergo an exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in transport. Such materials are considered to be polymerizing substances of Division 4.1 when:

(i) Their self-accelerating polymerization temperature (SAPT) is 75 °C (167 °F) or less under the conditions (with or without chemical stabilization) as offered for transport in the packaging, IBC or portable tank in which the material or mixture is to be

transported. An appropriate IBC or portable tank for a polymerizing material must be determined using the heating under confinement testing protocol from boxes 7, 8, 9, and 13 of Figure 20.1 (a) and (b) (Flow Chart Scheme for Self-Reactive Substances and Organic Peroxides) from the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter) by successfully passing the UN Test Series E at the ''None'' or ''Low'' level, or by an equivalent test method with the approval of the Associate Administrator;

(ii) They exhibit a heat of reaction of more than 300 J/g; and

(iii) Do not meet the definition of hazard classes 1–8 (including combustible liquids).

(iv) The provisions concerning polymerizing substances in paragraph (a)(4) will be effective until January 2, 2019.

(b) *Division 4.2 (Spontaneously Combustible Material).* For the purposes of this subchapter, *spontaneously combustible material* (Division 4.2) means—

(1) *A pyrophoric material.* A pyrophoric material is a liquid or solid that, even in small quantities and without an external ignition source, can ignite within five (5) minutes after coming in contact with air when tested according to UN Manual of Tests and Criteria.

(2) *Self-heating material.* A self-heating material is a material that through a process where the gradual reaction of that substance with oxygen (in air) generates heat. If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion. A material of this type which exhibits spontaneous ignition or if the temperature of the sample exceeds 200 °C (392 °F) during the 24-hour test period when tested in accordance with UN Manual of Tests and Criteria (IBR; *see* § 171.7 of this subchapter), is classed as a Division 4.2 material.

(c) *Division 4.3 (Dangerous when wet material).* For the purposes of this chapter, *dangerous when wet material* (Division 4.3) means a material that, by contact with water, is liable to become spontaneously flammable or to give off flammable or toxic gas at a rate greater than 1 L per kilogram of the material, per hour, when tested in accordance with UN Manual of Tests and Criteria.

■ 29. Section 173.165 is revised to read as follows:

§ 173.165 Polyester resin kits.

(a) *General requirements.* Polyester resin kits consisting of a base material component (Class 3, Packing Group II or III) or (Division 4.1, Packing Group II or III) and an activator component (Type D, E, or F organic peroxide that does not require temperature control)—

(1) The organic peroxide component must be packed in inner packagings not over 125 mL (4.22 fluid ounces) net capacity each for liquids or 500 g (17.64 ounces) net capacity each for solids.

(2) Except for transportation by aircraft, the flammable liquid component must be packaged in suitable inner packagings.

(i) For transportation by aircraft, a Class 3 Packing Group II base material is limited to a quantity of 5 L (1.3 gallons) in metal or plastic inner packagings and 1 L (0.3 gallons) in glass inner packagings. A Class 3 Packing Group III base material is limited to a quantity of 10 L (2.6 gallons) in metal or plastic inner packagings and 2.5 L (0.66 gallons) in glass inner packagings.

(ii) For transportation by aircraft, a Division 4.1 Packing Group II base material is limited to a quantity of 5 kg (11 pounds) in metal or plastic inner packagings and 1 kg (2.2 pounds) in glass inner packagings. A Division 4.1 Packing Group III base material is limited to a quantity of 10 kg (22 lbs) in metal or plastic inner packagings and 2.5 kg (5.5 pounds) in glass inner packagings.

(3) If the flammable liquid or solid component and the organic peroxide component will not interact dangerously in the event of leakage, they may be packed in the same outer packaging.

(4) The Packing Group assigned will be II or III, according to the criteria for Class 3, or Division 4.1, as appropriate, applied to the base material. Additionally, polyester resin kits must be packaged in specification combination packagings, based on the performance level required of the base material (II or III) contained within the kit, as prescribed in § 173.202, 173.203, 173.212, or 173.213, as appropriate.

(5) For transportation by aircraft, the following additional requirements apply:

(i) Closures on inner packagings containing liquids must be secured by secondary means;

(ii) Inner packagings containing liquids must be capable of meeting the pressure differential requirements prescribed in § 173.27(c); and

(iii) The total quantity of activator and base material may not exceed 5 kg (11 lbs) per package for a Packing Group II base material. The total quantity of activator and base material may not exceed 10 kg (22 lbs) per package for a Packing Group III base material. The total quantity of polyester resin kits per package is calculated on a one-to-one basis (*i.e.,* 1 L equals 1 kg).

(b) *Small and excepted quantities.* Polyester resin kits are eligible for the Small Quantity exceptions in § 173.4 and the Excepted Quantity exceptions in § 173.4a, as applicable.

(c) *Limited quantities.* Limited quantity packages of polyester resin kits are excepted from labeling requirements, unless the material is offered for transportation or transported by aircraft, and are excepted from the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph (c). For transportation by aircraft, only hazardous material authorized aboard passenger-carrying aircraft may be transported as a limited quantity. A limited quantity package that conforms to the provisions of this section is not subject to the shipping paper requirements of subpart C of part 172 of this subchapter, unless the material meets the definition of a hazardous substance, hazardous waste, marine pollutant, or is offered for transportation and transported by aircraft or vessel, and is eligible for the exceptions provided in § 173.156. In addition, shipments of limited quantities are not subject to subpart F (Placarding) of part 172 of this subchapter. Each package must conform to the general packaging requirements of subpart B of this part and may not exceed 30 kg (66 pounds) gross weight.

(1) Except for transportation by aircraft, the organic peroxide component must be packed in inner packagings not over 125 mL (4.22 fluid ounces) net capacity each for liquids or 500 g (17.64 ounces) net capacity each for solids. For transportation by aircraft, the organic peroxide component must be packed in inner packagings not over 30 mL (1 fluid ounce) net capacity each for liquids or 100 g (3.5 ounces) net capacity each for solids.

(2) Except for transportation by aircraft, the flammable liquid component must be packed in inner packagings not over 5 L (1.3 gallons) net capacity each for a Packing Group II and Packing Group III liquid. For transportation by aircraft, the flammable liquid component must be packed in inner packagings not over 1 L (0.3 gallons) net capacity each for a Packing Group II material. For transportation by aircraft, the flammable liquid component must be packed in metal or plastic inner packagings not over 5.0 L (1.3 gallons) net capacity each or glass inner packagings not over 2.5 L (0.66 gallons) net capacity each for a Packing Group III material.

(3) Except for transportation by aircraft, the flammable solid component must be packed in inner packagings not over 5 kg (11 pounds) net capacity each for a Packing Group II and Packing Group III solid. For transportation by aircraft, the flammable solid component must be packed in inner packagings not over 1 kg (2.2 pounds) net capacity each for a Packing Group II material. For transportation by aircraft, the flammable solid component must be packed in metal or plastic inner packagings not over 5.0 kg (11 pounds) net capacity each or glass inner packagings not over 2.5 kg (5.5 pounds) net capacity each for a Packing Group III material.

(4) If the flammable liquid or solid component and the organic peroxide component will not interact dangerously in the event of leakage, they may be packed in the same outer packaging.

(5) For transportation by aircraft, the following additional requirements apply:

(i) Closures on inner packagings containing liquids must be secured by secondary means as prescribed in § 173.27(d);

(ii) Inner packagings containing liquids must be capable of meeting the pressure differential requirements prescribed in § 173.27(c); and

(iii) The total quantity of activator and base material may not exceed 1 kg (2.2 pounds) per package for a Packing Group II base material. The total quantity of activator and base material may not exceed 5 kg (11 pounds) per package for a Packing Group III base material. The total quantity of polyester resin kits per package is calculated on a one-to-one basis (*i.e.,* 1 L equals 1 kg);

(iv) Fragile inner packagings must be packaged to prevent failure under conditions normally incident to transport. Packages of consumer commodities must be capable of withstanding a 1.2 m drop on solid concrete in the position most likely to cause damage; and

(v) *Stack test capability.* Packages of consumer commodities must be capable of withstanding, without failure or leakage of any inner packaging and without any significant reduction in effectiveness, a force applied to the top surface for a duration of 24 hours equivalent to the total weight of identical packages if stacked to a height of 3.0 m (including the test sample).

(d) *Consumer commodities.* Until December 31, 2020, a limited quantity package of polyester resin kits that are also consumer commodities as defined in § 171.8 of this subchapter may be renamed ''Consumer commodity'' and reclassed as ORM–D or, until December 31, 2012, as ORM–D–AIR material and offered for transportation and transported in accordance with the applicable provisions of 49 CFR subchapter C (revised as of October 1, 2010).

■ 30. In § 173.185, the introductory text and paragraphs (c)(2) and (3), (c)(4)(ii), (e), and (f)(4) are revised to read as follows:

§ 173.185 Lithium cells and batteries.

As used in this section, *lithium cell(s)* or *battery(ies)* includes both lithium metal and lithium ion chemistries. *Equipment* means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation. *Consignment* means one or more packages of hazardous materials accepted by an operator from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address.

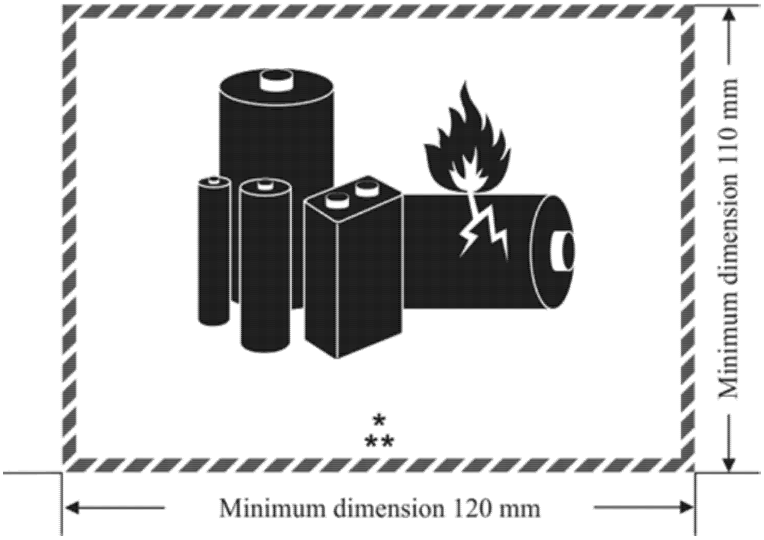
* * * * *

(c) * * *

(2) *Packaging.* Each package must be rigid unless the cell or battery is contained in equipment and is afforded equivalent protection by the equipment in which it is contained. Except when lithium cells or batteries are contained in equipment, each package of lithium cells or batteries, or the completed package when packed with equipment must be capable of withstanding a 1.2 meter drop test, in any orientation, without damage to the cells or batteries contained in the package, without shifting of the contents that would allow battery-to-battery (or cell-to-cell) contact, and without release of the contents of the package.

(3) *Hazard communication.* Each package must display the lithium battery mark except when a package contains button cell batteries installed in equipment (including circuit boards), or no more than four lithium cells or two lithium batteries contained in equipment, where there are not more than two packages in the consignment.

(i) The mark must indicate the UN number, 'UN3090' for lithium metal cells or batteries or 'UN 3480' for lithium ion cells or batteries. Where the lithium cells or batteries are contained in, or packed with, equipment, the UN number 'UN3091' or 'UN 3481' as appropriate must be indicated. Where a package contains lithium cells or batteries assigned to different UN numbers, all applicable UN numbers must be indicated on one or more marks. The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.



(A) The mark must be in the form of a rectangle with hatched edging. The mark must be not less than 120 mm (4.7 inches) wide by 110 mm (4.3 inches) high and the minimum width of the hatching must be 5 mm (0.2 inches) except markings of 105 mm (4.1 inches) wide by 74 mm (2.9 inches) high may be used on a package containing lithium batteries when the package is too small for the larger mark;

(B) The symbols and letters must be black on white or suitable contrasting background and the hatching must be red;

(C) The ''*'' must be replaced by the appropriate UN number(s) and the ''**'' must be replaced by a telephone number for additional information; and

(D) Where dimensions are not specified, all features shall be in approximate proportion to those shown.

