

DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

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

[Docket No. PHMSA–2025–0048 (HM–215S)]

RIN 2137–AF75

Hazardous Materials: Harmonization With International Standards

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

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: PHMSA proposes to update the Hazardous Materials Regulations to adopt certain international regulations and standards related to proper shipping names, hazard classes, packing groups, special provisions, packaging authorizations, air transport quantity limitations, and vessel stowage requirements. These proposed amendments are intended to maintain consistency with the latest international regulations and standards, to reduce costs to entities or individuals within the United States, and to lower the cost of regulations on the U.S. economy.

DATES: Comments must be received by December 28, 2026. To the extent possible, PHMSA will consider late-filed comments while a final rule is developed.

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

- *Federal Rulemaking Portal:* <http://www.regulations.gov>. Follow the online instructions for submitting comments.
- *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:* 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–2025–0048 (HM–215S) or RIN 2137–AF75 for this rulemaking at the beginning of your comment. 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.

Docket: For access to the dockets to read background documents (including the Preliminary Regulatory Impact Analysis (PRIA)) or comments received, go to <http://www.regulations.gov> or DOT's Docket Operations Office (see ADDRESSES).

Confidential Business Information: Confidential Business Information (CBI) is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments in response to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Pursuant to 49 CFR 105.30, you may ask PHMSA to provide confidential treatment to the information you give to the agency by taking the following steps: (1) mark each page of the original document submission containing CBI as “Confidential;” (2) send PHMSA a copy of the original document with the CBI deleted along with the original, unaltered document; and (3) explain why the information you are submitting is CBI. Submissions containing CBI should be sent to Steven Andrews, DOT: PHMSA–PHH–10, 1200 New Jersey Avenue SE, Washington, DC 20590–0001. Any comment PHMSA receives that is not explicitly designated as CBI will be placed in the public docket.

FOR FURTHER INFORMATION CONTACT: Steven Webb or Aaron Wiener, International Program, or Steven Andrews, Standards and Rulemaking, at 202–366–8553, Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue SE, East Building, Washington, DC 20590–0001.

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I. Executive Summary

The Federal Hazardous Materials Transportation Law directs the Secretary of Transportation to ensure domestic regulations for the transportation of hazardous materials are generally consistent with the latest international regulations and standards, unless they are unnecessary or unsafe, or a more stringent safety standard is in the public interest.¹ Consistent with this statutory requirement, the Pipeline and Hazardous Materials Safety Administration (PHMSA) proposes to amend the Hazardous Materials Regulations (HMR; 49 CFR parts 171 to 180) to adopt certain international regulations and standards. The amendments in this notice of proposed rulemaking (NPRM) include changes to material incorporated by reference, hazardous materials descriptions and proper shipping names (PSN), hazard classes, packing groups (PG), special provisions (SP), packaging authorizations, air transport quantity limitations, and vessel stowage requirements.

The proposed amendments will maintain the current levels of safety achieved under the HMR. Harmonizing the HMR with international regulations and standards will reduce delays and interruptions in the transportation of hazardous materials and promote the free flow of commerce by eliminating unnecessary and outdated regulatory requirements. Overall, the proposed amendments will reduce costs to entities or individuals within the U.S. or otherwise lower the cost of regulations on the U.S. economy.²

PHMSA anticipates the NPRM will benefit safety by harmonizing domestic and international regulations. PHMSA

¹ 49 U.S.C. 5120.

² Readers should be aware that several provisions in this NPRM cover subject matter similar to that discussed in the recently published HM–215R NPRM (91 FR 5996; Feb. 10, 2026). To the extent any text appears inconsistent between the two documents, PHMSA asserts such instances will be reconciled upon publication of the HM–215R final rule.

solicits comments on the need, benefits, and costs of the proposed HMR revisions; impact on safety and the environment; and any other relevant information. PHMSA also solicits comments regarding approaches to reducing the costs of the proposed HMR revisions while maintaining or increasing safety benefits and on any other specific changes (e.g., greater flexibility regarding a particular proposal) that might improve the rulemaking. As further explained in the Preliminary Regulatory Impact Analysis (PRIA), PHMSA expects the aggregate benefits of the NPRM will justify the aggregate costs for U.S. entities or individuals.

II. Background

PHMSA 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 whether to adopt new or amended international regulations and standards, PHMSA reviews each provision, assesses its overall impact on transportation safety, and analyzes the economic impacts of its adoption. The goal of PHMSA is to harmonize the HMR without reducing safety or imposing undue burdens on the regulated community.

The United Nations Sub-Committee of Experts (UNSCOE) on the Transport of Dangerous Goods (TDG) and on the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) issues the UN Model Regulations (UNMR). The UNMR are amended and updated biennially by the UNSCOE and serve as the basis for national, regional, and international modal regulations, including the International Civil Aviation Organization (ICAO) Technical Instructions and IMDG Code. PHMSA routinely updates the HMR to incorporate by reference these biennial amendments.

PHMSA has evaluated the latest biennial updates and proposes to revise the HMR to adopt changes consistent with revisions to the 2027–28 edition of the ICAO Technical Instructions, Amendment 43–26 to the IMDG Code, the 2024 updates to the Transport Canada's TDG, and the 24th revised edition of the UNMR. These biennial updates will be published by or in effect on January 1, 2027.³ PHMSA also

proposes to incorporate by reference certain revised international regulations and standards, as well as several new or updated International Organization of Standardization (ISO) standards, which are referenced in these international frameworks. The regulations and standards incorporated by reference are authorized for use for domestic and international transportation under specific conditions in 49 CFR part 171, subpart C of the HMR.

III. Incorporation by Reference Discussion Under 1 CFR Part 51

PHMSA currently incorporates by reference into the HMR all or parts of numerous standards and specifications developed and published by standard development organizations (SDO). In general, SDOs update and revise their published standards every two to five years to reflect modern technology and best technical practices. The National Technology Transfer and Advancement Act of 1995 (NTTAA; Pub. L. 104–113) directs Federal agencies to use standards developed by voluntary consensus standards bodies in lieu of government-written standards whenever possible. Voluntary consensus standards bodies develop, establish, or coordinate technical standards using agreed-upon procedures. The Office of Management and Budget (OMB) issued Circular A–119 (*Federal Participation in the Development and Use of Voluntary Consensus Standards and in Conformity Assessment Activities*) to implement the obligations imposed on Federal agencies under the NTTAA. OMB Circular A–119 provides guidance for agencies participating in voluntary consensus standards bodies and describes procedures for satisfying the reporting requirements in the NTTAA.

PHMSA is responsible for determining which standards currently referenced in the HMR should be updated, revised, or removed, and which new standards should be added to the HMR, under the NTTAA and OMB Circular A–119. PHMSA proposes revisions to materials incorporated by reference in the HMR via the notice-and-comment rulemaking process. PHMSA must obtain approval from the Office of the Federal Register to incorporate by reference any new materials during that process. The Office of the Federal Register issued a rulemaking that revised 1 CFR 51.5 to require that an agency detail in the preamble of an NPRM the ways the materials it proposes to incorporate by

reference are reasonably available to interested parties, or how the agency worked to make those materials reasonably available to interested parties.⁴ Proposed changes to the material incorporated by reference in the HMR are discussed in detail in the Section 171.7 discussion (*see Section V. Section-by-Section Review of NPRM Proposals*).

The regulations and standards addressed in this NPRM are reasonably available to interested parties in several ways. The UNMR and its supporting United Nations Manual of Tests and Criteria (UN Manual of Tests and Criteria) are free and easily accessible to the public on the internet (links are provided in footnotes as part of the Section 171.7 discussion (*see Section V. Section-by-Section Review of NPRM Proposals*)).⁵ The Transport Canada Transportation of Dangerous Goods regulations are also available for free online.⁶ The ICAO Technical Instructions, the IMDG Code, and all ISO standard references are available for interested parties to purchase, either in print or electronic versions through the organizations' websites. In addition, all standards that PHMSA proposes to incorporate by reference in the NPRM will be available for review at the DOT docket office during the comment period, free of charge, at PHMSA Headquarters, 1200 New Jersey Avenue SE, Washington, DC 20590.

IV. Amendments Not Proposed for Adoption

PHMSA has determined that certain elements of updated international regulations and standards should not be adopted into the HMR and thus is not including them in this proposed rule.⁷ PHMSA has also determined that certain transport requirements should be considered for authorization on a case-by-case basis through special permits rather than proposed for adoption for general applicability in the HMR. Additional information about these topics is provided below.

A. Revised Cylinder Definitions

The 24th revised edition of the UNMR contains updated definitions for “cylinder,” “bundle of cylinders,” “salvage pressure receptacle,” “tube,”

⁴ 79 FR 66278 (Nov. 7, 2014).

⁵ UNECE, *Manual of Tests and Criteria, Eighth Revised Edition*, (2023), available at: <https://unece.org/transport/publications/un-manual-tests-and-criteria-rev8-2023>.

⁶ Transport Canada, *Transportation of Dangerous Goods Regulations* (Oct. 2025), available at: <https://tc.canada.ca/en/corporate-services/acts-regulations/list-regulations/transportation-dangerous-goods-regulations>.

⁷ See 49 U.S.C. 5120(c).

³ Amendment 43–26 of the IMDG Code becomes mandatory on January 1, 2027. Voluntary compliance will begin on January 1, 2026; PHMSA also proposes to adopt the provisions from Addendum 1 to the 2026–27 Edition of the ICAO Technical Instructions issued and effective on

March 27, 2026. *See* discussion in Section 175.10, Section IV. *Section-by-Section Review of NPRM Proposals* for more details.

“usable water capacity,” and “pressure-volume product.” The cylinder definition includes a test-pressure cap expressed in volumetric-pressure units (e.g., 1.5 million bar-litres). Additional information about these revisions is available in the UNSCOE TDG working paper.⁸

PHMSA is declining to propose to adopt these revised definitions. PHMSA has not identified sufficient safety or performance data indicating that the revised definitions would produce measurable safety benefits beyond the current HMR requirements. Adopting these definitions could also disrupt domestic industry practices without a clear compensating safety advantage. Accordingly, PHMSA will retain the current HMR definitions to preserve regulatory clarity, to minimize disruption to U.S. stakeholders, and to maintain the high safety standards already in place.

B. Infectious Substances (Indicative List)

The 24th revised edition of the UNMR adopted an updated version of the indicative list of Category A infectious substances. PHMSA previously determined that adopting the UNMR indicative list of infectious substances into 49 CFR 173.134 would introduce redundancies with existing U.S. public health frameworks and create unnecessary compliance complexities. PHMSA’s criteria-based classification system in 49 CFR 173.134, developed in consultation with experts from the Centers for Disease Control and Prevention (CDC) and U.S. Department of Agriculture (USDA), ensures rigorous oversight of substances capable of causing life-threatening or fatal diseases in humans or animals. This approach provides flexibility to address emerging pathogens (e.g., novel viruses) without reliance on a static list, while maintaining consistency with domestic enforcement protocols, stakeholder expectations, and packaging requirements tailored to U.S. healthcare and research logistics. PHMSA concludes that retaining its current criteria-driven framework for Category A infectious substances in 49 CFR 173.134, rather than adopting the UNMR indicative list, best serves the public interest by balancing global harmonization objectives with the need for adaptable, risk-proportionate regulations.

In addition, the UNMR adopted language stating that an infectious substance not meeting the criteria for inclusion in Category A is assigned to Category B (UN3373). Because PHMSA is not proposing to adopt the Category A indicative list, a clarifying amendment to the HMR for Category B infectious substances is not necessary.

C. Exceptions for Medical Devices as Infectious Substances

The 24th revised edition of the UNMR adopted exceptions for medical devices that may be contaminated with an infectious substance. The HMR already contains provisions for the transportation of medical devices containing an infectious substance in 49 CFR 173.134. Therefore, a clarifying amendment to address the new exceptions in the UNMR is not necessary.

D. Environmentally Hazardous Paint

The 24th revised edition of the UNMR adopted a new special packing provision (PP99) for PSN “UN3082, Environmentally Hazardous Substance.” As discussed in the UNSCOE TDG working paper, this new provision applies to packaging of mixtures assigned to UN3082 containing less than one percent of substances of highly toxic ingredients with an M-factor of 10, 100, or 1000.⁹ PHMSA is not proposing to adopt this provision because these mixtures are already excepted from regulation under the HMR. The definition of a “marine pollutant” in 49 CFR 171.8 includes mixtures or solutions packaged in a concentration which equals or exceeds one percent by weight of the solution or mixture for materials that are identified as severe marine pollutants in Appendix B to 49 CFR 172.101, or 10 percent by weight of the solution or mixture for non-severe marine pollutant materials listed in the appendix. The exception provided in the international standards applies only if the total concentration of highly toxic ingredients (e.g., the constituents that are marine pollutants) do not exceed one percent. All mixtures covered by this exception are already excepted under the HMR.

E. UN Fiber Reinforced Plastic (FRP) Portable Tanks and Service Equipment

The 24th revised edition of the UNMR added standards for UN FRP portable tank service equipment. In the HM-215Q NPRM, PHMSA concluded that

further research on UN FRP portable tanks is necessary in areas covering material fatigue, suitability of the pool fire test and impact testing as packaging qualification methods, and in the identification of the most appropriate non-destructive test methodology to qualify UN FRP portable tanks.¹⁰ Since PHMSA did not adopt the requirements for UN FRP portable tanks, there is no justification to adopt the provision for UN FRP portable tank service equipment.

PHMSA is proposing an amendment to 49 CFR 171.25—Additional requirements for the use of the IMDG Code—that would allow limited import and export of UN FRP portable tanks and service equipment within a single port area. See *Section IV. Section-by-Section Review of NPRM Proposals* for a discussion of 49 CFR 171.25 changes.

F. Net Explosive Weight (NEW)

The 24th revised edition of the UNMR and the associated UNSCOE TDG working paper revises the term “NEW” to “net explosive mass” (NEM) to align with scientific precision, as mass (measured in kilograms) and weight (a force measured in newtons) are distinct physical concepts.¹¹ Although PHMSA acknowledges this technical distinction, adopting the UNMR terminology would introduce inconsistency with longstanding HMR terminology and industry practice. Accordingly, PHMSA is not proposing to adopt the new terminology.

G. Regulatory Clarification for Labels

The 24th revised edition of the UNMR adopted language permitting the use of labels with minor variations to the symbols used in various modal and regional regulations, provided such variations do not alter the clear meaning of the label. The HMR already authorizes the use of labels conforming to the UNMR, the IMDG Code, the ICAO Technical Instructions, and the TC TDG in 49 CFR 172.407(f). Consequently, the wording from the UNMR does not need to be adopted in the HMR.

H. Use of Recycled Plastics

The 24th revised edition of the UNMR adopts provisions for the use of recycled plastics in the manufacturing of intermediate bulk containers (IBCs). In the HM-215Q NPRM, PHMSA determined that oversight for the use of recycled plastics is still needed in areas such as batch testing to ensure the quality of recycled plastics used in the

⁸ United Nations Economic Commission for Europe (UNECE), *Additional data on proposal ST/SG/AC.10/C.3/2023/1—Report of the intersessional working group on the pV-product limit for pressure receptacles* (Apr. 11, 2023), available at: https://unece.org/sites/default/files/2023-05/ST-SG-AC.10_C.3-2023-1e.pdf.

⁹ UNECE, *Transport provisions for small quantities of environmentally hazardous paints, printing inks, and related materials* (Nov. 28, 2024), available at: <https://unece.org/sites/default/files/2024-11/UN-SCETDG-65-INF61e.pdf>.

¹⁰ 88 FR 34568 (May 30, 2023).

¹¹ UNECE, *Net explosive weight* (Sept. 8, 2023), available at: <https://unece.org/sites/default/files/2023-10/ST-SG-AC10-C3-2023-51E.pdf>.

construction of rigid plastic IBCs. PHMSA continues to believe that oversight is needed for the approval of IBCs that are manufactured from recycled plastics to ensure safety of their use in hazardous materials transportation. PHMSA is evaluating the stakeholder feedback received in response to a previous request for information on the recycled plastics policy and expects to address that issue in a future rulemaking.¹² For these reasons, PHMSA is not proposing to adopt the revised provisions in the UN Model Regulations at this time.

I. Periodic Leakproofness Testing

The 24th revised edition of the UNMR clarifies that the periodic leakproofness test for IBCs, required every two and a half years, may be performed at the design type test level rather than under full retesting conditions. A UNSCOE TDG working paper identifies perceived ambiguity in the current language and seeks to standardize interpretation across jurisdictions.¹³

PHMSA does not believe that this clarification needs to be adopted. The HMR already requires that IBCs undergo periodic leakproofness testing in accordance with 49 CFR 180.352(d).¹⁴ Specifically, 49 CFR 180.352(d)(1)(i) requires that repaired or remanufactured IBCs comply with the original design type specifications. This linkage ensures that leakproofness testing is inherently aligned with the design type's validated performance standards, eliminating the need for additional language to specify "design type-level" testing. The HMR framework emphasizes functional equivalence and safety by tying periodic testing to the design type's integrity, as demonstrated during initial design qualification.

J. Regulatory Clarification for Definition of Class 1 Explosives as Articles

The 24th revised edition of the UNMR clarifies that explosive substances deemed "too dangerous to transport" are explicitly prohibited for transportation. The UNSCOE TDG adopted this clarification to address a gap in the existing framework. While prohibiting transport of overly sensitive substances, the UNMR did not similarly restrict overly sensitive articles. The UNSCOE TDG determined that this omission could create ambiguity regarding whether overly sensitive

explosive articles are similarly forbidden under the UNMR.

PHMSA does not believe that this clarification needs to be adopted. The HMR already addresses the concern that UNSCOE TDG identified with the UNMR. Class 1 explosives explicitly encompass both substances and articles under 49 CFR 173.50. Section 173.54(k) also prohibits the transportation of any Class 1 explosive, substance, or article that fails to meet the acceptance criteria outlined in 49 CFR 173.57. In addition, 49 CFR 173.57(b) explicitly prohibits articles that are thermally unstable or impact-sensitive. For these reasons, the regulatory gap in the UNMR never existed in the HMR.

