

**Billing Code: 4910-60-P**  
**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:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The Pipeline and Hazardous Materials Safety Administration (PHMSA) proposes 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 proposes several amendments to the HMR that result from coordination with Canada under the U.S.-Canada Regulatory Cooperation Council.

**DATES:** Comments must be received by [INSERT DATE 60 DAYS FROM

PUBLICATION DATE OF NPRM].

**ADDRESSES:** You may submit comments by any of the following methods:

Federal Rulemaking Portal: <http://www.regulations.gov>. Follow the on-line instructions for submitting comments.

Fax: 1-202-493-2251.

Mail: Docket Management System; U.S. Department of Transportation, Docket Operations, M-30, Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE, Washington, DC 20590-0001.

Hand Delivery: To U.S. Department of Transportation, Docket Operations, M-30, Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE, Washington, DC 20590-0001 between 9 a.m. and 5 p.m. Monday through Friday, except Federal holidays.

Instructions: Include the agency name and docket number PHMSA-2015-0273 (HM-215N) or RIN 2137-AF18 for this rulemaking at the beginning of your comment. Note that all comments received will be posted without change to <http://www.regulations.gov> including any personal information provided. If sent by mail, comments must be submitted in duplicate. Persons wishing to receive confirmation of receipt of their comments must include a self-addressed stamped postcard.

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.regulations.gov>.

Docket: You may view the public docket through the Internet at

<http://www.regulations.gov> or in person at the Docket Operations office at the above

address (See ADDRESSES).

**FOR FURTHER INFORMATION CONTACT:** Steven Webb, Office of Hazardous Materials Standards or Aaron Wiener, International Standards, telephone (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:**

**Table of Contents**

- I. Executive Summary
- II. Background
- III. Incorporation by Reference Discussion Under 1 CFR Part 51
- IV. Harmonization Proposals in this NPRM
- V. Amendments Not Being Considered for Adoption in this NPRM
- VI. Section-by-Section Review
- VII. Regulatory Analyses and Notices
  - A. Statutory/Legal Authority for this Rulemaking
  - B. Executive Order 12866, Executive Order 13563, and DOT Regulatory Policies and Procedures
  - C. Executive Order 13132
  - D. Executive Order 13175
  - E. Regulatory Flexibility Act, Executive Order 13272, and DOT Policies and Procedures
  - F. Paperwork Reduction Act
  - G. Regulation Identifier Number (RIN)
  - H. Unfunded Mandates Reform Act of 1995
    - I. Environment Assessment
    - J. Privacy Act
  - K. Executive Order 13609 and International Trade Analysis
  - L. National Technology Transfer and Advancement Act
- List of Subjects

## **I. Executive Summary**

The Pipeline and Hazardous Materials Safety Administration (PHMSA) proposes to amend 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.

In this NPRM, PHMSA proposes to amend the HMR to maintain consistency with various international standards. The following are some of the more noteworthy proposals set forth in this NPRM:

- Incorporation by Reference: PHMSA proposes to incorporate by reference the newest versions of various international hazardous materials standards, including the 2017–2018 Edition of the International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions); Amendment 38-16 to the International Maritime Dangerous Goods Code (IMDG Code); the 19th Revised Edition of the United Nations Recommendations on the Transport of Dangerous Goods (UN Model Regulations); the 6th Revised Edition of the United Nations Manual of Tests and Criteria; and the 6th Revised Edition of the Globally Harmonized System of Classification and Labelling of Chemicals. Additionally, we propose to update 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 NPRM, PHMSA proposes the adoption of updated International Organization for Standardization (ISO) standards.

- Hazardous Materials Table (HMT): PHMSA proposes amendments to 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 propose 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 proposes to revise the HMT consistent with amendments adopted into the UN Model Regulations. Specifically, we propose to include into the HMT four new Division 4.1 entries for polymerizing substances and to add into the HMR defining criteria, authorized packagings, and safety requirements including, but not limited to, stabilization methods and operational controls.
- Modification of the Marine Pollutant List: PHMSA proposes to modify 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 proposes various amendments to 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 proposes to revise hazard communication requirements for shipments of lithium batteries consistent with changes adopted in the 19th Revised Edition of the UN Model Regulations. Specifically, PHMSA proposes to adopt a new lithium battery label in place of the existing Class 9 label; to amend 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;<sup>1</sup> to delete the documentation requirement in § 173.185(c) for shipments of small lithium cells and batteries; and to require the lithium battery mark be applied to each package containing small lithium cells or batteries contained in equipment when there are more than four

---

<sup>1</sup> 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).

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 proposes to harmonize the HMT proper shipping names utilized for the transportation of engines and machinery containing engines with those in the UN Model Regulations. Additionally, PHMSA proposes harmonization with the IMDG Code for domestic vessel shipments of engines, internal combustion, and machinery containing combustion engines. Under the proposals in this NPRM, the existing “Engine, internal combustion” entries would be assigned their own UN numbers and hazard class based on the type of fuel (e.g. a flammable liquid powered engine is assigned a proper shipping name with a Class 3 designation). Existing requirements and exceptions for the transportation of engines and machinery containing engines transported by road, rail, and aircraft would remain unchanged. PHMSA is, however, proposing to harmonize 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) Proposals: PHMSA proposes several amendments to the HMR resulting from coordination with Canada under the U.S.-Canada RCC. Specifically, we propose provisions for recognition of Transport Canada (TC) cylinders, equivalency certificates (permit for equivalent level of safety), and inspection and repair of cargo tanks. These changes would be made in conjunction with Transport Canada proposing similar regulatory changes that will provide reciprocal recognition of DOT cylinders and DOT special permits.

If adopted in a final rule, the amendments proposed in this NPRM will result in minimal burdens on the regulated community. The benefits achieved from their adoption include enhanced transportation safety resulting from the consistency of domestic and international hazard communication and continued access to foreign markets by U.S. manufacturers of hazardous materials. PHMSA anticipates that most of the amendments in this NPRM will result in cost savings and will ease the regulatory compliance burden for shippers engaged in domestic and international commerce, including trans-border shipments within North America.

PHMSA solicits comment from the regulated community on these amendments and others proposed in this NPRM pertaining to need, benefits and costs of international harmonization, impact on safety, and any other relevant concerns. In addition, PHMSA solicits comment regarding approaches to reducing the costs of this rule while maintaining or increasing the benefits. In its preliminary analysis, PHMSA concluded that the aggregate benefits of the amendments proposed in this NPRM justify their aggregate costs. Nonetheless, PHMSA solicits comment on specific changes (i.e., greater flexibility with regard to a particular amendment) that might improve the rule.

## **II. Background**

Federal law and policy strongly favor the harmonization of domestic and international standards for hazardous materials transportation. The Federal hazardous materials transportation law (49 U.S.C. § 5101 *et seq.*, “Federal hazmat law”) directs PHMSA to participate in relevant international standard-setting bodies and promotes consistency of the HMR with international transport standards to the extent practicable.



Although Federal hazmat law permits PHMSA to depart from international standards to promote safety or other overriding public interest, it otherwise encourages domestic and international harmonization (see 49 U.S.C. 5120).

In a final rule published December 21, 1990 (Docket HM-181; 55 FR 52402), PHMSA's predecessor—the Research and Special Programs Administration (RSPA)—comprehensively revised the HMR for international harmonization with the UN Model Regulations. The UN Model Regulations constitute a set of recommendations issued by the United Nations Sub-Committee of Experts (UNSCOE) on the Transport of Dangerous Goods (TDG) and the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The UN Model Regulations are amended and updated biennially by the UNSCOE and serve as the basis for national, regional, and international modal regulations, including the IMDG Code and the ICAO Technical Instructions.

Since publication of the 1990 rule, PHMSA has issued 11 additional international harmonization rulemakings under the following dockets: HM-215A [59 FR 67390]; HM-215B [62 FR 24690]; HM-215C [64 FR 10742]; HM-215D [66 FR 33316]; HM-215E [68 FR 44992]; HM-215G [69 FR 76044]; HM-215I [71 FR 78595]; HM-215J [74 FR 2200]; HM-215K [76 FR 3308]; HM-215L [78 FR 987]; and HM-215M [80 FR 1075]. These rulemakings were based on biennial updates of the UN Model Regulations, the IMDG Code, and the ICAO Technical Instructions.

Harmonization becomes increasingly important as the volume of hazardous materials transported in international commerce grows. It not only facilitates international trade by minimizing the costs and other burdens of complying with multiple or inconsistent safety requirements for transportation of hazardous materials, but it also enhances safety

when the international standards provide an appropriate level of protection. PHMSA actively participates in the development of international standards for the transportation of hazardous materials and promotes the adoption of standards consistent with the HMR. When considering the harmonization of the HMR with international standards, 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 with international standards without diminishing the level of safety currently provided by the HMR or imposing undue burdens on the regulated community.

Based on recent review and evaluation, PHMSA proposes to revise the HMR to incorporate changes from the 19th Revised Edition of the UN Model Regulations, Amendment 38-16 to the IMDG Code, and the 2017–2018 Edition of the ICAO Technical Instructions, which become effective January 1, 2017.<sup>2</sup>

In addition, PHMSA proposes to incorporate by reference the newest editions of various international standards. These standards incorporated by reference are authorized for use, under specific circumstances, in part 171 subpart C of the HMR. This proposed rule is necessary to incorporate revisions to the international standards and, if adopted in the HMR, will be effective January 1, 2017.

#### *Possible Interim Final Rule*

The changes to the international standards will take effect on January 1, 2017. Therefore, it is essential that a final rule incorporating these standards by reference be

---

<sup>2</sup> 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.

published no later than December 31, 2016 with an effective date of January 1, 2017. Otherwise, U.S. companies—including numerous small entities competing in foreign markets—will be at an economic disadvantage because of their need to comply with a dual system of regulations (specifically, the HMR, UN Model Regulations, and ICAO Technical Instructions). To this end, if it appears a final rule under this docket will not be published prior to January 1, 2017, PHMSA will publish a bridging document in the form of an interim final rule to amend the HMR by incorporating the 19th Revised Edition of the UN Recommendations and the 2017–2018 Edition of the ICAO Technical Instructions.

With regard to Amendment 38-16 of the IMDG Code, the International Maritime Organization (IMO) approved an implementation date of January 1, 2018. The current edition of the IMDG Code (Amendment 37-14) remains in effect through 2017; therefore, we will not include the newest version of the IMDG Code in any bridging document. The proposed incorporation by reference of the newest edition of the IMDG Code and all other changes proposed in this NPRM would be addressed in a subsequent final rule also under this docket [PHMSA-2015-0273 (HM–215N)]. Accordingly, any interim final rule will only incorporate by reference editions of the international standards that become effective on January 1, 2017.

### **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 websites. 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 websites. The price charged for those not freely available helps to cover the cost of developing, maintaining, hosting, and accessing these standards. The specific standards are discussed in greater detail in the following analysis.

#### **IV. Harmonization Proposals in this NPRM**

In addition to various other revisions to the HMR, PHMSA proposes the following amendments to harmonize the HMR with the most recent revisions to the UN Model Regulations, ICAO Technical Instructions, and IMDG Code, as well as several amendments resulting from coordination with Canada under the U.S.-Canada RCC:

- Incorporation by Reference: PHMSA proposes to incorporate by reference the latest editions of various international transport standards including the 2017–2018 Edition of the ICAO Technical Instructions; Amendment 38-16 of the IMDG Code; the 6th Revised Edition of the UN Manual of Tests and Criteria; the 6th Revised Edition of the United Nations Globally Harmonized System of Classification and Labelling of Chemicals; and the 19th Revised Edition of the UN Model Regulations. Additionally, we are proposing to update our incorporation by reference of the Canadian 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. This incorporation by reference augments the broad reciprocity provided in § 171.12 where the HMR allow the use of the TDG Regulations under certain conditions when transporting hazardous materials to or from Canada by highway or rail. Finally, PHMSA proposes the incorporation by reference of new and updated ISO standards.

- Hazardous Materials Table (HMT): PHMSA proposes amendments to the HMT to add, revise, or remove certain proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, bulk packaging requirements, vessel stowage and segregation requirements, and passenger and cargo aircraft maximum quantity limits.
- Packaging Requirements for Water-Reactive Materials Transported by Vessel: PHMSA proposes various amendments to packaging requirements for vessel transportation of water-reactive substances. 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. These proposed changes are consistent with IMDG Code requirements.
- Hazard Communication Requirements for Lithium Batteries: PHMSA proposes to revise hazard communication requirements for lithium batteries consistent with changes adopted in the 19th Revised Edition of the UN Model Regulations. Specifically, PHMSA proposes to adopt a new lithium battery label in place of the existing Class 9 label; to amend 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; to remove the documentation requirement in § 173.185(c) for shipments of small lithium cells and batteries; and to amend 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 contained in equipment, where there are not more than two packages in the consignment.”

- Engine, Internal Combustion/Machinery, Internal Combustion: PHMSA proposes to harmonize the HMT entries for the transportation of engines and machinery containing engines with those in the UN Model Regulations. Additionally, PHMSA proposes harmonization with the IMDG Code for domestic vessel shipments of engines, internal combustion, and machinery containing combustion engines. Under the proposals in this NPRM, the existing “Engine, internal combustion” entries would be assigned their own UN numbers and hazard class based on the type of fuel (e.g., a flammable liquid powered engine is assigned a proper shipping name with a Class 3 designation). Existing requirements and exceptions for the transportation of engines and machinery containing engines transported by road, rail, and aircraft would remain unchanged. PHMSA is, however, proposing to harmonize 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) Proposals: The Prime

Minister of Canada and the President of the United States created the U.S.-Canada Regulatory Cooperation Council in 2011. Through this effort, the United States and Canada strive to strengthen regulatory cooperation and reciprocity to enhance economic competitiveness while maintaining high standards of health, safety, and environmental protection. DOT, together with Transport Canada, have collaborated to develop a regulatory partnership statement and work plan, both of which can be viewed at <http://trade.gov/rcc>. Stakeholder input (which can be viewed at [www.regulations.gov](http://www.regulations.gov) under Docket No. PHMSA 2012-0058), as well as internal and mutual regulatory review, help determine work plan initiatives and areas where enhanced regulatory cooperation and reciprocity might be feasible and beneficial provided there is no compromise in safety. Three primary initiatives identified in the work plan are the recognition of inspection and repair of cargo tanks under the U.S. requirements for highway transport, the mutual recognition of standard pressure receptacles (cylinders), and mutual recognition of DOT special permits and Transport Canada equivalency certificates.

- PHMSA proposes to address the cargo tank initiative by authorizing facilities in Canada that hold a Certificate of Authorization for repair from a provincial pressure vessel jurisdiction to repair DOT specification cargo tanks that are used to transport hazardous materials in the United States. PHMSA further proposes to except those facilities from registering in accordance with part 107 subpart F of the HMR provided they are registered in accordance with the Transport Canada TDG Regulations. This proposed authority and exception would provide carriers with additional access to repair facilities in Canada

without jeopardizing the DOT specification of a cargo tank and broaden reciprocity with Canada, which already recognizes repairs of TC specification cargo tanks performed by authorized and registered facilities in the United States.

- PHMSA proposes to address the cylinder initiative by authorizing the filling, requalification, and use of cylinders manufactured in accordance with the TDG Regulations that have a corresponding DOT specification in the HMR. Mutual recognition of cylinder specifications and requalification inspections will mean cylinder users that frequently conduct business that crosses the border will not need to maintain two sets of substantially similar cylinders.
- PHMSA proposes to address the equivalency certificate initiative by amending the HMR to allow shipments offered in accordance with an equivalency certificate to transit to their first destination without having to apply for a duplicative special permit from PHMSA.

## **V. Amendments Not Being Considered for Adoption in this NPRM**

PHMSA's goal in this rulemaking is to maintain consistency between the HMR and the international requirements. We are not striving to make the HMR identical to the international regulations but rather to remove or avoid potential barriers to international transportation.

PHMSA proposes changes to the HMR based on amendments adopted in the 19th Revised Edition of the UN Model Regulations, the 2017–2018 Edition of the ICAO Technical Instructions, and Amendment 38-16 to the IMDG Code. We are not, however,



proposing to adopt all of the amendments made to the various international standards into the HMR.

In many cases, amendments to the international recommendations and regulations are not adopted into the HMR because the framework or structure makes adoption unnecessary. In other cases, we have addressed, or will address, the amendments in separate rulemaking proceedings. If we have inadvertently omitted an amendment in this NPRM, we will attempt to include the omission in the final rule; however, our ability to make changes in a final rule is limited by requirements of the Administrative Procedure Act (5 U.S.C. 553). In some instances, we can adopt a provision inadvertently omitted in the NPRM if it is clearly within the scope of changes proposed in the notice. Otherwise, in order to provide opportunity for notice and comment, the change must first be proposed in an NPRM.

The following is a list of notable amendments to the international regulations that PHMSA is not considering for adoption in this NPRM:

- Large Salvage Cylinders: The 17th Revised Edition of the UN Model Regulations includes guidelines for Competent Authorities to use when issuing approvals for salvage pressure receptacles. These revisions are found in Chapter 1.2, 4.1, 5.4, and 6.2 of the UN Model Regulations. Specifically, these requirements address the packaging, hazard communication, and safe transport of salvage pressure receptacles, also known as salvage cylinders in the United States. The 19th Revised Edition of the UN Model Regulations includes changes to the definition and packaging allowances for salvage cylinders. These changes authorize the use of a large salvage cylinder with a water capacity not exceeding 3,000 L to transport

a cylinder with a water capacity up to 1,000 L. Salvage cylinders still require approval by appropriate Competent Authorities.