(ii) For transportation by highway, rail or vessel, the provisions in 49 CFR 173.185(c)(3) (revised as of October 1, 2016) for marking packages, including the exceptions from marking, may continue to be used until December 31, 2018. For transportation by aircraft, the provisions for the lithium battery handling marking in 49 CFR 173.185(c)(3)(ii) (revised as of October 1, 2016) may continue to be used until December 31, 2018.

* * * * *

(4) * * *

(ii) When packages required to bear the lithium battery mark in paragraph (c)(3)(i) are placed in an overpack, the lithium battery mark must either be clearly visible through the overpack, or the handling mark must also be affixed on the outside of the overpack, and the overpack must be marked with the word ''OVERPACK.''

* * * * *

(e) *Low production runs and prototypes.* Low production runs (*i.e.,* annual production runs consisting of not more than 100 lithium cells or batteries), or prototype lithium cells or batteries, including equipment transported for purposes of testing, are excepted from the testing and record keeping requirements of paragraph (a) of this section, provided:

(1) Except as provided in paragraph (e)(4) of this section, each cell or battery is individually packed in a non-metallic inner packaging, inside an outer packaging, and is surrounded by cushioning material that is non-combustible and non-conductive or contained in equipment. Equipment must be constructed or packaged in a manner as to prevent accidental operation during transport;

(2) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during transport. Cushioning material that is non-combustible and non-conductive may be used to meet this requirement;

(3) The lithium cells or batteries are packed in inner packagings or contained in equipment. The inner packaging or equipment is placed in one of the following outer packagings that meet the requirements of part 178, subparts L and M, of this subchapter at the Packing Group I level. Cells and batteries, including equipment of different sizes, shapes or masses must be placed into an outer packaging of a tested design type listed in this section provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested. A cell or battery with a net mass of more than 30 kg is limited to one cell or battery per outer packaging;

(i) Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), or solid plastic (4H2) box;

(ii) Metal (1A2, 1B2, 1N2), plywood (1D), or plastic (1H2) drum.

(4) Lithium batteries, including lithium batteries contained in equipment, that weigh 12 kg (26.5 pounds) or more and have a strong, impact-resistant outer casing or assemblies of such batteries, may be packed in strong outer packagings, in protective enclosures (for example, in fully enclosed or wooden slatted crates), or on pallets or other handling devices, instead of packages meeting the UN performance packaging requirements in paragraphs (b)(3)(ii) and (iii) of this section. The battery or battery assembly must be secured to prevent inadvertent movement, and the terminals may not support the weight of other superimposed elements;

(5) Irrespective of the limit specified in column (9B) of the § 172.101 Hazardous Materials Table, the battery or battery assembly prepared for transport in accordance with this paragraph may have a mass exceeding 35 kg gross weight when transported by cargo aircraft;

(6) Batteries or battery assemblies packaged in accordance with this paragraph are not permitted for transportation by passenger-carrying aircraft, and may be transported by cargo aircraft only if approved by the Associate Administrator prior to transportation; and

(7) Shipping papers must include the following notation ''Transport in accordance with § 173.185(e).''

(f) * * *

(4) The outer package must be marked with an indication that the package contains a ''Damaged/defective lithium ion battery'' and/or ''Damaged/defective lithium metal battery'' as appropriate. The marking required by this paragraph (f)(4) must be in characters at least 12 mm (0.47 inches) high.

* * * * *

■ 31. In § 173.217, revise paragraph (c)(3) to read as follows:

§ 173.217 Carbon dioxide, solid (dry ice).

* * * * *

(c) * * *

(3) The quantity limits per package shown in columns (9A) and (9B) of the Hazardous Materials Table in § 172.101 of this subchapter are not applicable to dry ice being used as a refrigerant for other than hazardous materials loaded in a unit load device. In such a case, the unit load device must be identified to the operator and allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure.

* * * * *

■ 32. Section 173.220 is revised to read as follows:

§ 173.220 Internal combustion engines, vehicles, machinery containing internal combustion engines, battery-powered equipment or machinery, fuel cell-powered equipment or machinery.

(a) *Applicability.* An internal combustion engine, self-propelled vehicle, machinery containing an internal combustion engine that is not consigned under the ''Dangerous goods in machinery *or* apparatus'' UN 3363 entry, a battery-powered vehicle or equipment, or a fuel cell-powered vehicle or equipment, or any combination thereof, is subject to the requirements of this subchapter when transported as cargo on a transport vehicle, vessel, or aircraft if—

(1) The vehicle, engine, or machinery contains a liquid or gaseous fuel. Vehicles, engines, or machinery may be considered as not containing fuel when the engine components and any fuel lines have been completely drained, sufficiently cleaned of residue, and purged of vapors to remove any potential hazard and the engine when held in any orientation will not release any liquid fuel;

(2) The fuel tank contains a liquid or gaseous fuel. A fuel tank may be considered as not containing fuel when the fuel tank and the fuel lines have been completely drained, sufficiently cleaned of residue, and purged of vapors to remove any potential hazard;

(3) It is equipped with a wet battery (including a non-spillable battery), a sodium battery or a lithium battery; or

(4) Except as provided in paragraph (f)(1) of this section, it contains other hazardous materials subject to the requirements of this subchapter.

(b) *Requirements.* Unless otherwise excepted in paragraph (b)(4) of this section, vehicles, engines, and equipment are subject to the following requirements:

(1) *Flammable liquid fuel and fuels that are marine pollutants.* (i) A fuel tank containing a flammable liquid fuel must be drained and securely closed, except that up to 500 mL (17 ounces) of residual fuel may remain in the tank, engine components, or fuel lines provided they are securely closed to prevent leakage of fuel during transportation. Self-propelled vehicles containing diesel fuel are excepted from the requirement to drain the fuel tanks, provided that sufficient ullage space has been left inside the tank to allow fuel expansion without leakage, and the tank caps are securely closed.

(ii) Engines and machinery containing liquid fuels meeting the definition of a marine pollutant (see § 171.8 of this subchapter) and not meeting the classification criteria of any other Class or Division transported by vessel are subject to the requirements of § 176.906 of this subchapter.

(2) *Flammable liquefied or compressed gas fuel.* (i) For transportation by motor vehicle, rail car or vessel, fuel tanks and fuel systems containing flammable liquefied or compressed gas fuel must be securely closed. For transportation by vessel, the requirements of §§ 176.78(k), 176.905, and 176.906 of this subchapter apply.

(ii) For transportation by aircraft:

(A) Flammable gas-powered vehicles, machines, equipment or cylinders containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all traces of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the vehicle to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading the vehicle aboard the aircraft; or alternatively;

(B) Flammable gas powered vehicles, machines or equipment, which have cylinders (fuel tanks) that are equipped with electrically operated valves, may be transported under the following conditions:

(*1*) The valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;

(*2*) After closing the valves, the vehicle, equipment or machinery must be operated until it stops from lack of fuel before being loaded aboard the aircraft;

(*3*) In no part of the closed system shall the pressure exceed 5% of the maximum allowable working pressure of the system or 290 psig (2000 kPa), whichever is less; and

(*4*) There must not be any residual liquefied gas in the system, including the fuel tank.

(3) *Truck bodies or trailers on flat cars—flammable liquid or gas powered.* Truck bodies or trailers with automatic heating or refrigerating equipment of the flammable liquid type may be shipped with fuel tanks filled and equipment operating or inoperative, when used for the transportation of other freight and loaded on flat cars as part of a joint rail and highway movement, provided the equipment and fuel supply conform to the requirements of § 177.834(l) of this subchapter.

(4) *Modal exceptions.* Quantities of flammable liquid fuel greater than 500 mL (17 ounces) may remain in the fuel tank in self-propelled vehicles engines, and machinery only under the following conditions:

(i) For transportation by motor vehicle or rail car, the fuel tanks must be securely closed.

(ii) For transportation by vessel, the shipment must conform to § 176.905 of this subchapter for self-propelled vehicles and § 176.906 of this subchapter for engines and machinery.

(iii) For transportation by aircraft, when carried in aircraft designed or modified for vehicle ferry operations when all the following conditions must be met:

(A) Authorization for this type operation has been given by the appropriate authority in the government of the country in which the aircraft is registered;

(B) Each vehicle is secured in an upright position;

(C) Each fuel tank is filled in a manner and only to a degree that will preclude spillage of fuel during loading, unloading, and transportation; and

(D) Each area or compartment in which a self-propelled vehicle is being transported is suitably ventilated to prevent the accumulation of fuel vapors.

(c) *Battery-powered or installed.* Batteries must be securely installed, and wet batteries must be fastened in an upright position. Batteries must be protected against a dangerous evolution of heat, short circuits, and damage to terminals in conformance with § 173.159(a) and leakage; or must be removed and packaged separately under § 173.159. Battery-powered vehicles, machinery or equipment including battery-powered wheelchairs and mobility aids are not subject to any other requirements of this subchapter except § 173.21 when transported by rail, highway or vessel. Where a vehicle could possibly be handled in other than an upright position, the vehicle must be secured in a strong, rigid outer packaging. The vehicle must be secured by means capable of restraining the vehicle in the outer packaging to prevent any movement during transport which would change the orientation or cause the vehicle to be damaged.

(d) *Lithium batteries.* Except as provided in § 172.102, special provision A101, of this subchapter, vehicles, engines, and machinery powered by lithium metal batteries, that are transported with these batteries installed, are forbidden aboard passenger-carrying aircraft. Lithium batteries contained in vehicles, engines, or mechanical equipment must be securely fastened in the battery holder of the vehicle, engine, or mechanical equipment, and be protected in such a manner as to prevent damage and short circuits (*e.g.,* by the use of non-conductive caps that cover the terminals entirely). Except for vehicles, engines, or machinery transported by highway, rail, or vessel with prototype or low production lithium batteries securely installed, each lithium battery must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter), as specified in § 173.185, unless approved by the Associate Administrator. Where a vehicle could possibly be handled in other than an upright position, the vehicle must be secured in a strong, rigid outer packaging. The vehicle must be secured by means capable of restraining the vehicle in the outer packaging to prevent any movement during transport which would change the orientation or cause the vehicle to be damaged.

(e) *Fuel cells.* A fuel cell must be secured and protected in a manner to prevent damage to the fuel cell. Equipment (other than vehicles, engines or mechanical equipment) such as consumer electronic devices containing fuel cells (fuel cell cartridges) must be described as ''Fuel cell cartridges contained in equipment'' and transported in accordance with § 173.230. Where a vehicle could possibly be handled in other than an upright position, the vehicle must be secured in a strong, rigid outer packaging. The vehicle must be secured by means capable of restraining the vehicle in the outer packaging to

prevent any movement during transport which would change the orientation or cause the vehicle to be damaged.

(f) *Other hazardous materials.* (1) Items containing hazardous materials, such as fire extinguishers, compressed gas accumulators, safety devices, and other hazardous materials that are integral components of the motor vehicle, engine, or mechanical equipment, and that are necessary for the operation of the vehicle, engine, or mechanical equipment, or for the safety of its operator or passengers, must be securely installed in the motor vehicle, engine, or mechanical equipment. Such items are not otherwise subject to the requirements of this subchapter. Equipment (other than vehicles, engines, or mechanical equipment), such as consumer electronic devices containing lithium batteries, must be described as ''Lithium metal batteries contained in equipment'' or ''Lithium ion batteries contained in equipment,'' as appropriate, and transported in accordance with § 173.185, and applicable special provisions. Equipment (other than vehicles, engines, or mechanical equipment), such as consumer electronic devices containing fuel cells (fuel cell cartridges), must be described as ''Fuel cell cartridges contained in equipment'' and transported in accordance with § 173.230.

(2) Other hazardous materials must be packaged and transported in accordance with the requirements of this subchapter.