K. ISO 11515:2022, (Gas Cylinders—Refillable Composite Reinforced Tubes of Water Capacity Between 450 l and 3000 l—Design, Construction and Testing)

The 24th edition of the UNMR adopted ISO 11515:2022. PHMSA is not proposing to incorporate by reference ISO 11515:2022 in this NPRM. Incorporating ISO 11515:2022 would require extensive exceptions to maintain the HMR's current level of safety. The standard contains a significant typographical error regarding testing thresholds for Type 4 liner thickness modifications greater than 105 percent instead of greater than 10 percent. In addition, the new gunfire test does not apply to civilian Type 2 designs, and its five-minute bonfire test falls short of the 15-minute duration required by PHMSA special permits to allow for first responder arrival. For these reasons, PHMSA declines to propose to incorporate this edition pending future ISO corrections.

V. Section-by-Section Review of NPRM Proposals

The following is a section-by-section review of proposed amendments to harmonize the HMR with international regulations and standards.

A. Part 171

Section 171.7

Section 171.7 lists all consensus regulations and standards incorporated by reference into the HMR. PHMSA is proposing to add or revise the following references in 49 CFR 171.7:¹⁵

- The 2027–28 edition of the ICAO Technical Instructions in paragraph (t)(1) will replace the edition currently referenced in 49 CFR 171.8; 171.22

¹⁵ All other standards that are set out as part of the regulatory text of 49 CFR 171.7(w) were previously approved for incorporation by reference and no changes are proposed.

through 171.24; 172.101; 172.202; 172.401; 172.407; 172.512; 172.519; 172.602; 173.56; 173.320; 175.10, 175.33; and 178.3. The ICAO Technical Instructions specify detailed instructions and requirements for the safe international transport of dangerous goods (*i.e.*, hazardous materials) by air. The requirements in the 2027–28 edition have been amended to align better with the 24th revised edition of the UNMR. Notable changes in the 2027–28 edition of the ICAO Technical Instructions include new packing and stowage provisions, new and revised entries on its Dangerous Goods List, and editorial corrections.¹⁶

- The 2026 edition of the IMDG Code (Amendment 43–26) in new paragraph (v)(3) will replace the edition currently referenced in 49 CFR 171.22; 171.23; 171.25; 172.101; 172.202; 172.203; 172.401; 172.407; 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; 176.708; 176.720; 176.906; 178.3; and 178.274.¹⁷ The IMDG Code is a unified international code that outlines standards and requirements for the transport of dangerous goods (*i.e.*, hazardous materials) by sea (*i.e.*, by vessel). Notable changes in Amendment 43–26 of the IMDG Code include new packing and stowage provisions, new and revised entries on its Dangerous Goods List, and editorial corrections.¹⁸

- The following International Maritime Organization International Convention for the Safety of Life at Sea (SOLAS) Chapter II–2 Construction—Fire protection, fire detection and fire extinction standards are added or updated in paragraph (v):
—*Regulation 3, Definitions* in paragraph (v)(1). PHMSA proposes to add the 2024 edition of this SOLAS regulation and incorporate it by reference into 49 CFR 176.905. This document contains definitions used throughout SOLAS and is relevant to the definition of roll-on/roll-off (*i.e.*, "Ro-Ro") passenger ships as discussed in proposed changes to 49 CFR 176.905(a).
—*Regulation 19, Carriage of dangerous goods* in paragraph (v)(2). PHMSA proposes to replace the 2009 fifth edition, which is currently referenced

¹⁶ The ICAO Technical Instructions are available for purchase on the ICAO website at <https://store.icao.int/en/shop-by-areas/safety/dangerous-goods>. PHMSA anticipates that the 2027–28 edition of the ICAO Technical Instructions will be available for publication in late 2026.

¹⁷ The HM–215R NPRM (91 FR 5996 (Feb. 10, 2026)) proposed to incorporate the 2024 edition (42–24) of the IMDG Code.

¹⁸ Distributors of the IMDG Code can be found on IMO website at: <https://www.imo.org/en/publications/Pages/Distributors-default.aspx>.

¹² 88 FR 23140 (Apr. 14, 2023).

¹³ UNECE, *Periodic leakproofness retesting on IBCs after two and a half years at the level of the design type test* (Sept. 6, 2024), available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-81E.pdf>.

¹⁴ 49 CFR 180.352(b)(1).

in 49 CFR 176.63 and 176.84, with the 2024 edition of this SOLAS regulation in paragraph (v)(2).

- The following ISO standards for the specification, design, construction, testing, and use of gas cylinders in paragraph (w):

—*ISO 535:2023, (Paper and board—Determination of water absorptiveness—Cobb method)* in paragraph (w)(1). PHMSA proposes to replace the currently referenced 1991 edition of ISO 535 in 49 CFR 178.516, 178.707, and 178.708 with the updated 2023 edition.¹⁹ ISO 535:2023 specifies a method of determining the water absorptiveness of sized paper and board, including corrugated fiberboard, under standard conditions.

—*ISO 1496–3:2019, (Series 1 freight containers—Specification and testing—Part 3: Tank containers for liquids, gases and pressurized dry bulk)*, in paragraph (w)(3). PHMSA proposes to replace the currently referenced 1995 edition of ISO 1496–3 in 49 CFR 178.74, 178.75, and 178.274, with the updated 2019 edition.²⁰ ISO 1496–3:2019 specifies the basic specifications and testing requirements for ISO series 1 tank containers suitable for the carriage of gases, liquids, and solid substances (dry bulk) that can be loaded or unloaded as liquids by gravity or pressure discharge, for international exchange, and for transport by highway, rail and vessel, including interchange between these forms of transport.

—*ISO 4706:2023, (Gas cylinders—Refillable welded steel cylinders—Test pressure 60 bar and below)* in paragraph (w)(22). PHMSA proposes to replace the currently referenced 2008 edition of ISO 4706 in 49 CFR 178.71 with the updated 2023 edition.²¹ ISO 4706:2023 specifies the minimum requirements concerning material selection, design, construction and workmanship, procedure, and testing at manufacture of refillable welded-steel gas cylinders of water capacities from 0.5 L up to and including 150 L and drums of

water capacities of 150 L to 500 L of a test pressure not greater than 60 bar, exposed to extreme worldwide temperatures (–50 °C to +65 °C) used for compressed, liquefied or dissolved gases.

- ISO 10297:2024, (Gas cylinders—Cylinder valves—Specification and type testing)* in paragraph (w)(47). PHMSA proposes to reference the 2024 edition of ISO 10297:2024 in 49 CFR 173.301b and 178.71. ISO 10297:2024 sets out the requirements for the design, type testing, and marking of cylinder valves used on refillable transportable gas cylinders.²²
- ISO 11114–1:2020/Amd 1:2023, (Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials—Amendment 1)* in paragraph (w)(52).²³ PHMSA proposes to add the 2023 Amendment 1 of ISO 11114–1:2020 to be referenced in 49 CFR 172.102, 173.301b, and 178.71. ISO 11114–1:2020/Amd 1:2023 provides requirements for the selection of safe combinations of metallic cylinder and valve materials and cylinder gas content.²⁴
- ISO 11623:2023, (Gas cylinders—Composite cylinders and tubes—Periodic inspection and testing)* into paragraph (w)(79). PHMSA proposes to reference the 2023 edition of this document in 49 CFR 180.207.²⁵ ISO 11623:2023 specifies the requirements for periodic inspection and testing to verify the integrity for further service of hoop-wrapped and fully-wrapped composite transportable gas cylinders and tubes, with aluminum-alloy, steel or non-metallic liners or of linerless construction (Types 2, 3, 4, and 5), intended for compressed, liquefied or dissolved gases under pressure, of water capacity from 0.5 L up to 3,000 L.
- ISO 14246:2022, (Gas cylinders—Cylinder valves—Manufacturing tests and examinations)* in paragraph (w)(84). PHMSA proposes to reference the 2022 edition of this document in 49 CFR 178.71.²⁶ ISO 14246:2022

specifies the manufacturing tests and examinations required for cylinder valves used on refillable gas cylinders.

- ISO 18119:2018/Amd 1:2021/Amd 2:2024, (Gas cylinders—Seamless steel and seamless aluminium-alloy gas cylinders and tubes—Periodic inspection and testing)* in paragraph (w)(93). PHMSA proposes to replace the currently referenced ISO 4706:2008(E) in 49 CFR 180.207 with ISO 18119: 2018/Amd 1:2021/Amd 2:2024. ISO 18119 specifies the requirements for periodic inspection and testing to verify the integrity of cylinders and tubes to be re-introduced into service for a further period of time.²⁷
- ISO 22434:2022, (Gas cylinders—Inspection and maintenance of valves)* in paragraph (w)(100). PHMSA proposes to reference the 2022 edition of this document in 49 CFR 180.207. ISO 22434:2022 specifies requirements for the inspection and maintenance of valves for refillable transportable gas cylinders, cylinder bundles, pressure drums and tubes which transport compressed, liquefied, or dissolved gases.²⁸
- The 2024 updates to Transport Canada's Transportation of Dangerous Goods (TDG) Regulations in paragraph (bb)(1) to replace the edition currently referenced in 49 CFR 107.801; 107.805; 171.12; 171.22; 171.23; 172.401; 172.407; 172.502; 172.519; 172.602; 173.31; 173.32; 173.33; 173.301; 180.205; 180.211; 180.212; and 180.413.²⁹ Like the HMR, the TDG regulations provide requirements for transportation of hazardous materials goods and activities relating to road, rail, air, and marine transport into, from, and within Canada.
 - The 24th Revised Edition (2025) of the United Nations Recommendations on the Transport of Dangerous Goods—Model Regulations (UN Model Regulations), Volumes I and II, in paragraph (dd)(1), to replace the edition currently referenced in 49 CFR 171.8; 171.12; 172.202; 172.401; 172.407; 172.502; 172.519; 173.22; 173.24;

default/files/2023-11/ST-SG-AC.10-C.3-2023-21E.pdf.

²⁷ UNECE, *Updated ISO standards in Class 2* (Sept. 3, 2024), available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-62E.pdf>.

²⁸ UNECE, *Updated ISO standards in Class 2* (Apr. 20, 2023), available at: <https://unece.org/sites/default/files/2023-11/ST-SG-AC.10-C.3-2023-21E.pdf>.

²⁹ The HM–215R NPRM (91 FR 5996 (Feb. 10, 2026)) proposed to incorporate by reference the 2023 edition of the Transport Canada's Transportation of Dangerous Goods (TDG) Regulations.

¹⁹ UNECE, *Revision of standard ISO 535:2014* (July 28, 2023), available at: <https://unece.org/sites/default/files/2023-09/ST-SG-AC10-C3-2023-31E.pdf>; The HM–215R NPRM (91 FR 5996 (Feb. 10, 2026)) proposed to replace the 1991 version of ISO 535 with the 2014 edition of ISO 535.

²⁰ UNECE, *ISO standard updates—proposal for amendments to document ST/SG-AC10/C3/2024/21* (July 2, 2024), available at: <https://unece.org/sites/default/files/2024-07/UN-SCETDG-64-INF72e.pdf>.

²¹ UNECE, *Updated ISO standards in Class 2* (Apr. 5, 2024), available at: <https://unece.org/sites/default/files/2024-05/ST-SG-AC10-C3-2024-11E.pdf>.

²² UNECE, *Updated ISO standards in Class 2* (Apr. 18, 2024), available at: <https://unece.org/sites/default/files/2024-04/UN-SCETDG-64-INF08e.pdf>.

²³ The HM–215R NPRM (91 FR 5996 (Feb. 10, 2026)) proposed to adopt ISO 11114–1:2020 sans Amendment 1.

²⁴ UNECE, *Updated ISO standards in Class 2* (Sept. 8, 2023), available at: <https://unece.org/sites/default/files/2023-10/ST-SG-AC10-C3-2023-46E.pdf>.

²⁵ UNECE, *Updated ISO standards in Class 2* (Apr. 5, 2024), available at: <https://unece.org/sites/default/files/2024-05/ST-SG-AC10-C3-2024-11E.pdf>.

²⁶ UNECE, *Updated ISO standards in Class 2* (Apr. 5, 2024), available at: <https://unece.org/sites/>

173.24b; 173.40; 173.56; 173.192; 173.302b; 173.304b; 178.75; and 178.274. The UNMR presents a basic scheme of provisions that allow uniform development of national and international regulations governing the various modes of transport.³⁰

- Amendment 1 to the Eighth Revised Edition of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, in paragraph (dd)(2), to replace the edition currently referenced in 49 CFR 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; 173.224; 173.225; 173.232; part 173, appendix H; 175.10; 176.905; and 178.274.³¹ The UN Manual of Tests and Criteria contains standards, test methods, and procedures to be used for the classification of hazardous materials according to the UNMR. The Eighth Revised Edition Amendment 1 of the UN Manual of Tests and Criteria is available online at: <https://unece.org/transport/dangerous-goods/rev8-files>.

- The 11th Revised Edition of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), in paragraph (dd)(3), to replace the edition currently referenced in 49 CFR 172.401.³² The GHS is an international system standardizing hazard classification and communication. The HMR authorizes its use for labeling of packages.³³

Section 171.8

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

- *Large packaging and large salvage packaging*: PHMSA proposes to revise the definitions of *large packaging* and *large salvage packaging* to clarify that the three m³ maximum volume refers to the internal, not the external, volume of the packaging. There is disagreement among experts on the meaning of the

word “volume” in association with these definitions—some interpret it as “external volume,” while others understand it as “internal volume”—leading to differing transport requirements. The UNSCOE TDG working paper that resulted in this clarification cited an example of industrial lithium battery products with an internal volume of 2.7 or 2.8 m³ where the overall external volume of the contents and the packaging exceeds 3 m³.³⁴ This clarification would aid in ensuring appropriate use of these packagings for the transportation of hazardous materials.

- *Single packaging*: A *single packaging* is currently defined in 49 CFR 171.8 as a non-bulk packaging other than a combination packaging. The ICAO Technical Instructions define *single packaging* as “a packaging which does not require any inner packaging to perform its containment function during transport.”³⁵ A proposal submitted to the UNSCOE noted that the UNMR and IMDG Code do not define “single packaging” although the term is used numerous times.³⁶ Without a definition, there was confusion on a separate proposal where “single packaging” was interpreted to mean one packaging instead of the intended meaning, perhaps confusing the term “packaging” with “package.” To address that confusion, the UNMR and IMDG Code adopted a definition consistent with the ICAO Technical Instructions. In this NPRM, PHMSA proposes to add text from the definition in the UNMR to the existing definition of *single packaging*.

PHMSA believes that adopting the international definitions into the HMR will provide greater clarity without resulting in any unintended consequences. Clear, uniform definitions facilitate international commerce and reduce the risk of non-compliance due to misinterpretation.

Section 171.25

Section 171.25 outlines additional requirements for using the IMDG Code in addition to those found in 49 CFR 171.22 and 171.23. Although PHMSA is not proposing to adopt provisions for UN FRP portable tank service equipment, see *Section IV. Amendments Not Being Considered for Adoption*,

PHMSA is proposing to revise 49 CFR 171.25(c)(5) to facilitate limited import and export of UN portable tanks containing FRP service equipment in international commerce and to facilitate transport experience. Specifically, PHMSA proposes to add FRP service equipment to the general prohibition of transportation of UN FRP portable tanks designed and constructed in accordance with Chapter 6.10 of the IMDG Code within the United States. But PHMSA proposes to allow FRP service equipment to be used along with the UN FRP portable tanks within a single port area in the United States in accordance with the provisions of 49 CFR 171.25(d) covering the use of the IMDG Code in port areas. This action will maintain the safe transportation of hazardous material under the HMR while facilitating international commerce by permitting the import or export of hazardous materials in UN FRP portable tanks with FRP service equipment and limiting their use and movement within a single port area.

B. Part 172

Section 172.101 Hazardous Materials Table (HMT)

The HMT designates listed materials as hazardous materials and summarizes terms and conditions governing their transportation under the HMR. For each entry, the HMT identifies basic information, such as the PSN, UN identification number, and hazard class and hazard label. The HMT specifies additional information or references requirements in the HMR, such as hazard communication, assigned special provisions, packaging reference citations, and modal requirements, like quantity limits aboard aircraft, and vessel stowage restriction of hazardous materials aboard vessels. PHMSA proposes several changes to the HMT as discussed below. For purposes of the U.S. Government Publishing Office's typesetting procedures, proposed changes to the HMT appear under three sections of the HMT: “remove,” “add,” and “revise.” Certain entries in the HMT, such as those with revisions to the PSNs, appear as a “remove” and “add.” Proposed amendments to the HMT include the following:

New HMT Entries

Butyl Acrylates, Stabilized (UN 2348)

PHMSA proposes to add a PG II entry for the PSN “UN2348, Butyl acrylates, stabilized, 3” to the HMT. Butyl acrylates are a group of chemicals that are flammable and liable to polymerize without stabilization. This group includes the substance tert-butyl

³⁰ The 24th revised edition of the UN Model Regulations is available online at: <https://unece.org/transport/dangerous-goods/un-model-regulations-rev-23>.

³¹ The HM-215R NPRM (91 FR 5996 (Feb. 10, 2026)) proposed to incorporate by reference the Eighth Revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria without Amendment 1.

³² The HM-215R NPRM (91 FR 5996 (Feb. 10, 2026)) proposed to incorporate by reference the 10th Revised Edition of the Globally Harmonized System of Classification and Labelling of Chemicals.

³³ The 11th revised edition of the GHS is available online at <https://unece.org/transport/dangerous-goods/ghs-rev11-2025>.

³⁴ UNECE, *Proposal on clarifying the definition of large packaging* (Sept. 13, 2024), available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-90E.pdf>.

³⁵ ICAO Technical Instructions Part 1;3.1.

³⁶ UNECE, *Report of the Sub-Committee of Experts on the Transport of Dangerous Goods on its sixty-fifth session* (Jan. 8, 2025), available at: <https://unece.org/sites/default/files/2025-02/ST-SG-AC10-C3-130E.pdf>.

acrylate. Currently, the HMT only provides for a Class 3, PG III designation for this material. According to data listed in the European Chemicals Agency (ECHA) database, the flash point for tert-butyl acrylate is 14 °C (57 °F). Flammable liquids with a flash point below 23 °C (73 °F) are assigned to PG II or PG I depending on the boiling point. PHMSA is proposing to add a line to the current entry to allow for assignment of “Butyl Acrylates, Stabilized” as a PG II material. This amendment will ensure appropriate packaging use, hazard communication, and accurate information for emergency responders.