The HMR currently address the packaging, hazard communication, and safe transport of salvage cylinders in § 173.3(d) and do not require approval of the Associate Administrator to do so. PHMSA considers the current salvage cylinder requirements in the HMR to provide a sufficient level of safety and adequately address the shipment of damaged and defective cylinders. It is appropriate that larger salvage cylinders go through the existing approval process. Therefore, PHMSA is not proposing changes to the current HMR requirements for salvage cylinders.

- Large Packagings for Waste Aerosols: The 19th Revised Edition of the UN Model Regulations includes changes to the large packaging requirements for waste aerosols. The most notable change was to the packing group (PG) performance level required for large packagings transporting waste aerosols—from PG III to PG II. The HMR do not currently authorize the use of large packagings for aerosols. Therefore, PHMSA is not proposing changes to the current HMR requirements for large packagings for waste aerosols.
- Table Tennis Balls: The 19th Revised Edition of the UN Model Regulations includes a special provision assigned to “UN 2000, Celluloid” that exempts 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 a previously issued letter of interpretation (Ref. No. 14-0141), PHMSA stated that “it is the

opinion of this office that the entry for UN 2000 Celluloid only applies when the material is in a pre-manufactured state i.e. blocks, rod, rolls, sheets, tubes etc.” We further stated: “Based on the information provided in your letter, including form and quantity of celluloid contained in the table tennis balls, it is our determination the table tennis balls are not in a quantity and form that pose an unreasonable risk to health, safety or property during transportation and, therefore, are not subject to regulation under the HMR.”

PHMSA maintains 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). Therefore, PHMSA is not proposing changes to the current HMR requirements to provide an exception for UN 2000.

- IMO Portable Tank Marking: Amendment 38-16 to the IMDG Code includes an amendment to require IMO portable tanks manufactured before January 1, 2003, to be marked with an indication of the portable tank instruction for which it meets the minimum test pressure, minimum shell thickness, pressure relief requirements, and bottom opening requirements (i.e., the appropriate portable tank instruction). This change was made to clarify that the existing requirement for marking portable tanks with the portable tank instruction either on the tank itself or the tank data plate also applied to older IMO type portable tanks manufactured before January 1, 2003. PHMSA did not adopt the requirement for portable tanks to be marked with an indication of the portable tank instruction to which they comply when this

requirement was first introduced. Therefore, PHMSA is not proposing changes to the current HMR requirements for IMO type portable tank markings. PHMSA notes, however, that portable tanks utilized in international transportation will need to be marked with an indication of an appropriate portable tank instruction.

- Classification Inconsistencies: The 19th Revised Edition of the UN Model Regulations includes text to address situations in which a consignor who is aware, on the basis of test data, that a substance listed by name in column 2 of the Dangerous Goods List in Chapter 3.2 of the UN Model Regulations meets classification criteria for a hazard class or division that is not identified in the list, may with the approval of the competent authority consign the substance:
    - Under the same UN number and name but with additional hazard communication information as appropriate to reflect the additional subsidiary risk(s) (e.g., documentation, label, placard) provided that the primary hazard class remains unchanged and that any other transport conditions (e.g., limited quantity, packing and tank provisions) that would normally apply to substances possessing such a combination of hazards are the same as those applicable to the substance listed; or
    - Under the most appropriate generic or n.o.s. entry reflecting all hazards.
- The HMR, in §§ 172.402(a)(2) and 172.202(a)(3), allow and in most cases require hazardous materials exhibiting an additional subsidiary hazard to be labeled with the subsidiary hazard and to have the additional hazard described on shipping papers.

As detailed in the definition of Competent Authority Approval in § 107.1, specific regulations in subchapter A or C of the HMR are considered Competent Authority Approvals. PHMSA generally does not issue Competent Authority Approvals for situations already addressed by the HMR. Therefore, PHMSA is not proposing such changes to the current HMR requirements. Although PHMSA is not incorporating language specifically requiring a Competent Authority Approval in situations where a consignor has determined a substance has a different subsidiary risk than those identified in the HMT, we maintain the power to do so in order to facilitate commerce in situations where other competent authorities or carriers require such a document be provided.

- Filling Procedures for UN Pressure Receptacles: The 19th Revised Edition of the UN Model Regulations includes text in P200 requiring the filling of pressure receptacles to be carried out by qualified staff using appropriate equipment and procedures. These procedures are described as including checks of the following: conformity of receptacles and accessories with the UN Model Regulations, compatibility of the cylinder with the product to be transported, absence of damage that might affect safety, compliance with the degree or pressure of filling, and accuracy of marks and identification. Additionally, five ISO standards concerning inspection and filling of various cylinders were incorporated into P200. Compliance with these filling procedures is considered met if the appropriate ISO standard is applied.

The existing HMR requirements for filling procedures for pressure receptacles provide a sufficient level of safety and adequately address filling

requirements for pressure vessels. Therefore, PHMSA is not proposing changes to the current HMR requirements for the filling of pressure receptacles nor the adoption of any of the five ISO standards applicable to filling conditions and inspections.

- Intentionally Infected Animals: The 2017–2018 ICAO Technical Instructions adopted changes to the classification framework for infected live animals and animal materials. These changes are intended to support consistent classification for infected animals and animal materials. The issue was brought to the attention of the UN Sub-Committee at its 48th session, but they were not able to ascertain the impact of the changes made to the ICAO Technical Instructions or if further changes were necessary to the UN Model Regulations. The representative from ICAO who presented the paper noted they would come back with an additional paper and clarifications at the next session. As work at the UN Sub-Committee is still ongoing, PHMSA is not proposing changes to the current HMR requirements for the classification or transportation of infected live animals or animal materials at this time.
- Special Aircraft Operations: The 2017–2018 ICAO Technical Instructions adopted changes to the general exceptions for hazardous materials carried by an aircraft in special aircraft operations (e.g., air ambulance, search and rescue). These changes are to clarify that hazardous materials involved in these special aircraft operations for related purposes (e.g., training flights and positioning flights prior to or after maintenance) are excepted from the ICAO Technical Instructions as stated in Part 1, Chapter 1. On June 2, 2016, PHMSA published a final rule [Docket No.

PHMSA–2013–0225 (HM–218H); 81 FR 35483] that revised § 175.1(d) (formerly § 175.9(b)(4)) to clarify that staging operations and other operations related to dedicated air ambulance, firefighting, or search and rescue operations are intended to be excepted from the HMR when in compliance with the [Federal Aviation Regulations] (FAR).” Accordingly, PHMSA and the Federal Aviation Administration (FAA) believe that the current special aircraft operation’s provisions in § 175.1(d) sufficiently provide the flexibility to allow for these types of flight activities (e.g., training flights and positioning flights prior to or after maintenance). Therefore, PHMSA is not proposing changes to the current HMR requirements for special aircraft operations.

- Enhanced Safety Provisions for Lithium Batteries Transported by Aircraft: The 2015–2016 Edition of the ICAO Technical Instructions adopted enhanced safety provisions for lithium batteries transported by aircraft, effective April 1, 2016. These amendments (1) prohibit the transport of lithium ion cells and batteries as cargo on passenger aircraft; (2) require all lithium ion cells and batteries to be shipped at not more than a 30 percent state of charge on cargo-only aircraft; and (3) limit the use of alternative provisions for small lithium cell or battery shipments under 49 CFR § 173.185(c). PHMSA is considering adopting these amendments in a separate rulemaking. Further information is available in the docket for this rulemaking [PHMSA-2016-0014].
- Sterilization Devices Containing Nitrogen Tetroxide or Nitric Oxide: The 2017–2018 ICAO Technical Instructions adopted special provision A211 to allow for the transport of sterilization devices that contain small quantities of “UN 1067,

Nitrogen dioxide” and “UN 1660, Nitric oxide, compressed” by both passenger and cargo aircraft. We are not proposing incorporation of ICAO special provision A211 at this time.

While we did not oppose the adoption of this provision at ICAO, we did so recognizing that the transport environment and infrastructure is much different in parts of the world outside of the United States; and that consistent with our harmonization rulemaking considerations we would assess how best to address this topic within the HMR. During the time these amendments were being considered by ICAO, we received a special permit application that detailed more specific information than was available during the ICAO deliberations. Additionally, PHMSA received a petition for rulemaking (P-1672) requesting PHMSA harmonize with the recently adopted ICAO TI provisions for sterilization devices. Based on the lack of broad applicability, the technically specific nature of these devices and packaging systems, the significant toxicity hazard and corresponding risk to air transport, and the benefit of considering additional operational controls available to mitigate risk, it is our determination that transport in accordance with the provisions of ICAO special provision A211 are more suitably addressed through PHMSA’s Special Permit program.

- Cylinders Containing Gases for use in Fire Extinguishers or Stationary Fire-fighting Installations: In some cases cylinders that are not a permanent component of a fire extinguisher or a stationary fire-fighting installation are transported separately from these fire extinguishers (e.g., prior to their use in the fire extinguisher or stationary fire-fighting installation and for filling). At the 44th



session of the UN Sub-Committee, it was agreed that when the cylinder containing the compressed gas is transported separately, it should be subject to the same requirements as conventional cylinders.

On July 26, 2016, PHMSA published a NPRM [Docket No. PHMSA–2011–0140 (HM–234); 81 FR 48977] proposing to revise the § 173.309 introductory text to include cylinders used as part of a fire suppression system as a cylinder type authorized for transport in accordance with the HMT entry for fire extinguishers. The HM-234 NPRM notes the controls detailed in § 173.309 provide an acceptable level of safety regardless of whether the cylinder is equipped for use as a handheld fire extinguisher or as a component of a fixed fire suppression system.

As this issue is already being considered in an open rulemaking, we are not proposing to make any changes to the transport provisions for fire extinguishers or cylinders used in fire extinguishers. All comments, including potential impacts arising from differing domestic and international requirements, concerning transport requirements for cylinders used in fire extinguishers should be submitted to the HM-234 docket (Docket No. PHMSA–2011–0140) at

<http://www.regulations.gov>.

## **VI. Section-By-Section Review**

The following is a section-by-section review of the amendments proposed in this NPRM:

### Part 107

### *Section 107.502*

Section 107.502 provides general requirements for the registration of cargo tank and cargo tank motor vehicle manufacturers, assemblers, repairers, inspectors, testers, and design certifying engineers. In this NPRM, PHMSA proposes to revise 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 proposed § 180.413(a)(1)(iii) in this NPRM. 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 website at <http://www.wapps.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 the proposed § 180.413(a)(1)(iii) would be unnecessarily duplicative and that excepting them from registering in accordance with part 107 subpart F would augment reciprocity without negatively impacting safety. See "Harmonization Proposals in this NPRM" and the § 180.413 entry in the "Section-by-Section Review" of this document for additional background and discussion of this proposal.

### *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). In this NPRM, PHMSA proposes to amend 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, CRC, or BTC 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. Upon approval, the Requalifier Identification Number (RIN) holder must mark the TC cylinder in accordance with applicable Transport Canada TDG Regulations except that the requalifier's registered mark shall be replaced with the DOT RIN. See the discussion of proposed changes to § 107.805 for additional requirements and exceptions.

#### *Section 107.805*

Section 107.805 prescribes the requirements cylinder and pressure receptacle requalifiers need to meet in order to be approved by PHMSA. In this NPRM, PHMSA proposes to amend paragraph (a) to authorize prospective requalifiers to obtain approval by PHMSA to inspect, test, certify, repair, or rebuild TC specification cylinders; to amend 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 to amend paragraph (d) to include various TC cylinders to the list of cylinders

requiring issuance of a RIN to requalifiers.

PHMSA also proposes to amend 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 website 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 a Transport Canada assigned requalifier's registered mark back to the appropriate requalification facility.<sup>3</sup>

The proposed addition of paragraph (f)(2) would allow persons who are already registered with PHMSA to perform requalification functions on DOT specification cylinders to register to requalify corresponding TC cylinder specifications without additional review by an independent inspection agency. Specifications considered equivalent are identified in the preamble to this notice (see Table 1 in § 171.12 discussion). Applicants would 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.

---

<sup>3</sup> The search function on Transport Canada's website 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.

The proposed addition of paragraph (f)(3) would allow persons who are already registered with Transport Canada to requalify corresponding DOT specification cylinders without additional application to PHMSA for approval. This proposed exception would 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 proposes to amend 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 proposed 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 NPRM, PHMSA proposes to add and revise 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, would be revised to incorporate the 2017–2018 Edition.
- 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, would be revised to incorporate the 2016 Edition, Amendment 38-16.
- Paragraph (w), which incorporates various International Organization for Standardization entries, would be 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 proposed for incorporation in paragraph (w)(16).
- 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 are proposed for incorporation in paragraphs (w)(27) and (w)(28).
- ISO 11114-2:2013 Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials is proposed for incorporation in paragraph (w)(48).
- 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 proposed for incorporation in paragraph (w)(36).
- ISO 10297:2014 Gas cylinders — Cylinder valves — Specification and type testing is proposed for incorporation in paragraph (w)(42).
- ISO 10462 (E), Gas cylinders — Transportable cylinders for dissolved acetylene — Periodic inspection and maintenance is proposed for incorporation in paragraph (w)(44).
- 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 proposed for incorporation in paragraphs (w)(54), (w)(56), (w)(57), and (w)(59), respectively.

- ISO 11515:2013 Gas cylinders — Refillable composite reinforced tubes of water capacity between 450 L and 3000 L — Design, construction and testing is proposed for incorporation in paragraph (w)(62).
- Paragraph (bb)(1), which incorporates the Transport Canada Transportation of Dangerous Goods Regulations, would add subparagraphs (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.
- 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, would be revised to incorporate the 19th Revised Edition (2015),



Volumes I and II.

- Paragraph (dd)(2), which incorporates the United Nations Recommendations on the Transport of Dangerous Goods—Manual of Tests and Criteria, 5th Revised Edition (2009), would be revised to incorporate the 6th Revised Edition (2015).
- Paragraph (dd)(3) would be 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 proposed addition of this paragraph would correct this oversight.

#### *Section 171.8*

Section 171.8 defines terms generally used throughout the HMR that have broad or multi-modal applicability. In this NPRM, PHMSA proposes to add the following terms and definitions:

- Design life: PHMSA proposes to add 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 proposes to add the term “SAPT” and a reference to § 173.21(f). SAPT means self-accelerated polymerization temperature. See §173.21(f) of this subchapter. This is consistent with the similar term SADT (self-accelerated decomposition temperature).
- Service life: PHMSA proposes to add 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 proposes to amend the definitions for the following terms:

- Aerosol: PHMSA proposes to revise 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 proposes to revise 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 proposes to revise 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 NPRM, PHMSA proposes to address 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 proposes to amend § 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 proposed 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.

The HMR in § 171.12(a)(4) authorize the transportation of a cylinder authorized by the Transport Canada TDG Regulations to, from, or within the United States. Currently this authorization is limited to Canadian Transport Commission (CTC) cylinders corresponding to a DOT specification cylinder and UN pressure receptacles marked with "CAN." In this NPRM, PHMSA proposes to amend paragraph (a)(4)(ii) authorizing the

use of Canadian manufactured cylinders. Specifically, PHMSA proposes to authorize the transportation of CTC, CRC, BTC, and TC cylinders that have a corresponding DOT specification cylinder prescribed in the HMR.

This proposal does not remove or amend existing requirements for DOT specification cylinders; rather, PHMSA proposes to provide 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 proposes to amend 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 will extend 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.

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

<b>Table 1</b>		
<b>TC</b>	<b>DOT (some or all of these may also be marked with a ICC prefix)</b>	<b>CTC (some or all of these may also be marked with a BTC and a CRC prefix)</b>
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

A U.S.-based facility is permitted to refill and use a cylinder marked as meeting CTC specification provided it complies with the applicable requirements specified in § 171.12. In accordance with § 171.12(a)(4), when the provisions of subchapter C of the HMR require that 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.

If implemented, the proposed actions described above would resolve many of the existing reciprocity issues, streamline the processing of Canadian cylinders within the United States, and alleviate unnecessary burdens on the transportation industry. DOT RIN holders may requalify and mark a TC cylinder in accordance with applicable TDG Regulations, including the application of metric markings.

### *Section 171.23*

Section 171.23 prescribes requirements for specific materials and packagings transported under the various international standards authorized by the HMR. PHMSA proposes to amend 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 Printing Office's typesetting procedures, proposed 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 NPRM, PHMSA proposes to amend 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. With the addition of an

internationally recognized proper shipping name and identification number, PHMSA is considering the removal of the existing HMT entry “NA 0276, Model rocket motor.” We specifically solicit comment on the potential impact of removing the existing “NA 0276” 1.4C HMT entry.

- 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.

- 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.

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

At the ICAO DGP/25 meeting, the Panel was informed of an incident involving Catecholborane (also known as 1, 3, 2-Benzodioxaborole) that resulted in an industry 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 indicated (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 and cargo aircraft. Transport on cargo aircraft would be possible with the approval of the State of Origin and State of the Operator.

Consistent with the ICAO Technical Instructions, PHMSA proposes to add new HMT entries in italics for “Catecholborane” and “1, 3, 2-Benzodioxaborole” and to assign a new special provision A210 clarifying that this material is forbidden for air transport unless approved by the Associate Administrator.

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 proposes to amend 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 proposes to amend 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), we propose this revision to ensure 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 proposes to revise 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 to add 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 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 the UNSCOE 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 proposes to make 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 proposes to revise the labels for consistency with the change made to the classification of this material under amendments to column (3) (see above). The Class 8 (Corrosive) primary hazard label would be revised to a Division 6.1 primary hazard label and 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 proposed additions, revisions, and deletions to the special provisions addressed in this NPRM.

- In this NPRM, new special provision 157 is proposed to be assigned to the HMT entry “UN 3527, Polyester resin kit, solid base material.”
- In this NPRM, new special provision 379 is proposed to be assigned to the HMT entries “UN1005, 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.