(g) *Additional requirements for internal combustion engines and vehicles with certain electronic equipment when transported by aircraft or vessel.* When an internal combustion engine that is not installed in a vehicle or equipment is offered for transportation by aircraft or vessel, all fuel, coolant or hydraulic systems remaining in the engine must be drained as far as practicable, and all disconnected fluid pipes that previously contained fluid must be sealed with leak-proof caps that are positively retained. When offered for transportation by aircraft, vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

(h) *Exceptions.* Except as provided in paragraph (f)(2) of this section, shipments made under the provisions of this section—

(1) Are not subject to any other requirements of this subchapter for transportation by motor vehicle or rail car;

(2) Are not subject to the requirements of subparts D, E, and F (marking, labeling and placarding, respectively) of part 172 of this subchapter or § 172.604 of this subchapter (emergency response telephone number) for transportation by aircraft. For transportation by aircraft, the provisions of § 173.159(b)(2) as applicable, the provisions of § 173.230(f), as applicable, other applicable requirements of this subchapter, including shipping papers, emergency response information, notification of pilot-in-command, general packaging requirements, and the requirements specified in § 173.27 must be met; and

(3) For exceptions for transportation by vessel; see § 176.905 of this subchapter for vehicles, and § 176.906 of this subchapter for engines and machinery.

■ 33. In § 173.221, paragraph (d) is added to read as follows:

§ 173.221 Polymeric beads, expandable and Plastic molding compound.

* * * * *

(d) *Exceptions.* When it can be demonstrated that no flammable vapor, resulting in a flammable atmosphere, is evolved according to test U1 (Test method for substances liable to evolve flammable vapors) of Part III, subsection 38.4.4 of the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter), polymeric beads, expandable need not be classed as Class 9 (UN2211). This test should only be performed when de-classification of a substance is considered.

■ 34. In § 173.225, in paragraph (c)(8), the ''Organic Peroxide Table'' is revised and in paragraph (e), the ''Organic Peroxide IBC Table'' is revised to read as follows:

§ 173.225 Packaging requirements and other provisions for organic peroxides.

* * * * *

(c) * * *

(8) * * *

ORGANIC PEROXIDE TABLE

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
Acetyl acetone peroxide	UN3105	≤42	≥48			≥8	OP7			2
Acetyl acetone peroxide [as a paste]	UN3106	≤32					OP7			21
Acetyl cyclohexanesulfonyl peroxide	UN3112	≤82				≥12	OP4	−10	0	
Acetyl cyclohexanesulfonyl peroxide	UN3115	≤32		≥68			OP7	−10	0	
tert-Amyl hydroperoxide	UN3107	≤88	≥6			≥6	OP8			
tert-Amyl peroxyacetate	UN3105	≤62	≥38				OP7			
tert-Amyl peroxybenzoate	UN3103	≤100					OP5			
tert-Amyl peroxy-2-ethylhexanoate	UN3115	≤100					OP7	20	25	
tert-Amyl peroxy-2-ethylhexyl carbonate	UN3105	≤100					OP7			
tert-Amyl peroxy isopropyl carbonate	UN3103	≤77	≥23				OP5			
tert-Amyl peroxyneodecanoate	UN3115	≤77		≥23			OP7	0	10	
tert-Amyl peroxyneodecanoate	UN3119	≤47	≥53				OP8	0	10	
tert-Amyl peroxypivalate	UN3113	≤77		≥23			OP5	10	15	
tert-Amyl peroxypivalate	UN3119	≤32	≥68				OP8	10	15	
tert-Amyl peroxy-3,5,5-trimethylhexanoate.	UN3105	≤100					OP7			
tert-Butyl cumyl peroxide	UN3109	>42–100					OP8			9
tert-Butyl cumyl peroxide	UN3108	≤52			≥48		OP8			9
n-Butyl-4,4-di-(tert-butylperoxy)valerate	UN3103	>52–100					OP5			
n-Butyl-4,4-di-(tert-butylperoxy)valerate	UN3108	≤52			≥48		OP8			
tert-Butyl hydroperoxide	UN3103	>79–90				≥10	OP5			13
tert-Butyl hydroperoxide	UN3105	≤80	≥20				OP7			4, 13
tert-Butyl hydroperoxide	UN3107	≤79				>14	OP8			13, 16
tert-Butyl hydroperoxide	UN3109	≤72				≥28	OP8			13

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
tert-Butyl hydroperoxide [and] Di-tert-butylperoxide.	UN3103	<82 + >9	.....	.....	.....	≥7	OP5	.....	.....	13
tert-Butyl monoperoxymaleate	UN3102	>52–100	.....	.....	.....	.....	OP5	.....	.....	.....
tert-Butyl monoperoxymaleate	UN3103	≤52	≥48	.....	.....	.....	OP6	.....	.....	.....
tert-Butyl monoperoxymaleate	UN3108	≤52	.....	.....	≥48	.....	OP8	.....	.....	.....
tert-Butyl monoperoxymaleate [as a paste].	UN3108	≤52	.....	.....	.....	.....	OP8	.....	.....	.....
tert-Butyl peroxyacetate	UN3101	>52–77	≥23	.....	.....	.....	OP5	.....	.....	.....
tert-Butyl peroxyacetate	UN3103	>32–52	≥48	.....	.....	.....	OP6	.....	.....	.....
tert-Butyl peroxyacetate	UN3109	≤32	.....	≥68	.....	.....	OP8	.....	.....	.....
tert-Butyl peroxybenzoate	UN3103	>77–100	.....	.....	.....	.....	OP5	.....	.....	.....
tert-Butyl peroxybenzoate	UN3105	>52–77	≥23	.....	.....	.....	OP7	.....	.....	1
tert-Butyl peroxybenzoate	UN3106	≤52	.....	.....	≥48	.....	OP7	.....	.....	.....
tert-Butyl peroxybenzoate	UN3109	≤32	≥68	.....	.....	.....	OP8	.....	.....	.....
tert-Butyl peroxybutyl fumarate	UN3105	≤52	≥48	.....	.....	.....	OP7	.....	.....	.....
tert-Butyl peroxycrotonate	UN3105	≤77	≥23	.....	.....	.....	OP7	.....	.....	.....
tert-Butyl peroxydiethylacetate	UN3113	≤100	.....	.....	.....	.....	OP5	20	25	.....
tert-Butyl peroxy-2-ethylhexanoate	UN3113	>52–100	.....	.....	.....	.....	OP6	20	25	.....
tert-Butyl peroxy-2-ethylhexanoate	UN3117	>32–52	.....	≥48	.....	.....	OP8	30	35	.....
tert-Butyl peroxy-2-ethylhexanoate	UN3118	≤52	.....	.....	≥48	.....	OP8	20	25	.....
tert-Butyl peroxy-2-ethylhexanoate	UN3119	≤32	.....	≥68	.....	.....	OP8	40	45	.....
tert-Butyl peroxy-2-ethylhexanoate [and] 2,2-di-(tert-Butylperoxy)butane.	UN3106	≤12 + ≤14	≥14	.....	≥60	.....	OP7	.....	.....	.....
tert-Butyl peroxy-2-ethylhexanoate [and] 2,2-di-(tert-Butylperoxy)butane.	UN3115	≤31 + ≤36	.....	≥33	.....	.....	OP7	35	40	.....
tert-Butyl peroxy-2-ethylhexylcarbonate	UN3105	≤100	.....	.....	.....	.....	OP7	.....	.....	.....
tert-Butyl peroxyisobutyrate	UN3111	>52–77	.....	≥23	.....	.....	OP5	15	20	.....
tert-Butyl peroxyisobutyrate	UN3115	≤52	.....	≥48	.....	.....	OP7	15	20	.....
tert-Butylperoxy isopropylcarbonate	UN3103	≤77	≥23	.....	.....	.....	OP5	.....	.....	.....
1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene.	UN3105	≤77	≥23	.....	.....	.....	OP7	.....	.....	.....
1-(2-tert-Butylperoxy isopropyl)-3-isopropenylbenzene.	UN3108	≤42	.....	.....	≥58	.....	OP8	.....	.....	.....
tert-Butyl peroxy-2-methylbenzoate	UN3103	≤100	.....	.....	.....	.....	OP5	.....	.....	.....
tert-Butyl peroxyneodecanoate	UN3115	>77–100	.....	.....	.....	.....	OP7	−5	5	.....
tert-Butyl peroxyneodecanoate	UN3115	≤77	.....	≥23	.....	.....	OP7	0	10	.....
tert-Butyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤52	.....	.....	.....	.....	OP8	0	10	.....
tert-Butyl peroxyneodecanoate [as a stable dispersion in water (frozen)].	UN3118	≤42	.....	.....	.....	.....	OP8	0	10	.....
tert-Butyl peroxyneodecanoate	UN3119	≤32	≥68	.....	.....	.....	OP8	0	10	.....
tert-Butyl peroxyneoheptanoate	UN3115	≤77	≥23	.....	.....	.....	OP7	0	10	.....
tert-Butyl peroxyneoheptanoate [as a stable dispersion in water].	UN3117	≤42	.....	.....	.....	.....	OP8	0	10	.....
tert-Butyl peroxypivalate	UN3113	>67–77	≥23	.....	.....	.....	OP5	0	10	.....
tert-Butyl peroxypivalate	UN3115	>27–67	.....	≥33	.....	.....	OP7	0	10	.....
tert-Butyl peroxypivalate	UN3119	≤27	.....	≥73	.....	.....	OP8	30	35	.....
tert-Butylperoxy stearylcarbonate	UN3106	≤100	.....	.....	.....	.....	OP7	.....	.....	.....
tert-Butyl peroxy-3,5,5-trimethylhexanoate.	UN3105	>37–100	.....	.....	.....	.....	OP7	.....	.....	.....
tert-Butyl peroxy-3,5,5-trimethlyhexanoate.	UN3106	≤42	.....	.....	≥58	.....	OP7	.....	.....	.....
tert-Butyl peroxy-3,5,5-trimethylhexanoate.	UN3109	≤37	.....	≥63	.....	.....	OP8	.....	.....	.....
3-Chloroperoxybenzoic acid	UN3102	>57–86	.....	.....	≥14	.....	OP1	.....	.....	.....
3-Chloroperoxybenzoic acid	UN3106	≤57	.....	.....	≥3	≥40	OP7	.....	.....	.....
3-Chloroperoxybenzoic acid	UN3106	≤77	.....	.....	≥6	≥17	OP7	.....	.....	.....
Cumyl hydroperoxide	UN3107	>90–98	≤10	.....	.....	.....	OP8	.....	.....	13
Cumyl hydroperoxide	UN3109	≤90	≥10	.....	.....	.....	OP8	.....	.....	13, 15
Cumyl peroxyneodecanoate	UN3115	≤87	≥13	.....	.....	.....	OP7	−10	0	.....
Cumyl peroxyneodecanoate	UN3115	≤77	.....	≥23	.....	.....	OP7	−10	0	.....
Cumyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤52	.....	.....	.....	.....	OP8	−10	0	.....
Cumyl peroxyneoheptanoate	UN3115	≤77	≥23	.....	.....	.....	OP7	−10	0	.....
Cumyl peroxypivalate	UN3115	≤77	.....	≥23	.....	.....	OP7	−5	5	.....
Cyclohexanone peroxide(s)	UN3104	≤91	.....	.....	.....	≥9	OP6	.....	.....	13
Cyclohexanone peroxide(s)	UN3105	≤72	≥28	.....	.....	.....	OP7	.....	.....	5
Cyclohexanone peroxide(s) [as a paste]	UN3106	≤72	.....	.....	.....	.....	OP7	.....	.....	5, 21
Cyclohexanone peroxide(s)	Exempt	≤32	.....	>68	.....	.....	Exempt	.....	.....	29
Diacetone alcohol peroxides	UN3115	≤57	.....	≥26	.....	≥8	OP7	40	45	5
Diacetyl peroxide	UN3115	≤27	.....	≥73	.....	.....	OP7	20	25	8,13
Di-tert-amyl peroxide	UN3107	≤100	.....	.....	.....	.....	OP8	.....	.....	.....
([3R- (3R, 5aS, 6S, 8aS, 9R, 10R, 12S, 12aR**)]-Decahydro-10-methoxy-3, 6, 9-trimethyl-3, 12-epoxy-12H-pyrano [4, 3- j]-1, 2-benzodioxepin).	UN3106	≤100	.....	.....	.....	.....	OP7	.....	.....	.....
2,2-Di-(tert-amylperoxy)-butane	UN3105	≤57	≥43	.....	.....	.....	OP7	.....	.....	.....