Vanadium Pentoxide (UN2862)

PHMSA proposes to add a PG II entry for the PSN “UN2862, Vanadium pentoxide, 6.1” to the HMT. Vanadium pentoxide is commonly transported in flake or powder form and is primarily used as a catalyst in industrial processes such as sulfuric acid production and as a steel additive. Currently, the HMT only lists a PG III designation for this material. Data indicates that vanadium pentoxide in a respirable particle size range meets the criteria for GHS Category 2 acute inhalation toxicity, which aligns with assignment of PG II under the UNMR.³⁷ For transport purposes, a solid substance is considered respirable if it contains particles 10 micrometers (µm) or smaller and must be tested if at least 10 percent of its total mass is likely to be dust in a respirable range. Vanadium pentoxide powder with a particle size under 45 µm is commercially available, but the minimum size is not specified, raising concerns that a portion of the material may fall within the less than 10 µm respirable range. Given this uncertainty and the toxicological data, the UNSCOE TDG supported adding a PG II entry while retaining the existing PG III entry, citing a long record of safe transport under PG III without known health incidents. This is consistent with the precedent used when adding the Division 6.1, PG I entry for “UN3550, Cobalt dihydroxide powder,” which is a solid substance similarly classified due to inhalation risks when packaged containing 10 percent or more respirable particles. PHMSA proposes that vanadium pentoxide (in non-fused form) containing 10 percent or more respirable particles be assigned to PG II. When containing less than 10 percent

respirable particles, the existing PG III entry for vanadium pentoxide is assigned. This new entry will be added with italics that may be used in addition to the PSN, “UN2862, Vanadium pentoxide, *non-fused form, containing not less than 10 percent respirable particles.*”

In addition, PHMSA is proposing to revise the PSN for the PG III vanadium pentoxide entry to account for the 10 percent threshold as “UN2862, Vanadium pentoxide, *non-fused form containing less than 10 percent respirable particles.*” PHMSA expects these provisions will facilitate the continued safe transport of this material as a PG III material when appropriate and maintain the HMT’s safety standard for transportation of Division 6.1 solid materials.

Chlorophenols (UN3561 and UN3562)

Chlorophenols are currently transported under “UN2020, Chlorophenols, solid, 6.1, PG III” or “UN2021, Chlorophenols, liquid, 6.1, PG III,” along with a separate entry for “UN3155, Pentachlorophenol, 6.1, PG II.” A review of the 19 total chlorophenols (phenols with only chlorine substituents) presented to the UNSCOE TDG found that individual chlorophenols within the chemical group include: (1) those that do not meet the definition of a hazardous material; (2) those that meet the classification criteria for Division 6.1, PG III consist with the existing HMT entries for liquids and solids; (3) solids that meet the Class 8, PG II classification criteria; (4) solids that meet the Class 8 and Division 6.1, PG II classification criteria, and; (5) for pentachlorophenol, a solid meeting the classification criteria for Division 6.1, PG II, assigned to UN3155.³⁸

To address the findings described in items (3) and (4) above and to ensure appropriate classification of chlorophenols not addressed by the current UN2020, UN2021, and UN3155 entries, PHMSA proposes to add two new corrosive entries, “UN3561, Chlorophenols, corrosive, toxic, solid, n.o.s., 8 (6.1), II” and “UN3562, Chlorophenols, corrosive, solid, n.o.s., 8, II.” Consequently, the existing UN2020 and UN2021 entries would be amended by adding the symbol “G” in column one of the HMT, which signifies that a technical name must be included with the basic description. In addition, the proper shipping names in column

two would be modified to include the text “toxic” and “n.o.s.” for consistency with the new entries proposed to differentiate between toxic and corrosive hazards. Together, these amendments will ensure appropriate classification, packaging use, hazard communication, and accurate information for emergency responders for all chlorophenols meeting the definition of a hazardous material.

Lithium Metal Batteries, Lithium Ion Batteries, and Sodium Ion Batteries Transported in Cargo Transport Units (UN3563, UN3536 and UN3564)

PHMSA proposes to add two new entries for cargo transport units (CTU) containing batteries: “UN3563, Lithium metal batteries installed in cargo transport unit” and “UN3564, Sodium ion batteries installed in cargo transport unit.” Lithium batteries installed in a CTU and designed only to provide power external to the CTU are presently assigned to the HMT entry “UN3536, Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries.*” Although most energy storage systems offered for transport in accordance with the provisions for UN3536 are lithium ion, there are currently three possible battery chemistries (lithium ion, lithium metal, and sodium ion) used for battery energy storage systems. Further, lithium ion and lithium metal batteries are both assigned UN3536 without indicating the battery chemistry, which impacts the manner of emergency response should they become involved in a fire.

In 2024, near Baker, California, an overturned truck transporting lithium batteries classified and described as UN3536 was involved in a fire.³⁹ Emergency responders on the scene were initially unable to determine whether the CTU contained lithium ion or lithium metal batteries. The uncertainty over the battery chemistry negatively impacted the emergency response. An indication of the type of batteries being transported allows for appropriate differentiation of transport provisions and for application of appropriate emergency response actions based on the types of batteries installed in the CTU.

PHMSA proposes splitting the single entry for UN3536 into three separate entries with separate UN numbers, consistent with revisions in the UNMR. This will more precisely communicate the battery chemistries being

³⁷ UNECE, *New entry for UN 2862 VANADIUM PENTOXIDE, non-fused form, with packing group II—an amendment to proposal 1 in document ST/SG/AC.10/C.3/2024/80* (Nov. 22, 2024), available at: <https://unece.org/sites/default/files/2024-11/UN-SCETDG-65-INF48e.pdf>.

³⁸ UNECE, *Adequate UN entry for 2,4-Dichlorophenol with a possible solution for all chlorophenols—revised proposal*, available at: <https://unece.org/sites/default/files/2023-11/UN-SCETDG-63-INF55e.pdf> (Nov. 30, 2023).

³⁹ Cal. Dept. of Transp., *Caltrans Statement on San Bernardino County I-15 Fire*, available at: <https://dot.ca.gov/news-releases/news-release-2024-027> (Jul. 28, 2024).

transported in CTUs and allow transport provisions and emergency response measures tailored to each chemistry. To minimize impacts to shippers, PHMSA proposes to keep CTUs containing lithium ion batteries assigned to UN3536 and to establish two new entries for CTUs containing lithium metal batteries and sodium ion batteries; specifically, “UN3563, Lithium metal batteries installed in cargo transport unit” and “UN3564, Sodium ion batteries installed in cargo transport unit.” In addition, the existing entry UN3536 PSN would be revised to reference lithium ion only.

Finally, PHMSA proposes a conforming revision to Special Provision 389, which is assigned to UN3536 and will be assigned to the new entries. In Special Provision 389, PHMSA proposes to clarify that the PSN selected should reflect the primary battery chemistry type used in the CTU and that the use of multiple chemistries must be identified for emergency response purposes. These amendments will enhance safety and emergency response effectiveness by clearly distinguishing battery chemistries through separate UN numbers and additional information, ensuring responders have accurate information during incidents.

Revisions to the HMT Columns of Information

Below are revisions to the HMT columns of information not otherwise mentioned in other sections of this NPRM:

Column (1) Symbols

Section 172.101(b) describes column (1), which may contain one of six symbols: “+”, “A”, “D”, “G”, “I” and “W”. The letter “G” identifies proper shipping names for which one or more technical names of the hazardous material must be entered in parentheses in association with the basic description. As described in the above discussion on chlorophenols, PHMSA proposes to add the symbol “G” to the existing entries for solid chlorophenols (UN2020) and liquid chlorophenols (UN2021). This would align with the UNMR in identifying a technical name for these toxic materials (Division 6.1) to assist with identifying emergency response and appropriate first aid measures.

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

PSNs. PHMSA discusses numerous proposed changes as follows:

(1) As described in the above discussion on the new HMT entries for chlorophenols, PHMSA proposes to amend the PSNs for the existing entries solid chlorophenols (UN2020) and liquid chlorophenols (UN2021). The amendments would add the text “toxic” and “n.o.s.” for consistency with the new entries for chlorophenols that also exhibit a corrosive hazard (UN3561 and UN3562) and describe the hazards more accurately within the chlorophenols chemical group.

(2) As described in the above discussion on the new HMT entries for lithium metal and sodium ion batteries installed in CTUs, PHMSA proposes to amend the existing entry for “UN3536, Lithium batteries installed in cargo transport unit.” The amendment would include the text “ion” as part of the PSN.

(3) PHMSA proposes to add “Heating machines” to the existing PSN for both “UN2857, Refrigerating machines, containing non-flammable, non-toxic gases, or ammonia solutions” and “UN3358, Refrigerating machines, containing flammable, non-toxic, liquified gas.” Refrigerating machines currently transported under these entries when containing up to 12 kg of gas may be excepted from the requirements of the HMR if they meet the conditions in 49 CFR 173.307(a)(4). Heat pumps and electrical devices that are part of a typical heating and cooling system work in the same manner and present the same hazard as refrigerating machines. This revision will add regulatory clarity by identifying heating machines as eligible for exception from regulation similar to refrigerating machines.

(4) PHMSA proposes to remove the existing entry for “UN2941, Fluoroanilines, 6.1, PG III.” Fluoroanilines comprise a group of substances derived from aniline and fluorobenzene. A review of 19 fluoroanilines demonstrated varying characteristics, resulting in classifications other than Division 6.1 or, in some cases, a non-hazardous determination. To align with the UNMR and to describe chemicals in the fluoroaniline group more appropriately, PHMSA proposes replacing the current entry with a listing of the most frequently transported fluoroanilines (2,4-Difluoroaniline, 2-Fluoroaniline, 4-Fluoroaniline, o-Fluoroaniline, and p-Fluoroaniline) with references to the most appropriate general hazardous material description entry (*i.e.*, a n.o.s. entry). For example, 2,4-Difluoroaniline will be directed to the HMT entry

“Toxic, liquids, organic, n.o.s.” for authorized packaging and transport requirements.

Column (6) Label Codes

Section 172.101(g) describes column (6) of the HMT, which contains label codes representing the hazard warning labels required for a package filled with a material conforming to the associated hazard class and PSN, unless the package is otherwise excepted from labeling. The first code is indicative of the primary hazard of the material. Additional label codes are indicative of subsidiary hazards. PHMSA summarizes changes to HMT entry label codes based on indicative data presented to the UNSCOE TDG as follows:

(1) Ethylene oxide, a toxic gas, also meets criteria for being corrosive to skin necessitating the addition of Class 8 subsidiary hazard to “UN1040, Ethylene oxide, 2.3 (2.1) or Ethylene oxide with nitrogen,” “UN1041, Ethylene oxide and carbon dioxide mixture with more than nine percent but not more than 87 percent ethylene oxide, 2.1” and “UN3300, Ethylene oxide and carbon dioxide mixture with more than 87 percent ethylene oxide, 2.3 (2.1).”⁴⁰

(2) Ammonium hydrogendifluoride, a corrosive solid, also meets criteria for oral toxicity at the PG III level, necessitating the addition of the Division 6.1 subsidiary hazard to “UN1727, Ammonium hydrogendifluoride, solid, 8.”⁴¹

(3) 1,2-Di-(dimethylamino)ethane, a flammable liquid, also meets criteria for corrosivity at the PG II level and oral toxicity and inhalation toxicity at the PG III and PG II levels, respectively, necessitating the addition of Class 8 and Division 6.1 subsidiary hazards to “UN2372, 1,2-Di-(dimethylamino)ethane, 3.”⁴²

Column (7) Special Provisions

Section 172.101(h) describes column (7) of the HMT, which assigns special provisions for each HMT entry. Section

⁴⁰ UNECE, *Proposal to add class 8 as subsidiary hazard to UN 1040, UN 1041 and UN 3300*, available at: <https://unece.org/sites/default/files/2023-10/ST-SG-AC10-C3-2023-39E.pdf> (Sept. 6, 2023).

⁴¹ UNECE, *Proposal to add class 8 as subsidiary hazard to UN 1040, UN 1041 and UN 3300*, available at: <https://unece.org/sites/default/files/2023-10/ST-SG-AC10-C3-2023-39E.pdf> (Sept. 6, 2023); UNECE, *Additional information to document ST/SG/AC.10/C.3/2023/42—Classification of UN 1727 AMMONIUM HYDROGENDIFLUORIDE, SOLID*, available at: https://unece.org/sites/default/files/2023-11/UN-SCETDG-63-INF45e_0.pdf (Nov. 27, 2024).

⁴² UNECE, *Classification and transport of UN 2372 (1,2-di-(dimethylamino) ethane)*, available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-106E.pdf> (Sept. 13, 2023).

172.102 provides for the meaning and requirements of the special provisions assigned to entries in the HMT. The proposed revisions to column (7) of certain entries in the HMT are discussed below.

(1) For “UN1544, Alkaloids, solid, n.o.s. or Alkaloid salts, solid, n.o.s.” and “UN3140, Alkaloids, liquid, n.o.s., or Alkaloid salts, liquid, n.o.s.,” PHMSA proposes to assign new Special Provision, A239, to provide an exception to the technical name requirement for these substances when such disclosure is prohibited.

(2) For “UN2029, Hydrazine, anhydrous,” PHMSA proposes to assign two special provisions: (1) Existing Special Provision 74, which requires that the material be protected from direct sunshine and be stored or kept in a cool and well-ventilated place away from all sources of heat; and (2) New Special Provision 601, which states that when a pressure receptacle is used the internal pressure at 65 °C shall not exceed the test pressure.

(3) For the proposed revised entries “UN2857, Refrigerating machines or heating machines, 2.2” and “UN3358, Refrigerating machines or heating machines, 2.1,” PHMSA proposes to assign new Special Provision 75, which authorizes machines that are used to perform heating and cooling functions to be transported either under entry “Refrigerating machines” or “Heating machines.”

(4) For “UN2372, 1,2-Di-(dimethylamino)ethane,” PHMSA proposes to revise the portable tank code from T4 to T7. This is consistent with the subsidiary hazards proposed for this material (*see* proposed amendments to Column (5) above) and follows the UN Guiding Principles for the Development of the UN Model Regulations for a Class 3, PG II material with a Division 6.1 or Class 8 subsidiary hazard. In addition, consistent with the UNMR, PHMSA proposes to assign portable tank Special Provision TP28, which allows a deviation from the test pressure requirements and transport in portable tanks with a minimum test pressure of 2.65 bar. This means that depending on applicable portable tank requirements, transport in T4 portable tanks may continue as currently authorized.

(5) For “UN2735, Amines, liquid, corrosive, n.o.s. or Polyamines, liquid, corrosive, n.o.s., 8,” in the PG II entry, PHMSA proposes to revise the portable tank Special Provision from TP1 to TP2. This amendment was brought forward by the IMO to the UNSCOE TDG, and it was agreed that TP2 is consistent with the Guiding Principles for the

Development of the UN Model Regulations for Class 8, PG II liquids and applies the most appropriate maximum degree of filling of the portable tank with these materials.

(6) For “UN3563, Lithium metal batteries installed in cargo transport unit” and “UN3564, Sodium ion batteries installed in cargo transport unit,” PHMSA proposes to assign Special Provision 389. Special Provision 389 prescribes requirements for lithium and sodium ion batteries installed in a CTU and designed only to provide power external to the CTU.

(7) For the following entries: “UN3556, Lithium metal batteries installed in cargo transport unit,” “UN3564, Sodium ion batteries installed in cargo transport unit,” “UN3537, Articles containing flammable gas, n.o.s.,” “UN3171, Battery-powered vehicle or Battery-powered equipment,” “UN3363, Dangerous good in articles or Dangerous good in machinery or Dangerous good in apparatus,” “UN3529, 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,” “UN3528, 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,” “UN3530, Engine, internal combustion or Machinery, internal combustion,” “UN3072, Life-saving appliances, not self-inflating containing dangerous goods as equipment,” “UN2990, Life-saving appliances, self-inflating,” “UN3536, Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal batteries,” “UN3166, Vehicle, flammable liquid powered or Vehicle, fuel cell, flammable liquid powered,” “UN3556, Vehicle, lithium ion battery powered,” “UN3557, Vehicle, lithium metal battery powered,” and “UN3558, Vehicle, sodium ion battery powered,” PHMSA proposes to assign Special Provision 180 to facilitate the transportation of articles and equipment containing damaged or defective lithium ion or sodium ion batteries.

(8) For the following entries: “UN3480, Lithium ion batteries,” “UN3481, Lithium ion batteries contained in equipment,” “UN3481, Lithium ion batteries packed with equipment,” “UN3551, Sodium ion batteries,” “UN3552, Sodium ion batteries contained in equipment,” “UN3552, Sodium ion batteries packed

with equipment,” “UN3563, Lithium metal batteries installed in cargo transport unit,” and “UN3564, Sodium ion batteries installed in cargo transport unit,” PHMSA proposes to assign new Special Provision 410, establishing requirements for transportation of hybrid batteries—*i.e.*, those batteries containing both lithium ion and sodium ion cells.

(9) For “UN3538, Articles containing non-flammable, non-toxic gas, n.o.s.,” PHMSA proposes to assign new Special Provision 411, which sets out conditions for transportation of an MRI scanner with hazardous materials components.

(10) For “UN1075, Petroleum gases, liquefied or Liquefied petroleum gas,” and “UN1965, Hydrocarbon gas mixture, liquefied, n.o.s.,” PHMSA proposes to assign new Special Provision 412, which authorizes the use of these entries for transportation of liquefied petroleum gas (LPG) blended with up to 12 percent by mass of “UN1033, Dimethyl ether.”

(11) For the following entries (that are also marine pollutants): “UN1599, Dinitrophenol solutions,” “UN1761, Cupriethylenediamine solution,” “UN1897, Tetrachloroethylene,” “UN2046, Cymenes,” “UN2052, Dipentene,” “UN2235, Chlorobenzyl chlorides, liquid,” “UN2279, Hexachlorobutadiene,” “UN2315, Polychlorinated biphenyls, liquid,” “UN2321, Trichlorobenzenes, liquid,” “UN2433, Chloronitrotoluenes, liquid,” “UN2504, Tetrabromoethane,” “UN2514, Bromobenzene,” “UN2515, Bromoform,” “UN2518, 1,5,9-Cyclododecatriene,” and “UN3408, Lead perchlorate, solution,” PHMSA proposes to revise the assignment of portable tank Special Provision TP1 to TP2. 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, necessitating the change.