In this NPRM, new special provision 387 (special provision 386 already exists) is proposed to be assigned to all 52 HMT entries.

<b>Table 2</b>	
<b>PROPER SHIPPING NAME</b>	<b>UN NUMBER</b>
Acrolein dimer, stabilized	UN2607
Acrolein, stabilized	UN1092
Acrylic acid, stabilized	UN2218
Acrylonitrile, stabilized	UN1093
Allyl isothiocyanate, stabilized	UN1545

Allyltrichlorosilane, stabilized	UN1724
Bicyclo [2,2,1] hepta-2,5-diene, stabilized <u>or</u> 2,5-Norbornadiene, stabilized	UN2251
Butadienes, stabilized <u>or</u> Butadienes and Hydrocarbon mixture, stabilized <u>containing more than 40% butadienes</u>	UN1010
Butyl acrylates, stabilized	UN2348
n-Butyl methacrylate, stabilized	UN2227
Butyl vinyl ether, stabilized	UN2352
1,2-Butylene oxide, stabilized	UN3022
Chloroprene, stabilized	UN1991
Crotonaldehyde <u>or</u> Crotonaldehyde, stabilized	UN1143
Cyanogen chloride, stabilized	UN1589
Diketene, stabilized	UN2521
Dipropylamine	UN2383
Divinyl ether, stabilized	UN1167
Ethyl acrylate, stabilized	UN1917
Ethyl methacrylate, stabilized	UN2277
Ethylacetylene, stabilized	UN2452
Ethyleneimine, stabilized	UN1185
Hydrogen cyanide, stabilized <u>with less than 3 percent water</u>	UN1051
Hydrogen cyanide, stabilized, <u>with less than 3 percent water and absorbed in a porous inert material</u>	UN1614
Isobutyl acrylate, stabilized	UN2527
Isobutyl methacrylate, stabilized	UN2283
Isoprene, stabilized	UN1218
Methacrylaldehyde, stabilized	UN2396
Methacrylic acid, stabilized	UN2531
Methacrylonitrile, stabilized	UN3079
Methyl acetylene and propadiene mixtures, stabilized	UN1060
Methyl acrylate, stabilized	UN1919
Methyl isopropenyl ketone, stabilized	UN1246
Methyl methacrylate monomer, stabilized	UN1247
Methyl vinyl ketone, stabilized	UN1251
Propadiene, stabilized	UN2200
Propyleneimine, stabilized	UN1921
Styrene monomer, stabilized	UN2055
Sulfur trioxide, stabilized	UN1829
Tetrafluoroethylene, stabilized	UN1081
Trifluorochloroethylene, stabilized <u>or</u> Refrigerant gas R 1113	UN1082
Vinyl acetate, stabilized	UN1301
Vinyl bromide, stabilized	UN1085
Vinyl butyrate, stabilized	UN2838
Vinyl chloride, stabilized	UN1086
Vinyl ethyl ether, stabilized	UN1302
Vinyl fluoride, stabilized	UN1860
Vinyl isobutyl ether, stabilized	UN1304
Vinyl methyl ether, stabilized	UN1087
Vinylidene chloride, stabilized	UN1303
Vinylpyridines, stabilized	UN3073
Vinyltoluenes, stabilized	UN2618

- In this NPRM, new special provision 422 is proposed to be 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.”
- In this NPRM, special provision 134 is proposed to be 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. On January 8, 2015, PHMSA published a final rule [Docket No. PHMSA-2013-0260 (HM-215M); 80 FR 1075] that added special provision 134 to “UN 3072.” The intent of this action was to harmonize with special provision A182 of the ICAO Technical Instructions 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.” 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 proposes 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.

- In this NPRM, new special provision A210 is proposed to be assigned to the new HMT italicized entries for “Catecholborane” and “1, 3, 2-Benzodioxaborole.”
- In this NPRM, new special provision A212 is proposed to be assigned to the HMT entry “UN 2031, Nitric acid other than red fuming, with more than 20 percent and less than 65 percent nitric acid.”
- In this NPRM, new special provision B134 is proposed to be assigned to the PG III entries in Table 4 to be consistent with revisions to the IMDG Code.

<b>Table 4</b>	
<b>PROPER SHIPPING NAME</b>	<b>UN NUMBER</b>
Aluminum powder, coated	UN1309
Ferrous metal borings <u>or</u> Ferrous metal shavings <u>or</u> Ferrous metal turnings <u>or</u> Ferrous metal cuttings <u>in a form liable to self-heating</u>	UN2793
Iron oxide, spent, <u>or</u> Iron sponge, spent <u>obtained from coal gas purification</u>	UN1376
Magnesium <u>or</u> Magnesium alloys <u>with more than 50 percent magnesium in pellets, turnings or ribbons</u>	UN1869
Peroxides, inorganic, n.o.s	UN1483
Titanium sponge granules <u>or</u> Titanium sponge powders	UN2878

- In this NPRM, new special provision B135 is proposed to be assigned to the PG III entries in Table 5 consistent with revisions to the IMDG Code.

<b>Table 5</b>	
<b>PROPER SHIPPING NAME</b>	<b>UN NUMBER</b>
Hafnium powder, dry	UN2545
Metal catalyst, dry	UN2881
Metal powder, self-heating, n.o.s	UN3189
Titanium powder, dry	UN2546
Zirconium powder, dry	UN2008
Zirconium scrap	UN1932

- In this NPRM, 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), 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.



- In this NPRM, special provisions T9, TP7, and TP33 are proposed to be 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.
- In this NPRM, new special provisions W31, W32, W40, and W100 are proposed to certain water-reactive substances. The proposed special provisions correspond with special packaging provisions PP31, PP31 “modified” (Packing Instruction P403), PP40, and PP100 of the IMDG Code, respectively. Table 6 contains the proposed changes listed in alphabetical order and showing the proper shipping name, UN identification number, and the proposed special provision(s).

<b>Table 6</b>		
<b>PROPER SHIPPING NAME</b>	<b>UN NUMBER</b>	<b>PROPOSED ADDITION(S)</b>
Alkali metal alcoholates, self-heating, corrosive, n.o.s.	UN3206	W31
Alkali metal alloys, liquid, n.o.s	UN1421	W31
Alkali metal amalgam, liquid	UN1389	W31
Alkali metal amalgam, solid	UN3401	W32
Alkali metal amides	UN1390	W31, W40
Alkali metal dispersions, flammable <u>or</u> Alkaline earth metal dispersions, flammable	UN3482	W31
Alkali metal dispersions, <u>or</u> Alkaline earth metal dispersions	UN1391	W31
Alkaline earth metal alcoholates, n.o.s.	UN3205	W31
Alkaline earth metal alloys, n.o.s	UN1393	W31, W40
Alkaline earth metal amalgams, liquid	UN1392	W31
Alkaline earth metal amalgams, solid	UN3402	W32
Aluminum carbide	UN1394	W31, W40
Aluminum ferrosilicon powder (PG II)	UN1395	W31, W40
Aluminum hydride	UN2463	W32
Aluminum phosphide	UN1397	W32
Aluminum phosphide pesticides	UN3048	W31
Aluminum powder, coated	UN1309	W100
Aluminum powder, uncoated	UN1396	W31, W40
Aluminum silicon powder, uncoated	UN1398	W31, W40
Aluminum smelting by-products <u>or</u> Aluminum remelting by-products (PG II)	UN3170	W31, W40

Aluminum smelting by-products or Aluminum remelting by-products (PG III)	UN3170	W31
2-Amino-4,6-Dinitrophenol, wetted <u>with not less than 20 percent water by mass</u>	UN3317	W31
Ammonium picrate, wetted <u>with not less than 10 percent water, by mass</u>	UN1310	W31
Arsenic acid, liquid	UN1533	W31
Barium	UN1400	W31, W40
Barium alloys, pyrophoric	UN1854	W31
Barium azide, wetted <u>with not less than 50 percent water, by mass</u>	UN1571	W31
Barium cyanide	UN1565	W31
Barium peroxide	UN1449	W100
Beryllium, powder	UN1567	W100
Boron trifluoride diethyl etherate	UN2604	W31
Boron trifluoride dimethyl etherate	UN2965	W31
Bromobenzyl cyanides, liquid	UN1694	W31
Bromobenzyl cyanides, solid	UN3449	W31
Calcium	UN1401	W31, W40
Calcium carbide (PG I)	UN1402	W32
Calcium carbide (PG II)	UN1402	W31, W40
Calcium cyanamide <u>with more than 0.1 percent of calcium carbide</u>	UN1403	W31, W40
Calcium cyanide	UN1575	W31
Calcium dithionite or Calcium hydrosulfite	UN1923	W31
Calcium hydride	UN1404	W32
Calcium manganese silicon	UN2844	W31
Calcium peroxide	UN1457	W100
Calcium phosphide	UN1360	W32
Calcium, pyrophoric or Calcium alloys, pyrophoric	UN1855	W31
Calcium silicide (PG II)	UN1405	W31
Calcium silicide (PG III)	UN1405	W31, W40
Carbon, activated	UN1362	W31
Carbon disulfide	UN1131	W31
Cerium, <u>slabs, ingots, or rods</u>	UN1333	W100
Cerium, <u>turnings or gritty powder</u>	UN3078	W31, W40
Cesium or Caesium	UN1407	W32
Chloric acid aqueous solution, <u>with not more than 10 percent chloric acid</u>	UN2626	W31
Chlorosilanes, water-reactive, flammable, corrosive, n.o.s	UN2988	W31
Chromium trioxide, anhydrous	UN1463	W31
Corrosive solids, water-reactive, n.o.s (PG II)	UN3096	W100
Cyanogen bromide	UN1889	W31
Decaborane	UN1868	W31
Dinitrophenol, wetted <u>with not less than 15 percent water, by mass</u>	UN1320	W31
Dinitrophenolates, wetted <u>with not less than 15 percent water, by mass</u>	UN1321	W31
Dinitroresorcinol, wetted <u>with not less than 15 percent water, by mass</u>	UN1322	W31
Diphenylamine chloroarsine	UN1698	W31

Diphenylchloroarsine, liquid	UN1699	W31
Diphenylchloroarsine, solid	UN3450	W31
Dipicryl sulfide, wetted <u>with not less than 10 percent water, by mass</u>	UN2852	W31
Ethyldichlorosilane	UN1183	W31
Ferrocium	UN1323	W100
Ferrosilicon <u>with 30 percent or more but less than 90 percent silicon</u>	UN1408	W100
Ferrous metal borings <u>or</u> Ferrous metal shavings <u>or</u> Ferrous metal turnings <u>or</u> Ferrous metal cuttings <u>in a form liable to self-heating</u>	UN2793	W100
Fibers <u>or</u> Fabrics, animal <u>or</u> vegetable <u>or</u> Synthetic, n.o.s. <u>with animal or vegetable oil</u>	UN1373	W31
Fish meal, unstabilized <u>or</u> Fish scrap, unstabilized	UN1374	W31, W40
Hafnium powder, dry	UN2545	W31
Hafnium powder, wetted <u>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</u>	UN1326	W31, W40
Iron oxide, spent, <u>or</u> Iron sponge, spent <u>obtained from coal gas purification</u>	UN1376	W100
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>	UN2478	W31
Lithium	UN1415	W32
Lithium aluminum hydride	UN1410	W32
Lithium borohydride	UN1413	W32
Lithium ferrosilicon	UN2830	W31, W40
Lithium hydride	UN1414	W32
Lithium hydride, fused solid	UN2805	W31, W40
Lithium nitride	UN2806	W32
Lithium peroxide	UN1472	W100
Lithium silicon	UN1417	W31, W40
Magnesium aluminum phosphide	UN1419	W32
Magnesium diamide	UN2004	W31
Magnesium granules, coated, <u>particle size not less than 149 microns</u>	UN2950	W100
Magnesium hydride	UN2010	W32
Magnesium <u>or</u> Magnesium alloys <u>with more than 50 percent magnesium in pellets, turnings or ribbons</u>	UN1869	W100
Magnesium peroxide	UN1476	W100
Magnesium phosphide	UN2011	W32
Magnesium, powder <u>or</u> Magnesium alloys, powder (PG I)	UN1418	W32
Magnesium, powder <u>or</u> Magnesium alloys, powder (PG II)	UN1418	W31, W40
Magnesium, powder <u>or</u> Magnesium alloys, powder (PG III)	UN1418	W31

Magnesium silicide	UN2624	W31, W40
Maneb <u>or</u> Maneb preparations <u>with not less than 60 percent maneb</u>	UN2210	W100
Maneb stabilized <u>or</u> Maneb preparations, stabilized <u>against self-heating</u>	UN2968	W100
Mercuric potassium cyanide	UN1626	W31
Metal catalyst, dry	UN2881	W31
Metal catalyst, wetted <u>with a visible excess of liquid</u>	UN1378	W31, W40
Metal hydrides, flammable, n.o.s. (PG II)	UN3182	W31, W40
Metal hydrides, flammable, n.o.s. (PG III)	UN3182	W31
Metal hydrides, water reactive, n.o.s. (PG I)	UN1409	W32
Metal hydrides, water reactive, n.o.s. (PG II)	UN1409	W31, W40
Metal powder, self-heating, n.o.s	UN3189	W31
Metal powders, flammable, n.o.s	UN3089	W100
Metal salts of organic compounds, flammable, n.o.s.	UN3181	W31
Metallic substance, water-reactive, n.o.s (PG I)	UN3208	W32
Metallic substance, water-reactive, n.o.s (PG II)		W31
Metallic substance, water-reactive, n.o.s (PG III)	UN3208	W31, W40
Metallic substance, water-reactive, self-heating, n.o.s (PG I and III)	UN3209	W32
Metallic substance, water-reactive, self-heating, n.o.s (PG II)	UN3209	W32, W40
Methyldichlorosilane	UN1242	W31
Nitrocellulose, <u>with not more than 12.6 percent nitrogen, by dry mass</u> mixture with <u>or</u> without plasticizer, with <u>or</u> without pigment	UN2557	W31
Nitrocellulose with alcohol <u>with not less than 25 percent alcohol by mass, and with not more than 12.6 percent nitrogen, by dry mass</u>	UN2556	W31
Nitrocellulose with water <u>with not less than 25 percent water by mass</u>	UN2555	W31
Nitroguanidine, wetted <u>or</u> Picrite, wetted <u>with not less than 20 percent water, by mass</u>	UN1336	W31
4-Nitrophenylhydrazine, <u>with not less than 30 percent water, by mass</u>	UN3376	W31
Nitrostarch, wetted <u>with not less than 20 percent water, by mass</u>	UN1337	W31
Organometallic substance, liquid, water-reactive	UN3398	W31
Organometallic substance, liquid, water-reactive, flammable	UN3399	W31
Organometallic substance, solid, water-reactive	UN3395	W31
Organometallic substance, solid, water-reactive, flammable	UN3396	W31
Organometallic substance, solid, water-reactive, self-heating	UN3397	W31

Osmium tetroxide	UN2471	W31
Paper, unsaturated oil treated <u>incompletely dried (including carbon paper)</u>	UN1379	W31
Peroxides, inorganic, n.o.s	UN1483	W100
9-Phosphabicyclononanes <u>or</u> Cyclooctadiene phosphines	UN2940	W31
Phosphorus heptasulfide, <u>free from yellow or white phosphorus</u>	UN1339	W31
Phosphorus pentasulfide, <u>free from yellow or white phosphorus</u>	UN1340	W31, W40
Phosphorus sesquisulfide, <u>free from yellow or white phosphorus</u>	UN1341	W31
Phosphorus trisulfide, <u>free from yellow or white phosphorus</u>	UN1343	W31
Phosphorus, white dry <u>or</u> Phosphorus, white, under water <u>or</u> Phosphorus white, in solution <u>or</u> Phosphorus, yellow dry <u>or</u> Phosphorus, yellow, under water <u>or</u> Phosphorus, yellow, in solution	UN1381	W31
Potassium	UN2257	W32
Potassium borohydride	UN1870	W32
Potassium cyanide, solid	UN1680	W31
Potassium cyanide solution	UN3413	W31
Potassium dithionite <u>or</u> Potassium hydrosulfite	UN1929	W31
Potassium, metal alloys, liquid	UN1420	W31
Potassium, metal alloys, solid	UN3403	W32
Potassium phosphide	UN2012	W32
Potassium sodium alloys, liquid	UN1422	W31
Potassium sodium alloys, solid	UN3404	W32
Potassium sulfide, anhydrous <u>or</u> Potassium sulfide <u>with less than 30 percent water of crystallization</u>	UN1382	W31, W40
Pyrophoric liquids, organic, n.o.s	UN2845	W31
Pyrophoric metals, n.o.s., <u>or</u> Pyrophoric alloys, n.o.s	UN1383	W31
Pyrophoric solid, inorganic, n.o.s	UN3200	W31
Pyrophoric solids, organic, n.o.s	UN2846	W31
Rubidium	UN1423	W32
Self-heating liquid, corrosive, inorganic, n.o.s.	UN3188	W31
Self-heating liquid, corrosive, organic, n.o.s.	UN3185	W31
Self-heating liquid, inorganic, n.o.s.	UN3186	W31
Self-heating liquid, organic, n.o.s.	UN3183	W31
Self-heating liquid, toxic, inorganic, n.o.s.	UN3187	W31
Self-heating liquid, toxic, organic, n.o.s.	UN3184	W31
Self-heating solid, inorganic, n.o.s.	UN3190	W31
Self-heating solid, organic, n.o.s	UN3088	W31
Silver picrate, wetted <u>with not less than 30 percent water, by mass</u>	UN1347	W31
Sodium	UN1428	W32
Sodium aluminum hydride	UN2835	W31, W40
Sodium borohydride	UN1426	W32