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
1,1-Di-(tert-amylperoxy)cyclohexane	UN3103	≤82	≥18				OP6			
Dibenzoyl peroxide	UN3102	>52–100			≤48		OP2			3
Dibenzoyl peroxide	UN3102	>77–94				≥6	OP4			3
Dibenzoyl peroxide	UN3104	≤77				≥23	OP6			
Dibenzoyl peroxide	UN3106	≤62			≥28	≥10	OP7			
Dibenzoyl peroxide [as a paste]	UN3106	>52–62					OP7			21
Dibenzoyl peroxide	UN3106	>35–52			≥48		OP7			
Dibenzoyl peroxide	UN3107	>36–42	≥18			≤40	OP8			
Dibenzoyl peroxide [as a paste]	UN3108	≤56.5				≥15	OP8			
Dibenzoyl peroxide [as a paste]	UN3108	≤52					OP8			21
Dibenzoyl peroxide [as a stable dispersion in water].	UN3109	≤42					OP8			
Dibenzoyl peroxide	Exempt	≤35			≥65		Exempt			29
Di-(4-tert-butylcyclohexyl)peroxydicarbonate.	UN3114	≤100					OP6	30	35	
Di-(4-tert-butylcyclohexyl)peroxydicarbonate [as a stable dispersion in water].	UN3119	≤42					OP8	30	35	
Di-tert-butyl peroxide	UN3107	>52–100					OP8			
Di-tert-butyl peroxide	UN3109	≤52		≥48			OP8			24
Di-tert-butyl peroxyazelate	UN3105	≤52	≥48				OP7			
2,2-Di-(tert-butylperoxy)butane	UN3103	≤52	≥48				OP6			
1,6-Di-(tert-butylperoxycarbonyloxy)hexane.	UN3103	≤72	≥28				OP5			
1,1-Di-(tert-butylperoxy)cyclohexane	UN3101	>80–100					OP5			
1,1-Di-(tert-butylperoxy)cyclohexane	UN3103	>52–80	≥20				OP5			
1,1-Di-(tert-butylperoxy)-cyclohexane	UN3103	≤72		≥28			OP5			30
1,1-Di-(tert-butylperoxy)cyclohexane	UN3105	>42–52	≥48				OP7			
1,1-Di-(tert-butylperoxy)cyclohexane	UN3106	≤42	≥13		≥45		OP7			
1,1-Di-(tert-butylperoxy)cyclohexane	UN3107	≤27	≥25				OP8			22
1,1-Di-(tert-butylperoxy)cyclohexane	UN3109	≤42	≥58				OP8			
1,1-Di-(tert-Butylperoxy) cyclohexane	UN3109	≤37	≥63				OP8			
1,1-Di-(tert-butylperoxy)cyclohexane	UN3109	≤25	≥25	≥50			OP8			
1,1-Di-(tert-butylperoxy)cyclohexane	UN3109	≤13	≥13	≥74			OP8			
1,1-Di-(tert-butylperoxy)cyclohexane + tert-Butyl peroxy-2-ethylhexanoate.	UN3105	≤43+≤16	≥41				OP7			
Di-n-butyl peroxydicarbonate	UN3115	>27–52		≥48			OP7	−15	−5	
Di-n-butyl peroxydicarbonate	UN3117	≤27		≥73			OP8	−10	0	
Di-n-butyl peroxydicarbonate [as a stable dispersion in water (frozen)].	UN3118	≤42					OP8	−15	−5	
Di-sec-butyl peroxydicarbonate	UN3113	>52–100					OP4	−20	−10	6
Di-sec-butyl peroxydicarbonate	UN3115	≤52		≥48			OP7	−15	−5	
Di-(tert-butylperoxyisopropyl) benzene(s).	UN3106	>42–100			≤57		OP7			1, 9
Di-(tert-butylperoxyisopropyl) benzene(s).	Exempt	≤42			≥58		Exempt			
Di-(tert-butylperoxy)phthalate	UN3105	>42–52	≥48				OP7			
Di-(tert-butylperoxy)phthalate [as a paste].	UN3106	≤52					OP7			21
Di-(tert-butylperoxy)phthalate	UN3107	≤42	≥58				OP8			
2,2-Di-(tert-butylperoxy)propane	UN3105	≤52	≥48				OP7			
2,2-Di-(tert-butylperoxy)propane	UN3106	≤42	≥13		≥45		OP7			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3101	>90–100					OP5			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3103	>57–90	≥10				OP5			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3103	≤77		≥23			OP5			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3103	≤90		≥10			OP5			30
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3110	≤57			≥43		OP8			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3107	≤57	≥43				OP8			
1,1-Di-(tert-butylperoxy)-3,3,5-trimethylcyclohexane.	UN3107	≤32	≥26	≥42			OP8			
Dicetyl peroxydicarbonate	UN3120	≤100					OP8	30	35	
Dicetyl peroxydicarbonate [as a stable dispersion in water].	UN3119	≤42					OP8	30	35	
Di-4-chlorobenzoyl peroxide	UN3102	≤77				≥23	OP5			
Di-4-chlorobenzoyl peroxide	Exempt	≤32			≥68		Exempt			29
Di-2,4-dichlorobenzoyl peroxide [as a paste].	UN3118	≤52					OP8	20	25	
Di-4-chlorobenzoyl peroxide [as a paste]	UN3106	≤52					OP7			21
Dicumyl peroxide	UN3110	>52–100			≤48		OP8			9
Dicumyl peroxide	Exempt	≤52			≥48		Exempt			29
Dicyclohexyl peroxydicarbonate	UN3112	>91–100					OP3	10	15	

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
Dicyclohexyl peroxydicarbonate	UN3114	≤91				≥9	OP5	10	15	
Dicyclohexyl peroxydicarbonate [as a stable dispersion in water].	UN3119	≤42					OP8	15	20	
Didecanoyl peroxide	UN3114	≤100					OP6	30	35	
2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl)propane.	UN3106	≤42			≥58		OP7			
2,2-Di-(4,4-di(tert-butylperoxy)cyclohexyl)propane.	UN3107	≤22		≥78			OP8			
Di-2,4-dichlorobenzoyl peroxide	UN3102	≤77				≥23	OP5			
Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil].	UN3106	≤52					OP7			
Di-(2-ethoxyethyl) peroxydicarbonate	UN3115	≤52		≥48			OP7	−10	0	
Di-(2-ethylhexyl) peroxydicarbonate	UN3113	>77–100					OP5	−20	−10	
Di-(2-ethylhexyl) peroxydicarbonate	UN3115	≤77		≥23			OP7	−15	−5	
Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water].	UN3119	≤62					OP8	−15	−5	
Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water].	UN3119	≤52					OP8	−15	−5	
Di-(2-ethylhexyl) peroxydicarbonate [as a stable dispersion in water (frozen)].	UN3120	≤52					OP8	−15	−5	
2,2-Dihydroperoxypropane	UN3102	≤27			≥73		OP5			
Di-(1-hydroxycyclohexyl)peroxide	UN3106	≤100					OP7			
Diisobutyryl peroxide	UN3111	>32–52		≥48			OP5	−20	−10	
Diisobutyryl peroxide	UN3115	≤32		≥68			OP7	−20	−10	
Diisopropylbenzene dihydroperoxide	UN3106	≤82	≥5			≥5	OP7			17
Diisopropyl peroxydicarbonate	UN3112	>52–100					OP2	−15	−5	
Diisopropyl peroxydicarbonate	UN3115	≤52		≥48			OP7	−20	−10	
Diisopropyl peroxydicarbonate	UN3115	≤32	≥68				OP7	−15	−5	
Dilauroyl peroxide	UN3106	≤100					OP7			
Dilauroyl peroxide [as a stable dispersion in water].	UN3109	≤42					OP8			
Di-(3-methoxybutyl) peroxydicarbonate	UN3115	≤52		≥48			OP7	−5	5	
Di-(2-methylbenzoyl)peroxide	UN3112	≤87				≥13	OP5	30	35	
Di-(4-methylbenzoyl)peroxide [as a paste with silicone oil].	UN3106	≤52					OP7			
Di-(3-methylbenzoyl) peroxide + Benzoyl (3-methylbenzoyl) peroxide + Dibenzoyl peroxide.	UN3115	≤20 + ≤18 + ≤4		≥58			OP7	35	40	
2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane.	UN3102	>82–100					OP5			
2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane.	UN3106	≤82			≥18		OP7			
2,5-Dimethyl-2,5-di-(benzoylperoxy)hexane.	UN3104	≤82				≥18	OP5			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane.	UN3103	>90–100					OP5			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane.	UN3105	>52–90	≥10				OP7			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane.	UN3108	≤77			≥23		OP8			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane.	UN3109	≤52	≥48				OP8			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane [as a paste].	UN3108	≤47					OP8			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3.	UN3101	>86–100					OP5			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3.	UN3103	>52–86	≥14				OP5			
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexyne-3.	UN3106	≤52			≥48		OP7			
2,5-Dimethyl-2,5-di-(2-ethylhexanoylperoxy)hexane.	UN3113	≤100					OP5	20	25	
2,5-Dimethyl-2,5-dihydroperoxyhexane	UN3104	≤82				≥18	OP6			
2,5-Dimethyl-2,5-di-(3,5,5-trimethylhexanoylperoxy)hexane.	UN3105	≤77	≥23				OP7			
1,1-Dimethyl-3-hydroxybutylperoxyneoheptanoate.	UN3117	≤52	≥48				OP8	0	10	
Dimyristyl peroxydicarbonate	UN3116	≤100					OP7	20	25	
Dimyristyl peroxydicarbonate [as a stable dispersion in water].	UN3119	≤42					OP8	20	25	
Di-(2-neodecanoylperoxyisopropyl)benzene.	UN3115	≤52	≥48				OP7	−10	0	
Di-(2-neodecanoyl-peroxyisopropyl) benzene, as stable dispersion in water.	UN3119	≤42					OP8	−15	−5	
Di-n-nonanoyl peroxide	UN3116	≤100					OP7	0	10	
Di-n-octanoyl peroxide	UN3114	≤100					OP5	10	15	