Column (8) Packaging

Section 172.101(i) explains the purpose of column (8) in the HMT. Columns (8A), (8B), and (8C) specify the applicable sections for exceptions, non-bulk packaging requirements, and bulk packaging requirements, respectively. Columns (8A), (8B), and (8C) are completed in a manner which indicates that “49 CFR 173” precedes the designated numerical entry. Column (8A) contains exceptions from some of the requirements of the HMR. The referenced exceptions are in addition to those specified in subpart A of part 173 and elsewhere in the HMR. The word

“None” in this column means no packaging exceptions are authorized, except as may be provided by special provisions in column (7).

For “UN2956, 5-tert-Butyl-2,4,6-trinitro-m-xylene *or* Musk xylene,” PHMSA proposes to revise Column (8A) by replacing “151” with “None” to eliminate the limited quantity authorization for this entry. The IMO informed the UNSCOE TDG about a discrepancy between the IMDG Code and the UNMR concerning the provision for limited quantities of UN2956. Specifically, the UNMR currently authorizes limited quantity transport of UN2956 when the inner packaging does not exceed five kg. In contrast, the IMDG Code does not authorize transport of musk xylene under limited quantity provisions. In addition, Special Provision 133, assigned exclusively to UN2956 in both the UNMR and the IMDG Code, notes that this substance may exhibit explosive behavior if over-confined in packagings. The associated Packing Instruction P409 in both the UNMR and the IMDG Code (aligned with 49 CFR 173.223 of the HMR) requires packaging that is designed to prevent over-confinement. However, Packing Instruction P409 (49 CFR 173.223) is not applicable in the context of hazardous materials packed in limited quantities, as limited quantities generally provide relief from the performance packaging requirements. Based on these considerations, PHMSA proposes to align with the IMDG Code and revise the HMT entry for UN2956 accordingly to not authorize transportation as a limited quantity material.

Column (10) Vessel Stowage

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 49 CFR 176.84.

Consistent with changes adopted in the IMDG Code, PHMSA proposes to revise the stowage code for the “UN2203, Silane” by revising column (10A) from Category E to Category D. This aligns with the entry “UN3553, Disilane” assigned to Category D on the basis that silane gas is also pyrophoric and that on deck only stowage is most appropriate.

For the entry “UN2225, Benzene sulfonyl chloride,” PHMSA proposes to assign codes 53 and 58 in Column (10B) requiring stowage “separated from” alkaline compounds and cyanides, respectively. This aligns the stowage segregation provisions for UN2225 with all other entries in the IMDG Code assigned to the Segregation Group Code 1, applicable to acids. Finally, in development of this NPRM related to the new PG II entry for “UN2862, Vanadium pentoxide,” PHMSA discovered that the existing PG III entry is assigned stowage code 40, “Stow clear of living quarters,” but this stowage code is not assigned to either the existing PG III entry or the new PG II entry in the IMDG Code. Further, stowage code 40 is not generally assigned to Division 6.1 solids except for those with generic group names. Consistent with other entries in the HMT and the IMDG Code, PHMSA proposes to remove stowage code 40 from Column (10B) for the PG III entry of “UN2862, Vanadium pentoxide.”

Section 172.102 (Special Provisions)

Section 172.102 lists special provisions assigned in column (7) of the HMT and applicable to the transportation of specific hazardous materials. Special provisions contain various provisions including packaging requirements, prohibitions, and exceptions applicable to particular quantities or forms of hazardous materials. PHMSA proposes the following additions and revisions to the special provisions in this section:

Special Provision 75

PHMSA proposes to adopt and to assign new Special Provision 75 to the proposed revised entries “UN2857, Refrigerating machines *or* heating machines, 2.2” and “UN3358, Refrigerating machines *or* heating machines, 2.1.” This special provision would provide a description of both refrigerating and heating machines consistent with UN Special Provision 119 and authorize machines that perform heating and cooling functions to be transported under either PSN, *i.e.* “Refrigerating machines” or “Heating machines.”

Special Provision 135

Special Provision 135 is assigned to the HMT entries for certain vehicles and cargo transport units to indicate selection of the appropriate HMT entry. The special provision currently states that hybrid electric vehicles with wet, sodium, or lithium batteries installed that are also powered by an internal combustion engine must be described as

“Vehicle, flammable gas powered,” “Vehicle, flammable liquid powered,” “Vehicle, fuel cell, flammable gas powered,” or “Vehicle, fuel cell, flammable liquid powered,” as appropriate. As only wet, sodium, and lithium batteries are referenced in the special provision, hybrid electric vehicles using other battery chemistry types, such as nickel-metal hydride batteries, have been refused for transport by carriers when described under the above entries. Consistent with how wet, sodium, or lithium batteries are treated when installed in a vehicle, PHMSA is proposing to expand the list of hybrid electric vehicle battery types to include wet, nickel-metal hydride, metallic sodium, sodium alloy, lithium metal, lithium ion, sodium ion, or hybrid batteries.

In addition, CTUs containing lithium batteries are currently required to be transported under the PSN “Lithium batteries installed in cargo transport unit.” Due to the increasing usage of CTUs using different chemistry types, PHMSA proposes to revise this special provision to require that CTUs containing lithium ion or sodium ion batteries to be described with appropriate shipping description.

Finally, PHMSA proposes to clarify that vehicles powered solely by lithium ion, lithium metal, or sodium ion batteries must be assigned to “UN3556, Vehicle, lithium ion battery powered,” “UN3557, Vehicle, lithium metal battery powered,” or “UN3558, Vehicle, sodium ion battery powered vehicle,” respectively, and that vehicles powered solely by hybrid batteries containing both lithium ion cells and sodium ion cells can be described for transportation as “UN3556, Vehicle, lithium ion battery powered.”

Special Provision 136

Special Provision 136 is assigned to the HMT entry “UN3363, Dangerous Goods in Articles *or* Machinery *or* Apparatus, Class 9” and specifies the eligibility and conditions for use of this classification and description. PHMSA proposes to authorize the inclusion of small lithium ion or sodium ion cells or batteries shipped as dangerous goods in articles, machinery, or apparatus. A submission to the UNSCOE TDG noted that the e-commerce shift from business-to-business to direct-to-consumer delivery, combined with the widespread use of small lithium batteries installed in everyday goods, is leading to an increase in articles that contain both batteries and other limited amounts of

hazardous materials.⁴³ But existing provisions do not presently allow for classification and description of these products under UN3363.

Materials shipped under UN3363 are restricted to those authorized for transport in limited quantities, and lithium ion and sodium ion batteries are ineligible for transport under the limited quantity provisions. The HMT entries for lithium batteries contained in equipment, UN3481 or UN3091, exclude other hazardous materials. Further, the HMT entries for articles of UN3537, UN3540, UN3541, and UN3548 are intended to address larger quantities of hazardous materials containing more than the limited quantity thresholds and are not permitted for air transport without competent authority approval. The UNSCOE TDG proposal noted that this encourages misdeclaration, though there is no evidence that misdeclared consumer products containing small amounts of hazardous materials and small lithium ion and sodium ion cells and batteries present an unacceptable risk in transportation.

PHMSA proposes to revise Special Provision 136 to specify “UN3363, Dangerous Goods in Articles or Machinery or Apparatus” may additionally contain lithium cells or batteries or sodium ion cells or batteries, provided the cells or batteries provide electrical power for their operation and meet the requirements prescribed in 49 CFR 173.185(a) and (c). For additional information, also see discussion on corresponding revisions to 49 CFR 173.222.

Special Provision 160

Special Provision 160 is assigned to HMT entry “UN3268, Safety devices, *electrically initiated*, 9,” and outlines conditions and criteria for use of the entry. Special Provision 160 currently applies to safety devices such as vehicle air bag inflators and seat-belt pretensioners, but explicitly excludes devices associated with life-saving appliances regulated under 49 CFR 173.219. Consistent with the proposed changes in 49 CFR 173.219 that would authorize Class 9 safety devices as components in life-saving appliances, PHMSA proposes a corresponding revision to Special Provision 160. For example, an inflator unit designed for use in a wearable vest could be offered for transport as a UN3268 material because the vest is a “safety device”

installed in a self-inflating, life-saving appliance. This revision would specify that using UN3268 is appropriate for Class 9 safety device component parts of a life-saving appliance when transported for installation in the life-saving appliance.

Special Provision 180

PHMSA proposes a new special provision assigned to articles, vehicles, or equipment containing damaged or defective batteries to facilitate the conditions for their transportation. Specifically, this proposed special provision would allow articles, vehicles, or equipment to continue to be transported under their original UN number, provided the damaged or defective batteries are either removed prior to transportation or the entire article, vehicle, or equipment is packaged and marked in accordance with the requirements in 49 CFR 173.185(f), which prohibits transport by aircraft. This proposed special provision also clarifies vehicles containing damaged or defective batteries shipped by vessel must still comply with the requirements in 49 CFR 176.905(a)(3).

Special Provision 196

Special Provision 196 states that nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN Manual of Tests and Criteria, Appendix 10. The requirements in this special provision are intended to ensure the stability of mixtures containing nitrocellulose by testing in accordance with Test Series 3(c) of the UN Manual of Tests and Criteria. The text as currently written in Special Provision 196 may be misinterpreted to apply only to listed items and not to all mixtures. To address concerns regarding full application of the special provision, PHMSA proposes to revise Special Provision 196 to ensure the exception from 3(c) testing only applies to dry or unmodified nitrocellulose.

Special Provision 360

Special Provision 360 specifies the applicable description and UN identification number for lithium ion and sodium ion batteries that power vehicles and for batteries installed in a CTU designed only to provide external power. Consistent with the proposal in this NPRM to split the existing single entry for “UN3536, Lithium batteries installed in cargo transport” into three separate UN identification numbers to account for the battery chemistry, PHMSA proposes to revise this special provision to specify that lithium and sodium ion batteries installed in CTUs

must be described for transport using the corresponding new proposed entries, “UN3536, Lithium ion batteries installed in a cargo transport unit,” “UN3563, Lithium metal batteries installed in cargo transport unit,” or “UN3564, Sodium ion batteries installed in cargo transport unit.” This Special Provision would also indicate that CTUs installed with hybrid batteries, consistent with proposed new Special Provision 410 discussed below, must be described using the entry “UN3536, Lithium ion batteries installed in a cargo transport unit.” For more information on the new CTU HMT entries, refer to the 49 CFR 172.101 discussion in the *Section-by-Section Review*. These revisions ensure use of the most appropriate description, identification number, and transport provisions.

Special Provision 379

Special Provision 379 provides conditions for exception from full regulation under the HMR for anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems. One condition is that receptacles containing adsorbed or absorbed ammonia must be made of a material compatible with ammonia as specified in ISO 11114–1:2020(E), (*Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials*). PHMSA proposes to revise language in Special Provision 379 to add a reference to an amendment to ISO standard 11114–1:2020(E); specifically, ISO 11114–1:2020/Amd 1:2023(E). The amendment to the 2020 edition updates a compatibility table in the standard for eight (8) specific gases.

Special Provision 388

Special Provision 388 prescribes requirements for lithium batteries containing both lithium metal cells and lithium ion cells that are not designed to be charged externally. The present text states the total lithium content of all lithium metal cells contained in the battery must not exceed 1.5 g and the total “capacity” of all lithium ion cells contained in the battery must not exceed 10 Wh. To align with the UNMR and to avoid confusion between electrical capacity (ampere-hours) and energy content (Wh), PHMSA proposes an editorial revision to the special provision by replacing the term “capacity” with “watt-hour rating.”

⁴³ UNECE, *Proposal to allow articles classified as UN3363 to contain lithium batteries complying with Special Provision 188*, available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-91E.pdf> (Sept. 13, 2024).

Special Provision 389

Special Provision 389 provides packaging instructions and hazard communication requirements for “UN3536, Lithium batteries installed in cargo transport unit.” Consistent with the proposal in this NPRM to split the existing single HMT entry for UN3536 into three separate HMT entries, each having a unique UN identification number to account for various battery chemistries used in battery energy storage systems, PHMSA proposes to revise this special provision to clarify that it also applies to sodium ion batteries used in these systems, including hybrid batteries containing both lithium ion and sodium ion batteries (*see* Special Provision 410 below for further discussion of hybrid batteries).

Special Provision 401

Special Provision 401 specifies selection and use of sodium ion battery HMT entries. The HMT entries to which Special Provision 401 is presently assigned include “UN3292, Batteries, containing metallic sodium or sodium alloy” and “UN3292, Cells, containing metallic sodium or sodium alloy.” Consistent with the UNMR, PHMSA proposes to revise Special Provision 401 to indicate specifically that batteries containing metallic sodium or sodium alloy must be transported using the UN3292 identification number and the associated PSN.

Special Provision 410

PHMSA proposes to adopt and to assign new Special Provision 410 to establish requirements for transport of hybrid batteries (*i.e.*, batteries containing both lithium ion and sodium ion cells). Hybrid batteries are a new product type that consists of lithium ion and sodium ion cells connected in series. By combining the high energy density of lithium ion batteries with the low temperature adaptability of sodium ion batteries, hybrids are anticipated to see widespread use in the automotive and energy storage industries. Due to their intermediate energy density and the inability of the lithium ion cells to be discharged fully, hybrid batteries present a hazard profile similar to lithium ion batteries.

To facilitate safe transport, PHMSA proposes to require hybrid batteries to be tested and to be packaged in accordance with the provisions for lithium ion batteries. Specifically, each component lithium ion and sodium ion cell within the hybrid battery must be of the type proven to meet the criteria in part III, subsection 38.3 of the UN

Manual of Tests and Criteria. PHMSA also proposes that hybrid batteries must be classified and described under the lithium ion battery entries, UN3480, UN3481, or UN3536, as appropriate. For UN 3556, see the proposed language in 172.102, Special Provision 135. Special Provision 410 would also clarify that when hybrid batteries are transported under the small battery provisions prescribed in 49 CFR 173.185(c), the Wh rating must not exceed 100 Wh and must be marked on the outer casing.

Special Provision 411

PHMSA proposes a new Special Provision 411 to facilitate the transportation of a recently developed type of magnetic resonance imaging (MRI) scanner. This new type of MRI scanner includes the use of new, superconductive magnets. These magnets contain helium that must be cooled to near absolute zero to achieve superconductivity of the coils. Traditional MRI scanners typically contain between 125 and 250 kg of refrigerated liquid helium and are classified and described as “UN1963, Helium, refrigerated liquid.” In contrast, the new MRI scanners use significantly less helium (1.5 kg). Due to this difference, UNSCOE determined that the UN1963 identification number is not the most appropriate description for these devices. In addition, since these MRI scanners contain components designed for cooling purposes, PHMSA proposes to provide the same exception currently applicable to refrigerating machines containing less than 12 kg of a non-flammable, non-toxic gas to include these devices. Specifically, Special Provision 411 will be assigned to the current HMT entry “UN3538, Articles containing non-flammable, non-toxic gas, n.o.s.” and would except MRI scanners with less than 12 kg of such gas from the requirements of the HMR when designed and constructed to prevent the risk of bursting or cracking of the components containing gas under normal conditions of transport. This special provision will support the safe global transport of MRI scanners, while applying a level of regulation appropriate to the hazard.

Special Provision 412

PHMSA proposes to adopt and to assign new Special Provision 412 to HMT entries “UN1075, Petroleum gases, liquefied or Liquefied petroleum gas” and “UN1965, Hydrocarbon gas mixture, liquefied, n.o.s.” to authorize the use of these entries for liquefied petroleum gas (LPG) containing up to 12 percent by mass of “UN1033, Dimethyl ether.” The LPG industry is

transitioning to more sustainable sources like bio/renewable/recycled materials. This includes blending LPG with renewable or recycled dimethyl ether (DME), a clean-burning, low-carbon fuel compatible with existing LPG infrastructure. DME shares similar properties with LPG, making it feasible to blend up to 12 percent by mass without altering transport, filling, or hazard communication requirements. The flow capacity for pressure relief valves shows that if the valves are sized for LPG, they will also have the correct flow capacity for DME/LPG blends. Testing with blends of 20 percent DME (by mass in the liquid phase) with LPG shows that the materials used in the transport and storage chain are still suitable, affording the proposed 12 percent a safety factor.

Special Provision 413

PHMSA proposes to adopt and to assign new Special Provision 413 to HMT entry “UN3082, Environmentally hazardous substance, liquid, n.o.s.” This special provision would establish a quantity limit for physically dissolved hydrogen in liquid organic hydrogen carriers (LOHCs) to ensure safe transport conditions.

Hydrogen can be transported in several forms, including as a compressed gas under high pressure, as a refrigerated liquefied gas, or as chemically bound to liquid carrier substances known as LOHCs. For a substance to be an LOHC, it must be capable of chemically binding hydrogen. Depending on the degree of hydrogenation, one liter of LOHC can hold several hundred liters of hydrogen. The hydrogen can be released through a reversible chemical process, which requires a dedicated dehydrogenation catalyst and high temperatures (>250°C). The spontaneous release of chemically bound hydrogen during transport is not possible. During the process of binding hydrogen to the carrier, very small amounts may remain physically dissolved, not chemically bound, in the LOHC. These physically dissolved traces can potentially be released during transport due to changes in temperature or pressure, creating the risk of an explosive atmosphere. One of the substances that hydrogen can be chemically bound to is benzyltoluene, which is commonly classified and described for transport under UN3082.

To address the absence of a defined limit for the amount of physically dissolved hydrogen allowed in LOHCs, testing was conducted under extreme conditions to evaluate the potential for

an explosive atmosphere formation.⁴⁴ The test results demonstrated that only untreated samples under extreme conditions showed a minor risk of ignition; in all other cases, no ignition occurred. The tests showed the effectiveness of treatment procedures such as inertization with nitrogen. Using the definition for Division 4.3 materials as a reference—substances that emit flammable gas at a rate exceeding one L/kg per hour when in contact with water—a more conservative limit of 0.5 L/kg per hour was adopted. Proposed Special Provision 413 would require that LOHCs classified and described under UN3082 may only be transported if the amount of physically dissolved hydrogen does not exceed 0.5 L of hydrogen/kg of LOHC. Transporting hydrogen using LOHCs offers a potentially safer alternative to conventional methods.