Sodium cyanide, solid	UN1689	W31
Sodium cyanide solution	UN3414	W31
Sodium dinitro-o-cresolate, wetted <u>with not less than 10% water, by mass</u>	UN3369	W31
Sodium dinitro-o-cresolate, wetted <u>with not less than 15 percent water, by mass</u>	UN1348	W31
Sodium dithionite <u>or</u> Sodium hydrosulfite	UN1384	W31
Sodium hydride	UN1427	W32
Sodium hydrosulfide, <u>with less than 25 percent water of crystallization</u>	UN2318	W31
Sodium methylate	UN1431	W31
Sodium phosphide	UN1432	W32
Sodium picramate, <u>wetted with not less than 20 percent water, by mass</u>	UN1349	W31
Sodium sulfide, anhydrous <u>or</u> Sodium sulfide <u>with less than 30 percent water of crystallization</u>	UN1385	W31, W40
Stannic phosphide	UN1433	W32
Strontium peroxide	UN1509	W100
Strontium phosphide	UN2013	W32
Tear gas substances, liquid, n.o.s.	UN1693	W31
Tear gas substance, solid, n.o.s.	UN3448	W31
4-Thiapentanal	UN2785	W31
Thiourea dioxide	UN3341	W31
Titanium disulphide	UN3174	W31
Titanium hydride	UN1871	W31, W40
Titanium powder, dry	UN2546	W31
Titanium powder, wetted <u>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</u>	UN1352	W31, W40
Titanium sponge granules <u>or</u> Titanium sponge powders	UN2878	W100
Titanium trichloride, pyrophoric <u>or</u> Titanium trichloride mixtures, pyrophoric	UN2441	W31
Toxic solids, water-reactive, n.o.s.	UN3125	W100
Trichlorosilane	UN1295	W31
Trinitrobenzene, wetted, <u>with not less than 10% water, by mass</u>	UN3367	W31
Trinitrobenzene, wetted <u>with not less than 30 percent water, by mass</u>	UN1354	W31
Trinitrobenzoic acid, wetted <u>with not less than 10% water by mass</u>	UN3368	W31
Trinitrobenzoic acid, wetted <u>with not less than 30 percent water, by mass</u>	UN1355	W31
Trinitrochlorobenzene (picryl chloride), wetted, <u>with not less than 10% water by mass</u>	UN3365	W31
Trinitrophenol (picric acid), wetted, <u>with not less than 10 percent water by mass</u>	UN3364	W31
Trinitrophenol, wetted <u>with not less than 30 percent water, by mass</u>	UN1344	W31

Trinitrotoluene (TNT), wetted, <u>with not less than 10 percent water by mass</u>	UN3366	W31
Trinitrotoluene, wetted <u>or</u> TNT, wetted, <u>with not less than 30 percent water by mass</u>	UN1356	W31
Urea nitrate, wetted, <u>with not less than 10 percent water by mass</u>	UN3370	W31
Urea nitrate, wetted <u>with not less than 20 percent water, by mass</u>	UN1357	W31
Water-reactive liquid, n.o.s	UN3148	W31
Water-reactive solid, corrosive, n.o.s (PG I and III)	UN3131	W31
Water-reactive solid, corrosive, n.o.s (PG II)	UN3131	W31, W40
Water-reactive solid, flammable, n.o.s (PG I and III)	UN3132	W31
Water-reactive solid, flammable, n.o.s (PG III)	UN3132	W31, W40
Water-reactive solid, n.o.s (PG I)	UN2813	W32
Water-reactive solid, n.o.s (PG II)	UN2813	W31, W40
Water-reactive solid, n.o.s (PG III)	UN2813	W31
Water-reactive solid, self-heating, n.o.s (PG I and III)	UN3135	W31
Water-reactive solid, self-heating, n.o.s (PG I)	UN3135	W31, W40
Water-reactive solid, toxic, n.o.s (PG I and III)	UN3134	W31
Water-reactive solid, toxic, n.o.s (PG II)	UN3134	W31, W40
Xanthates	UN3342	W31
Xylyl bromide, liquid	UN1701	W31
Zinc ashes	UN1435	W100
Zinc peroxide	UN1516	W100
Zinc phosphide	UN1714	W32
Zinc powder <u>or</u> Zinc dust (PG I and III)	UN1436	W31
Zinc powder <u>or</u> Zinc dust (PG II)	UN1436	W31, W40
Zirconium hydride	UN1437	W31, W40
Zirconium, dry, <u>coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns)</u>	UN2858	W100
Zirconium, dry, <u>finished sheets, strip or coiled wire</u>	UN2009	W31
Zirconium picramate, wetted <u>with not less than 20 percent water, by mass</u>	UN1517	W31
Zirconium powder, dry	UN2008	W31
Zirconium powder, wetted <u>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</u>	UN1358	W31, W40
Zirconium scrap	UN1932	W31

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 NPRM, PHMSA proposes for column (9B) a quantity limit of 75 kg for “UN 0501, Propellant, solid, Division 1.4C.” Previously, column (9B) forbid the transport of UN 0501 by cargo-only aircraft. This new quantity limit is consistent with the authorized quantity limit found in the ICAO Technical Instructions. In a working paper submitted at the 25th meeting the ICAO DGP, it was noted that while all other Division 1.4C explosives listed in the table were forbidden on passenger aircraft, only UN 0501 was also forbidden on cargo aircraft. A maximum net quantity of 75 kg per package was permitted on cargo aircraft for all other Division 1.4C explosives. It was also reported that a June 2015 meeting of the United Nations Working Group on Explosives had determined that there were no differences between the transport risks posed by UN 0501 and other Division 1.4C explosives.

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 of this subchapter.

Consistent with changes to Amendment 38-16 of the IMDG Code, PHMSA proposes 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 7 contains the proposed changes listed in alphabetical order and showing the proper shipping name, UN identification number, current vessel stowage location code, and proposed vessel stowage location.

<b>Table 7</b>			
<b>PROPER SHIPPING NAME</b>	<b>UN NUMBER</b>	<b>CURRENT VESSEL STOWAGE CODE</b>	<b>PROPOSED VESSEL STOWAGE CODE</b>
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 <u>non fissile or fissile-excepted</u>	2978	A	B
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 proposes that code “40,” which indicates that the material must be stowed clear of living quarters, be added 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 52 existing entries in the HMT that are identified as requiring such, the IMO amended vessel stowage requirements for these entries. PHMSA proposes to add code “25” to column (10B) for the same 52 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” or “UN 2383, Dipropylamine.” 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 propose to add stowage code “25” to these two HMR entries.

Code “28” requires materials to which this code is assigned to be stowed away

from flammable liquids. In this NPRM, consistent with changes to the IMDG Code, PHMSA proposes to remove 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, Methylchlorosilane”; “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.”

Appendix B to § 172.101:

Appendix B to § 172.101 lists marine pollutants regulated under the HMR. PHMSA proposes to revise the list of marine pollutants by adding six new entries to remain consistent with the IMDG Code. These changes are proposed to 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 proposed to be added to the list of marine pollutants in appendix B to § 172.101: Hexanes; Hypochlorite solutions; Isoprene, stabilized; N-Methylaniline; Methylcyclohexane; and Tripropylene.

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 NPRM, PHMSA proposes 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 proposes to revise 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 proposes to revise 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 proposes to organize the structure of the special provision into paragraph form for ease of reading.
- 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 proposes to revise 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 proposes to revise 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 proposes adding new special provision 157 and assigning it to “UN 3527, Polyester resin kit, solid base material.” The special provision would allow the maximum net capacity for inner packagings of flammable solids in packing group 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 proposes 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 would specify 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 proposes 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 proposes to revise 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 proposes to revise special provision 369 in conjunction with revising the primary classification for UN 3507 from Class 8 to Division 6.1. Specifically, PHMSA proposes to clarify 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 proposes 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 and cargo aircraft; however, consistent with the ICAO Technical Instructions, PHMSA proposes to authorize them on

cargo aircraft subject to the transport conditions prescribed in the special provision with additional approval of the Associate Administrator.

- Special Provision 387: PHMSA proposes 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 proposes to clarify in special provision 387 that these substances are forbidden for transport by air when temperature control is required.
- Special Provision 422: PHMSA proposes to add new special provision 422 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 “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 proposes 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 proposes 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 aircraft with the approval of the Associate Administrator.
- Special Provision A212: PHMSA proposes 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 aircraft irrespective of column (9A) of



the § 172.101 HMT listing the material as forbidden.

- Special Provision B134: PHMSA proposes adding new special provision B134 and assigning it to UN Numbers 1309, 1376, 1483, 1869, 2793, and 2878. 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 proposes adding new special provision B135 and assigning it to UN Numbers 1932, 2008, 2545, 2546, 2881, and 3189. 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 proposes to add a new IP Code 19 and assign it to UN 3531, UN 3532, UN 3553, and UN 3534. Consistent with international regulations, this special provision would require 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

- Special Provision N90: Special provision N90 is assigned to the HMT entry “UN 3474, 1-Hydroxybenzotriazole, monohydrate” and prohibits the use of metal packages. PHMSA proposes, consistent with the UN Model Regulations, to revise 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 proposes adding special provision N92 to the four proposed 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 proposes adding new special provision W31 and assigning it to the 155 HMT entries identified in Table 6 in the “Amendments to column (7) special provisions” section of this rulemaking. With the addition of this special provision, PHMSA proposes to require packages assigned as such to be hermetically sealed when offered for transportation by vessel.

The proposed 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.<sup>4</sup> 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 proposed amendment 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 proposing to amend 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 NPRM, PHMSA proposes to strengthen the ability of these packages transporting water-reactive substances. PHMSA anticipates this proposed amendment could result in additional costs to domestic-only shippers but not to those shippers transporting such goods internationally. We assume that all shippers

---

<sup>4</sup> 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.

that ship hazardous materials internationally will incorporate IMDG Code-compliant packaging requirements into their business practices. These proposed amendments will increase costs for some domestic shipments of affected commodities and will require materials currently transported in packaging not already hermetically sealed to be thus packaged. Adoption of 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 toxic gases on contact with water or moisture. A 2011 Formal Safety Assessment (FSA) report presented to the IMO on shipping water-reactive materials by vessel<sup>5</sup> provides guidance regarding changes to the regulation of such shipments, as well as the net benefit of such changes. The FSA report notes that analysis of the documented cases of fire at sea indicates that the cause of the accidents is often difficult or impossible to determine. Although the cargo space is in some cases identified as the origin of the fire, the originating container is only identifiable in rare instances, and thus, there is no reliable data on the involvement of water-reactive materials in these fires. Additionally, in most cases, fires that start do not exceed the containment of the container itself and extinguish on their own. These self-extinguishing fires are usually not detected until the container is unloaded at its destination and, thus, are rarely documented in any relation to vessel or mode of

---

<sup>5</sup> International Maritime Organization, 2011. "Stowage of Water-Reactive Materials - Report of the Formal Safety Assessment - Submitted by Germany." Report No. SO-ER 2009.267A.

shipment.<sup>6</sup>

Regarding the cost of reducing the risk of fire from water-exposure of water-reactive materials by requiring water-resistant packaging, the FSA report concluded that the costs in relation to the amount of affected goods is likely to be high.<sup>7</sup> However, the FSA expect that this measure will affect only a small number of goods, which are transported in small amounts, so that the costs in relation to the total amount of all transported goods is likely to be low.<sup>8</sup> PHMSA recognizes that both the FSA report and our own Regulatory Impact Analysis lack quantitative data on the true cost of this proposal, as well as the amount of these hazardous materials currently transported by vessel. We are specifically soliciting comment addressing any estimates of the cost of compliance with these amendments and any quantitative data on the amounts of the commodities affected by this proposal that are currently offered for transportation by domestic vessel.

- Special Provision W32: PHMSA proposes adding new special provision W32 and assigning it to 38 HMT entries identified in Table 6 in the “Amendments to column (7) special provisions” section of this rulemaking. With the addition of this special provision, PHMSA proposes to require 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 are proposed 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

---

<sup>6</sup> Ibid, p. 24.

<sup>7</sup> Ibid. p. 78.

<sup>8</sup> Ibid, p. 78.

discussion above) assigned to various packing instructions. See the comments in the W31 discussion above for more discussion on the reasons for this proposed amendment.

- Special Provision W40: PHMSA proposes adding new special provision W40 and assigning it to 38 HMT entries identified in Table 6 in the “Amendments to column (7) special provisions” section of this rulemaking. With the addition of this special provision, PHMSA proposes to prohibit the use of bags when offered for transportation by vessel. See the comments in the W31 discussion above for more discussion on the reasons for this proposed amendment.
- Special Provision W100: PHMSA proposes adding new special provision W100 and assigning it to 27 HMT entries identified in Table 6 in the “Amendments to the column (7) special provisions” section of this rulemaking. With the addition of this special provision, PHMSA proposes to require 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 proposed 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 proposed amendment.

#### *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 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 proposing to revise 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 proposing to extend 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..

*Section 172.447*

PHMSA proposes to create a new section containing a new Class 9 hazard

warning label for lithium batteries. The label would consist 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 would 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 propose this transition period to allow shippers to exhaust existing stocks of labels and pre-printed packagings. We are not proposing 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 solicits comment on the appropriateness of this transition period.

#### *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<sub>2</sub>F<sub>2</sub>).<sup>9</sup>

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

---

<sup>9</sup> <https://www.epa.gov/sites/production/files/2014-11/documents/tsd58.pdf>



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 on each side and each end. PHMSA proposes to add a requirement for these shipments currently requiring corrosive subsidiary placards to also placard with 6.1 poison or toxic placards. PHMSA believes the addition of this requirement will provide important hazard communication information in the event of a release of uranium hexafluoride.

### Part 173

#### *Section 173.4a*

Section 173.4a prescribes transportation requirements for excepted packages. In this NPRM, consistent with changes to the UN Model Regulations, PHMSA proposes to amend paragraph (e)(3) to allow required absorbent materials to be placed in either the intermediate or outer packaging. PHMSA believes this change will provide shippers of excepted packages with increased flexibility in choosing packaging configurations, while maintaining the current level of safety for the transportation of these small amounts of hazardous materials.

#### *Section 173.9*

Section 173.9 prescribes requirements for the fumigant marking. In this NRPM, PHMSA proposes to amend § 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. Amendment 38-16 of the IMDG Code was amended to require the fumigant marking to be capable of surviving three months immersion in the sea, which is consistent with IMDG Code requirements for placard survivability. PHMSA believes ensuring that the fumigant marking and its required information are robust enough to handle conditions normally incident to transportation will ensure the proper information is conveyed to those needing it. Therefore, we are proposing amendments to this section consistent with the survivability requirements for placards.

#### *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 proposes to lower 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 to amend 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. We are not proposing to adopt 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. Further, we believe maintaining a single SADT/SAPT for temperature controls for all relevant materials (i.e., self-reactives, organic peroxides, and polymerizing substances) and all packaging sizes (i.e., non-bulk, IBC, and bulk) is less confusing for the user.

#### *Section 173.40*

Section 173.40 provides general packaging requirements for toxic materials packaged in cylinders. In this NPRM, PHMSA proposes to revise 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.

#### *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 proposes to amend 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 proposes to amend 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 proposes to revise § 173.62 relating to specific packaging requirements for explosives.

In paragraph (b), in the Explosives Table, the entry for “UN 0510, Rocket motors” would be 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) would be revised by adding a particular packaging requirement applicable to UN 0504 requiring that metal packagings must not be used. It would also be 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) would be 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 would be revised by adding UN 0510 to the list of large and robust explosives articles that may be transported unpackaged. PHMSA proposes to add UN 0502 to Packing Instruction P130. This addition corrects an existing error in the HMR. Packing Instruction 130 is referenced for UN 0502, but there is no mention of UN 0502 in the actual instruction. Packing Instruction 137 would be revised 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).

#### *Section 173.121*

Section 173.121 provides criteria for the assignment of packing groups to Class 3 materials. Paragraph (b)(iv) provides criteria for viscous flammable liquids of Class 3, such as paints, enamels, lacquers and varnishes, to be placed in packing group III on the basis of their viscosity, coupled with other criteria. In this NPRM, and consistent with the changes to the UN Model regulations, PHMSA proposes to amend paragraph (b)(iv) to include additional viscosity criteria that can be used as an alternative where a flow cup test is unsuitable. Many products of the paint and printing ink industry are thixotropic in nature, which means that they are viscous at rest but become thinner on application of shear or agitation (such as stirring or brushing). During transport these viscous flammable

liquids have the potential to thin under movement, but their viscosity cannot be properly characterized using a flow cup test since they will not run through the cup under static conditions. Additionally, PHMSA proposes to include an explanatory footnote to the existing table of viscosity and flash point to assist users of the section in determining kinematic viscosity.

*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. 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 proposes to add 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 method. Given concerns with potential test equipment issues (i.e., clogging) when subjecting polymerizing materials to the UN Test Series E, PHMSA

solicits comment on other equivalent test methods.

Specifically, we propose to add 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.

#### *Section 173.165*

Section 173.165 prescribes the transport and packaging requirements for polyester resin kits. PHMSA proposes to revise § 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 proposes to amend 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.

Additionally, the package must be of adequate size that the lithium battery mark can be displayed on one side of the package without folding. PHMSA also proposes to require the lithium battery mark 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.

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 NPRM, PHMSA proposes to replace the existing text 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. PHMSA proposes a transition period of December 31, 2018, to provide adequate time for shippers to transition the new lithium battery mark and exhaust existing stocks of preprinted packagings or markings. 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 49<sup>th</sup> session of 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. We are proposing to also allow the mark on a background of suitable contrasting color in addition to white.

Additionally, PHMSA proposes to amend § 173.185(c)(2) 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 proposals will enhance the communication and recognition of lithium batteries and better ensure that packaging is strong enough to withstand normal transport conditions.