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
Di-(2-phenoxyethyl)peroxydicarbonate	UN3102	>85–100					OP5			
Di-(2-phenoxyethyl)peroxydicarbonate	UN3106	≤85				≥15	OP7			
Dipropionyl peroxide	UN3117	≤27		≥73			OP8	15	20	
Di-n-propyl peroxydicarbonate	UN3113	≤100					OP3	−25	−15	
Di-n-propyl peroxydicarbonate	UN3113	≤77		≥23			OP5	−20	−10	
Disuccinic acid peroxide	UN3102	>72–100					OP4			18
Disuccinic acid peroxide	UN3116	≤72				≥28	OP7	10	15	
Di-(3,5,5-trimethylhexanoyl) peroxide	UN3115	>52–82	≥18				OP7	0	10	
Di-(3,5,5-trimethylhexanoyl)peroxide [as a stable dispersion in water].	UN3119	≤52					OP8	10	15	
Di-(3,5,5-trimethylhexanoyl)peroxide	UN3119	≤38	≥62				OP8	20	25	
Ethyl 3,3-di-(tert-amylperoxy)butyrate	UN3105	≤67	≥33				OP7			
Ethyl 3,3-di-(tert-butylperoxy)butyrate	UN3103	>77–100					OP5			
Ethyl 3,3-di-(tert-butylperoxy)butyrate	UN3105	≤77	≥23				OP7			
Ethyl 3,3-di-(tert-butylperoxy)butyrate	UN3106	≤52			≥48		OP7			
1-(2-ethylhexanoylperoxy)-1,3-Dimethylbutyl peroxypivalate.	UN3115	≤52	≥45	≥10			OP7	−20	−10	
tert-Hexyl peroxyneodecanoate	UN3115	≤71	≥29				OP7	0	10	
tert-Hexyl peroxypivalate	UN3115	≤72		≥28			OP7	10	15	
3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate.	UN3115	≤77	≥23				OP7	−5	5	
3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤52					OP8	−5	5	
3-Hydroxy-1,1-dimethylbutyl peroxyneodecanoate.	UN3117	≤52	≥48				OP8	−5	5	
Isopropyl sec-butyl peroxydicarbonat + Di-sec-butyl peroxydicarbonate + Di-isopropyl peroxydicarbonate.	UN3111	≤52 + ≤28 + ≤22					OP5	−20	−10	
Isopropyl sec-butyl peroxydicarbonate + Di-sec-butyl peroxydicarbonate + Di-isopropyl peroxydicarbonate.	UN3115	≤32 + ≤15 − 18 + ≤12 − 15	≥38				OP7	−20	−10	
Isopropylcumyl hydroperoxide	UN3109	≤72	≥28				OP8			13
p-Menthyl hydroperoxide	UN3105	>72–100					OP7			13
p-Menthyl hydroperoxide	UN3109	≤72	≥28				OP8			
Methylcyclohexanone peroxide(s)	UN3115	≤67		≥33			OP7	35	40	
Methyl ethyl ketone peroxide(s)	UN3101	≤52	≥48				OP5			5, 13
Methyl ethyl ketone peroxide(s)	UN3105	≤45	≥55				OP7			5
Methyl ethyl ketone peroxide(s)	UN3107	≤40	≥60				OP8			7
Methyl isobutyl ketone peroxide(s)	UN3105	≤62	≥19				OP7			5, 23
Methyl isopropyl ketone peroxide(s)	UN3109	(See remark 31)	≥70				OP8			31
Organic peroxide, liquid, sample	UN3103						OP2			12
Organic peroxide, liquid, sample, temperature controlled.	UN3113						OP2			12
Organic peroxide, solid, sample	UN3104						OP2			12
Organic peroxide, solid, sample, temperature controlled.	UN3114						OP2			12
3,3,5,7,7-Pentamethyl-1,2,4-Trioxepane	UN3107	≤100					OP8			
Peroxyacetic acid, type D, stabilized	UN3105	≤43					OP7			13, 20
Peroxyacetic acid, type E, stabilized	UN3107	≤43					OP8			13, 20
Peroxyacetic acid, type F, stabilized	UN3109	≤43					OP8			13, 20, 28
Peroxyacetic acid or peracetic acid [with not more than 7% hydrogen peroxide].	UN3107	≤36				≥15	OP8			13, 20, 28
Peroxyacetic acid or peracetic acid [with not more than 20% hydrogen peroxide].	Exempt	≤6				≥60	Exempt			28
Peroxyacetic acid or peracetic acid [with not more than 26% hydrogen peroxide].	UN3109	≤17					OP8			13, 20, 28
Peroxylauric acid	UN3118	≤100					OP8	35	40	
Pinanyl hydroperoxide	UN3105	>56–100					OP7			13
Pinanyl hydroperoxide	UN3109	≤56	≥44				OP8			
Polyether poly-tert-butylperoxycarbonate	UN3107	≤52		≥48			OP8			
Tetrahydronaphthyl hydroperoxide	UN3106	≤100					OP7			
1,1,3,3-Tetramethylbutyl hydroperoxide	UN3105	≤100					OP7			
1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate.	UN3115	≤100					OP7	15	20	
1,1,3,3-Tetramethylbutyl peroxyneodecanoate.	UN3115	≤72		≥28			OP7	−5	5	
1,1,3,3-Tetramethylbutyl peroxyneodecanoate [as a stable dispersion in water].	UN3119	≤52					OP8	−5	5	
1,1,3,3-tetramethylbutyl peroxypivalate	UN3115	≤77	≥23				OP7	0	10	
3, 6, 9-Triethyl-3, 6, 9-trimethyl-1, 4, 7-triperoxonane.	UN3110	≤17	≥18		≥65		OP8			

ORGANIC PEROXIDE TABLE—Continued

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane.	UN3105	≤42	≥58	.....	.....	.....	OP7	.....	.....	26
Di-(3, 5, 5-trimethylhexanoyl) peroxide ..	UN3119	>38–52	≥48	.....	.....	.....	OP8	10	15	.....

Notes:
1. For domestic shipments, OP8 is authorized.
2. Available oxygen must be <4.7%.
3. For concentrations <80% OP5 is allowed. For concentrations of at least 80% but <85%, OP4 is allowed. For concentrations of at least 85%, maximum package size is OP2.
4. The diluent may be replaced by di-tert-butyl peroxide.
5. Available oxygen must be ≤9% with or without water.
6. For domestic shipments, OP5 is authorized.
7. Available oxygen must be ≤8.2% with or without water.
8. Only non-metallic packagings are authorized.
9. For domestic shipments this material may be transported under the provisions of paragraph (h)(3)(xii) of this section.
10. [Reserved]
11. [Reserved]
12. Samples may only be offered for transportation under the provisions of paragraph (b)(2) of this section.
13. ''Corrosive'' subsidiary risk label is required.
14. [Reserved]
15. No ''Corrosive'' subsidiary risk label is required for concentrations below 80%.
16. With <6% di-tert-butyl peroxide.
17. With ≤8% 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.
18. Addition of water to this organic peroxide will decrease its thermal stability.
19. [Reserved]
20. Mixtures with hydrogen peroxide, water and acid(s).
21. With diluent type A, with or without water.
22. With ≥36% diluent type A by mass, and in addition ethylbenzene.
23. With ≥19% diluent type A by mass, and in addition methyl isobutyl ketone.
24. Diluent type B with boiling point >100 C.
25. No ''Corrosive'' subsidiary risk label is required for concentrations below 56%.
26. Available oxygen must be ≤7.6%.
27. Formulations derived from distillation of peroxyacetic acid originating from peroxyacetic acid in a concentration of not more than 41% with water, total active oxygen less than or equal to 9.5% (peroxyacetic acid plus hydrogen peroxide).
28. For the purposes of this section, the names ''Peroxyacetic acid'' and ''Peracetic acid'' are synonymous.
29. Not subject to the requirements of this subchapter for Division 5.2.
30. Diluent type B with boiling point >130 °C (266 °F).
31. Available oxygen ≤6.7%.

* * * * * (e) * * *

ORGANIC PEROXIDE IBC TABLE

UN No.	Organic peroxide	Type of IBC	Maximum quantity (liters)	Control temperature	Emergency temperature
3109	ORGANIC PEROXIDE, TYPE F, LIQUID	.....	.....	.....	.....
	tert-Butyl cumyl peroxide	31HA1	1000	.....	.....
	tert-Butyl hydroperoxide, not more than 72% with water	31A	1250	.....	.....
	tert-Butyl peroxyacetate, not more than 32% in diluent type A.	31A 31HA1	1250 1000	.....	.....
	tert-Butyl peroxybenzoate, not more than 32% in diluent type A.	31A	1250	.....	.....
	tert-Butyl peroxy-3,5,5-trimethylhexanoate, not more than 37% in diluent type A.	31A 31HA1	1250 1000	.....	.....
	Cumyl hydroperoxide, not more than 90% in diluent type A.	31HA1	1250	.....	.....
	Dibenzoyl peroxide, not more than 42% as a stable dispersion.	31H1	1000	.....	.....
	Di-tert-butyl peroxide, not more than 52% in diluent type B	31A 31HA1	1250 1000	.....	.....
	1,1-Di-(tert-Butylperoxy) cyclohexane, not more than 37% in diluent type A.	31A	1250	.....	.....
	1,1-Di-(tert-butylperoxy) cyclohexane, not more than 42% in diluent type A.	31H1	1000	.....	.....
	Dicumyl peroxide, less than or equal to 100%	31A 31HA1	1250 1000	.....	.....
	Dilauroyl peroxide, not more than 42%, stable dispersion, in water.	31HA1	1000	.....	.....
	Isopropyl cumyl hydroperoxide, not more than 72% in diluent type A.	31HA1	1250	.....	.....
	p-Menthyl hydroperoxide, not more than 72% in diluent type A.	31HA1	1250	.....	.....

ORGANIC PEROXIDE IBC TABLE—Continued

UN No.	Organic peroxide	Type of IBC	Maximum quantity (liters)	Control temperature	Emergency temperature
	Peroxyacetic acid, stabilized, not more than 17%	31A	1500		
		31H1	1500		
		31H2	1500		
		31HA1	1500		
	Peroxyacetic acid, with not more than 26% hydrogen peroxide.	31A	1500		
		31HA1	1500		
	Peroxyacetic acid, type F, stabilized	31A	1500		
		31HA1	1500		
3110	ORGANIC PEROXIDE TYPE F, SOLID				
	Dicumyl peroxide, less than or equal to 100%	31A	2000		
		31H1			
		31HA1			
3119	ORGANIC PEROXIDE, TYPE F, LIQUID, TEMPERATURE CONTROLLED.				
	tert-Amyl peroxypivalate, not more than 32% in diluent type A.	31A	1250	+ 10 °C	+ 15 °C
	tert-Butyl peroxy-2-ethylhexanoate, not more than 32% in diluent type B.	31HA1	1000	+ 30 °C	+ 35 °C
		31A	1250	+ 30 °C	+ 35 °C
	tert-Butyl peroxyneodecanoate, not more than 32% in diluent type A.	31A	1250	0 °C	+ 10 °C
	tert-Butyl peroxyneodecanoate, not more than 52%, stable dispersion, in water.	31A	1250	−5 °C	+ 5 °C
	tert-Butyl peroxypivalate, not more than 27% in diluent type B.	31HA1	1000	+ 10 °C	+ 15 °C
		31A	1250	+ 10 °C	+ 15 °C
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, not more than 42%, stable dispersion, in water.	31HA1	1000	+ 30 °C	+ 35 °C
	Dicetyl peroxydicarbonate, not more than 42%, stable dispersion, in water.	31HA1	1000	+ 30 °C	+ 35 °C
	Dicyclohexylperoxydicarbonate, not more than 42% as a stable dispersion, in water.	31A	1250	+ 10 °C	+ 15 °C
	Di-(2-ethylhexyl) peroxydicarbonate, not more than 62%, stable dispersion, in water.	31A	1250	−20 °C	−10 °C
		31HA1	1000	−20 °C	−10 °C
	Diisobutyryl peroxide, not more than 28% as a stable dispersion in water.	31HA1	1000	−20 °C	−10 °C
		31A	1250	−20 °C	−10 °C
	Diisobutyryl peroxide, not more than 42% as a stable dispersion in water.	31HA1	1000	−25 °C	−15 °C
		31A	1250	−25 °C	−15 °C
	Dimyristyl peroxydicarbonate, not more than 42%, stable dispersion, in water.	31HA1	1000	+ 15 °C	+ 20 °C
	Di-(2-neodecanoylperoxyisopropyl) benzene, not more than 42%, stable dispersion, in water.	31A	1250	−15 °C	−5 °C
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52% in diluent type A.	31HA1	1000	+ 10 °C	+ 15 °C
		31A	1250	+ 10 °C	+ 15 °C
	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water.	31A	1250	+ 10 °C	+ 15 °C
	3-Hydroxy-1,1-dimethylbutyl peroxy-neodecanoate, not more than 52%, stable dispersion, in water.	31A	1250	−15 °C	−5 °C
	1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate, not more than 67%, in diluent type A.	31HA1	1000	+15 °C	+20 °C
	1,1,3,3-Tetramethylbutyl peroxyneodecanoate, not more than 52%, stable dispersion, in water.	31A	1250	−5 °C	+ 5 °C
		31HA1	1000	−5 °C	+ 5 °C

* * * * *

■ 35. In § 173.301, paragraphs (a)(1) and (2) are revised to read as follows:

§ 173.301 General requirements for shipment of compressed gases and other hazardous materials in cylinders, UN pressure receptacles and spherical pressure vessels.

(a) * * *

(1) Compressed gases must be in UN pressure receptacles built in accordance with the UN standards or in metal cylinders and containers built in accordance with the DOT and ICC specifications and part 178 of this subchapter in effect at the time of manufacture or CRC, BTC, CTC or TC specification, and requalified and marked as prescribed in subpart C in part 180 of this subchapter, if applicable. The DOT, ICC, CRC, BTC, CTC and TC specifications authorized for use are as follows:

PACKAGINGS [1]

2P	4AA480
2Q	4B
ICC–3 [2]	4B240ET
3A	4BA
3AA	4BW
3AL	4D
3AX	4DA
3A480X	4DS
3AAX	4E
3B	4L
3BN	8
3E	8AL
3HT	39
3T	

[1] Authorized CRC, BTC, CTC or TC specification cylinders that correspond with a DOT specification cylinder are listed in § 171.12(a)(4)(iii) of this subchapter.