Special Provision 601

PHMSA proposes to adopt and to assign new Special Provision 601 to HMT entry “UN2029, Hydrazine, anhydrous, 3.” This special provision would restrict the pressure in a cylinder at 65 °C to not more than the test pressure. Currently, 49 CFR 173.201 is assigned to UN2029 for authorized packaging and allows use of cylinders conforming to the general packaging requirements of 49 CFR part 173, subpart B and the requirements of 49 CFR part 178 at the PG I performance level. The provisions in 49 CFR 173.201 do not contemplate industry practice of using inert gas under pressure for the transport of anhydrous hydrazine. The proposed pressure limit was adopted into the UNMR to address concerns regarding over-confinement of the anhydrous hydrazine and to ensure the strength of the packaging is sufficient for transport.⁴⁵

Special Provision A53

Special Provision A53 applies to refrigerating machines and to refrigerating machine components containing a non-flammable gas or ammonia solution. Consistent with the proposed revision to add “heating

machines” to the PSN for UN2857, PHMSA is proposing to revise Special Provision A53 to apply to both refrigerating machines and heating machines.

Special Provision A225

Special Provision A225 applies to the transportation of “UN3538, Articles containing non-flammable, non-toxic gas, n.o.s.” on passenger and cargo-only aircraft. PHMSA proposes to revise the provision to include sodium ion batteries in addition to lithium batteries that are currently authorized.

Special Provision A239

PHMSA proposes to add and to assign new Special Provision A239 to HMT entries for “UN1544, Alkaloids, solid, n.o.s. or Alkaloid salts, solid, n.o.s.” and “UN3140, Alkaloids, liquid, n.o.s., or Alkaloid salts, liquid, n.o.s.” Air transport is used for controlled substances to expedite delivery by minimizing transit time and mitigating security risks such as theft. Currently, 49 CFR 172.203(k) requires a technical name to be included in association with “n.o.s.” PSNs. But the disclosure of the specific chemical identity for certain controlled substances may be prohibited by national law or international convention or may pose significant security risks during transport. Consistent with the ICAO Technical Instructions amendment, this new special provision would provide an exception to the technical name requirement for these substances when such disclosure is prohibited.

IB and IP Codes

Consistent with changes proposed for 49 CFR 173.232, PHMSA proposes to revise the paragraph (c)(4) introductory text by adding reference to 49 CFR 173.232 for authorized use of large packagings for articles without having to assign IP codes to corresponding entries in the HMT.⁴⁶

Special Provision TP43

PHMSA proposes to add Special Provision TP43 to the list of portable tank “T” codes and assign it to proposed the new PG II HMT entry for “UN2862, Vanadium Pentoxide.” TP43 would provide continue use of portable tank instruction T1 until December 31, 2028. This is consistent with the PG III HMT entry for “UN2862, Vanadium Pentoxide, nonfused form,” which is assigned T1. This temporary alignment ensures regulatory continuity for the transport of UN2862 in portable tanks

while allowing time for any needed technical or administrative adjustments associated with the reassignment to PG II. See Section B above for further discussion of the change’s association with the HMT entry for vanadium pentoxide.

Section 172.202

Section 172.202 details the requirements for the description of hazardous materials on shipping papers with paragraph (a)(6) specific to requirements applicable to transportation by aircraft. In paragraph (a)(6)(iii), PHMSA proposes to add “articles” to the existing references of “machinery” and “apparatus.” This is consistent with an editorial revision to the ICAO Technical Instructions as all three phrases are assigned to “UN3363, Dangerous goods in articles or Dangerous goods in machinery or Dangerous goods in apparatus.”

C. Part 173

Section 173.2a

Section 173.2a provides instructions on the classification of a material having more than one hazard. PHMSA proposes to revise Note 2 to 49 CFR 173.2a to clarify classification of a material that is both corrosive and toxic. Specifically, PHMSA is correcting Note 2 to state that for Class 8 to take precedence both dermal toxicity and oral toxicity must be in the range of PG III or less. If either the dermal toxicity or the oral toxicity is not in the range of PG III or less (*i.e.*, either is in PG I or II), then Division 6.1 takes precedence. This clarification ensures the appropriate primary hazard classification of materials that exhibit both corrosive and toxic hazards and harmonizes with changes in the UNMR.

Section 173.14

Section 173.14 provides exceptions from the HMR for certain devices or equipment, such as data loggers and cargo tracking devices, containing hazardous materials that are in use or which are intended for use during transport. These items are often powered by hazardous materials, such as lithium cells or batteries, which are necessary to power the device or equipment. PHMSA proposes to revise 49 CFR 173.14 to allow sensors, in addition to data logger and cargo tracking devices, to be transported under the provisions in this section in alignment with the UNMR changes. PHMSA notes that although the ICAO Technical Instructions did not make this revision, adding the term sensor is still appropriate. PHMSA also proposes to revise 49 CFR 173.14 to allow for

⁴⁴ UNECE, *Transport of liquid organic hydrogen carriers—new special provision to UN 3082*, available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-73E.pdf> (Sept. 6, 2024); UNECE, *Transport of liquid organic hydrogen carriers—new special provision to UN 3082—additional information*, available at: <https://unece.org/sites/default/files/2024-09/UN-SCETDG-65-INF05e.pdf> (Sept. 16, 2024).

⁴⁵ UNECE, *Provisions for UN 2029 Hydrazine Anhydrous*, available at: <https://unece.org/sites/default/files/2024-09/ST-SG-AC10-C3-2024-102E.pdf> (Sept. 13, 2024).

⁴⁶ See 49 CFR 173.232 for a detailed discussion of the authorization of large packagings for articles.

devices and equipment to be powered by sodium ion batteries. Finally, PHMSA is proposing to revise current reference to “equipment” to a more general term of “device” for consistency within the section.

Section 173.32

Section 173.32 outlines the requirements for the use of portable tanks. PHMSA proposes to revise the loading requirements in 49 CFR 173.32(f)(5) to change terminology from “ullage condition” to “filling condition.” A working group on the harmonization of European regulations for transport of hazardous materials by highway, rail, and inland waterways with the UNMR recommended use of the term “filling condition” for consistency with terminology throughout the UNMR. PHMSA agrees that this minor clarifying amendment makes it easier to understand the provision and avoid unintentional hydraulic force within a portable tank due to the surge caused by incorrect filling.

Section 173.62

Section 173.62 provides specific packaging requirements for explosives. PHMSA proposes to revise Table 2 to paragraph (c)(5) “Table of Packing Methods” by updating Packing Instruction (PI) 130. The revision would clarify that cartridges classified and described under “UN0012, cartridges, small arms” and “UN0014, Cartridges, small arms, blank” may be packed in metal containers without inner packaging. PI 130 is currently assigned to “UN0012, cartridges, small arms” and to “UN0014, Cartridges, small arms, blank” which consist of metal components. PI 130 does not require inner or intermediate packaging and authorizes outer packagings, including boxes and drums made of aluminum, steel, and other metals. But 49 CFR 173.60(b)(3), which corresponds to a Class 1 special packing provision in the UNMR, creates an inconsistency in the regulations by requiring that metallic components of articles, such as small arms cartridges, must be prevented from making contact with metal packagings.

Two sessions of the Explosives Working Group of the UNSCOE TDG discussed this topic. The group evaluated the potential for the buildup of static electricity between metals posing an ignition risk and concluded the risk is negligible. Acknowledging that preventing metal-to-metal contact represents best practices in packaging explosives for transport, several experts recognized that transporting bulk ammunition in metal containers without

inner packaging has been standard military practice for decades. No incidents related to this packing method have been reported by explosives experts. This is further supported by extensive experience in the United States, where small arms cartridges are often transported loose in metal outer packaging, allowing metal-to-metal contact. The proposed revision will resolve the inconsistency and clarify a widely accepted and historically safe packaging method for cartridges under UN0012 and UN0014.

Section 173.125

Section 173.125 outlines the criteria for assigning packing groups to Class 4 materials. PHMSA proposes to revise PG III criteria for Division 4.2 materials to clarify that the volume applies to the internal volume of the packaging and not to the external volume. This clarification would aid in ensuring appropriate PG assignment and harmonizes with revisions in the UNMR.

Section 173.166

Section 173.166 prescribes transportation requirements for safety devices. To align with proposed changes to Special Provision 160 authorizing safety devices as components in life-saving appliances, PHMSA proposes amending the introductory text of this section to include the term “life-saving appliances” along with a corresponding example. PHMSA also proposes to include reference that safety devices include the term “Safety device, pyrotechnic.”

Section 173.185

Section 173.185 prescribes requirements for transportation of lithium cells and batteries. Paragraph (c) prescribes requirements for smaller cells or batteries and paragraph (c)(3) specifies the requirements for the use of the battery mark. Packages containing only button cell batteries installed in equipment (including circuit boards) or consignments of not more than four cells or two batteries contained in equipment are not required to bear the battery mark. Consistent with the UNMR, PHMSA proposes to clarify that any button cells contained in equipment do not count toward the consignment limits. In paragraph (c)(3)(i), PHMSA also proposes to clarify that the UN identification number for button cells is not required on the battery mark when equipment contains one or more button cells in addition to cells or batteries, such as in the case of laptop computers.

Further, PHMSA proposes to clarify the required location of the battery mark

on packages that also require other hazard labels. Currently, when both the battery mark and labels representing other hazards (*i.e.*, non-battery hazards) are required on the same package, there is no requirement they be placed on the same surface of the package. This can lead to inconsistent placement, such as the battery mark on one side of a package and the non-battery hazard label on another side, potentially resulting in misinterpretation of the full hazard in the package during transport or incident response. To reduce the risk that the hazard represented by the battery mark or other hazard label is overlooked, PHMSA proposes a new paragraph (c)(3)(iv) to prescribe that when a package requires both the battery mark and hazard labels (other than the Class 9 lithium ion or sodium ion battery label), the battery mark must be placed on the same surface of the package as the labels if the package dimensions are adequate. This proposed revision ensures that all hazards associated with packages containing batteries are clearly visible.

Section 173.219

Section 173.219 prescribes the transport conditions and packaging requirements for life-saving appliances. PHMSA proposes to authorize self-inflating protective equipment including those containing a small pyrotechnic device as a lifesaving appliance. These pyrotechnic devices rapidly release a compressed gas to inflate an airbag in a crash situation. A proposal to the UNSCOE TDG initially focused on the appropriate classification applicable to wearable airbag systems for motorcyclists. A more general approach was appropriate as there are other devices used in similar applications involving the same principles (*e.g.*, small gas cylinders, sensors, and an activation charge).⁴⁷ Consistent with Special Provision 296 of the UN Model Regulations, in paragraph (a), PHMSA proposes to add a non-exhaustive list of lifesaving appliance examples including the term “self-inflating protective equipment.” The term is broad, covering not just motorcycle wearable airbag systems but also other inflatable safety devices, and is intended to allow flexibility to accommodate various current and future technologies that protect individuals by inflating on demand.

In addition, PHMSA proposes to revise paragraph (b)(6) to authorize self-inflating lifesaving appliances (UN2990)

⁴⁷ UNECE, *Wearable airbag system*, available at: <https://unece.org/sites/default/files/2024-10/ST-SG-AC10-C3-2024-71E.pdf> (Sept. 5, 2024).

to include installed Class 9 safety devices (UN3268), provided the explosive component of the safety device does not exceed 3.2 grams, consistent with the existing authorization for installed Division 1.4S cartridges, power device. See Section 172.102, Special Provision 160 above for further discussion.

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. PHMSA proposes to amend paragraph (h) that contains exceptions to the general transport requirements to require marks and labels for packaged vehicles powered by lithium ion batteries, lithium metal batteries, and sodium ion batteries under the entries (UN3556, UN3557, and UN3558, respectively). This amendment would require packaged electric vehicles to meet the marking and labeling requirements of subparts D and E of part 172. This is largely consistent with marking and labeling requirements for packaged equipment containing lithium ion or sodium ion batteries.

Section 173.222

Section 173.222 specifies the packaging requirements for “UN3363, Dangerous goods in machinery or articles or apparatus.” In conjunction with the proposed revision to Special Provision 136 authorizing the articles to contain lithium ion and sodium ion cells or batteries and small quantities of hazardous materials, PHMSA proposes to add paragraph (b)(4) to clarify that cells and batteries must be protected from damage and short circuit, and that the article must be equipped with an effective means of preventing accidental activation. In addition, PHMSA clarifies in paragraph (c) that quantities specified in paragraphs (c)(1) and (c)(2) do not apply to any installed cells or batteries as they are limited to providing electrical power for the operation of the article. See Section 172.102, Special Provision 136 above for further discussion.

Finally, consistent with a revision to the UNMR, PHMSA proposes to amend paragraph (a) to clarify that, if the articles contain more than one item of hazardous materials and these items could react dangerously with one another during transport, each of the hazardous materials must be enclosed separately. This revision would use the existing text in 49 CFR 173.232 to align

with the text for articles under UN identification numbers 3537–3548 and UN3363 when containing more than one hazardous material.

Section 173.224

Section 173.224 outlines the packaging and control and emergency temperatures for self-reactive materials. PHMSA proposes to clarify paragraph (a) to emphasize that, “[t]o avoid the unnecessary confinement of liquids, metal packagings meeting hydrostatic test pressure criteria at the Packing Group I must not be used [emphasis added].” PHMSA notes that the shipper should consult with the packaging manufacturer to verify that the metal packaging does not meet the pressure test criteria at the PG I level.

Furthermore, paragraph (c) of this section prescribes requirements for new self-reactive materials, formulations, and samples. PHMSA proposes to add a new paragraph (c)(5) with provisions addressing transportation of samples of potentially explosive or self-reactive substances in quantities of up to 200 grams for solids or 200 mL for liquids per outer package when supporting data for classification is unknown. These substances usually consist of organic molecules that are active ingredients, building blocks, or intermediates for pharmaceutical or agricultural chemicals. The molecules of the substances often possess chemical functional groups listed in Tables A6.1 and/or A6.3 in Annex 6 (Screening Procedures) of the UN Manual of Tests and Criteria, which would indicate explosive or self-reactive properties, though these substances are not designed with explosive intent.

This amendment is necessary to facilitate transport of these materials during research and development because often there is not enough material available for classification testing or the cost of testing is otherwise prohibitive. Typical quantities of material handled in this phase are small, ranging from 10 to 100 grams. The existing provisions for samples of self-reactive materials do not necessarily satisfy the quantity needs or require classification test data that is unavailable. The International Group of Experts for Unstable Substances: Energetic and Oxidizing Substances (IGUS EOS Working Group) and the Explosives Working Group of the UNSCOE TDG reviewed the proposed criteria. Decomposition energy and the onset of decomposition can be determined by differential scanning calorimetry (DSC), a thermal analysis method using very small amounts of a material. The results of decomposition

energy analysis show that salts and complexes of organic compounds with energies of less than 1,500 J/g, or other organic substances with energies of less than 2,000 J/g, would not be more dangerous than a self-reactive material of Type B. Therefore, no further testing is required. For energy thresholds more than 1,500 J/g or 2,000 J/g, respectively, additional testing is prescribed. In addition to criteria for applicability and eligibility, the proposed new paragraph (c)(5) would authorize transport of samples up to 200 grams for solids or 200 mL for liquids per outer package in accordance with existing provisions in paragraphs (c)(3) and (c)(4)(i)–(iii).

Finally, PHMSA proposes to revise 49 CFR 173.224(c)(4) to reference table A6.3 correctly (instead of currently referenced A6.2) and to permit an additional density option for the expandable polyethylene foam matrix used to isolate very small energetic samples. The existing requirement is for a foam density of 18 plus or minus one g/L in a matrix at least 130 mm thick. A submission to the UNSCOE TDG explained that the originally specified foam is no longer readily available and presented test data demonstrating that a functionally equivalent foam with a density of 24 plus or minus 2.4 g/L provides comparable protection.⁴⁸ For these reasons, PHMSA proposes to allow the foam matrix to have a density of either 18 plus or minus one g/L or 24 plus or minus 2.4 g/L, while retaining the existing 130 mm minimum thickness requirement.

Section 173.225

Section 173.225 prescribes packaging requirements and other provisions for organic peroxides. As a result of new peroxide formulations becoming commercially available and clarifications made to the UNMR, the list of assigned organic peroxides in the UNMR was updated to include formulations of these materials authorized for transportation without prior approval. To maintain consistency with UNMR, PHMSA proposes to remove one entry and to add seven new entries and a note to the Organic Peroxide Table in Table 1 to paragraph (c). PHMSA also proposes to add an entry to the Organic Peroxide IBC Table in Table 3 to paragraph (e).

The subcommittee identified an inaccuracy in the entry for “[3R(3R,5aS,6S,8aS,9R,10R,12S,12aR)]-

⁴⁸ UNECE, *Alternative polyethylene foam for the safe transport of small amounts of energetic samples according to PP95 of packing instruction P520*, available at <https://unece.org/sites/default/files/2024-11/UN-SCETDG-65-INF23e.pdf> (Nov. 11, 2024).

Decahydro-10-methoxy-3,6,9-trimethyl-3,12-epoxy-12H-pyranol[4,3-j]-1,2-benzodioxepin,” which closely resembles the chemical name of artemether. Artemisinin is a natural compound extracted from the artemisia annua plant and is one of the most effective treatments for malaria. A range of derivatives, such as artemether, are produced from artemisinin and are also used in malaria treatment. These compounds, including their stereoisomers, share a similar molecular structure containing a single peroxide bridge and have the properties of organic peroxides. A review of available classification test results and approvals by competent authorities, including approval CA2006080015 (3rd Rev.) issued by PHMSA, supports the classification of this group as UN3106, with packaging method OP7. Consistent with the UNMR, in paragraph (c) Organic Peroxide Table, PHMSA proposes to replace the inaccurate entry with five common names for artemisinin and its derivatives as follows: “Arteether (including stereoisomers),” “Artemether (including stereoisomers),” “Artemisinin,” “Artesunate (including stereoisomers),” and Dihydroartemisinin (including stereoisomers).”

The two additional entries PHMSA proposes to add are a new entry for “tert-Amyl peroxy-pivalate” at a lower concentration than the currently listed value and a new organic peroxide “1,2,4,5,7,8-Hexoxonane, 3,6,9-Trimethyl-3,6,9-tris (ethyl and propyl) derivatives” with a new note 34, requiring available oxygen ≤7.3 percent.