PHMSA proposes amendments to § 173.185(e) to permit the transport of prototype and low production runs of lithium batteries contained in equipment. These proposals are mostly consistent with amendments adopted into the 19th Revised Edition of the UN Model Regulations and Amendment 38-16 to 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 TI authorizes the transportation of prototype and low production runs of lithium batteries contained in equipment in packaging tested to the PG I level. PHMSA proposes to continue to require prototype and low production batteries to be placed in packaging tested to the PG I performance level. PHMSA believes that the higher integrity packaging provides an additional layer of protection for cells and batteries not otherwise subjected to the UN design tests.

Consistent with changes to the UN Model Regulations, the IMDG Code, and the ICAO Technical Instructions, PHMSA proposes to add 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 proposes amendments to § 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 (.47 inch) 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, in this NPRM, PHMSA proposes to remove 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.

A working paper submitted to the October 2014 ICAO Dangerous Goods Panel meeting noted that the term “other type of pallet” was used in conjunction in various parts of the ICAO Technical Instructions with the terms “package,” “overpack,” or “unit load device,” which were all defined in the ICAO Technical Instructions. The ICAO Technical Instructions do not have a specific definition for “other type of pallet,” as the term is understood to represent devices that are widely used in transport, such as wooden skids or pallets that allow the use of a forklift for ease of moving packages around and to prevent damage to the contents of the skid or pallet. The definition for “overpack” already addresses the intent of the term “other type of pallet,” so it was agreed that the term “other type of pallet” was redundant and that references to it would be removed.

*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 proposed 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 were 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 proposes to add to the HMR the new UN identification numbers and proper shipping names for engines and machinery. PHMSA proposes to maintain 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 proposes the following amendments to § 173.220: amending paragraph (b)(1) 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; 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; 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 adding paragraph (h)(3) to include references to existing and proposed 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. ICAO adopted this provision to ensure that small vehicles, particularly those powered by lithium batteries are adequately protected from damage during transport. PHMSA proposes to amend paragraphs (c) and (d) consistent with this requirement. While this

international requirement is specific to air transport, we believe there is benefit to applying this requirement for transportation by all transport modes.

#### *Section 173.221*

Section 173.221 prescribes the packaging requirements for Polymeric beads (or granules), expandable, evolving flammable vapor. PHMSA proposes to add a procedure for declassification of polymeric beads, expandable. This exception is proposed to differentiate between polymeric beads made of materials that may present a risk for formation of a flammable atmosphere in a package and those that do not. When it can be demonstrated that no flammable vapor, resulting in a flammable atmosphere, is evolved by utilizing test U1—the test method for substances liable to evolve flammable vapors—of part III, sub-section 38.4.4 of the UN Manual of Tests and Criteria, polymeric beads, expandable need not be classed as Class 9 (UN 2211).

#### *Section 173.225*

Section 173.225 prescribes packaging requirements and other provisions for organic peroxides. Consistent with the UN Model Regulations, PHMSA proposes to revise 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.” We propose to revise 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 proposed revisions are correctly inserted and adding the missing “UN” code to several identification numbers assigned to existing entries in the Organic Peroxide Table.

#### *Section 173.301b*

Section 173.301b contains additional general requirements for shipment of UN pressure receptacles. PHMSA proposes to amend 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 propose to amend 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 propose to amend § 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). The correct reference for the “UW” marking is § 178.71(q)(18). We propose to make this editorial change in this NPRM.

#### *Section 173.303*

Section 173.303 prescribes requirements for charging of cylinders with compressed gas in solution (acetylene). PHMSA proposes to amend 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 NPRM, PHMSA proposes to amend § 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 proposing 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 proposing to add a new special provision.

Consistent with special provision 378 of the UN Model Regulations, PHMSA



proposes 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 (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 1.69 fluid ounces (50 ml) capacity, from the requirements of the subchapter if they conform to (a) through (d) of this section.

#### *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 proposes to revise 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. **In another proposed amendment in this NPRM, PHMSA proposes to amend § 173.304b specifically by adding a new paragraph (b)(5) to include these filling and test pressure requirements consistent with the UN Recommendations.**

## 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 NPRM, PHMSA proposes to revise paragraph (a)(7) by limiting thermometers containing mercury to checked baggage only. This revision was based on a proposal submitted to the ICAO DGP/25 meeting that highlighted two incidents involving leakage of mercury from thermometers carried in the cabin and addressed the cost and difficult process of cleaning a spill. The proposal noted that digital thermometers had become widely available, and as such, there was no longer a need to allow mercury thermometers in the cabin or cockpit. The Panel discussed whether mercury thermometers should also be banned from checked baggage but agreed to retain the provision for checked baggage on the basis that there were parts of the world where their use was more prevalent.

### *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 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 has removed prescriptive requirements concerning how the information concerning dangerous goods that passengers are forbidden to transport are required to be conveyed to passengers by removing references to “prominently displayed” and “in sufficient numbers.” Additional ICAO Technical Instructions changes 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 proposes to harmonize 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 proposed revisions to § 175.25, in accordance with 14 CFR parts 121 and 135, air carriers operating under 14 CFR parts 121 or 135 will need to describe 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.

#### *Section 175.33*

Section 175.33 establishes requirements for shipping papers and for 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 NPRM,

PHMSA proposes to revise § 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 would align the consumer commodity notification of the pilot-in-command requirements in the HMR with the ICAO Technical Instructions.

#### *Section 175.900*

Section 175.900 prescribes the handling requirements for air carriers that transport dry ice. Consistent with the ICAO Technical Instructions, PHMSA proposes to remove the term “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 proposed 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 proposes to add a new group of hazardous materials that do not react dangerously with each other to this paragraph. The following materials are proposed for 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 alphanumeric 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 proposes to create a new stowage provision 149 and assign it to the new UN 3528 engines or machinery powered by internal combustion engine flammable liquid entry. This new stowage provision will require 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 proposes to create 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 proposed 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 proposes to revise § 176.905 to update the transport requirements and exceptions for vehicles transported by vessel. These changes are necessary to remove references to machinery (see proposed § 176.906) and to maintain consistency with changes made in Amendment 38-16 of the IMDG Code.

The following changes are proposed to the transport requirements for vehicles transported by vessel: [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 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 lithium batteries that 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 proposes the creation of 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.

A summary of the proposed hazard communication requirements for vessel transportation of engines and machinery that are not empty of fuel based on fuel content and capacity are provided in Tables 8 and 9. The additional hazard communication requirements column indicates requirements that would differ from existing hazard communication requirements for engines or machinery.



<b>Table 8</b>		
<b>Liquid Fuels Class 3 (UN 3528) and Class 9 (UN 3530)</b>		
<b>CONTENTS</b>	<b>CAPACITY</b>	<b>ADDITIONAL HAZARD COMMUNICATION REQUIREMENTS</b>
≤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

<b>Table 9</b>	
<b>Gaseous Fuels Division 2.1 (UN 3529)</b>	
<b>WATER CAPACITY</b>	<b>ADDITIONAL HAZARD COMMUNICATION REQUIREMENTS</b>
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 proposes to amend 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. In paragraph (l)(1), we propose to 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 proposed end dates for when the manufacture of cylinders and service equipment is no longer authorized in accordance with the outdated ISO standard.

Additionally, consistent with the UN Model Regulations, PHMSA proposes to revise paragraph (o)(2) to adopt the current ISO standard relating to material compatibility and to add 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, we propose to revise paragraphs (q) and (r) 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.

### *Section 178.75*

Section 178.75 contains specifications for Multiple-element gas containers (MEGCs). Consistent with the UN Model Regulations, PHMSA proposes to renumber existing paragraph (d)(3)(iv) as (d)(3)(v) and to add 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 proposes to revise 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—UN3378, 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. PHMSA proposes an amendment to paragraph (c) to require that Transport Canada cylinders be requalified and marked in accordance with the Transport Canada TDG Regulations. This amendment is necessary to ensure that RIN holders utilize the TDG Regulations when requalifying and marking Transport Canada cylinders.

### *Section 180.207*

Section 180.207 prescribes requirements for requalification of UN pressure receptacles. Consistent with changes to the UN Model Regulations, PHMSA proposes to revise 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 180.413*

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 discussed in the “Harmonization Proposals in this NPRM” section, 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. PHMSA finds 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 provides 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 proposes to expand the authorization for the repair of DOT specification cargo tanks by revising § 180.413(a)(1). Specifically, PHMSA proposes to add a new subparagraph (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 facility holds a valid Certificate of Authorization from a provincial pressure vessel jurisdiction for repair; the facility is registered in accordance with the Transport Canada TDG Regulations to repair the corresponding TC specification; and all repairs are performed using the quality control procedures used to obtain the Certificate of Authorization.

PHMSA also proposes an incidental revision to § 180.413(b) to except facilities in Canada that perform a repair in accordance with the proposed § 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 proposed 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 necessary opportunities for obtaining repairs to DOT specification cargo tanks in Canada.

See the review of § 107.502 for the discussion of a related proposal.

#### *Section 180.605*

Section 180.605 prescribes requirements for the qualification of portable tanks. Consistent with the UN Model Regulations, PHMSA proposes an amendment to 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 proposed amendment would 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)).

## **VII. Regulatory Analyses and Notices**

### **A. Statutory/Legal Authority for this Rulemaking**

This proposed rule is published under the statutory authority of Federal hazardous materials transportation law (49 U.S.C. 5101 et seq.). Section 5103(b) of Federal hazmat law authorizes the Secretary of Transportation to prescribe regulations for the safe transportation, including security, of hazardous materials in intrastate, interstate, and foreign commerce. This proposed 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 proposed 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 HMR level of safety or imposing undue burdens on the regulated community. Thus, as explained in the corresponding sections above, we are not proposing harmonization 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. Additionally, the following external agencies were consulted in the development of this rule:

Federal Aviation Administration

Federal Motor Carrier Safety Administration

Federal Railroad Administration

U.S. Coast Guard

Section 49 U.S.C. 5120(b) of Federal hazmat 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. This rule proposes to amend 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 proposes to incorporate changes into the HMR based on the 19th Revised Edition of the UN Model Regulations, Amendment 38-16 to the IMDG Code, and the 2017–2018 Edition of the ICAO Technical Instructions, which become effective January 1, 2017. The large volume of hazardous materials transported in international commerce warrants the harmonization of domestic and international requirements to the greatest extent possible.



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

This notice is not considered a significant regulatory action under section 3(f) of Executive Order 12866 (“Regulatory Planning and Review”) and, therefore, was not reviewed by the Office of Management and Budget. This notice is not considered a significant rule under the Regulatory Policies and Procedures of the Department of Transportation (44 FR 11034). Additionally, 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.

*Benefits to Harmonization*

**General Harmonization Benefit:** In an earlier regulatory evaluation,<sup>10</sup> PHMSA estimated a proxy for benefits of harmonization of the HMR with international standards of \$87.9 million. We estimated this number by multiplying a hazard communication cost per dollar of hazardous materials output (\$0.001) by the value of hazardous materials involved in international trade, as estimated by the proportion of trade (the total of gross imports and gross exports) in the fuels and lubricants, chemicals, and medicinal/dental/pharmaceutical products industries (\$879 billion in 2013)<sup>11</sup> that are hazardous products (approximately 10

---

<sup>10</sup> HM-215M: Hazardous Materials: Harmonization with International Standards (RRR), Final Rule, 80 FR 1075, January 8, 2015.

<sup>11</sup> As reported in the quarterly trade data of the U.S. Bureau of Economic Analysis, available at: [http://www.bea.gov/international/detailed\\_trade\\_data.htm](http://www.bea.gov/international/detailed_trade_data.htm).

percent).

For estimating benefits of this proposed rule, we follow a nearly identical approach, while acknowledging there is an inherent imprecision of benefits, and update the data and assumptions where possible. Unlike in the last regulatory evaluation, 2012 Commodity Flow Survey (CFS) data on hazardous materials is now available. According to the 2012 CFS, [\\$13,852,143](#) million worth of commodities were transported in the U.S. in 2012, of which [\\$2,334,425](#) million worth were hazardous (or 16.9 percent).<sup>12</sup>

However, we acknowledge that the estimated 16.9 percent proportion of total shipment values classed as hazardous materials may have had a high-side bias due to the variety of different classes of products classified as hazardous. The percentage of shipments properly classified as hazardous—particularly for medicinal/dental/pharmaceutical products—is likely lower, which for the purpose of this analysis we assume to be 10 percent.

We update our estimate of value of hazardous materials involved in international trade by using U.S. trade in goods seasonally adjusted, Census-based total gross imports, and gross exports in the fuels and lubricants, chemicals, and medicinal/dental/pharmaceutical products industries for 2015, which is the most recent year available.

- Gross imports: \$451.8 billion (rounded).
  - Fuels and lubricants: \$198.217 billion.
  - Chemicals: \$73.304 billion.

---

<sup>12</sup>[http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/commodity\\_flow\\_survey/2012/hazardous\\_materials/index.html](http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/commodity_flow_survey/2012/hazardous_materials/index.html)

- Medicinal/dental/pharmaceutical products: \$180.280 billion.
- Gross exports: \$281.6 billion (rounded).
  - Fuels and lubricants: \$115.013 billion.
  - Chemicals: \$111.492 billion.
  - Medicinal/dental/pharmaceutical products: \$55.046 billion.
- Gross imports plus gross exports: \$733.4 billion.<sup>13</sup>

Multiplying this \$733.4 billion figure by the estimated proportion of annual trade in these three industries that are hazardous products (10 percent) by the average hazard communication cost per dollar of hazardous materials produced in the United States (\$0.001) results in an estimate of benefits from general harmonization of about \$73.3 million annually, rounded.

If the HMR are not harmonized with international standards, we estimate that it will cost U.S. companies an additional \$73.3 million per year to comply with both the domestic and international standards. Harmonizing the HMR with the international standards, however, will avert these \$73.3 million in additional costs, making them the primary benefit attributable to this rulemaking.

**RCC Initiatives:** PHMSA believes that recognition under the HMR of Transport Canada cylinders, equivalency certificates, and cargo tanks would not result in any significant costs but would instead provide benefits in flexibility to cylinder users, shipments of hazardous materials made under an equivalency certificate to the U.S., and certain U.S.-based cargo tank motor vehicle operators requiring repairs while in Canada.

---

<sup>13</sup> Bureau of Economic Analysis, U.S. Department of Commerce, U.S. Trade in Goods (IDS-0008), available at: [http://www.bea.gov/international/detailed\\_trade\\_data.htm](http://www.bea.gov/international/detailed_trade_data.htm).

We do not believe there is currently a basis for reliably estimating quantitatively the benefits of the cylinder and equivalency certificate provisions of this proposed rule. However, we welcome and specifically solicit data available to commenters to more accurately estimate benefits quantitatively. With regard to all three RCC proposed amendments, PHMSA believes that aligning regulatory approaches between Canada and the United States can spur economic growth and job creation in both nations, facilitate trade, and still maintain appropriate safety standards. Preliminary analysis indicates that the total annual benefit of the cargo tank RCC provisions proposed in this rulemaking would be \$6,555,234 per year (for the high estimate of U.S.-made cargo tanks affected), \$779,337 per year (for the middle estimate), or \$693,804 per year (for the low estimate). Please see the Regulatory Impact Analysis (RIA) for this rulemaking action for a detailed discussion of the benefits of recognizing cargo tank repairs made in Canadian facilities.

#### *Costs of Harmonization*

Please see the RIA for this rulemaking—a copy of which has been placed in the docket—for detailed analysis of the costs of various amendments proposed in this NPRM. We provide below a summary of cost estimates for several of the larger cost proposals.

**Incorporation by Reference:** PHMSA anticipates that the primary cost of updating references incorporated in the HMR to the most recent international hazardous material standards will be the purchase of updated copies to be incorporated by reference. These costs will be borne by offerors, package manufacturers, and transporters of hazardous materials if this rulemaking were finalized.

It is unknown how many individuals and firms involved in shipping hazardous

materials will purchase copies of these international standards as a result of finalizing this rulemaking. We take a conservative approach to estimating such a figure by using as a proxy the number of shippers, carriers, or other offerors or transporters of hazardous materials in commerce with a PHMSA registration expiring before 2019. Currently, PHMSA's registration database indicates 38,070 registrants as of March 18, 2016.<sup>14</sup> Of these, 31,103 (approximately 82 percent) are small businesses as defined by the U.S. Small Business Administration. Further, 31,765 registrants (approximately 83 percent) indicated that they offer or transport hazardous materials solely by highway method.

If we assume (for conservative estimation purposes) that all registrants will purchase copies of the ICAO and IMDG publications, this indicates an estimated cost of \$19.3 million (rounded, \$508.70 cost of ICAO and IMDG publications  $\times$  38,070 registrants). However, we further assume that the two publications included in the \$19.3 cost (ICAO Technical Instructions (for air) and IMDG Code (by vessel)) will not apply to such registrants who indicated that they offer or transport in commerce hazardous materials only via highway. Therefore, costs for the 31,765 highway-only registrants would be zero. To counterbalance a registrant purchasing more than one copy, we conservatively assume all other registrants—while acknowledging that, in fact, some will purchase both standards copies and some will purchase none—will purchase updated copies of all standards publications listed here, indicating a rounded cost of \$3.2 million ( $\$508.70 \times 6,305$  registrants [38,070 total registrants – 31,765 highway-only registrants]).