[2] Use of existing cylinders is authorized. New construction is not authorized.

(2) A cylinder must be filled in accordance with this part, except that a ''TC'' cylinder must be filled in accordance with the Transport Canada TDG Regulations (IBR; see § 171.7 of this subchapter). Before each filling of a cylinder, the person filling the cylinder must visually inspect the outside of the cylinder. A cylinder that has a crack or leak, is bulged, has a defective valve or a leaking or defective pressure relief device, or bears evidence of physical abuse, fire or heat damage, or detrimental rusting or corrosion, may not be filled and offered for transportation. A cylinder may be repaired and requalified only as prescribed in subpart C of part 180 of this subchapter.

* * * * *

■ 36. In § 173.301b, paragraphs (a)(2), (c)(1), and (g) are revised to read as follows:

§ 173.301b Additional general requirements for shipment of UN pressure receptacles.

(a) * * *

(2) The gases or gas mixtures must be compatible with the UN pressure receptacle and valve materials as prescribed for metallic materials in ISO 11114–1:2012(E) (IBR, see § 171.7 of this subchapter) and for non-metallic materials in ISO 11114–2:2013(E) (IBR, see § 171.7 of this subchapter).

* * * * *

(c) * * *

(1) When the use of a valve is prescribed, the valve must conform to the requirements in ISO 10297:2014(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2020, the manufacture of a valve conforming to the requirements in ISO 10297:2006(E) is authorized. Until December 31, 2008, the manufacture of a valve conforming to the requirements in ISO 10297:1999(E) (IBR, *see* § 171.7 of this subchapter) is authorized.

* * * * *

(g) *Composite cylinders in underwater use.* A composite cylinder certified to ISO–11119–2 or ISO–11119–3 may not be used for underwater applications unless the cylinder is manufactured in accordance with the requirements for underwater use and is marked ''UW'' as prescribed in § 178.71(q)(18) of this subchapter.

■ 37. In § 173.303, paragraph (f)(1) is revised to read as follows:

§ 173.303 Charging of cylinders with compressed gas in a solution (acetylene).

* * * * *

(f) * * *

(1) UN cylinders and bundles of cylinders are authorized for the transport of acetylene gas as specified in this section.

(i) Each UN acetylene cylinder must conform to ISO 3807:2013€: (IBR, see § 171.7 of this subchapter), have a homogeneous monolithic porous mass filler and be charged with acetone or a suitable solvent as specified in the standard. UN acetylene cylinders must have a minimum test pressure of 52 bar and may be filled up to the pressure limits specified in ISO 3807:2013(E). The use of UN tubes and MEGCs is not authorized.

(ii) Until December 31, 2020, cylinders conforming to the requirements in ISO 3807–2(E) (IBR, *see* § 171.7 of this subchapter), having a homogeneous monolithic porous mass filler and charged with acetone or a suitable solvent as specified in the standard are authorized. UN acetylene cylinders must have a minimum test pressure of 52 bar and may be filled up to the pressure limits specified in ISO 3807–2(E).

* * * * *

■ 38. In 173.304b, paragraph (b)(5) is added to read as follows:

§ 173.304b Additional requirements for shipment of liquefied compressed gases in UN pressure receptacles.

* * * * *

(b) * * *

(5) For liquefied gases charged with compressed gases, both components—the liquid phase and the compressed—have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle. The maximum mass of contents per liter of water capacity shall not exceed 95 percent of the density of the liquid phase at 50 °C (122 °F); in addition, the liquid phase shall not completely fill the pressure receptacle at any temperature up to 60 °C (140 °F). When filled, the internal pressure at 65 °C (149 °F) shall not exceed the test pressure of the pressure receptacles. The vapor pressures and volumetric expansions of all substances in the pressure receptacles shall be considered. The maximum filling limits may be determined using the procedure in (3)(e) of P200 of the UN Recommendations.

* * * * *

■ 39. Section 173.310 is revised to read as follows:

§ 173.310 Exceptions for radiation detectors.

Radiation detectors, radiation sensors, electron tube devices, or ionization chambers, herein referred to as ''radiation detectors,'' that contain only Division 2.2 gases in non-refillable cylinders, are excepted from the specification packaging in this subchapter and, except when transported by air, from labeling and placarding requirements of this subchapter when designed, packaged, and transported as follows:

(a) Radiation detectors must be single-trip, hermetically sealed, welded metal inside containers that will not fragment upon impact.

(b) Radiation detectors must not have a design pressure exceeding 5.00 MPa (725 psig) and a capacity exceeding 405 fluid ounces (731 cubic inches). They must be designed and fabricated with a burst pressure of not less than three times the design pressure if the radiation detector is equipped with a pressure relief device, and not less than four times the design pressure if the detector is not equipped with a pressure relief device.

(c) Radiation detectors must be shipped in a strong outer packaging capable of withstanding a drop test of at least 1.2 meters (4 feet) without breakage of the radiation detector or rupture of the outer packaging. If the radiation detector is shipped as part of other equipment, the equipment must be packaged in strong outer packaging or the equipment itself must provide an equivalent level of protection.

(d) Emergency response information accompanying each shipment and available from each emergency response telephone number for radiation detectors must identify those receptacles that are not fitted with a pressure relief device and provide appropriate guidance for exposure to fire.

(e) Except as provided paragraph (f) of this section, transport in accordance with this section must be noted on the shipping paper.

(f) Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of this subchapter, including shipping papers, if the detectors meet the requirements in paragraphs (a) through (d) of this section and the capacity of detector receptacles does not exceed 50 ml (1.7 oz.).

■ 40. In § 173.335, paragraph (a) is revised to read as follows:

§ 173.335 Chemical under pressure n.o.s.

(a) *General requirements.* A cylinder filled with a chemical under pressure must be offered for transportation in accordance with the requirements of this section and § 172.301 of this subchapter. In addition, a DOT specification cylinder must meet the requirements in §§ 173.301a, 173.302, 173.302a, and 173.305, as applicable.

UN pressure receptacles must meet the requirements in §§ 173.301b, 173.302b, and 173.304b, as applicable. Where more than one section applies to a cylinder, the most restrictive requirements must be followed.

* * * * *

PART 175—CARRIAGE BY AIRCRAFT

■ 41. The authority citation for part 175 continues to read as follows:

Authority: 49 U.S.C. 5101–5128; 44701; 49 CFR 1.81 and 1.97.

■ 42. In § 175.10, revise paragraph (a)(7) to read as follows:

§ 175.10 Exceptions for passengers, crewmembers, and air operators.

(a) * * *

(7) A small medical or clinical mercury thermometer for personal use, when carried in a protective case in checked baggage.

* * * * *

■ 43. Section 175.25 is revised to read as follows:

§ 175.25 Passenger notification system.

(a) *General.* Each person who engages in for hire air transportation of passengers must effectively inform passengers about hazardous materials that passengers are forbidden to transport on aircraft and must accomplish this through the development, implementation, and maintenance of a passenger notification system.

(b) *Passenger notification system requirements.* The passenger notification system required by paragraph (a) of this section must ensure that:

(1) A passenger is presented with information required under paragraph (a) of this section at the point of ticket purchase or, if this is not practical, in another way prior to boarding pass issuance;

(2) A passenger is presented with information required under paragraph (a) of this section at the point of boarding pass issuance (*i.e.* check-in), or when no boarding pass is issued, prior to boarding the aircraft;

(3) A passenger, where the ticket purchase and/or boarding pass issuance can be completed by a passenger without the involvement of another person, acknowledges that they have been presented with the information required under paragraph (a) of this section; and

(4) A passenger is presented with information required under paragraph (a) of this section at each of the places at an airport where tickets are issued, boarding passes are issued, passenger baggage is dropped off, aircraft boarding areas are maintained, and at any other location where boarding passes are issued and/or checked baggage is accepted. This information must include visual examples of forbidden hazardous materials.

(c) *Aircraft operator manual requirements.* For certificate holders under 14 CFR parts 121 and 135, procedures and information necessary to allow personnel to implement and maintain the passenger notification system required in paragraphs (a) and (b) of this section must be described in an operations manual and/or other appropriate manuals in accordance with 14 CFR part 121 or 135.

■ 44. In § 175.33, revise paragraph (a)(3) to read as follows:

§ 175.33 Shipping paper and notification of pilot-in-command.

(a) * * *

(3) The net quantity or gross weight, as applicable, for each package except those containing Class 7 (radioactive) materials. For a shipment consisting of multiple packages containing hazardous materials bearing the same proper shipping name and identification number, only the total quantity and an indication of the quantity of the largest and smallest package at each loading location need to be provided. For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the shipping paper;

* * * * *

■ 45. In § 175.75:

■ a. Paragraphs (c) and (e)(1) are revised; and

■ b. In paragraph (f), in the QUANTITY AND LOADING TABLE, in Note 1, paragraph f. is added.

The revisions and addition read as follows:

§ 175.75 Quantity limitations and cargo location.

* * * * *

(c) For each package containing a hazardous material acceptable for carriage aboard passenger-carrying aircraft, no more than 25 kg (55 pounds) net weight of hazardous material may be loaded in an inaccessible manner. In addition to the 25 kg limitation, an additional 75 kg (165 pounds) net weight of Division 2.2 (non-flammable compressed gas) may be loaded in an inaccessible manner. The requirements of this paragraph (c) do not apply to Class 9, articles of Identification Numbers UN0012, UN0014, or UN0055 also meeting the requirements of § 173.63(b) of this subchapter, articles of Identification Numbers UN3528 or UN3529, and Limited or Excepted Quantity material.

* * * * *

(e) * * *

(1) Class 3, PG III (unless the substance is also labeled CORROSIVE), Class 6.1 (unless the substance is also labeled for any hazard class or division except FLAMMABLE LIQUID), Division 6.2, Class 7 (unless the hazardous material meets the definition of another hazard class), Class 9, articles of Identification Numbers UN0012, UN0014, or UN0055 also meeting the requirements of § 173.63(b) of this subchapter, articles of Identification Numbers UN3528 or UN3529, and those marked as a Limited Quantity or Excepted Quantity material.

* * * * *

(f) * * *

Note 1: * * *

f. Articles of Identification Numbers UN3528 or UN3529.

* * * * *

■ 46. Section 175.900 is revised to read as follows:

§ 175.900 Handling requirements for carbon dioxide, solid (dry ice).

Carbon dioxide, solid (dry ice) when shipped by itself or when used as a refrigerant for other commodities, may be carried only if the operator has made suitable arrangements based on the aircraft type, the aircraft ventilation rates, the method of packing and stowing, whether animals will be carried on the same flight and other factors. The operator must ensure that the ground staff is informed that the dry ice is being loaded or is on board the aircraft. For arrangements between the shipper and operator, see § 173.217 of this subchapter. Where dry ice is contained in a unit load device (ULD) prepared by a single shipper in accordance with § 173.217 of this subchapter and the operator after the acceptance adds additional dry ice, the operator must ensure that the information provided to the pilot-in-command and the marking on the ULD when used as a packaging reflects that revised quantity of dry ice.

PART 176—CARRIAGE BY VESSEL

■ 47. The authority citation for part 176 continues to read as follows:

Authority: 49 U.S.C. 5101–5128; 49 CFR 1.81 and 1.97.

■ 48. In § 176.83, paragraph (a)(4)(ii) is revised to read as follows:

§ 176.83 Segregation.