For the change to the Organic Peroxide IBC Table in paragraph (e), PHMSA proposes to add a new entry for “tert-Butyl peroxy-2-ethylhexanoate, not more than 52 percent, in diluent type A” and identifying it as “UN3119, Organic peroxide, type F, liquid, temperature controlled.”

Section 173.230

Section 173.230 outlines the requirements for transporting fuel cell cartridges containing a hazardous material. Currently, paragraph (f)(4), applicable to air transportation, limits the maximum number of fuel cell cartridges in an intermediate packaging to the number required to power the equipment, plus two spares. PHMSA proposes to revise paragraph (f)(4) to clarify that this allowance permits two “sets” of spares, rather than only two individual spare cartridges. This revision accommodates equipment that requires multiple cartridges to function and is consistent with terminology used for spare sets elsewhere in the HMR

(e.g., 49 CFR 173.185(c)(4)(i)). For example, if a piece of equipment requires two fuel cell cartridges to operate, a single “set” of spares would be two cartridges. Under the proposed revision, the intermediate packaging would be permitted to contain a maximum of six cartridges in total: two required to power the equipment, plus four additional cartridges, representing two complete spare sets.

Section 173.232

Section 173.232 outlines the packaging requirements for articles containing hazardous materials of various hazard classes and divisions that are not otherwise specified by name in the HMR. These “articles” typically refer to machinery, apparatuses, or complex devices that contain hazardous materials as an integral, non-removable component necessary for their operation. This section applies when the hazardous materials within an article exceed the quantity limits authorized for “UN3363, Dangerous goods in machinery or apparatus.”

During development of this NPRM, PHMSA discovered that in a previous final rule, HM-215O, provisions for use of large packagings were inadvertently not included.⁴⁹ To correct this oversight and to align with international regulations and standards, PHMSA proposes to add authorized large packagings, except for air transportation, in new paragraph (f)(3). Expanding the packaging options for transportation of these articles will offer greater flexibility to shippers without compromising safety for modes other than air.

Paragraph (h) provides for additional requirements that apply to air transportation. These requirements allow articles to contain lithium cells or batteries. PHMSA proposes to revise paragraphs (h)(1) and (2) to include reference to sodium ion batteries.

Section 173.301b

Section 173.301b outlines additional general requirements when shipping gases in UN pressure receptacles (e.g., cylinders). Paragraph (a)(2) of this section requires that the gases or gas mixtures be compatible with the UN pressure receptacle and valve materials prescribed for metallic materials in ISO 11114-1:2020, *Gas cylinders—Compatibility of cylinder and valve materials with gas contents Part 1: Metallic materials*. PHMSA proposes to revise this paragraph to cite the updated edition of ISO 11114-1:2020/Amd 1:2023. PHMSA also proposes to revise

paragraph (c)(1) to add the phrase “or clause 5.4.2 of ISO 10297:2024.”

Section 173.306

Section 173.306 prescribes the general requirements and exceptions for limited quantities of compressed gases. Paragraph (e) provides exceptions from certain requirements for refrigerating machines. Consistent with the proposed revisions to add “heating machines” to the PSNs for UN2857 and UN3358 as discussed above in Section 172.101, PHMSA proposes to add “heating machines” in conjunction with references to “refrigerating machines” or otherwise generally refer to “machines” in the paragraph (e) provisions for refrigerating and heating machines.

Section 173.307

Section 173.307 provides exceptions from the regulations for compressed gases. Paragraph (a)(4) provides exceptions specific to refrigerating machines subject to certain criteria. Consistent with the proposed revisions to add “heating machines” to the PSNs for UN2857 and UN3358 as discussed above in Section 172.101, PHMSA proposes to add “heating machines” in conjunction with references to “refrigerating machines” to clarify that the exceptions also apply to heating machines such as heat pumps.

D. Part 175

Section 175.10

Section 175.10 specifies the conditions under which passengers, crew members, or air operators may carry hazardous materials aboard an aircraft.

PHMSA proposes minor editorial amendments in paragraph (a)(17) for the requirements for lithium ion batteries to be removed from wheelchairs or mobility aids by amending “battery” to “batteries” and aligning with text in the ICAO Technical Instructions requiring that a removed or spare battery be carried “in the cabin” instead of as “carry-on baggage.”

In addition, effective March 27, 2026, the ICAO Technical Instructions published Addendum No. 1 to the 2025–26 Edition of the Technical Instructions (Doc 9284) to provide conditions for the carriage of power banks by passengers or crew in carry-on baggage.⁵⁰ Currently, paragraph

⁵⁰ ICAO, *Report of the 30th meeting of the Dangerous Goods Panel*, Agenda Item 4.3, available at <https://www.icao.int/sites/default/files/DangerousGoods/DGP%20Meeting%20Documentation/DGP-30/Report/English/Final%20report.pdf>; <https://www.icao.int/news/>

⁴⁹ 85 FR 27810 (May 11, 2020).

(a)(18)(iv) requires that articles containing lithium metal or lithium ion cells or batteries with the primary purpose to provide power to another device be carried as spare batteries in accordance with the provisions of the paragraph. Consistent with Addendum No. 1 to the 2025–26 Edition of the ICAO Technical Instructions, PHMSA proposes to amend paragraph (a)(18)(iv) to limit the number of power banks (e.g., portable devices used to charge electronic devices such as cell phones or laptops) to no more than two per person. PHMSA also proposes that power banks cannot be recharged while aboard the aircraft. Further, consistent with the ICAO Technical Instructions, PHMSA proposes to recommend, but not require, that power banks should not be used to recharge a portable electronic device (e.g., watches, calculating machines, cameras, cellular phones, laptop and notebook computers, camcorders, medical devices, etc.) while aboard the aircraft. PHMSA is proposing to include this recommendation in the regulatory text to maintain consistency with ICAO.

Section 175.33

Section 175.33 establishes requirements for the notification of the pilot-in-command when hazardous materials are transported by aircraft. Consistent with a revision to the ICAO Technical Instructions, in paragraph (a)(13), PHMSA proposes to add reference to sodium ion batteries to the provisions that currently apply to lithium ion and metal batteries.

Section 175.78

Section 175.78 prescribes the stowage compatibility of hazardous materials offered for transportation by aircraft. Consistent with changes in the ICAO Technical Instructions, PHMSA proposes to revise paragraph (c)(4) (i.e., “Note 1”) to specify that explosives in Compatibility Group G must not be stowed with explosives in Compatibility Groups C, D, or E. Furthermore, PHMSA proposes that, when loaded into Unit Load Devices (ULDs), the explosives in Category G must be separated from ULDs containing explosives in Compatibility C, D, or E by other cargo at least two meters (6.5 feet). When not loaded into ULDs, explosives in Compatibility Group G must be loaded into different, non-adjacent loading positions and separated by other cargo by at least two meters (6.5 feet). This change is the result of a discrepancy between the ICAO Technical

Instructions and the Supplement to the Technical Instructions identifying explosives separation (i.e., Table 7–2 in the Technical Instructions and S–7–1 in the Supplement). Before the revision, the ICAO Technical Instructions specified that explosives of Compatibility Groups C, D and E could be loaded with Compatibility Group G, while the Supplement required separation. The Dangerous Goods Panel agreed that they should be separated. This revision is also consistent with the criteria for separation of explosives provided in 7.1.3.1 of the UN Model Regulations.

E. Part 176

Section 176.708

Section 176.708 prescribes minimum separation distances between radioactive materials and spaces regularly occupied by crew members or passengers, or between radioactive materials and undeveloped photographic film, while aboard vessels. Paragraph (d) currently provides two methods for determining separation distances from crew members and passengers using either a table provided in this section of the HMR or, for shipments under exclusive use conditions, using dose rate ranges. PHMSA proposes to allow the use of the IMDG Code segregation distances provided in their Table 7.1.4.5.18, which would authorize a third alternative for determining segregation distances between radioactive materials and crew members and passengers. Shipments made in accordance with the IMDG Code already have this option under 49 CFR 171.25(b)(2). PHMSA believes allowing the IMDG Code provisions for domestic shipments will provide shippers and carriers additional flexibility in determining appropriate segregation distances while not compromising safety to crew members and passengers.

Section 176.905

Section 176.905 prescribes transportation requirements and exceptions for vessel transportation of motor vehicles (“vehicle”). PHMSA proposes to replace the existing text of 49 CFR 176.905 to adopt updated transport provisions and exceptions for vessel shipments of these vehicles consistent with changes made in the IMDG Code. In response to multiple roll-on/roll-off vessel (“Ro-Ro vessel”) fire incidents resulting in crew member deaths and injuries and hundreds of millions of dollars in loss to cargo and vessels, the International Maritime Organization Sub-Committee on

Carriage of Cargoes and Containers established a correspondence group to review existing international transport standards and safety of transport of motor vehicles and to make recommendations for changes to prevent future incidents or mitigate impacts. The resulting recommendations were adopted in the IMDG Code and, in this NPRM, PHMSA proposes to adopt these amendments in the HMR.

Specifically, PHMSA proposes a new paragraph (a) that requires the shipper(s) of all vehicles offered for transport by vessel, except for those driven on board Ro-Ro passenger vessels under their own power by a passenger, to assess the safety condition of the vehicle prior to offering it for transport. If a vehicle has or shows signs of damage to electrical equipment (e.g., batteries) or to supplemental restraint systems (e.g., airbags or seatbelt pretensioners) or has been impacted by extreme weather or natural events (e.g., flooding, wildfire), the vehicle may not be offered for transport unless corrective action can be implemented to address the identified hazard from damage prior to offering for transportation. Similar inspection criteria prior to loading a vessel are in 49 CFR 176.905(a)(1). These conditions do not apply to vehicles offered under the exceptions in 49 CFR 176.905(i), which includes all vehicles offered for transport on Ro-Ro vessels (and, thus, most vehicle vessel shipments).

PHMSA believes an increased assessment prior to offering a vehicle for transport and clearly outlining conditions under which a vehicle is not allowed to be transported will help prevent future incidents by ensuring unsafe vehicles (for transport) are not offered for vessel transportation. In response to a fire aboard the Ro-Ro vessel, Höegh Xiamen, the National Transportation Safety Board (NTSB) issued safety recommendation M–21–014 to PHMSA to remove the exceptions in 49 CFR 176.905(i) for used and damaged flammable liquid-powered vehicles transported by Ro-Ro vessels.⁵¹ PHMSA believes this proposed change addresses the intent of the NTSB safety recommendation. The primary factor and negative safety impact NTSB identified is the waiving of the inspection of vehicles under 49 CFR 176.905(i) and its associated mitigation of hazards prior to transport.

Proposed paragraph (b) contains transport requirements for vehicles that

⁵¹ National Transportation Safety Board (NTSB), Safety Recommendation M–21–014, available at: <https://data.ntsb.gov/carol-main-public/sr-details/M-21-014> (Dec. 16, 2021).

meet the assessment criteria of paragraph (a) to qualify for exceptions from the HMR if certain conditions are met related to the motive power source and quantity of fuel, if applicable. These provisions are largely consistent with existing exceptions found in 49 CFR 176.905(i). A clarification is proposed in paragraph (b)(3)(vii) to indicate that lithium battery-powered vehicles are not eligible for the exceptions provided by paragraph (b).

Proposed paragraph (c) contains requirements for vehicles that are not prohibited by paragraph (a) yet are not eligible for the exceptions in paragraph (b). These provisions are largely consistent with existing requirements found in 49 CFR 176.905(a) with an additional reference to the requirement to mark and to label packaged vehicles consistent with the proposed requirement in § 173.220(h). In addition, PHMSA proposes to require shipments of vehicles in closed CTUs to be placarded on each side and each end, regardless of whether the vehicle is packaged or unpackaged.

PHMSA believes this change increases awareness of the presence of vehicles—both packaged and unpackaged—when enclosed in CTUs. It also increases awareness of hazardous materials in the transport chain. Additional placarding requirements would only apply to vehicles that were ineligible for the exceptions found in the remainder of the section. Moreover, it would primarily apply to vehicles powered by lithium ion or sodium ion batteries (or hybrid batteries) as well as vehicles with internal combustion engines containing more fuel than is currently allowed by the exception. Furthermore, the hazardous materials (hazmat) endorsement on a Commercial Driver's License (CDL) requirements addressed in 49 CFR part 383 and defined in 49 CFR 383.5 apply to a material that has been designated as hazardous under 49 U.S.C. 5103 and is required to be placarded under subpart F of 49 CFR part 172; or any quantity of a material listed as a select agent or toxin in 42 CFR part 73. Since the proposed requirement to placard CTUs is in 49 CFR part 176, it would not necessitate the driver of a commercial vehicle to obtain a hazmat endorsement on his or her CDL.

In addition, PHMSA proposes to move the existing 49 CFR 176.905(b)–(h) provisions related to vessel operational controls into paragraph (c)(7)–(13). This proposal is consistent with existing HMR requirements for shipments of vehicles that are not excepted from the rest of the subchapter in paragraph. PHMSA notes these additional

operational conditions would only apply to vehicles offered in accordance with paragraph (c). PHMSA believes not applying these provisions to all vehicles, consistent with existing requirements, is warranted as those vehicles offered in accordance with the exceptions found in proposed paragraph (b) are either in designated and otherwise approved vehicle spaces or have mitigating factors such as no fuel or fuel with a high flashpoint.

F. Part 178

Section 178.71

Section 178.71 prescribes specifications for UN pressure receptacles. First, PHMSA proposes to amend paragraph (d)(2) to incorporate by reference clause 5.4.2 of ISO 10297:2024(E) and the updated edition of ISO 14246:2022(E) for cylinder valves. Adding clause 5.4.2 of ISO 10297:2024(E) would authorize an alternative to the 2014 edition that is currently referenced, providing manufacturers with the flexibility to use the updated impact testing standards for valve protection without invalidating existing designs. The incorporation of ISO 14246:2022(E) includes updated requirements for oxidizing gases and a revised test pressure for acetylene valves.

Specifically, PHMSA proposes to add language to paragraph (d)(2) to state “or clause 5.4.2 of ISO 10297:2024(E) (*Gas cylinders—Refillable gas cylinder valves—Specification and type testing*)” and to reference ISO 14246:2022(E), (*Gas cylinders—Cylinder valves—Manufacturing tests and examinations*).

Paragraph (o) addresses material compatibility for UN pressure receptacles. PHMSA proposes to amend paragraph (o)(1) to update the reference to ISO standard 11114–1, (*Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials*) to reference the 2020 edition with the 2023 amendment (i.e., ISO 11114–1:2020/ Amd 1:2023) for material compatibility requirements.

Finally, paragraph (t) contains the marking requirements for UN non-refillable pressure receptacles. PHMSA proposes to add paragraph (t)(5) stating that non-refillable UN pressure receptacles of seamless construction with a diameter of less than or equal to 40 mm may also be permanently marked (e.g., stenciled, stamped, engraved or etched) on the side walls, provided no harmful stress concentration is created and the minimum cylindrical shell wall thickness is maintained. The marking must be at least 1.5 mm and the UN

pressure receptacle must be at least three mm. Further, the minimum size of the “DO NOT REFILL” mark would be revised to three mm.

Section 178.277

Section 178.277 outlines the requirements for the design, construction, inspection, and testing of portable tanks intended for the transportation of refrigerated liquefied gases. Paragraph (d)(1) requires that each filling and discharge opening in portable tanks used for the transport of flammable refrigerated liquefied gases must be fitted with at least three mutually independent shutoff devices in series, with the first being a stop-valve situated as close as reasonably practicable to the jacket. This stop-valve must be a self-closing device capable of being closed from an accessible position on the portable tank in the event of an incident. The UNMR were amended to clarify that the requirement for three shutoff devices also applies to the openings in the vapor phase of the tank. These openings are primarily used for pre-cooling the tanks and for pressure reduction (vapor recovery) during filling. Therefore, PHMSA proposes to revise paragraph (d)(1) to clarify that filling and discharge openings also include the openings in the vapor phase of the portable tank that are used for vapor recovery. In addition, portable tanks constructed after January 1, 2029, must be equipped with three independent shutoff devices on these vapor phase openings. However, portable tanks constructed before January 1, 2029, without these shutoff devices in the vapor space may continue to be used.

Section 178.703

Section 178.703 prescribes IBC marking requirements. PHMSA proposes editorial revisions for consistent use of units of measure and terminology for the stacking test so that mass (kg) is used on markings, while maintaining force/load (measured in newtons) for the stacking test procedure. The existing text mixes units of measure by referencing a “stacking test load” with its value in kilograms, which incorrectly equates a test force to a mass. Specifically, PHMSA proposes to revise the specification marking provision in 49 CFR 178.703(a)(1)(vii), and the example text in 49 CFR 178.703(a)(2)(iii), to replace “stacking test load” with “superimposed stacking test mass,” and the stacking symbol text in 49 CFR 178.703(b)(7)(iv) to replace “stacking test load” with “superimposed stacking mass.” For consistency with the UNMR, PHMSA is

also proposing an editorial amendment to revise the reference to the load imposed the design test to the calculation in the stacking test criteria of 49 CFR 178.815(c)(5). These proposed revisions are terminology and unit of measure clarification changes only and do not change the marking requirements on a package or the stacking test itself. See the corresponding clarification of the IBC test method in 49 CFR 178.815.

Section 178.815

Section 178.815 prescribes the stacking test requirements for IBCs. PHMSA proposes an editorial clarification in 49 CFR 178.815(c), *Calculation of superimposed test load*, to align with force and mass terminology in the UNMR. Paragraph (c)(5) currently states that “the load to be placed on the IBC” must be 1.8 times the combined maximum permissible gross mass of the number of similar IBCs that may be stacked on top of the IBC during transportation. PHMSA proposes to revise the text to “the mass placed on the IBC surface to create the superimposed test load” is 1.8 times the combined mass. The proposed text in 49 CFR 178.815(c) clarifies that a mass (kg) is used to generate the test force and eliminates language that could be interpreted as equating force and mass.