All of the ISO standards incorporated will not be purchased by the majority of

---

<sup>14</sup> See PHMSA Hazardous Materials Registration Program Registration Data Files, link available at: <http://www.phmsa.dot.gov/hazmat/registration>, accessed on March 18, 2016.

shippers and carriers and, thus, will likely only impact a small subset of the regulated community. Further, we assume that many companies will purchase multiple copies of the ISO codes, rather than only one copy. Manufacturers of pressure receptacles impacted by the ISO codes are included in the North American Industry Classification System (NAICS) 332420 “Metal Tank (Heavy Gauge) Manufacturing,” which includes cylinders, and NAICS 332911 “Industrial Valve Manufacturing,” or more generally in NAICS 332, “Fabricated Metal Product Manufacturing.” Users of pressure receptacles impacted by the ISO codes are included in NAICS 325120 “Industrial Gas Manufacturing,” or more generally in NAICS 325 “Chemical Manufacturing.” Testers and requalifiers of pressure receptacles are included in NAICS 541380 “Testing Laboratories,” or more generally in NAICS 541 “Professional, Scientific, and Technical Services.” The more conservative, all-encompassing three-digit NAICS industries are used to estimate impacted entities, as each entity may purchase more than one copy of a publication. The PHMSA registration database has 834 registrants in NAICS 332; 3,335 registrants in NAICS 325; and 415 registrants in NAICS 541, for a total of 4,584 impacted registrants. It costs each impacted registrant \$1,853 to purchase the ISO standards, or \$8.5 million total (rounded, 4,584 impacted registrants × \$1,853 cost per registrant).

It will cost \$3.2 million to purchase the ICAO and IMDG publications and \$8.5 million to purchasing the ISO publications, giving a total one-time cost of \$11.7 million. We do not believe we have sufficient data to estimate the precise number of registrants. However, we use one copy per impacted registrant as a reasonably conservative estimate on costs of the proposed rulemaking. It should also be noted that several of the companies purchasing the international standards may serve international markets and would have

purchased these publications even in the absence of this rulemaking. Therefore, costs due to this proposed rule are likely lower than these estimates.

**Lithium Battery Hazard Communication:** PHMSA anticipates that incorporating a new battery label in place of the existing label and requiring a new lithium battery label in place of the existing label will be cost neutral. We anticipate that the price of the new label will be similar to the price of existing labels. The proposed amendment provides a phase-in period to December 2018, allowing shippers and carriers of the impacted lithium battery shipments a sufficient transition period to use the new label.

PHMSA anticipates that incorporating a new standard lithium battery mark across all modes will provide consistent hazard communication, reduce training costs, and facilitate intermodal movements. Expanding the scope of packages requiring application of the new lithium battery mark for small shipments of lithium batteries will provide benefits pertaining to better identification of lithium battery shipments, but it will likely involve some amount of increased compliance cost. As with the proposed labeling revisions, PHMSA would provide a phase-in period to December 2018, allowing shippers and carriers of the impacted lithium battery shipments a sufficient transition period to use the new mark.

PHMSA anticipates that eliminating additional document requirements for shipments of small lithium batteries will likely provide economic benefits and cost savings to shippers.

However, PHMSA anticipates the provision increasing the number of packages containing lithium batteries installed in equipment that have to be marked with the lithium battery mark will increase compliance costs. The proposals in this NPRM would apply the

lithium battery mark to an expanded number of lithium batteries installed in equipment (LBIIE) packages. Currently packages that contain “no more than four lithium cells or two lithium batteries installed in equipment” are not subject to marking requirements regardless of how many packages are in a single shipment. In this NPRM, PHMSA proposes to require each package that contains lithium batteries installed in equipment to display the lithium battery marking when there are more than two packages in the consignment.

We assume that U.S. manufacturers of certain equipment containing lithium batteries and wholesalers of LBIIE that supply retailers with consignments containing more than two packages of LBIIE will be most impacted by the proposed provision.<sup>15</sup> We anticipate the provisions of this proposed change to impact U.S.-based manufacturers, wholesalers, and certain retailers of lithium batteries and equipment containing lithium batteries. PHMSA specifically solicits comment on the types and numbers of entities that are to be impacted by this proposed change.

The total domestic manufacturer and wholesaler marking costs as illustrated in the RIA in the docket for this rulemaking approximates the upper bound annual cost of the provision to be about \$4.9 million (\$838,456 + \$7,665 + \$4.0 million).<sup>16</sup> We anticipate that the cost will be substantially lower because many domestic manufacturers and shippers may already label their LBIIE packages with a current lithium battery label (regardless if required by the HMR); not all of these shippers would necessarily ship

---

<sup>15</sup> We assume that most retailers selling to end users are likely not impacted, as we assume that they primarily ship single units of LBIIE for the majority of their consignments, which would not require marking due to the two or few packages per consignment exception. However, we solicit comment on whether this assumption is appropriate and welcome data confirming or refuting this assumption.

<sup>16</sup> Because of the 2-year transition period, these costs would not be encountered until the third year after finalizing the rule.



LBIIE with more than two packages per shipment (for which shipments would be excepted from the lithium battery marking requirements of this provision); and transitioning to the new lithium battery mark may have minimal impact.

### *Net Benefit*

Based on the discussions of benefits and costs provided above, PHMSA estimates the net benefit associated with the rulemaking to be \$63.2 million–69 million in the first year after publication and \$70 million–75.8 million in the second year after publication. Please see the complete RIA for a more detailed analysis of the costs and benefits of this proposed rule.

### C. Executive Order 13132

This proposed rule has been analyzed in accordance with the principles and criteria contained in Executive Order 13132 (“Federalism”). It preempts State, local, and Indian tribe requirements but does not propose any regulation that has 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 proposed 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 proposed rule is necessary to incorporate changes adopted in international standards, effective January 1, 2017. If the proposed 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 proposed 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 proposes the effective date of Federal preemption be 90 days from publication of a final rule in this matter.

D. Executive Order 13175

This proposed rule was analyzed in accordance with the principles and criteria contained in Executive Order 13175 (“Consultation and Coordination with Indian Tribal Governments”). Because this proposed rule does not have tribal implications, does not impose substantial direct compliance costs, and is required by statute, the funding and consultation requirements of Executive Order 13175 do not apply.

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

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 proposed 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,” the majority of amendments in this proposed 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 NPRM 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, if promulgated, have a significant economic impact on a substantial number of small entities.

This proposed rule has been developed in accordance with Executive Order 13272 (“Proper Consideration of Small Entities in Agency Rulemaking”) and DOT’s procedures and policies 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 proposed 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. In this NPRM, PHMSA proposes to amend § 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 would be in addition to any existing application and burden encountered during the initial RIN application.

We anticipate this proposed 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 proposed 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 proposed rule are attributable to a new proposed 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 proposed 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 NPRM. PHMSA has developed burden estimates to reflect changes in this NPRM 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

Under the Paperwork Reduction Act of 1995, no person is required to respond to an information collection unless it has been approved by OMB and displays a valid OMB control number. Section 1320.8(d) of 5 CFR requires that PHMSA provide interested members of the public and affected agencies an opportunity to comment on information and recordkeeping requests. PHMSA specifically solicits comment on the information collection and recordkeeping burdens associated with developing, implementing, and maintaining these proposed requirements. Address written comments to the Dockets Unit as identified in the “ADDRESSES” section of this rulemaking. We must receive comments regarding information collection burdens prior to the close of the comment period as identified in the “DATES” section of this rulemaking. In addition, you may submit comments specifically related to the information collection burden to the PHMSA Desk Officer, Office of Management and Budget, at fax number 202-395-6974. Requests for a copy of this information collection should be directed to Steven Andrews or T. Glenn Foster, Standards and Rulemaking Division (PHH-10), Pipeline and Hazardous Materials Safety Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590-0001. If these proposed requirements are adopted in a final rule, 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 proposed 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 proposed 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 1500–1508) require Federal agencies to conduct an environmental review considering (1) the need for the proposed action, (2) alternatives to the proposed action, (3) probable environmental impacts of the proposed action and alternatives, and (4) the agencies and persons consulted during the consideration process.

1. Purpose and Need

This NPRM would amend the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) to maintain consistency with international standards by incorporating the 19<sup>th</sup> Revised Edition of the UN Recommendations on the Transport of Dangerous Goods—

Model Regulations, Amendment 38-16 to the IMDG Code, the 2017–2018 ICAO Technical Instructions, and Canada’s newest amendments to TDG Regulations.

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 proposed 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 in this proposed 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 proposing this rulemaking, PHMSA is considering the following alternatives:

### No Action Alternative:

If PHMSA were to 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 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.

Greenhouse gas emissions would remain the same under the No Action Alternative.

Preferred Alternative:

This alternative is the current proposal as it appears in this NPRM, applying to transport of hazardous materials by various transport modes (highway, rail, vessel, and aircraft). The proposed amendments included in this alternative are more fully addressed in the preamble and regulatory text sections of this NPRM. However, they generally include:

- 1) Updates to references to various international hazardous materials transport standards;
- 2) Amendments to the Hazardous Materials Table to include four new Division 4.1 entries for polymerizing substances and to add into the HMR defining criteria, authorized packagings, and safety requirements;
- 3) Amendments to add, revise, or remove certain proper shipping names, packing groups, special provisions, packaging authorizations, bulk packaging requirements, and vessel stowage requirements;

4) Changes to add the following substances to the list of marine pollutants in appendix B to § 172.101: Hexanes; Hypochlorite solutions; Isoprene, stabilized; N-Methylaniline; Methylcyclohexane; and Tripropylene;

5) Changes throughout the part 173 packaging requirements to authorize more flexibility when choosing packages for hazardous materials;

6) Various amendments to packaging requirements for the vessel transportation of water-reactive substances;

7) Revisions to hazard communication requirements for shipments of lithium batteries consistent with changes adopted in the 19th Revised Edition of the UN Model Regulations; and

8) Amendments to the HMR resulting from coordination with Canada under the U.S.-Canada Regulatory Cooperation Council (RCC).

### 3. Probable Environmental Impact of the Alternatives

#### No Action Alternative:

If PHMSA were to 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 proposed environmental and safety requirements in the NPRM under the No Action Alternative would result in a lost opportunity for reducing environmental and safety-related incidents.

Greenhouse gas emissions would remain the same under the No Action Alternative.

Preferred Alternative:

If PHMSA selects the provisions as proposed in this NPRM, safety and environmental risks would be reduced and that protections to human health and environmental resources would be increased. Potential environmental impacts of each proposed amendment in the preferred alternative are discussed as follows:

1. Incorporation by Reference: PHMSA proposes to update references to various international hazardous materials transport standards including the 2017–2018 ICAO Technical Instructions; Amendment 38-16 to 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. Additionally, we propose to add one new reference to standards and update eight other references to standards applicable to the manufacture use and requalification of pressure vessels published by the International Organization for Standardization.

This proposed amendment, which will increase standardization and consistency of regulations, will result in greater protection of human health and the environment. Consistency between U.S. and international regulations enhances the safety and

environmental protection of international hazardous materials transportation through better understanding of the regulations, an increased level of industry compliance, the smooth flow of hazardous materials from their points of origin to their points of destination, and consistent emergency response in the event of a hazardous materials incident. 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.

Harmonization will result in more targeted and effective training and thereby enhanced environmental protection. This proposed amendment will eliminate inconsistent hazardous materials regulations, which hamper compliance training efforts. For ease of compliance with appropriate regulations, air and vessel carriers engaged in the transportation of hazardous materials generally elect to comply with the ICAO Technical Instructions and IMDG Code as appropriate. Consistency between these international regulations and the HMR allows shippers and carriers to train their hazmat employees in a single set of requirements for classification, packaging, hazard communication, handling, stowage, etc., thereby minimizing the possibility of improperly preparing and transporting a shipment of hazardous materials because of differences between domestic and international regulations.

Greenhouse gas emissions would remain the same under this proposed amendment.

2. Consistent with amendments adopted into the UN Model Regulations, PHMSA proposes to revise the Hazardous Materials Table in § 172.101 to include four new Division 4.1 entries for polymerizing substances. Additionally, we propose to add into the HMR defining criteria, authorized packagings, and safety requirements including, but not limited to, stabilization methods and operational controls.

This proposed amendment, which will increase standardization and consistency of regulations, will result in greater protection of human health and the environment. Consistency between U.S. and international regulations enhances the safety and environmental protection of international hazardous materials transportation through better understanding of the regulations, an increased level of industry compliance, the smooth flow of hazardous materials from their points of origin to their points of destination, and consistent emergency response in the event of a hazardous materials incident. New and revised entries to the HMT reflect emerging technologies and a need to better describe or differentiate between existing entries. These proposed changes mirror changes in the Dangerous Goods List of the 19th Revised Edition of the UN Model Regulations, the 2017–2018 ICAO Technical Instructions, and the Amendment 38-16 to 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.

Harmonization will result in more targeted and effective training and thereby enhanced environmental protection. This proposed amendment will eliminate inconsistent hazardous materials regulations, which hamper compliance training efforts. For ease of compliance with appropriate regulations, international carriers engaged in the

transportation of hazardous materials by vessel generally elect to comply with the IMDG Code. Consistency between these international regulations and the HMR allows shippers and carriers to train their hazmat employees in a single set of requirements for classification, packaging, hazard communication, handling, stowage, etc., thereby minimizing the possibility of improperly preparing and transporting a shipment of hazardous materials because of differences between domestic and international regulations.

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

Greenhouse gas emissions would remain the same under this proposed amendment.

3. PHMSA proposes 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 also propose to add and revise special provisions, large packaging authorizations, and intermediate bulk container (IBC) authorizations consistent with the UN Model Regulations to provide a wider range of packaging options to shippers of hazardous materials.

This proposed amendment, which will increase standardization and consistency of

regulations, will result in greater protection of human health and the environment. Consistency between U.S. and international regulations enhances the safety and environmental protection of international hazardous materials transportation through better understanding of the regulations, an increased level of industry compliance, the smooth flow of hazardous materials from their points of origin to their points of destination, and consistent emergency response in the event of a hazardous materials incident. New and revised entries to the HMT reflect emerging technologies and a need to better describe or differentiate between existing entries. These proposed changes mirror changes in the Dangerous Goods List of the 19th Revised Edition of the UN Model Regulations, the 2017–2018 ICAO Technical Instructions, and the Amendment 38-16 to 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.

Harmonization will result in more targeted and effective training and thereby enhanced environmental protection. This proposed amendment will eliminate inconsistent hazardous materials regulations, which hamper compliance training efforts. For ease of compliance with appropriate regulations, international carriers engaged in the transportation of hazardous materials by vessel generally elect to comply with the IMDG Code. Consistency between these international regulations and the HMR allows shippers and carriers to train their hazmat employees in a single set of requirements for classification, packaging, hazard communication, handling, stowage, etc., thereby minimizing the possibility of improperly preparing and transporting a shipment of hazardous materials because of differences between domestic and international regulations.

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

Greenhouse gas emissions would remain the same under this proposed amendment.

4. PHMSA proposes to add the following substances to the list of marine pollutants in appendix B to § 172.101: Hexanes; Hypochlorite solutions; Isoprene, stabilized; N-Methylaniline; Methylcyclohexane; and Tripropylene.

This proposed amendment, which will increase standardization and consistency of regulations, will result in greater protection of human health and the environment. Consistency between U.S. and international regulations enhances the safety and environmental protection of international hazardous materials transportation through better understanding of the regulations, an increased level of industry compliance, the smooth flow of hazardous materials from their points of origin to their points of destination, and consistent emergency response in the event of a hazardous materials incident. These proposed additions and deletions 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 its list based on changes to the IMDG Code and evaluation of listed materials against the IMDG Code criteria. Amending the marine pollutant list will facilitate consistent communication of the presence of marine pollutants



and facilitate safe and efficient transportation without imposing significant burden associated with characterizing mixtures as marine pollutants.

Greenhouse gas emissions would remain the same under this proposed amendment.

5. Consistent with amendments adopted into the UN Model Regulations, PHMSA proposes to adopt changes throughout the part 173 packaging requirements to authorize more flexibility when choosing packages for hazardous materials. These changes include design, construction, and performance testing criteria of composite reinforced tubes between 450 L and 3,000 L water capacity.

These proposed 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.

Harmonization will result in more targeted and effective training and thereby enhanced environmental protection. This proposed amendment will eliminate inconsistent hazardous materials regulations, which hamper compliance training efforts. Consistency between these international regulations and the HMR allows shippers and carriers to train their hazmat employees in a single set of requirements for classification, packaging, hazard communication, handling, stowage, etc., thereby minimizing the possibility of improperly preparing and transporting a shipment of hazardous materials because of differences between domestic and international regulations.

Greenhouse gas emissions would remain the same under this proposed amendment.

6. PHMSA proposes various amendments to packaging requirements for the vessel transportation of water-reactive substances. 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.

The proposed amendment will 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. PHMSA proposes to amend 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 NPRM, PHMSA proposes to strengthen the ability of these packages transporting water-reactive substances. This proposed 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.

Harmonization will result in more targeted and effective training and thereby enhanced environmental protection. This proposed amendment will eliminate inconsistent hazardous materials regulations, which hamper compliance training efforts. For ease of compliance with appropriate regulations, international carriers engaged in the

transportation of hazardous materials by vessel generally elect to comply with the IMDG Code. Consistency between these international regulations and the HMR allows shippers and carriers to train their hazmat employees in a single set of requirements for classification, packaging, hazard communication, handling, stowage, etc., thereby minimizing the possibility of improperly preparing and transporting a shipment of hazardous materials because of differences between domestic and international regulations.

Greenhouse gas emissions would remain the same under this proposed amendment.

7. PHMSA proposes to revise hazard communication requirements for shipments of lithium batteries. Specifically, PHMSA proposes to adopt a new lithium battery label in place of the existing Class 9 label; to amend 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; to delete the documentation requirement in § 173.185(c) for shipments of small lithium cells and batteries; and to amend 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.”

This proposed amendment, which will provide for enhanced hazard communication, will result in greater protection of human health and the environment by increasing awareness and preparedness.

Greenhouse gas emissions would remain the same under this proposed amendment.