(a) * * *

(4) * * *

(ii) Between hazardous materials of different classes which comprise a group of substances that do not react dangerously with each other. The following materials are grouped by compatibility:

(A) Hydrogen peroxide, aqueous solutions *with not less than 8 percent but less than 20 percent hydrogen peroxide (stabilized as necessary);* Hydrogen peroxide, aqueous solutions *with not less than 20 percent but not more than 40 percent hydrogen peroxide;* Hydrogen peroxide, aqueous solutions *with more than 40 percent but not more than 60 percent hydrogen peroxide;* Hydrogen peroxide and peroxyacetic acid mixtures, stabilized *with acids, water and not more than 5 percent peroxyacetic acid;* Organic peroxide type D, liquid; Organic peroxide type E, liquid; Organic peroxide type F, liquid;

(B) Dichlorosilane, Silicon tetrachloride, and Trichlorosilane; and

(C) Organometallic substance, solid, pyrophoric; Organometallic substance, liquid, pyrophoric; Organometallic substance, solid, pyrophoric, water-reactive; Organometallic substance, liquid, pyrophoric, water-reactive; Organometallic substance, solid, water-reactive; Organometallic substance, solid, water-reactive, flammable; Organometallic substance, solid, water-reactive, self-heating; Organometallic substance, liquid, water-reactive; Organometallic substance, liquid, water-reactive, flammable; and Organometallic substance, solid, self-heating.

* * * * *

■ 49. In § 176.84(b), table provisions 149 and 150 are added in numerical order to read as follows:

§ 176.84 Other requirements for stowage, cargo handling, and segregation for cargo vessels and passenger vessels.

(b) * * *

Code	Provisions
* * * * * * *	
149	For engines or machinery containing fuels with flash point equal or greater than 23 °C (73.4 °F) , stowage Category A.
150	For uranium metal pyrophoric and thorium metal pyrophoric stowage, category D applies.
* * * * * * *	

* * * * *

■ 50. Section 176.905 is revised to read as follows:

§ 176.905 Stowage of vehicles.

(a) A vehicle powered by an internal combustion engine, a fuel cell, batteries or a combination thereof is subject to the following requirements when carried as cargo on a vessel:

(1) Before being loaded on a vessel, each vehicle must be inspected for signs of leakage from batteries, engines, fuel cells, compressed gas cylinders or accumulators, or fuel tank(s) when applicable, and any identifiable faults in the electrical system that could result in short circuit or other unintended electrical source of ignition. A vehicle showing any signs of leakage or electrical fault may not be transported.

(2) For flammable liquid powered vehicles, the fuel tank(s) containing the flammable liquid, may not be more than one fourth full and the flammable liquid must not exceed 250 L (66 gal) unless otherwise approved by the Associate Administrator.

(3) For flammable gas powered vehicles, the fuel shut-off valve of the fuel tank(s) must be securely closed.

(4) For vehicles with batteries installed, the batteries shall be protected from damage, short circuit, and accidental activation during transport. Except for vehicles with prototype or low production lithium batteries (*see* § 173.185(d) of this subchapter) securely installed, each lithium battery must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria (IBR, *see* § 171.7 of this subchapter), as specified in § 173.185(a) of this subchapter, unless approved by the Associate Administrator. Where a lithium battery installed in a vehicle is damaged or defective, the battery must be removed and transported according to § 173.185(f) of this subchapter, unless otherwise approved by the Associate Administrator.

(5) Whenever possible, each vehicle must be stowed to allow for its inspection during transportation.

(6) Vehicles may be refueled when necessary in the hold of a vessel in accordance with § 176.78.

(b) All equipment used for handling vehicles must be designed so that the fuel tank and the fuel system of the vehicle are protected from stress that might cause rupture or other damage incident to handling.

(c) Two hand-held, portable, dry chemical fire extinguishers of at least 4.5 kg (10 pounds) capacity each must be separately located in an accessible location in each hold or compartment in which any vehicle is stowed.

(d) ''NO SMOKING'' signs must be conspicuously posted at each access opening to the hold or compartment.

(e) Each portable electrical light, including a flashlight, used in the stowage area must be an approved, explosion-proof type. All electrical connections for any light must be made to outlets outside the space in which any vehicle is stowed.

(f) Each hold or compartment must be ventilated and fitted with an overhead water sprinkler system or fixed fire extinguisher system.

(g) Each hold or compartment must be equipped with a smoke or fire detection system capable of alerting personnel on the bridge.

(h) All electrical equipment in the hold or compartment other than fixed explosion-proof lighting must be disconnected from its power source at a location outside the hold or compartment during the handling and transportation of any vehicle. Where the disconnecting means is a switch or circuit breaker, it must be locked in the open position until all vehicles have been removed.

(i) *Exceptions.* A vehicle is not subject to the requirements of this subchapter if any of the following are met:

(1) The vehicle is stowed in a hold or compartment designated by the administration of the country in which the vessel is registered as specially designed and approved for vehicles and there are no signs of leakage from the battery, engine, fuel cell, compressed gas cylinder or accumulator, or fuel tank, as appropriate. For vehicles with batteries connected and fuel tanks containing gasoline transported by U.S. vessels, see 46 CFR 70.10–1 and 90.10–38;

(i) For vehicles powered solely by lithium batteries and hybrid electric vehicles powered by both an internal combustion engine and lithium metal or

ion batteries offered in accordance with this paragraph, the lithium batteries, except for prototype or those produced in low production, must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter), as specified in § 173.185(a) of this subchapter. Where a lithium battery installed in a vehicle is damaged or defective, the battery must be removed.

(ii) [Reserved]

(2) The vehicle is powered by a flammable liquid that has a flashpoint of 38 °C (100 °F) or above, the fuel tank contains 450 L (119 gallons) of fuel or less, there are no leaks in any portion of the fuel system, and installed batteries are protected from short circuit;

(3) The vehicle is powered by a flammable liquid fuel that has a flashpoint less than 38 °C (100 °F), the fuel tank is empty, and installed batteries are protected from short circuit. Vehicles are considered to be empty of flammable liquid fuel when the fuel tank has been drained and the vehicles cannot be operated due to a lack of fuel. Engine components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty. The fuel tank does not need to be cleaned or purged;

(4) The vehicle is powered by a flammable gas (liquefied or compressed), the fuel tanks are empty and the positive pressure in the tank does not exceed 2 bar (29 psig), the fuel shut-off or isolation valve is closed and secured, and installed batteries are protected from short circuit;

(5) The vehicle is solely powered by a wet or dry electric storage battery or a sodium battery, and the battery is protected from short circuit; or

(6) The vehicle is powered by a fuel cell engine, the engine is protected from inadvertent operation by closing fuel supply lines or by other means, and the fuel supply reservoir has been drained and sealed.

(j) Except as provided in § 173.220(f) of this subchapter, the provisions of this subchapter do not apply to items of equipment such as fire extinguishers, compressed gas accumulators, airbag inflators and the like which are installed in the vehicle if they are necessary for the operation of the vehicle, or for the safety of its operator or passengers.

■ 51. Section 176.906 is added to read as follows:

§ 176.906 Stowage of engines and machinery.

(a) Any engine or machinery powered by internal combustion systems, with or without batteries installed, is subject to the following requirements when carried as cargo on a vessel:

(1) Before being loaded on a vessel, each engine or machinery must be inspected for fuel leaks and identifiable faults in the electrical system that could result in short circuit or other unintended electrical source of ignition. Engines or machinery showing any signs of leakage or electrical fault may not be transported.

(2) The fuel tanks of an engine or machinery powered by liquid fuel may not be more than one-fourth full.

(3) Whenever possible, each engine or machinery must be stowed to allow for its inspection during transportation.

(b) All equipment used for handling engines or machinery must be designed so that the fuel tank and the fuel system of the engines or machinery are protected from stress that might cause rupture or other damage incident to handling.

(c) Two hand-held, portable, dry chemical fire extinguishers of at least 4.5 kg (10 pounds) capacity each must be separately located in an accessible location in each hold or compartment in which engine or machinery is stowed.

(d) ''NO SMOKING'' signs must be conspicuously posted at each access opening to the hold or compartment.

(e) Each portable electrical light, including a flashlight, used in the stowage area must be an approved, explosion-proof type. All electrical connections for any light must be made to outlets outside the space in which any engine or machinery is stowed.

(f) Each hold or compartment must be ventilated and fitted with an overhead water sprinkler system or fixed fire extinguisher system.

(g) Each hold or compartment must be equipped with a smoke or fire detection system capable of alerting personnel on the bridge.

(h) All electrical equipment in the hold or compartment other than fixed explosion-proof lighting must be disconnected from its power source at a location outside the hold or compartment during the handling and transportation of any engine or machinery. Where the disconnecting means is a switch or circuit breaker, it must be locked in the open position until all engines or machinery has been removed.

(i) *Exceptions.* (1) An engine or machinery is not subject to the requirements of this subchapter if the engine or machinery is empty of liquid or gaseous fuel(s), does not contain other dangerous goods, and installed batteries are protected from short circuit. An engine and machinery is considered to be empty of fuel when:

(i) For liquid fuels, the liquid fuel tank has been drained and the mechanical equipment cannot be operated due to a lack of fuel. Engine and machinery components such as fuel lines, fuel filters and injectors do not need to be cleaned, drained or purged to be considered empty of liquid fuels. In addition, the liquid fuel tank does not need to be cleaned or purged;

(ii) For gaseous fuels, the gaseous fuel tanks are empty of liquid (for liquefied gases), the positive pressure in the tanks does not exceed 2 bar (29 psig) and the fuel shut-off or isolation valve is closed and secured; or

(iii) The engine or machinery is powered by a fuel cell engine and the engine is protected from inadvertent operation by closing fuel supply lines or by other means, and the fuel supply reservoir has been drained and sealed.

(2) An engine or machinery is not subject to the requirements of this subchapter except for § 173.185 of this subchapter and the vessel stowage provisions of column (10) of table § 172.101 of this subchapter, if the following are met:

(i) Any valves or openings (*e.g.* venting devices) for liquid fuels must be closed during transport;

(ii) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged;

(iii) For UN 3528 and UN 3530:

(A) Where the engine or machinery contains more than 60 L (16 Gal) of liquid fuel and has a capacity of not more than 450 L (119 Gal), it shall be labeled in accordance with subpart E of part 172 of this subchapter;

(B) Where the engine or machinery contains more than 60 L of liquid fuel and has a capacity of more than 450 L (119 Gal) but not more than 3,000 L (793 Gal), it shall be labeled on two opposing sides in accordance with § 172.406(e) of this subchapter;

(C) Where the engine or machinery contains more than 60 L (16 Gal) of liquid fuel and has a capacity of more than 3,000 L (793 Gal), it shall be placarded on two opposing sides in accordance with subpart F of part 172 of this subchapter; and

(D) For UN 3530 the marking requirements of § 172.322 of this subchapter also apply.

(iv) For UN 3529:

(A) Where the fuel tank of the engine or mechanical equipment has a water

capacity of not more than 450 L (119 Gal), the labeling requirements of subpart E of part 172 of this subchapter shall apply;

(B) Where the fuel tank of the mechanical equipment has a water capacity of more than 450 L (119 Gal) but not more than 1,000 L (264 Gal), it shall be labeled on two opposing sides in accordance with § 172.406(e) of this subchapter;

(C) Where the fuel tank of the mechanical equipment has a water capacity of more than 1,000 L (264 Gal), it shall be placarded on two opposing sides in accordance with subpart F of part 172 of this subchapter.

(v) Except for engines or machinery offered in accordance with paragraph (i)(1) of this section, a shipping paper prepared in accordance with part 172 of this subchapter is required and shall contain the following additional statement ''Transport in accordance with § 176.906.'' For transportation in accordance with the IMDG Code (IBR, see § 171.7 of this subchapter) the following alternative statement is authorized ''Transport in accordance with IMDG Code special provision 363.''

(j) Except as provided in § 173.220(f) of this subchapter, the provisions of this subchapter do not apply to items of equipment such as fire extinguishers, compressed gas accumulators, airbag inflators and the like which are installed in the engine or machinery if they are necessary for the operation of the engine or machinery, or for the safety of its operator or passengers.

PART 178—SPECIFICATIONS FOR PACKAGINGS

■ 52. The authority citation for part 178 continues to read as follows:

Authority: 49 U.S.C. 5101–5128; 49 CFR 1.81 and 1.97.

■ 53. In § 178.71:

■ a. Revise paragraph (d)(2);

■ b. Add paragraph (g)(4);

■ c. Revise paragraphs (h), (k)(2), (l), and (o)(2);

■ d. Add paragraphs (q)(20) and (21); and

■ e. Revise paragraph (r).

The revisions and additions read as follows:

§ 178.71 Specifications for UN pressure receptacles.