Section 178.910

Section 178.910 prescribes Large Packaging marking requirements. PHMSA proposes editorial revisions for consistent use of units of measure and terminology for the stacking test so that mass (kg) is used on markings while maintaining force/load (measured in newtons) for the stacking test procedure. The existing text mixes units of measure by referencing a “stacking test load” with its value in kilograms, which incorrectly equates a test force to a mass. Specifically, PHMSA proposes to revise 49 CFR 178.910(a)(1)(vii) and the example text in 49 CFR 178.910(a)(2)(i) and (iv) to replace “stacking test load” with “superimposed stacking test mass.”

During development of this NPRM, PHMSA identified that the instruction to mark above the stacking symbol with the maximum mass authorized for stacking on the Large Packaging was inadvertently omitted when this section was added in a previous final rule, HM-215L.⁵² To correct this oversight and to align with international standards, PHMSA proposes to revise 49 CFR 178.910(b) with the stacking symbol marking instruction and reference the

superimposed stacking mass as described above.

These proposed revisions are clarifications only and do not change the marking requirements on a package or the stacking test itself. See the corresponding clarification of the Large Packaging test method in 49 CFR 178.980.

Section 178.980

Section 178.980 prescribes the stacking test requirements for Large Packagings. PHMSA proposes an editorial clarification in 49 CFR 178.980(c), calculation of superimposed test load, to align with force and mass terminology in the UNMR. Paragraph (c)(5) currently states that “the load to be placed on the Large Packaging” must be 1.8 times the combined maximum permissible gross mass of the number of similar Large Packagings that may be stacked on top of the Large Packaging during transportation. PHMSA proposes to revise text to “the mass placed on the Large Packaging surface to create the superimposed test load” is 1.8 times the combined mass. The proposed text clarifies that a mass (kg) is used to generate the test force and eliminates language that could be interpreted as equating force and mass.

Section 178.1010

Section 178.1010 prescribes flexible bulk container marking requirements. PHMSA proposes editorial revisions for consistent use of units of measure and terminology for the stacking test so that mass (kg) is used on markings while maintaining force/load (measured in newtons) for the stacking test procedure. The existing text mixes units of measure by referencing a “stacking test load” with its value in kilograms, which incorrectly equates a test force to a mass. Specifically, PHMSA proposes to revise 49 CFR 178.1010(a)(1)(vii) and the example text in 49 CFR 178.1010(a)(2) to replace “stacking test load” with “superimposed stacking test mass.” In addition, PHMSA proposes to correct an error inadvertently included when this section was added in a previous final rule, HM-215L, by removing the second sentence in (a)(1)(vii) that states “For Flexible Bulk Containers not designed for stacking the figure “0” must be shown.” All flexible bulk containers are designed to be stacked and tested accordingly so marking an indication of “0” is inappropriate. These proposed revisions are terminology and unit of measure clarification changes only and do not change the marking requirements on a package or the stacking test itself.

G. Part 180

Section 180.207

Section 180.207 outlines the requirements for the requalification of UN pressure receptacles. Paragraph (d)(1) specifies the requirements for seamless steel cylinders. PHMSA proposes to replace the reference to ISO 6406:2005(E) with ISO 18119. This proposed revision also responds to a petition for rulemaking.⁵³ Paragraph (d)(2) specifies the requirements for seamless UN aluminum cylinders. PHMSA proposes to replace the reference to ISO 10461 with ISO 18119. This proposed revision also responds to a petition for rulemaking.⁵⁴ Paragraph (d)(4) specifies the requirements for composite UN cylinders. PHMSA proposes to add reference to ISO 11623:2023(E) and to allow for the continued use of ISO 11623:2015(E) until December 31, 2028. Paragraph (d)(6) specifies the requirements for valves for UN pressure receptacles. PHMSA proposes to revise paragraph (d)(6) to incorporate by reference ISO 22434:2022 and allow for the continued use of ISO 22434:2006 until December 31, 2028.

VI. Regulatory Analyses and Notices

A. Statutory/Legal Authority

This NPRM is published under the authority of Federal Hazardous Materials Transportation Law set forth in 49 U.S.C. ch. 51. Under 49 U.S.C. 5103(b), the Secretary of Transportation is authorized to prescribe regulations for the safe transportation, including security, of hazardous materials in intrastate, interstate, and foreign commerce. The Secretary is authorized under 49 U.S.C. 5120 to consult with interested international authorities to ensure that, to the extent it is safe and practicable, regulations governing the transportation of hazardous materials in commerce are consistent with the standards adopted by international authorities. The Secretary has delegated the authority granted in the Federal Hazardous Materials Transportation Law to the PHMSA Administrator at 49 CFR 1.97(b).

B. Executive Order 12866 and Regulatory Planning and Review

Executive Order (E.O.) 12866 (*Regulatory Planning and Review*), as implemented by 49 CFR part 5, subpart

⁵³ *FIBA* (P-1752), PHMSA-2020-0168, available at: <https://www.regulations.gov/docket/PHMSA-2020-0168>.

⁵⁴ *Hazmat Safety Consultants*, (P-1776), PHMSA-2023-0088 available at: <https://www.regulations.gov/docket/PHMSA-2023-0088>.

⁵² 78 FR 988 (Jan. 7, 2013).

B, requires agencies to regulate in the “most cost-effective manner,” to make a “reasoned determination that the benefits of the intended regulation justify its costs,” and to develop regulations that “impose the least burden on society.”⁵⁵ In arriving at those conclusions, E.O. 12866 requires that agencies should consider “both quantifiable measures . . . and qualitative measures of costs and benefits that are difficult to quantify” and “maximize net benefits . . . unless a statute requires another regulatory approach.” E.O. 12866 also requires that “agencies should assess all costs and benefits of available regulatory alternatives, including the alternative of not regulating.” Per 49 CFR part 5, subpart B PHMSA and other Operating Administrations must generally choose the “least costly regulatory alternative that achieves the relevant objectives” unless required by law or compelling safety need. In addition, 49 CFR part 5, subpart B specifies that regulations should generally “not be issued unless their benefits are expected to exceed their costs.” PHMSA has complied with the requirements in E.O. 12866 as implemented by 49 CFR part 5, subpart B. Accordingly, PHMSA has preliminarily determined that the amendments proposed in this NPRM will result in cost savings by reducing regulatory burdens and regulatory uncertainty.

E.O. 12866 (*Regulatory Planning and Review*) and 49 CFR part 5, subpart B also require that PHMSA submit “significant regulatory actions” to the Office of Management and Budget (OMB) for review.⁵⁶ This rulemaking is not considered a significant regulatory action under Section 3(f) of E.O. 12866 and, therefore, was not formally reviewed by OMB.

C. Executive Orders 14192 and 14219

This rulemaking is expected to be an E.O. 14192 (*Unleashing Prosperity Through Deregulation*) deregulatory action.⁵⁷ The proposed rule would have net annualized cost savings of approximately \$56,000 using a three percent discount rate and \$49,000 using a seven percent discount rate. Details on the costs, cost savings, and benefits of this rulemaking can be found in the PRIA, which is available in the public docket.

D. Energy-Related Executive Orders 13211, 14154, and 14156

The President has declared in E.O. 14156 (*Declaring a National Energy Emergency*) a national emergency to address U.S. inadequate energy development production, transportation, refining, and generation capacity.⁵⁸ Similarly, E.O. 14154 (*Unleashing American Energy*) asserts a Federal policy to unleash American energy by ensuring access to abundant supplies of reliable, affordable energy from (inter alia) the removal of “undue burden[s]” on the identification, development, or use of domestic energy resources.⁵⁹ PHMSA preliminarily finds this NPRM is consistent with both E.O. 14156 and E.O. 14154.

This rulemaking is not a “significant” energy action under E.O. 13211 (*Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use*). It also is not a significant regulatory action under E.O. 12866 and is therefore not likely to have a significant adverse effect on the supply, distribution, or use of energy for purposes of the requirements of E.O. 14156 (*Declaring a National Energy Emergency*) and E.O. 14154 (*Unleashing American Energy*). In fact, as opposed to having an adverse effect on the domestic supply, distribution, or use of energy, this proposed rule may actually contribute to streamlining such transportation.

E. Executive Order 13132: Federalism

PHMSA analyzed this rulemaking in accordance with the principles and criteria contained in E.O. 13132 (*Federalism*) and the Presidential Memorandum (*Preemption*) published in the **Federal Register** on May 22, 2009. E.O. 13132 requires agencies to assure meaningful and timely input by State and local officials in the development of regulatory policies that may have “substantial direct effects on the States, on the relationship between the Federal Government and the States, or on the distribution of power and responsibilities among the various levels of government.”

The rulemaking may preempt State, local, and Tribal requirements but does not propose any regulation that has substantial direct effects on the States, the relationship between the Federal Government and the States, or the distribution of power and responsibilities among the various levels of government. The Federal Hazardous Materials Transportation Law contains a provision at 49 U.S.C.

5125(b) that expressly preempts State, local, and Tribal requirements on certain covered subjects, unless the non-Federal requirements are “substantively the same” as the Federal requirements, including the following:

- (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 would preempt State, local, and Tribal requirements not meeting the “substantively the same” standard. In this instance, the preemptive effect of the proposed rule is limited to the minimum level necessary to achieve the objectives of the hazardous materials transportation law under which the final rule is promulgated.

F. Regulatory Flexibility Act

This NPRM has been developed in accordance with E.O. 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.⁶⁰ This rulemaking 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 discussed at length in the PRIA found in the rulemaking docket, the amendments in this proposed rule should result in net cost savings that would ease the regulatory compliance burden for those

⁵⁵ 58 FR 51735 (Oct. 4, 1993); 91 FR 22431 (Apr. 27, 2026); see also DOT Order 2100.6B (*Policies and Procedures for Rulemakings*).

⁵⁶ 58 FR 51735 (Oct. 4, 1993).

⁵⁷ 90 FR 9065 (Jan. 31, 2025).

⁵⁸ 90 FR 8353 (Jan. 29, 2025).

⁵⁹ 90 FR 8353 (Jan. 29, 2025).

⁶⁰ DOT, *Rulemaking Requirements Related to Small Entities* (last updated May 18, 2012), available at: www.transportation.gov/regulations/rulemaking-requirements-concerning-small-entities.

and other entities engaged in domestic and international commerce, including transborder shipments within North America. In addition, the changes proposed in this NPRM would relieve U.S. companies, including small entities competing in foreign markets, from the burden of complying with a dual system of regulations. Therefore, PHMSA expects that these amendments will not, if adopted, have a significant economic impact on a substantial number of small entities. However, PHMSA solicits comments on the anticipated economic impacts to small entities.

G. Unfunded Mandates Reform Act of 1995 (UMRA)

This action does not contain an unfunded mandate of \$100 million (adjusted annually for inflation) or more (in 1995 dollars) and does not significantly or uniquely affect small governments. The action imposes no enforceable duty on any State, local or Tribal governments or the private sector.

H. National Environmental Policy Act

PHMSA has analyzed this proposed rule pursuant to the National Environmental Policy Act (NEPA; 42 U.S.C. 4321, *et seq.*) and has preliminarily determined it is categorically excluded under 23 CFR 771.117(c)(20), which applies to the promulgation of rules, regulations, and directives. Under Section 9 of DOT Order 5610.1D, PHMSA may apply a categorical exclusion (CE) established in another Operating Administration's procedures. PHMSA followed the requirements outlined in DOT Order 5610.1D to apply the Federal Highway Administration's CE to this proposed deregulatory action. PHMSA does not anticipate any adverse environmental impacts from this proposed rule, and PHMSA has determined no unusual circumstances are present under 23 CFR 771.117(b). PHMSA is soliciting comments on the environmental and safety impacts of the proposed rule. Following the public comment period, if determined appropriate, PHMSA will prepare a Categorical Exclusion Determination memo to be posted on PHMSA's website.⁶¹

I. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

PHMSA has analyzed this NPRM according to E.O. 13175 (*Consultation and Coordination with Indian Tribal*

Governments) and DOT Order 5301.1A (*Department of Transportation Tribal Consultation Policies and Procedures*).⁶² Because the NPRM does not significantly or uniquely affect the communities of the Indian Tribal governments or impose substantial direct compliance costs, the funding and consultation requirements of E.O. 13175 do not apply.

J. Privacy Act

In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to inform its rulemaking process. DOT posts these comments, without edits and including any personal information that the commenter includes in the system of records notice.⁶³

K. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (44 U.S.C. 3501, *et seq.*), no person is required to respond to an information collection unless it has been approved by OMB and displays a valid OMB control number. Pursuant to 44 U.S.C. 3506(c)(2)(B) and 5 CFR 1320.8(d), PHMSA must provide interested members of the public and affected agencies with an opportunity to comment on information collection and recordkeeping requests.

PHMSA has analyzed this NPRM in accordance with the Paperwork Reduction Act. *See* discussions on the OMB control numbers affected below:

2137–0018 “Inspection and Testing of Portable Tanks and Intermediate Bulk Containers”

PHMSA proposes to revise § 178.277(d)(1) to clarify that filling and discharge openings also include the openings in the vapor phase of the portable tank that are used for vapor recovery and that portable tanks constructed after January 1, 2029 must be constructed with three mutually independent shutoff devices on openings in the vapor phase. PHMSA expects that manufacturers would need to redesign portable tanks to include a third shutoff device and submit tank redesigns to a DAA for approval. Four domestic manufacturers will spend 43 hours each on tank redesigns in 2028, totaling 172 burden hours. Four DAAs will spend 4 hours per review, totaling 16 burden hours. In total, manufacturers and DAAs will spend 188 burden hours across eight total responses. The figures below reflect these one-time 2028 burdens annualized over OMB's standard three-year clearance period:

Manufacturers (Tank Redesigns & Submissions)

- Annual increase in number of respondents: 1.33
- Annual increase in number of responses: 1.33
- Annual increase in burden hours: 57.33 DAAs (Reviews & Approvals)
- Annual increase in number of respondents: 1.33
- Annual increase in number of responses: 1.33
- Annual increase in burden hours: 5.33

2137–0557: “Approvals for Hazardous Materials”

PHMSA anticipates this proposed rule would result in fewer explosives approvals submitted by shippers or manufacturers of small pyrotechnical devices used in lifesaving appliances and self-inflating protective equipment.

Annual decrease in number of respondents: 1

Annual decrease in number of responses: 1

Annual decrease in burden hours: 4.75

PHMSA requests comments on the information collection and recordkeeping burdens associated with developing, implementing, and maintaining the proposed requirements in this NPRM. Address written comments to the DOT Docket Operations Office identified in the **ADDRESSES** section of this rulemaking. PHMSA must receive comments regarding information collection burdens prior to the close of the comment period identified in the **DATES** section of this rulemaking. Requests for a copy of this information collection should be directed to Steven Andrews or Ryan Larson, 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.

L. Executive Order 13609 and International Trade Analysis

E.O. 13609 (*Promoting International Regulatory Cooperation*) requires that agencies 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 to compete internationally.⁶⁴ In meeting shared challenges involving health, safety,

⁶¹ PHMSA, *Implementing Procedures (NEPA)* (last accessed Feb. 11, 2026), available at: <https://www.phmsa.dot.gov/planning-and-analytics/environmental-analysis-and-compliance/implementing-procedures>.

⁶² 65 FR 67249 (Nov. 6, 2000).

⁶³ *See* DOT Privacy Program, available at: <https://www.transportation.gov/privacy> (Oct. 10, 2025).

⁶⁴ 77 FR 26413 (May 4, 2012).

labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

Similarly, the Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465) (as amended, the Trade Agreements Act), prohibits agencies from establishing any standards or engaging in related activities that create unnecessary obstacles to the foreign commerce of the United States. Pursuant to the Trade Agreements Act, the establishment of standards is not considered an unnecessary obstacle to the foreign commerce of the United States, as 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 are the basis for U.S. standards.

PHMSA participates in the establishment of international standards to protect the safety of the American public, and it has assessed the effects of the NPRM to ensure that it does not cause unnecessary obstacles to foreign trade. In fact, the proposed rule is expected to facilitate international trade by harmonizing U.S. and international requirements for the transportation of hazardous materials to reduce regulatory burdens and minimize delays arising from having to comply with divergent regulatory requirements. Accordingly, this rulemaking is consistent with E.O. 13609 and PHMSA's obligations under the Trade Agreements Act.

M. 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 preamble. See the Section-by-

Section Review in Section 171.7 for further details.

N. Cybersecurity and Executive Order 14028

E.O. 14028 (*Improving the Nation's Cybersecurity*) directs the Federal Government to improve its efforts to identify, deter, and respond to “persistent and increasingly sophisticated malicious cyber campaigns.”⁶⁵ PHMSA has considered the effects of the NPRM and has determined that its proposed regulatory amendments would not materially affect the cybersecurity risk profile for transportation of hazardous materials.

O. Severability

The purpose of this NPRM is to operate holistically in addressing different issues related to safety and environmental hazards associated with the transportation of hazardous materials. However, PHMSA recognizes that certain provisions focus on unique topics. Therefore, PHMSA finds that the various provisions of this proposed rule are severable and able to function independently if severed from each other. Thus, in the event a court were to invalidate one or more of this NPRM's unique provisions, the remaining provisions stand and continue in effect.

List of Subjects

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.

49 CFR Part 175

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

49 CFR Part 176

Cargo vessels, Hazardous materials transportation, Incorporation by reference, Maritime Carriers, 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, Incorporation by reference, Motor carriers, Motor vehicle safety, Packaging and containers, Reporting and recordkeeping requirements.

In consideration of the foregoing, PHMSA proposes to amend 49 CFR Chapter I as follows:

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

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

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

■ 2. In § 171.7, revise paragraphs (t)(1), (v), (w), (bb)(1), and (dd) to read as follows:

§ 171.7 Reference material.

* * * * *

(t) * * *

(1) ICAO Doc 9284 Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions), 2027–2028 Edition, copyright 2026, into §§ 171.8; 171.22 through 171.24; 172.101; 172.202; 172.401; 172.407; 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.

(1) International Convention for the Safety of Life at Sea, 1974, Consolidated Edition (SOLAS), Chapter II–2, Construction—Fire protection, fire detection and fire extinction, Regulation 3, Definitions, 2024, into § 176.905.

(2) International Convention for the Safety of Life at Sea, 1974, Consolidated Edition (SOLAS), Chapter II–2, Construction—Fire protection, fire detection and fire extinction, Regulation 19, Carriage of dangerous goods, 2024, into §§ 176.63, 176.84.

⁶⁵ 86 FR 26633 (May 17, 2021).