8. PHMSA proposes several amendments to the HMR resulting from coordination with Canada under the U.S.-Canada Regulatory Cooperation Council (RCC). We are

proposing provisions for recognition of Transport Canada (TC) cylinders, equivalency certificates, and inspection and repair of cargo tanks.

This proposed amendment, which will increase standardization and consistency of regulations, will result in greater protection of human health and the environment. Consistency between U.S. and international regulations enhances the safety and environmental protection of international hazardous materials transportation through better understanding of the regulations, an increased level of industry compliance, the smooth flow of hazardous materials from their points of origin to their points of destination, and consistent emergency response in the event of a hazardous materials incident. The proposed 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 will facilitate 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 proposed action is consistent with concurrent actions by Transport Canada to amend the TDG Regulations.

Greenhouse gas emissions would remain the same under this proposed amendment.

#### 4. Agencies Consulted

This NPRM represents PHMSA's first action in the U.S. for this program area. 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 proposed rule. PHMSA will consider the views expressed in comments to the NPRM submitted by members of the public, state and local governments, and industry.

## 5. Conclusion

The provisions of this proposed 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 proposed rule.

PHMSA welcomes any views, data, or information related to environmental impacts that may result if the proposed requirements are adopted, as well as possible alternatives and their environmental impacts.

### 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. 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 (Public Law 96-39), as amended by the Uruguay Round Agreements Act (Public Law 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 the proposed rule 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 NPRM 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, 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, 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 proposes to amend 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 (28 U.S.C. 2461note); Pub. L. 104–121 sections 212–213; Pub. L. 104–134 section 31001; Pub. L. 112–141 section 33006, 33010; 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 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);

\* \* \* \* \*

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 subchapter).

\* \* \* \* \*

(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 pamphlet 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 (28 U.S.C. 2461 note); Pub. L. 104-134, section 31001; 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. paragraphs (t), (t)(1), (v), (v)(2), (w)(1) through (69), (bb), (bb)(1), (dd) introductory text, (dd)(1), and (dd)(2) are revised;
- b. paragraphs (bb)(1) (xiii) through (xix) are added; and
- c. paragraph (dd)(3) is added.

The revisions and additions read as follows:

**§ 171.7 Reference material.**

\* \* \* \* \*

(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](mailto:sales@icao.int).

(1) Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions), 2017–2018 Edition, 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.

\* \* \* \* \*

(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](mailto:sales@imo.org).

(1) \* \* \*

(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; 178.3; 178.274.

(w) \* \* \*

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

(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: Gas cylinders -- Acetylene cylinders -- Basic requirements and type testing, Second edition, 2013-08-19, 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, 2008-04-15, 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 Gas cylinders -- Refillable seamless aluminium alloy gas cylinders -- Design, construction and testing, Second edition, 2012-08-21, into §178.71.

(28) ISO 7866:2012/Cor 1:2014 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 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, 2014-07-08, 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 Gas cylinders -- Cylinder valves -- Specification and type testing, Third Edition, 2014-07-16, 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 Gas cylinders -- Acetylene cylinders -- Periodic inspection and maintenance, Third edition, 2013-12-05, 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 Gas cylinders -- Compatibility of cylinder and valve materials with gas contents -- Part 2: Non-metallic materials, Second edition, 2013-03-21, 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 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, 2012-07-25, 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 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, 2012-07-13, into §178.71.

(57) 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, Second edition, 2014-08-11, 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 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, 2013-04-17, 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 11515:2013 Gas cylinders - Refillable composite reinforced tubes of water capacity between 450 L and 3000 L - Design, construction and testing, First edition, 2013-07-22, into § 178.71.

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

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

(65) 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.

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

(67) 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.

(68) 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.

(69) 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 §§171.12; 171.22; 171.23; 172.401; 172.502; 172.519; 172.602; 173.31; 173.32; 173.33; 180.413.

\* \* \* \* \*

(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](mailto: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; 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, definitions for “Design life”, “SAPT”, and “Service life” are added in the appropriate alphabetical sequence, and the definitions for “Aerosol”, Large salvage packaging”, and “UN tube” are revised to 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.

\* \* \* \* \*

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 (a)(4)(ii) 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, 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, 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) \* \* \*

(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 CRC, BTC, CTC or TC cylinder has been requalified under a program authorized by the TDG regulations; and

(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.

(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.).

\* \* \* \* \*

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 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 TDG Regulations, except that cylinders not conforming to these requirements must meet the requirements in paragraphs (a)(3), (a)(4) or (a)(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 TDG Regulations, 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, AND TRAINING REQUIREMENTS**

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, the Hazardous Materials Table is amended by removing the entries under “[REMOVE]”, by adding the entries under “[ADD]” and revising entries under “[REVISE]” in the appropriate alphabetical sequence to read as follows:

**§ 172.101 Purpose and use of the hazardous materials table.**

\* \* \* \* \*

Sym-bols (1)	Hazardous materials descriptions and proper shipping names (2)	Hazard class or division (3)	Identification Numbers (4)	PG (5)	Label Codes (6)	Special Provisions (§ 172.102) (7)	(8)			(9)		(10)	
							Packaging (§ 173.***)			Quantity limitations (see §§ 173.27 and 175.75)		Vessel stowage	
							Excep-tions (8A)	Non-bulk (8B)	Bulk (8C)	Passenger aircraft/rail (9A)	Cargo aircraft only (9B)	Loca-tion (10A)	Other (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,	2.1	UN3529		2.1	363	220	220	220	Forbidden	No limit	E	



	internal combustion, flammable gas powered or Machinery, 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	363	220	220	220	No limit	No limit	E	149
	Engine, internal combustion or Machinery, internal combustion	9	UN3530		9	363	220	220	220	No limit	No limit	A	
	*		*		*		*		*		*		*
	Polyester resin kit, <u>liquid base material</u>	3	UN3269		3	40, 149	165	165	None	5 kg	5 kg	B	
	Polyester resin kit, <u>solid base material</u>	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, 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, 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, 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, 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. <u>Inhalation hazard zone A</u>	2.3	UN3516		2.3, 8	1, 379	None	302c	None	Forbidden	Forbidden	D	40
G	Adsorbed gas, toxic, corrosive, n.o.s. <u>Inhalation hazard zone B</u>	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. <u>Inhalation hazard zone C</u>	2.3	UN3516		2.3, 8	3, 379, B14	None	302c	None	Forbidden	Forbidden	D	40
G	Adsorbed gas, toxic, corrosive, n.o.s. <u>Inhalation hazard zone D</u>	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, IP4, 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

	*		*		*		*		*		*		*
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, 14
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	Aluminum carbide	4.3	UN1394	II	4.3	A20, IB7, IP2, IP4, 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, IP4, T3, TP33, W100	151	212	240	15 kg	50 kg	A	13, 39, 52, 53, 74, 101, 147, 148
				III	4.1	B134, IB8, IP4, 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, IP4, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	A	13, 39, 52, 53, 148
				III	4.3	A19, A20, IB8, IP4, T1, TP33, W31, W40	151	213	241	25 kg	100 kg	A	13, 39, 52, 53, 148
	*		*		*		*		*		*		*
	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, IP4, T3, TP33, W31, W40	None	212	242	15 kg	50 kg	B	13, 85, 103, 148
				III	4.3	128, B115, IB8, IP4, 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
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	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, IP4, 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
	*		*		*		*		*		*		*

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, IP4, 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, IP4, N34, T3, TP33, W31, W40	151	212	241	15 kg	50 kg	B	13, 52, 148
*		*		*		*		*		*		*
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, IP4, T3, TP33, W31	151	212	241	15 kg	50 kg	B	13, 52, 85, 103, 148
				III	4.3	A1, A19, IB8, IP4, 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
	*		*		*		*		*		*		*
	Cerium, <u>slabs, ingots, or rods</u>	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, <u>turnings or gritty powder</u>	4.3	UN3078	II	4.3	A1, IB7, IP2, IP4, 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
	*		*		*		*		*		*		*
	Chloric acid aqueous solution, <u>with not more than 10 percent chloric acid</u>	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
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	Cycloheptane	3	UN2241	II	3	IB2, T4, TP2	150	202	242	5 L	60 L	B	40
	*		*		*		*		*		*		*
	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



	*		*		*		*		*		*		*
	Dinitrophenol, wetted <u>with not less than 15 percent water, by mass</u>	4.1	UN1320	I	4.1, 6.1	23, A8, A19, A20, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Dinitrophenolates, wetted <u>with not less than 15 percent water, by mass</u>	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 <u>with not less than 15 percent water, by mass</u>	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 <u>with not less than 10 percent water, by mass</u>	4.1	UN2852	I	4.1	162, A2, N41, N84, W31	None	211	None	Forbidden	0.5 kg	D	28, 36
	*		*		*		*		*		*		*
	Dipropylamine	3	UN2383	II	3, 8	387, IB2, T7, TP1	150	202	243	1 L	5 L	B	25
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	Ferrocium	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 <u>with 30 percent or more but less than 90 percent silicon</u>	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
	*		*		*		*		*		*		*
	Ferrous metal borings <u>or</u> Ferrous metal shavings <u>or</u> Ferrous metal turnings <u>or</u> Ferrous metal cuttings <u>in a form liable to self-heating</u>	4.2	UN2793	III	4.2	A1, A19, B134, IB8, IP4, IP7, W100	None	213	241	25 kg	100 kg	A	13, 148
	*		*		*		*		*		*		*
A W	Fibers <u>or</u> Fabrics, animal <u>or</u> vegetable <u>or</u> Synthetic, n.o.s. <u>with animal or vegetable oil</u>	4.2	UN1373	III	4.2	137, IB8, IP3, T1, TP33, W31	None	213	241	Forbidden	Forbidden	A	
	*		*		*		*		*		*		*
	Fish meal, unstablized <u>or</u> Fish scrap, unstablized	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, IP4, 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, IP4, T1, TP33, W100	None	213	240	Forbidden	Forbidden	E	13, 148
	*		*		*		*		*		*		*

	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. or 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, IP4, 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 <u>including lithium ion polymer batteries</u>	9	UN3480		9	422, A51, A54	185	185	185	5 kg	35 kg	A	
Lithium ion batteries contained in equipment <u>including lithium ion polymer batteries</u>	9	UN3481		9	181, 422, A54	185	185	185	5 kg	35 kg	A	
Lithium ion batteries packed with equipment <u>including lithium ion polymer batteries</u>	9	UN3481		9	181, 422, A54	185	185	185	5 kg	35 kg	A	
Lithium metal batteries <u>including lithium alloy batteries</u>	9	UN3090		9	422, A54	185	185	185	Forbidden	35 kg	A	
Lithium metal batteries contained in equipment <u>including lithium alloy batteries</u>	9	UN3091		9	181, 422, A54, A101	185	185	185	5 kg	35 kg	A	
Lithium metal batteries packed with equipment <u>including lithium alloy batteries</u>	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, IP4, 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, <u>particle size not less than 149 microns</u>	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, IP4, 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, IP4, 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, 25, 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, IP4, 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, IP4, T3, TP33, W31	151	212	242	15 kg	50 kg	E	13, 40, 148
				III	4.3	A7, IB8, IP4, 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

	*		*		*		*		*		*		*
	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 <u>other than red fuming, with more than 20 percent and less than 65 percent nitric acid</u>	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, <u>with not more than 12.6 percent nitrogen, by dry mass mixture with or without plasticizer, with or without pigment</u>	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,	4.3	UN3399	I	4.3, 3	T13, TP2, TP7, TP36, TP47, W31	None	201	244	Forbidden	1 L	D	13, 40, 52, 148

	flammable												
				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, 14
				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, 14
				III	4.3, 4.2	IB6, T1, TP33, TP36, TP47, W31	None	213	241	25 kg	100 kg	E	13, 40, 52, 14
	*		*		*		*		*		*		*
	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, IP4, N34, T1, TP33,	152	213	240	25 kg	100 kg	C	13, 52, 66, 75, 148

						W100							
	*		*		*		*		*		*		*
	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
	*		*		*		*		*		*		*
	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 monomethyldiphenylmethanes, liquid or	9	UN3151	II	9	IB2	155	204	241	100 L	220 L	A	95

	Polyhalogenated terphenyls, liquid												
	Polyhalogenated biphenyls, solid or Halogenated monomethyldiphenylmethanes, 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	52
	*		*		*		*		*		*		*
	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 or 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 or Potassium sulfide with less than 30 percent water of crystallization	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	181	244	Forbidden	Forbidden	D	13, 78, 148
G	Pyrophoric metals, n.o.s., or 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%	4.1	UN3369	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 36

	water, by mass												
	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,	None	212	241	15 kg	50 kg	D	13, 148

						W31							
				III	4.2	B135, IB8, IP4, 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 microns	4.1	UN1352	II	4.1	A19, A20, IB6, IP2, N34, T3, TP33, W31, W40	None	212	240	15 kg	50 kg	E	74
	Titanium sponge granules or Titanium sponge powders	4.1	UN2878	III	4.1	A1, B134, IB8, IP4, 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, <u>with not less than 10% water, by mass</u>	4.1	UN3367	I	4.1	162, A8, A19, N41, N84, W31	None	211	None	0.5 kg	0.5 kg	E	28, 3
	Trinitrobenzene, wetted <u>with not less than 30 percent water, by mass</u>	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 <u>with not less than 10% water by mass</u>	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 <u>with not less than 30 percent water, by mass</u>	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, <u>with not less than 10% water by mass</u>	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, <u>with not less than 10 percent water by mass</u>	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 <u>with not less than 30 percent water, by mass</u>	4.1	UN1344	I	4.1	162, A8, A19, N41, W31	None	211	None	1 kg	15 kg	E	28, 36
	*		*		*		*		*		*		*
	Trinitrotoluene (TNT), wetted, <u>with not less than 10 percent water by mass</u>	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, <u>with not less than 30 percent water by mass</u>	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, <u>less than 0.1 kg per package, non-fissile or fissile-excepted</u>	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, <u>with not less than 10 percent water by mass</u>	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 <u>with not less than 20 percent water, by mass</u>	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	C	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

	Vinytoluenes, 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, IP4, T3, TP33, W31, W40	151	212	242	15 kg	50 kg	E	13, 40, 148
				III	4.3	B132, IB8, IP4, 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, <u>finished sheets, strip or coiled wire</u>	4.2	UN2009	III	4.2	A1, A19, W31	None	213	240	25 kg	100 kg	D	13, 148
	*		*		*		*		*		*		*
	Zirconium picramate, wetted <u>with not less than 20 percent water, by mass</u>	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) <u>mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns</u>	4.1	UN1358	II	4.1	A19, A20, IB6, IP2, N34, T3, TP33, W31, W40	None	212	241	15 kg	50 kg	E	13, 74, 147, 148
	Zirconium scrap	4.2	UN1932	III	4.2	B135, IB8, IP4, N34, T1, TP33, W31	None	213	240	Forbidden	Forbidden	D	13, 148

\* \* \* \* \*

13. In Appendix B to § 172.101, the List of Marine Pollutants is amended by adding six (6) entries in appropriate alphabetical order to read as follows:

Appendix B to § 172.101--List of Marine Pollutants.

\* \* \* \* \*

LIST OF MARINE POLLUTANTS

S. M. P. (1)	Marine Pollutant (2)
[Add]  * *	* * * * *
	Hexanes
* *	* * * * *
	Hypochlorite solutions
* *	* * * * *
	Isoprene, stabilized
* *	* * * * *
	N-Methylaniline
* *	* * * * *
	Methylcyclohexane
* *	* * * * *



	Tripropylene
* *	* * * * *

14. In § 172.102:

a. In paragraph (c)(1), special provisions 40, 134, 135, 238 and 369 are revised, special provisions 157, 181, 182, 379, 387, and 422 are added.

b. In paragraph (c)(2), special provisions is revised and A210 and A212 are added.

c. Paragraph (c)(3), special provisions B134 and B135 are added.

d. Paragraph (c)(4), Table 2 is revised.

ed. In paragraph (c)(5), special provision N90 is revised and N92 is added.

e. In paragraph (c)(9), special provisions W31, W32, W40, and W100 are added.

The additions, revisions, and deletion are to 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 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), 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  $1 \times 10^{-10}$  cm<sup>3</sup>/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, 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 (a)(6), 173.420(d), 173.421(b) and (d), and, for fissile-excepted material, the conditions of 173.453 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) 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) 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.

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.

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.

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) 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.

\* \* \* \* \*

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.

\* \* \* \* \*

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) which meet the requirements of part 178 of the HMR 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.

\* \* \* \* \*

(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), 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 Packagings must be hermetically sealed.

W32 Packagings shall be hermetically sealed, except for solid fused material.

W40 Bags are not allowed.

\* \* \* \* \*

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

\* \* \* \* \*

15. In § 172.407, paragraphs (c)(1)(i) and (c)(1)(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 this paragraph in effect on December 31, 2014, may continue to be used until December 31, 2018.