* * * * *

(d) * * *

(2) Service equipment must be configured or designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and transport. Manifold piping leading to shut-off valves must be sufficiently flexible to protect the valves and the piping from shearing or releasing the pressure receptacle contents. The filling and discharge valves and any protective caps must be secured against unintended opening. The valves must conform to ISO 10297:2014(E) or ISO 13340:2001(E) (IBR, *see* § 171.7 of this subchapter) for non-refillable pressure receptacles, and be protected as specified in § 173.301b(f) of this subchapter. Until December 31, 2020, the manufacture of a valve conforming to the requirements in ISO 10297:2006(E) (IBR, *see* § 171.7 of this subchapter) is authorized. Until December 31, 2008, the manufacture of a valve conforming to the requirements in ISO 10297:1999(E) (IBR, *see* § 171.7 of this subchapter) is authorized.

* * * * *

(g) * * *

(4) ISO 9809–4:2014(E) (IBR, see § 171.7 of this subchapter).

(h) *Design and construction requirements for UN refillable seamless aluminum alloy cylinders.* In addition to the general requirements of this section, UN refillable seamless aluminum cylinders must conform to ISO 7866:2012(E) as modified by ISO 7866:2012/Cor.1:2014(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2020, the manufacture of a cylinder conforming to the requirements in ISO 7866(E) (IBR, see § 171.7 of this subchapter) is authorized. The use of Aluminum alloy 6351–T6 or equivalent is prohibited.

* * * * *

(k) * * *

(2) The porous mass in an acetylene cylinder must conform to ISO 3807:2013(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2020, the manufacture of a cylinder conforming to the requirements in ISO 3807–2(E) (IBR, see § 171.7 of this subchapter) is authorized.

(l) *Design and construction requirements for UN composite cylinders and tubes.* (1) In addition to the general requirements of this section, UN composite cylinders and tubes must be designed for a design life of not less than 15 years. Composite cylinders and tubes with a design life longer than 15 years must not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test program. The service life test program must be part of the initial design type approval and must specify inspections and tests to demonstrate that cylinders manufactured accordingly remain safe to the end of their design life. The service life test program and the results must be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder or tube must not be extended beyond its initial approved design life. Additionally, composite cylinders and tubes must conform to the following ISO standards, as applicable:

(i) ISO 11119–1:2012(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 11119–1(E), (IBR, see § 171.7 of this subchapter) are authorized.

(ii) ISO 11119–2:2012(E) (ISO 11119–2:2012/Amd.1:2014(E)) (IBR, see § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 11119–2(E) (IBR, see § 171.7 of this subchapter) are authorized.

(iii) ISO 11119–3:2013(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 11119–3(E) (IBR, see § 171.7 of this subchapter) are authorized.

(2) ISO 11119–2 and ISO 11119–3 gas cylinders of composite construction manufactured in accordance with the requirements for underwater use must bear the ''UW'' mark.

* * * * *

(o) * * *

(2) ISO 11114–2:2013(E) (IBR, see § 171.7 of this subchapter).

* * * * *

(q) * * *

(20) For composite cylinders and tubes having a limited design life, the letters ''FINAL'' followed by the design life shown as the year (four digits) followed by the month (two digits) separated by a slash (*i.e.* ''/'').

(21) For composite cylinders and tubes having a limited design life greater than 15 years and for composite cylinders and tubes having non-limited design life, the letters ''SERVICE'' followed by the date 15 years from the date of manufacture (initial inspection) shown as the year (four digits) followed by the month (two digits) separated by a slash (*i.e.* ''/'').

(r) *Marking sequence.* The marking required by paragraph (q) of this section must be placed in three groups as shown in the example below:

(1) The top grouping contains manufacturing marks and must appear consecutively in the sequence given in paragraphs (q)(13) through (19) of this section.

(2) The middle grouping contains operational marks described in paragraphs (q)(6) through (11) of this section.

(3) The bottom grouping contains certification marks and must appear consecutively in the sequence given in paragraphs (q)(1) through (5) of this section.

EXAMPLE TO § 178.71

(12) (13) (14) (15) (16) (17) (18) (19) (20) (21)

25E USA 765432 H UW FINAL 2XXX/XX FINAL 2XXX/XX SERVICE 2XXX/XX

---

(10) (6) (7) (8) (11) (9)

PW200 PH300BAR RCPXXXBAR 62.1 KG 50L 5.8MM

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(1) (2) (3) (4) (5)

ISO 9809-1 USA/MXXXX IB 2005/12

* * * * *

■ 54. In § 178.75, paragraph (d)(3)(iv) is redesignated as (d)(3)(v) and paragraph (d)(3)(iv) is added to read as follows:

§ 178.75 Specifications for MEGCs.

* * * * *

(d) * * *

(3) * * *

(iv) ISO 9809–4:2014(E) Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa (IBR, see § 171.7 of this subchapter).

* * * * *

■ 55. In § 178.1015, paragraph (f) is revised to read as follows:

§ 178.1015 General Flexible Bulk Container standards.

* * * * *

(f) A venting device must be fitted to Flexible Bulk Containers intended to transport hazardous materials that may develop dangerous accumulation of gases within the Flexible Bulk Container. Any venting device must be designed so that external foreign substances or the ingress of water are prevented from entering the Flexible Bulk Container through the venting device under conditions normally incident to transportation.

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

■ 56. The authority citation for part 180 continues to read as follows:

Authority: 49 U.S.C. 5101–5128; 49 CFR 1.81 and 1.97.

■ 57. In § 180.205, paragraph (c) is revised to read as follows:

§ 180.205 General requirements for requalification of specification cylinders.

* * * * *

(c) *Periodic requalification of cylinders.* Each cylinder bearing a DOT, CRC, BTC, or CTC specification marking must be requalified and marked as specified in the Requalification Table in this subpart or requalified and marked by a facility registered by Transport Canada in accordance with the Transport Canada TDG Regulations (IBR, *see* § 171.7 of this subchapter). Each cylinder bearing both a TC specification marking and also marked with a corresponding DOT specification marking must be requalified and marked as specified in the Requalification Table in this subpart or requalified and marked by a facility registered by Transport Canada in accordance with the Transport Canada TDG Regulations (IBR, *see* § 171.7 of this subchapter). Each cylinder bearing a DOT special permit number must be requalified and marked in conformance with this section and the terms of the applicable special permit. Each cylinder bearing only a TC mark must be requalified and marked as specified in the Transport Canada TDG Regulations (IBR, *see* § 171.7 of this subchapter), except that registration with Transport Canada is not required and cylinders must be marked with the requalifiers DOT issued requalifier identification number. No cylinder may be filled with a hazardous material and offered for transportation in commerce unless that cylinder has been successfully requalified and marked in accordance with this subpart. A cylinder may be requalified at any time during or before the month and year that the requalification is due. However, a cylinder filled before the requalification becomes due may remain in service until it is emptied. A cylinder with a specified service life may not be refilled and offered for transportation after its authorized service life has expired.

(1) Each cylinder that is requalified in accordance with the requirements specified in this section must be marked

in accordance with § 180.213 or the requirements of the Transport Canada TDG Regulations, or in the case of a TC cylinder requalified in the United States by a DOT RIN holder, in accordance with the requirements of the Transport Canada TDG Regulations except that registration with Transport Canada is not required and cylinders must be marked with the requalifiers DOT issued requalifier identification number.

(2) Each cylinder that fails requalification must be:

(i) Rejected and may be repaired or rebuilt in accordance with § 180.211 or § 180.212, as appropriate; or

(ii) Condemned in accordance with paragraph (i) of this section.

(3) For DOT specification cylinders, the marked service pressure may be changed upon approval of the Associate Administrator and in accordance with written procedures specified in the approval.

(4) For a specification 3, 3A, 3AA, 3AL, 3AX, 3AAX, 3B, 3BN, or 3T cylinder filled with gases in other than Division 2.2, from the first requalification due on or after December 31, 2003, the burst pressure of a CG–1, CG–4, or CG–5 pressure relief device must be at test pressure with a tolerance of plus zero to minus 10%. An additional 5% tolerance is allowed when a combined rupture disc is placed inside a holder. This requirement does not apply if a CG–2, CG–3 or CG–9 thermally activated relief device or a CG–7 reclosing pressure valve is used on the cylinder.

* * * * *

■ 58. In § 180.207, paragraph (d)(3) is revised to read as follows:

§ 180.207 Requirements for requalification of UN pressure receptacles.

* * * * *

(d) * * *

(3) Dissolved acetylene UN cylinders: Each dissolved acetylene cylinder must be requalified in accordance with ISO 10462:2013(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2018 requalification may be done in accordance with ISO 10462(E) (IBR, *see* § 171.7 of this subchapter). The porous mass and the shell must be requalified no sooner than 3 years, 6 months, from the date of manufacture. Thereafter, subsequent requalifications of the porous mass and shell must be performed at least once every ten years.

* * * * *

■ 59. In § 180.211, paragraph (a) is revised and paragraph (g) is added to read as follows:

§ 180.211 Repair, rebuilding and reheat treatment of DOT–4 series specification cylinders.

(a) *General requirements for repair and rebuilding.* Any repair or rebuilding of a DOT–4 series cylinder must be performed by a person holding an approval as specified in § 107.805 of this chapter or by a registered facility in Canada in accordance with the Transport Canada TDG Regulations (IBR, see § 171.7 of this subchapter). A person performing a rebuild function is considered a manufacturer subject to the requirements of § 178.2(a)(2) and subpart C of part 178 of this subchapter. The person performing a repair, rebuild, or reheat treatment must record the test results as specified in § 180.215. Each cylinder that is successfully repaired or rebuilt must be marked in accordance with § 180.213.

* * * * *

(g) *Repair, rebuilding and reheat treatment in Canada.* Repair, rebuilding, or reheat treatment of a DOT–4 series specification cylinder performed by a registered facility in Canada in accordance with the Transport Canada TDG Regulations (IBR, *see* § 171.7 of this subchapter) is authorized.

■ 60. In § 180.212, paragraph (a)(1)(ii) is revised to read as follows:

§ 180.212 Repair of seamless DOT 3-series specification cylinders and seamless UN pressure receptacles.

(a) * * *

(1) * * *

(ii) Except as provided in paragraph (b) of this section, the repair and the inspection is performed under the provisions of an approval issued under subpart H of part 107 of this chapter or by a facility registered by Transport Canada in accordance with the Transport Canada TDG Regulations (IBR; see § 171.7 of this subchapter) and conform to the applicable cylinder specification or ISO standard contained in part 178 of this subchapter.

* * * * *

■ 61. In § 180.413, paragraph (a)(1)(iii) is added and paragraph (b) introductory text is revised to read as follows:

§ 180.413 Repair, modification, stretching, rebarrelling, or mounting of specification cargo tanks.

(a) * * *

(1) * * *

(iii) A repair, as defined in § 180.403, of a DOT specification cargo tank used for the transportation of hazardous materials in the United States may be performed by a facility in Canada in accordance with the Transport Canada TDG Regulations (IBR, see § 171.7 of this subchapter) provided:

(A) The facility holds a valid Certificate of Authorization from a provincial pressure vessel jurisdiction for repair;

(B) The facility is registered in accordance with the Transport Canada TDG Regulations to repair the corresponding TC specification; and

(C) All repairs are performed using the quality control procedures used to obtain the Certificate of Authorization.

(b) *Repair.* The suitability of each repair affecting the structural integrity or lading retention capability of the cargo tank must be determined by the testing required either in the applicable manufacturing specification or in § 180.407(g)(1)(iv). Except for a repair performed by a facility in Canada in accordance with paragraph (a)(1)(iii) of this section, each repair of a cargo tank involving welding on the shell or head must be certified by a Registered Inspector. The following provisions apply to specific cargo tank repairs:

* * * * *

■ 62. In § 180.605, paragraph (g)(1) is revised to read as follows:

§ 180.605 Requirements for periodic testing, inspection and repair of portable tanks.

* * * * *

(g) * * *

(1) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for transportation. The wall thickness must be verified by appropriate measurement if this inspection indicates a reduction of wall thickness;

* * * * *

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Howard W. McMillan,

Acting Deputy Administrator, Pipeline and Hazardous Materials Safety Administration.

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