\* \* \* \* \*

16. New § 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:



(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) of this subpart, 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:

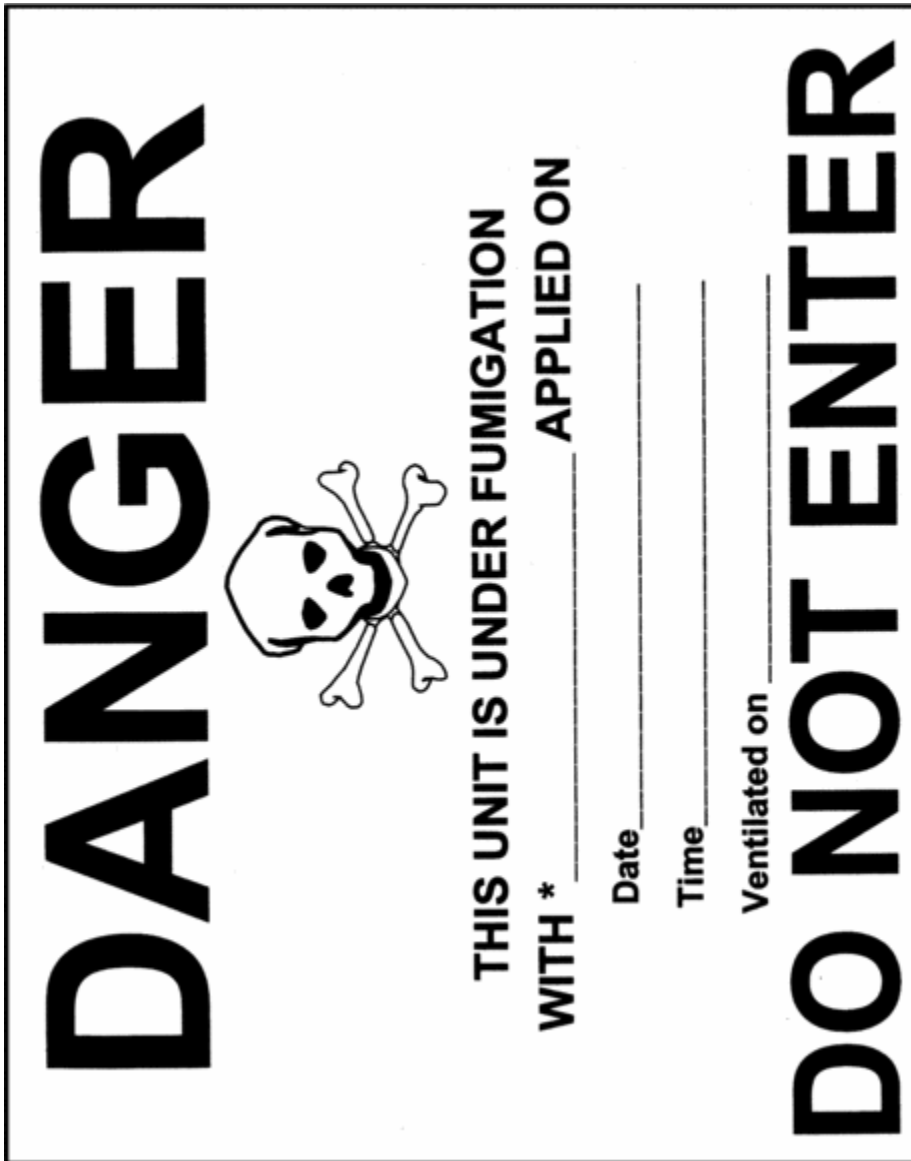
**§ 173.9 Transport vehicles or freight containers containing lading which has been fumigated.**

\* \* \* \* \*

(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]



(2) The “\*” shall be replaced with the technical name of the fumigant.

\* \* \* \* \*

21. In § 173.21, amend paragraph (f) 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 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 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.**

<b>SADT/SAPT<sup>1</sup></b>	<b>Control temperatures</b>	<b>Emergency temperature</b>
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.
50 °C (122 °F) <SADT/SAPT	( <sup>2</sup> )	( <sup>2</sup> )

<sup>1</sup>Self-accelerating decomposition temperature or Self-accelerating polymerization

temperature.

<sup>2</sup>Temperature control not required.

\* \* \* \* \*

22. 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, except that acetylene cylinders are not authorized. The use of UN tubes and MEGCs is prohibited for Hazard Zone A materials.

\* \* \* \* \*

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

**§173.50 Class 1—Definitions.**

\* \* \* \* \*

(b) \* \* \*

(6) Division 1.6<sup>2</sup> 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.

<sup>2</sup>The risk from articles of Division 1.6 is limited to the explosion of a single article.

\* \* \* \* \*

24. In § 173.52, in paragraph (b), in Table 1, the entry in the twelfth row is

revised 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
*	*	*

25. In § 173.62, in paragraph (b), in the Explosives Table, the entry for UN0510 is added; in paragraph (c), in the Table of Packing Methods, Packing Instructions 112(c), 114(b), 130, and 137 are revised to read as follows:

**§ 173.62 Specific packaging requirements for explosives.**

\* \* \* \* \*

(b) \* \* \*

**Explosives Table**

ID #	PI
* * * * *	
UN0510	130
* * * * *	

(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.
<p>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:</p> <p>1. For UN 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings must be lead free</p> <p>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.</p> <p>3. Inner packagings are not required if drums are used as the outer packaging.</p> <p>4. At least one of the packagings must be sift-proof</p> <p>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.</p>	<p>paper, multiwall, water resistant plastics woven plastics Receptacles fiberboard metal plastics wood</p>	<p>paper, multiwall, water resistant with inner lining plastics Receptacles metal plastics wood</p>	<p>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).</p>
* * * * *			
114(b)	Bags	Not necessary	Boxes
<p>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:</p> <p>1. For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings must be lead free</p>	<p>paper, kraft plastics textile, sift-proof woven plastics, sift-proof. Receptacles fiberboard</p>		<p>natural wood, ordinary (4C1). natural wood, sift-proof walls (4C2). plywood (4D). reconstituted wood (4F).</p>

<p>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</p> <p>3. For UN0160, UN0161, and UN0508, inner packagings are not necessary if drums are used as the outer packaging</p> <p>4. For UN0508 and UN0509, metal packagings must not be used.</p> <p>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.</p>	<p>metal paper plastics wood woven plastics, sift-proof.</p>		<p>fiberboard (4G). Drums. steel (1A1 or 1A2). aluminum (1B1 or 1B2). other metal (1N1 or 1N2). plywood (1D). fiber (1G). plastics (1H1 or 1H2).</p>
<p>* * * * *</p>			
<p>130</p>	<p>Not necessary</p>	<p>Not necessary</p>	<p>Boxes</p>
<p>Particular Packaging Requirements:</p>			
<p>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,</p>			<p>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</p>

<p>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</p> <p>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</p>			<p>(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 plastics (50H). Natural wood (50C). Plywood (50D). Reconstituted wood (50F). Rigid fiberboard (50G).</p>
* * * * *			
137	Bags	Not necessary	Boxes.
<p>PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0059, 0439, 0440</p>	<p>plastics Boxes fiberboard wood</p>		<p>steel (4A). aluminum (4B). other metal (4N). wood, natural,</p>



and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked in accordance with § 172.312(b) 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.	Tubes fiberboard metal plastics Dividing partitions in the outer packagings		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).
* * * * *			

\* \* \* \* \*

26. In § 173.121, (b)(1)(iv) is revised and a new footnote 1 is added to read as follows:

\* \* \* \* \*

(b) \* \* \*

(1) \* \* \*

(iv) The viscosity<sup>1</sup> and flash point are in accordance with the following table:

<b>Kinematic viscosity (extrapolated) v (at near-zero shear rate) mm<sup>2</sup>/s at 23°C (73.4 °F)</b>	<b>Flow-time t in seconds</b>	<b>Jet diameter in mm</b>	<b>Flash point c.c.</b>
20 < v ≤ 80	20 < t ≤ 60	4	above 17 °C (62.6

			°F).
$80 < v \leq 135$	$60 < t \leq 100$	4	above 10 °C (50 °F).
$135 < v \leq 220$	$20 < t \leq 32$	6	above 5 °C (41 °F).
$220 < v \leq 300$	$32 < t \leq 44$	6	above -1 °C (31.2 °F).
$300 < v \leq 700$	$44 < t \leq 100$	6	above -5 °C (23 °F).
$700 < v$	$100 < t$	6	No limit.

<sup>1</sup> 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.

\* \* \* \* \*

27. 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 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) of this part.

(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 subpart D of this part, 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)-(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 that 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 packaging 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)-(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;

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

(iii) Do not meet the definition of any other hazard class.

(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.

28. Section 173.165, is revised to read as follows:

**§ 173.165 Polyester resin kits.**

(a) 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 of this subchapter, 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) 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. 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 of this part. 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) Drop test capability. 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 reclassified 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 this subchapter in effect on October 1, 2010.

29. In § 173.185, the introductory paragraph and paragraphs (c)(2), (c)(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, or the completed package when packed with or contained in equipment, must be rigid. 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) The provisions for marking packages in effect on December 31, 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 marking 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)(3) 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 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 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 (b)(3)(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 must be in characters at least 12 mm (0.47 inches) high.

\* \* \* \* \*

30. 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 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.

\* \* \* \* \*

31. 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.

(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(1) 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 of this subchapter 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), 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 of this subchapter. 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 of this subchapter, 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 of this subchapter.

(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) of this part 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 of this subchapter 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.

32. In § 173.221, a new 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, sub-section 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.

\* \* \* \* \*

33. In §173.225:

a. In paragraph (c), the “Organic Peroxide Table” is revised.

b. In paragraph (e), the Organic Peroxide IBC Table” is revised.

The revisions are to read as follows:

**§ 173.225 Packaging requirements and other provisions for organic peroxides.**

\* \* \* \* \*

(c) \* \* \*

(8) \* \* \*

**Organic Peroxide Table**

Technical name	ID number	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packaging 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 peroxy-pivalate	UN3113	≤77		≥23			OP5	10	15	
tert-Amyl peroxy-pivalate	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
tert-Butyl hydroperoxide [and] Di-tert-butylperoxide	UN3103	<82 + >9				≥7	OP5			13
tert-Butyl monoperoxy-maleate	UN3102	>52-100					OP5			
tert-Butyl monoperoxy-maleate	UN3103	≤52	≥48				OP6			
tert-Butyl monoperoxy-maleate	UN3108	≤52			≥48		OP8			
tert-Butyl monoperoxy-maleate [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 peroxyacrylate	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 peroxyneohexanoate	UN3115	≤77	≥23				OP7	0	10	
tert-Butyl peroxyneohexanoate [as a stable dispersion in water]	UN3117	≤42					OP8	0	10	
tert-Butyl peroxyphenylacetate	UN3113	>67-77	≥23				OP5	0	10	
tert-Butyl peroxyphenylacetate	UN3115	>27-67		≥33			OP7	0	10	
tert-Butyl peroxyphenylacetate	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-trimethylhexanoate	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 peroxy-pivalate	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			
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 peroxyazolate	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-	UN3109	≤13	≥13	≥74			OP8			

butylperoxy)cyclohexane										
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	
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			
Diisobutryl peroxide	UN3111	>32-52		≥48			OP5	-20	-10	
Diisobutryl 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 +		≥58			OP7	35	40	
		≤18 + ≤4								
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-hydroxybutylperoxyneohexanoate	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-neodecanoylperoxyisopropyl) 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	
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 peroxy pivalate	UN3115	≤52	≥45	≥10			OP7	-20	-10	
tert-Hexyl peroxyneodecanoate	UN3115	≤71	≥29				OP7	0	10	

tert-Hexyl peroxyvalate	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					OP5	-20	-10	
		+ ≤22								
Isopropyl sec-butyl peroxydicarbonate + Di-sec-butyl peroxydicarbonate + Di-isopropyl peroxydicarbonate	UN3115	≤32 + ≤15	≥38				OP7	-20	-10	
		-18								
		+ ≤12								
		-15								
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,	UN3105	≤43					OP7			13,

stabilized										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 peroxy-pivalate	UN3115	≤77	≥23				OP7	0	10	
3, 6, 9-Triethyl-3, 6, 9-trimethyl-1, 4, 7-triperoxonane	UN3110	≤17	≥18		≥65		OP8			
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	

\* \* \* \* \*

(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	1250		
		31HA1	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	1250		
		31HA1	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	1250		
		31HA1	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	1250		
		31HA1	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		
	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 peroxy-pivalate, 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 peroxy-pivalate, 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
	Diisobutyl peroxide, not more than 28% as a stable dispersion in water	31HA1	1000	-20 °C	-10 °C
		31A	1250	-20 °C	-10 °C

	Diisobutyl 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

\* \* \* \* \*

34. 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 (IBR, see §171.7 of this subchapter) and for non-metallic materials in ISO 11114-2:2013 Gas cylinders -- Compatibility of cylinder and valve materials with gas contents -- Part 2: Non-metallic materials (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 10297:2006 (IBR, see §171.7 of this subchapter). Until December 31, 2020, the manufacture of a valve conforming to the requirements in ISO 10297:2006 (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 (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.

35. In § 173.303(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:Gas cylinders -- Acetylene cylinders -- Basic requirements and type testing (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. The use of UN tubes and MEGCs is not authorized.

(ii) Until December 31, 2020, cylinders conforming to the requirements in ISO 3807-2: Cylinders for acetylene—Basic requirements—Part 2: Cylinders with fusible plugs. (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.

\* \* \* \* \*

36. 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 gas – 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.

\* \* \* \* \*

37. 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) 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 if the detectors meet the requirements in (a) to (d) above and the capacity of detector receptacles does not exceed 50 ml (1.69 fluid ounces).

38. 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. 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**

39. 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.

40. 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.

\* \* \* \* \*

41. Section 175.25 is revised to read as follows:

**§ 175.25 Passenger Notification System**

(a) 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) must ensure that:

(1) A passenger is presented with information required under paragraph (a) 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) 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); and

(4) A passenger is presented with information required under paragraph (a) 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) must be described in an operations manual and/or other appropriate manuals in accordance with 14 CFR parts 121 or 135.

42. 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;

\* \* \* \* \*

43. 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 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**

44. 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.

45. 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.

\* \* \* \* \*

46. In § 176.84, paragraph (b) table provisions 149 and 150 are added:

**§ 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.
* * * * *	* * * * *

\* \* \* \* \*

47. Section 176.905 is revised 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)) 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), as specified in §173.185(a), 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), 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 of this part.

(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), as specified in §173.185(a). 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.

48. New § 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 have 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 and the vessel stowage provisions of column 10 of table §172.101, 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 labelled in accordance with subpart E of part 172;

(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);

(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; and

(D) For UN 3530 the marking requirements of §172.322 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 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);

(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 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 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**

49. 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.

50. In § 178.71, paragraphs (g)(4), (q)(20), and (q)(21) are added, paragraphs

(d)(2), (h), (k)(2), (l), (o)(2), and (r) are revised to 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 Gas cylinders -- Cylinder valves -- Specification and type testing, or ISO 13340 (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 (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 (IBR, see §171.7 of this subchapter) is authorized.

\* \* \* \* \*

(g) \* \* \*

(4) 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 (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 Gas cylinders -- Refillable seamless aluminium alloy gas cylinders -- Design, construction and testing (including Technical Corrigendum 1) (IBR, *see* §171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 7866: Gas cylinders—Refillable seamless aluminum alloy gas cylinders—Design, construction and testing (IBR, *see* §171.7 of this subchapter) are 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: Gas cylinders -- Acetylene cylinders -- Basic requirements and type testing (IBR, *see* §171.7 of this subchapter). Until December 31, 2020, the manufacture of a cylinder conforming to the requirements in ISO 3807-2: Cylinders for acetylene—Basic requirements—Part 2: Cylinders with fusible plugs (IBR, *see* §171.7 of this subchapter) is authorized.

(1) 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 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 (IBR, see § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in 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 (IBR, see § 171.7  
of this subchapter) are authorized.

(ii) 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 (including  
Amendment 1:2014) (IBR, see § 171.7 of this subchapter). Until December 31, 2020,  
cylinders conforming to the requirements in 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 (IBR, see § 171.7 of this subchapter) are authorized.

(iii) 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 (IBR, see § 171.7 of this subchapter). Until December 31, 2020, cylinders  
conforming to the requirements in 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, (IBR, see § 171.7 of this subchapter) are authorized.

(iv) ISO 11515:2013 Gas cylinders - Refillable composite reinforced tubes of  
water capacity between 450 L and 3000 L - Design, construction and testing  
(IBR, see § 171.7 of this subchapter).

(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 Gas cylinders -- Compatibility of cylinder and valve materials with gas contents -- Part 2: Non-metallic materials (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 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.

(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

---

(1)	(2)	(3)	(4)	(5)
-----	-----	-----	-----	-----



ISO 9809-1 USA/MXXXX IB 2005/12

\* \* \* \* \*

51. In § 178.75, existing paragraph (d)(3)(iv) is renumbered as (d)(3)(v), and new paragraph (d)(3)(iv) is added to read as follows:

**§ 178.75 Specifications for MEGCs.**

(d) \* \* \*

(3) \* \* \*

(iv) 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 (IBR, *see* §171.7 of this subchapter).

\* \* \* \* \*

52. In § 178.1015 paragraph (f) is revised to read as follows:

\* \* \* \* \*

(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**

53. 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.

54. In § 180.205, paragraph (c) is revised to read as follows:

\* \* \* \* \*

(c) Periodic requalification of cylinders. Each cylinder bearing a DOT specification marking must be requalified and marked as specified in the Requalification Table in this subpart. 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 CRC, BTC, CTC or TC cylinder must be requalified and marked as specified in the Transport Canada TDG Regulations (IBR, see § 171.7 of this subchapter). 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 in the case of a CRC, BTC, CTC or TC cylinder, in accordance with the requirements of the Transport Canada TDG Regulations.

(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, 3AXX, 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.



\* \* \* \* \*

55. 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 Gas cylinders -- Acetylene cylinders -- Periodic inspection and maintenance (IBR, see §171.7 of this subchapter). Until December 31, 2018 requalification may be done in accordance with ISO 10462 (E), Gas cylinders—Transportable cylinders for dissolved acetylene—Periodic inspection and maintenance, Second edition, February 2005 (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.

\* \* \* \* \*

56. In § 180.413, paragraph (a)(1)(iii) is added and paragraph (b) 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 this subpart, 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:

\* \* \* \* \*

57. 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;

\* \* \* \* \*

Issued in Washington, DC on August, 23, 2016 under authority delegated in 49 CFR 1.97.

William Schoonover  
Acting Associate Administrator for Hazardous Materials Safety  
Pipeline and Hazardous Materials Safety Administration