(3) International Maritime Dangerous Goods Code (IMDG Code), Incorporating Amendment 43–26 (English Edition), 2026 Edition; 2026, into §§ 171.22; 171.23; 171.25; 172.101; 172.202; 172.203; 172.401; 172.407; 172.502; 172.519; 172.602; 173.21; 173.56; 176.2; 176.5; 176.11; 176.27; 176.30; 176.83; 176.84; 176.140; 176.720; 176.906; 178.3; 178.274.

(i) Volume 1, Incorporating Amendment 43–26 (Vol. 1).

(ii) Volume 2, Incorporating Amendment 43–26 (Vol. 2).

(w) *International Organization for Standardization*, Case Postale 56, CH–1211, Geneve 20, Switzerland, <http://www.iso.org>. Also available from: ANSI 25, West 43rd Street, New York, NY 10036, 1–212–642–4900, <http://www.ansi.org>.

(1) ISO 535–2023(E) Paper and board—Determination of water absorptiveness—Cobb method, 2014, Fourth edition, 2023–03, into §§ 178.707; 178.708; 178.516.

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

(3) ISO 1496–3:2019(E)—Series 1 freight containers—Specification and testing—Part 3: Tank containers for liquids, gases and pressurized dry bulk, Fifth edition, 2019–04, into §§ 178.74; 178.75; 178.274.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(22) ISO 4706:2023(E), Gas cylinders—Refillable welded steel cylinders—Test pressure 60 bar and below, Third edition, 2023–09, into § 178.71.

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

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

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

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

(27) ISO 7866:2012(E), Gas cylinders—Refillable seamless aluminium alloy gas cylinders—Design,

construction and testing, Second edition, 2012–09–01, into § 178.71.

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

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

(30) ISO 9809–1:1999(E): Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with a 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 1100 MPa., Second edition, 2010–04–15, into §§ 178.37; 178.71; 178.75.

(32) ISO 9809–1:2019(E), Gas cylinders—Design, construction and testing of refillable seamless steel gas cylinders and tubes—Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1100 MPa, Third edition, 2019–08; into §§ 178.37; 178.71; 178.75.

(33) 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.

(34) 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; into §§ 178.71; 178.75.

(35) ISO 9809–2:2019(E): Gas cylinders—Design, construction and testing of refillable seamless steel gas cylinders and tubes—Part 2: Quenched and tempered steel cylinders and tubes with tensile strength greater than or equal to 1100 MPa, Third edition, 2019–08; into §§ 178.71; 178.75.

(36) 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.

(37) 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; into §§ 178.71; 178.75.

(38) ISO 9809-3:2019(E), Gas cylinders—Design, construction and testing of refillable seamless steel gas cylinders and tubes—Part 3: Normalized steel cylinders and tubes, Third edition, 2019-08; into §§ 178.71; 178.75

(39) ISO 9809-4:2014(E), Gas cylinders—Refillable seamless steel gas cylinders—Design, construction, and testing—Part 4: Stainless steel cylinders with an R_m value of less than 1100 MPa, First edition, 2014-07; into §§ 178.71; 178.75.

(40) ISO 9809-4:2021(E), Gas cylinders—Design, construction and testing of refillable seamless steel gas cylinders and tubes—Part 4: Stainless steel cylinders with an R_m value of less than 1100 MPa, Second edition, 2021-11; into §§ 178.71; 178.75.

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

(42) ISO 10156:2017(E), Gas cylinders—Gases and gas mixtures—Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets, Fourth edition, 2017-07; into § 173.115.

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

(44) ISO 10297:2006(E), Transportable gas cylinders—Cylinder valves—Specification and type testing, Second edition, 2006-01; into §§ 173.301b; 178.71.

(45) ISO 10297:2014(E), Gas cylinders—Cylinder valves—Specification and type testing, Third edition, 2014-07; into §§ 173.301b; 178.71.

(46) ISO 10297:2014/Amd 1:2017(E), Gas cylinders—Cylinder valves—Specification and type testing—Amendment 1: Pressure drums and tubes, Third edition, 2017-03; into §§ 173.301b; 178.71.

(47) ISO 10297:2024(E), Gas cylinders—Cylinder valves—Specification and type testing, Fourth edition, 2024-04; into §§ 173.301b; 178.71.

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

(49) ISO 10462:2013(E), Gas cylinders—Acetylene cylinders—Periodic inspection and maintenance, Third edition, 2013-12; into § 180.207.

(50) ISO 10462:2013/Amd 1:2019(E), Gas cylinders—Acetylene cylinders—Periodic inspection and maintenance—

Third edition, 2013-12, Amendment 1, 2019-06; into § 180.207.

(51) 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; into §§ 173.40; 173.302c.

(52) ISO 11114-1:2020/Amd 1:2023 (E), Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials, Third edition, 2020-05, Amendment 1, 2023-07; into §§ 172.102; 173.301b; 178.71.

(53) ISO 11114-2:2021(E), Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials, Third edition, 2021-10; into §§ 173.301b; 178.71.

(54) 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.

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

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

(57) ISO 11117:2019(E), “Gas cylinders—Valve protection caps and guards—Design, construction and tests, 2019-11; into § 173.301b.

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

(59) ISO 11118:2015(E), Gas cylinders—Non-refillable metallic gas cylinders—Specification and test methods, Second edition, 2015-09; into §§ 173.301b; 178.71.

(60) ISO 11118:2015/Amd 1:2019(E), Gas cylinders—Non-refillable metallic gas cylinders—Specification and test methods—Second edition, 2015-09-15—Amendment 1, Second Edition, 2019-10; into §§ 173.301b; 178.71.

(61) 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.

(62) ISO 11119-1:2012(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction, and testing—Part 1: Hoop wrapped fibre reinforced composite gas

cylinders and tubes up to 450 L, Second edition, 2012-08; into §§ 178.71; 178.75.

(63) ISO 11119-1:2020(E), Gas cylinders—Design, construction and testing of refillable composite gas cylinders and tubes Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l, Third edition, 2020-05; into §§ 178.71; 178.75.

(64) 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.

(65) ISO 11119-2:2012(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction, and testing—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners, Second edition, 2012-07; into §§ 178.71; 178.75.

(66) ISO 11119-2:2012/ Amd.1:2014(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners, Amendment 1, 2014-08; into §§ 178.71; 178.75.

(67) ISO 11119-2:2020(E), Gas cylinders—Design, construction and testing of refillable composite gas cylinders and tubes—Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners, Third edition, 2020-11; into §§ 178.71; 178.75.

(68) 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.

(69) ISO 11119-3:2013(E), Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners, Second edition, 2013-04; into §§ 178.71; 178.75.

(70) ISO 11119-3:2020(E), Gas cylinders—Design, construction and testing of refillable composite gas cylinders and tubes—Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with non-load-sharing metallic or non-metallic liners or without liners, Third edition, 2020-11; into §§ 178.71; 178.75.

(71) ISO 11119-4:2016(E), Gas cylinders—Refillable composite gas cylinders—Design, construction, and

testing—Part 4: Fully wrapped fibre reinforced composite gas cylinders up to 150 l with load-sharing welded metallic liners, First edition, 2016–02; into §§ 178.71; 178.75.

(72) ISO 11120(E), Gas cylinders—Refillable seamless steel tubes for compressed gas transport, of water capacity between 150 l and 3000 l—Design, construction, and testing, First edition, 1999–03; into §§ 178.71; 178.75.

(73) ISO 11120:2015(E), Gas cylinders—Refillable seamless steel tubes of water capacity between 150 l and 3000 l—Design, construction, and testing, Second edition, 2015–02; into §§ 178.71; 178.75.

(74) 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; into §§ 173.302c; 178.71; 180.207.

(75) ISO 11513:2019(E), Gas cylinders—Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene)—Design, construction, testing, use and periodic inspection, Second edition, 2019–09; into §§ 173.302c; 178.71; 180.207.

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

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

(78) ISO 11623(E), Transportable gas cylinders—Periodic inspection and testing of composite gas cylinders, Second edition, 2015–12; into § 180.207.

(79) ISO 11623(E), Gas cylinders—Composite cylinders and tubes—Periodic inspection and testing, Third edition, 2023–07; into § 180.207.

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

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

(82) ISO 14246:2014(E), Gas cylinders—Cylinder valves—Manufacturing tests and examinations, Second Edition, 2014–06; into § 178.71.

(83) ISO 14246:2014/Amd 1:2017(E), Gas cylinders—Cylinder valves—Manufacturing tests and examinations—Amendment 1, Second edition, 2017–06; into § 178.71.

(84) ISO 14246:2022(E), Gas cylinders—Cylinder valves—

Manufacturing tests and examinations, Third edition, 2022–02; into § 178.71.

(85) ISO 15105–1:2007(E), Plastics—Film and sheeting—Determination of gas-transmission rate Part 1: Differential-pressure methods, Second edition, 2007–10; into § 172.102.

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

(87) ISO 16111:2018(E), Transportable gas storage devices—Hydrogen absorbed in reversible metal hydride, Second edition, 2018–08; into §§ 173.301b; 173.311; 178.71.

(88) ISO 16148:2016(E), Gas cylinders—Refillable seamless steel gas cylinders and tubes—Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing, Second edition, 2016–04; into § 180.207.

(89) ISO 16148:2016/Amd 1:2020(E), Gas cylinders—Refillable seamless steel gas cylinders and tubes—Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing—Amendment 1, Second Edition, 2020–06; into § 180.207.

(90) ISO 17871:2015(E), Gas cylinders—Quick-release cylinder valves—Specification and type testing, First edition, 2015–08; into § 173.301b.

(91) ISO 17871:2020(E), Gas cylinders—Quick-release cylinder valves—Specification and type testing, Second edition, 2020–07; into § 173.301b.

(92) ISO 17879: 2017(E), Gas cylinders—Self-closing cylinder valves—Specification and type testing, First edition, 2017–07; into §§ 173.301b; 178.71.

(93) ISO 18119:2018/Amd 1:2021/Amd 2: 2024, Gas cylinders—Seamless steel and seamless aluminum-alloy gas cylinders and tubes—Periodic inspection and testing, First Edition, 2018–05, Amendment 2, 2024–06; into § 180.207.

(94) 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.

(95) ISO 20475:2018(E), Gas cylinders—Cylinder bundles—Periodic inspection and testing, First edition, 2018–02; into § 180.207.

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

(97) ISO 21172–1:2015(E), Gas cylinders—Welded steel pressure drums

up to 3,000 litres capacity for the transport of gases—Design and construction—Part 1: Capacities up to 1000 litres, First edition, 2015–04, into § 178.71.

(98) ISO 21172–1:2015/Amd 1:2018(E), Gas cylinders—Welded steel pressure drums up to 3000 litres capacity for the transport of gases—Design and construction—Part 1: Capacities up to 1000 litres—First Edition, 2015–04, Amendment 1, 2018–11; into § 178.71.

(99) ISO 22434:2006(E), Transportable gas cylinders—Inspection and maintenance of cylinder valves, First edition, 2006–09; into § 180.207.

(100) ISO 22434:2022(E), Gas cylinders—Inspection and maintenance of valves, Second edition, 2022–03; into § 180.207.

(101) ISO 23088:2020(E), Gas cylinders—Periodic inspection and testing of welded steel pressure drums—Capacities up to 1000 l, First edition, 2020–02; into § 180.207.

(102) ISO 23826:2021(E), Gas cylinders—Ball valves—Specification and testing, First edition, 2021–10, into §§ 173.301b and 178.71.

(103) ISO/TR 11364:2012(E), Gas cylinders—Compilation of national and international valve system/gas cylinder neck threads and their identification and marking system, First edition, 2012–12; into § 178.71.

* * * * *

(bb) * * *

(1) Transportation of Dangerous Goods Regulations (Transport Canada TDG Regulations), SOR 2001–286, as last amended on October 25, 2024, into §§ 107.801; 107.805; 171.12; 171.22; 171.23; 172.401; 172.407; 172.502; 172.519; 172.602; 173.31; 173.32; 173.33; 173.301; 180.205; 180.211; 180.212; 180.413.

* * * * *

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

(1) UN Recommendations on the Transport of Dangerous Goods, Model Regulations (UN Recommendations), 24th revised edition, Volumes I and II, ST/SG/AC.10/1/Rev.24, (2024), into §§ 171.8; 171.12; 172.202; 172.401; 172.407; 172.502; 172.519; 173.22; 173.24; 173.24b; 173.40; 173.56; 173.192; 173.302b; 173.304b; 178.75; 178.274 as follows:

(i) Volume I, ST/SG/AC.10.1/21/Rev.24 (Vol. I).

(ii) Volume II, ST/SG/AC.10.1/21/Rev.24 (Vol. II).

(2) Manual of Tests and Criteria Eighth revised edition, Amendment 1

(2025), 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; 173.169; 173.185; 173.220; 173.221; 173.224; 173.225; 173.232; Part 173, appendix H; 175.10; 176.905; 178.274.

(3) Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Eleventh revised edition, ST/SG/AC.10/30/Rev.11 (2025), into § 172.401.

(4) ADR 2025—Agreement concerning the International Carriage of Dangerous Goods by Road, copyright 2024; into §§ 171.8; 171.23 as follows:

(i) Volume I, ECE/TRANS/352/Vol.1 (Vol. I).

(ii) Volume II, ECE/TRANS/352/Vol.2 (Vol. II).

(5) UN/SCETDG/55/INF.27, United Nations Recommendations on Test Series 8: Applicability of Test Series 8(d), June 14, 2019; into § 172.102(c)(1), Special Provision 148.

* * * * *

■ 3. In § 171.8, revise the definitions of “Large packaging,” “Large salvage packaging,” and “Single packaging” to read as follows:

§ 171.8 Definitions and abbreviations.

* * * * *

Large packaging means a packaging that—

(1) Consists of an outer packaging that contains articles or inner packagings;

(2) Is designated for mechanical handling;

(3) Exceeds a net mass of 400 kg (882 pounds) or a capacity of 450 liters (119 gallons);

(4) Has an internal volume of not more than 3 cubic meters (m³) (106 cubic feet) (*see* § 178.801(i) of this subchapter); and

(5) Conforms to the requirements for the construction, testing and marking of Large Packagings as specified in subparts P and Q of Part 178 of this subchapter.

* * * * *

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) Exceeds a net mass of 400 kg (882 pounds) or a capacity of 450 L (119 gallons) but has an internal volume of not more than 3 cubic meters (m³) (106 cubic feet).

* * * * *

Single packaging means a non-bulk packaging other than a combination packaging (*i.e.*, a packaging which does not require any inner packaging to perform its containment function during transport).

* * * * *

■ 4. In § 171.25, revise paragraph (c)(5) to read as follows:

§ 171.25 Additional requirements for the use of the IMDG Code.

* * * * *

(c) * * *

(5) No person may offer a UN fiber-reinforced plastic portable tank or service equipment meeting the provisions of Chapter 6.10 of the IMDG Code (IBR, *See* § 171.7), except for transportation falling within the single port area criteria in paragraph (d) of this section.

* * * * *

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

■ 5. 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.

■ 6. In § 172.101, revise the entries to the § 172.101 Hazardous Materials Table as follows:

§ 172.101 Purpose and use of the hazardous materials table.

* * * * *

§ 172.101 Hazardous Materials Table.

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification No.	PG	Label codes	Special provisions (§ 172.102)	(8)			(9)			(10)	
							Packaging (§ 173.***)			Quantity limitations (see §§ 173.27 and 175.75)			Vessel stowage	
							Excep-tions	Non-bulk	Bulk	Excep-tions	Pas-senger aircraft/ rail	Cargo aircraft only		Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	
[REMOVE].														
	Butyl acrylates, stabilized	*	3 UN2348	III	3	*	387, B1, IB3, T2, TP1.	203	242	*	60 L	220 L	C	25.
	Chlorophenols, liquid	*	*	III	6.1	*	IB3, T4, TP1	203	241	*	60 L	220 L	A.	
	Chlorophenols, solid	6.1 UN2020	UN2020	III	6.1		IB8, IP3, T1, TP1, TP33.	213	240		100 kg	200 kg	A.	
	Fluoroanilines	*	6.1 UN2941	III	6.1	*	IB3, T4, TP1	203	241	*	60 L	220 L	A.	
	Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal bat-teries.	*	9 UN3536		*	389				Forbid-den.	Forbid-den.	D	25, 40.	
	Refrigerating machines containing flammable, non-toxic, liquefied gas.	*	2.1 UN3358		2.1	*		306, 307	306	*	Forbid-den.	Forbid-den.	D	40.
	Refrigerating machines containing non-flammable, non-toxic gases, or ammonia solutions (UN2672).		2.2 UN2857		2.2	A53		306, 307	306, 307		450 kg	450 kg	A.	
	Vanadium pentoxide, non-fused form.	*	6.1 UN2862	III	6.1	*	IB8, IP3, T1, TP33	153	240	*	100 kg	200 kg	A	40.
	[ADD].	*	*		*	*		*	*	*	*	*		
	Butyl acrylates, stabilized	*	3 UN2348	II	3	*	387, IB2, T4, TP1 ..	202	242	*	5 L	60 L	C	25, 40.
				III	3		387, B1, IB3, T2, TP1.	203	242		60 L	220 L	C	25.
G	Chlorophenols, corrosive, solid, n.o.s.	*	8 UN3562	II	8	*	IB8, IP2, IP4, T3, TP33.	212	240	*	15 kg	50 kg	A.	
G	Chlorophenols, corrosive, toxic, solid, n.o.s..	8, 6.1 UN3561	UN3561	II	8, 6.1		IB8, IP2, IP4, T3, TP33.	212	240		15 kg	50 kg	B	40.
G	Chlorophenols, toxic, liquid, n.o.s.	6.1 UN2021	UN2021	III	6.1		IB3, T4, TP1	203	241		60 L	220 L	A.	
G	Chlorophenols, toxic, solid, n.o.s.	6.1 UN2020	UN2020	III	6.1		IB8, IP3, T1, TP1, TP33.	213	240		100 kg	200 kg	A.	
	2,4-Difluoroaniline. see Toxic, liq-uids, organic, n.o.s.	*	*		*	*		*	*	*	*	*		

[illegible]

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification No.	PG	Label codes	Special provisions (§ 172.102)	(8)			(9)		(10)			
							Packaging (§ 173.***)			Quantity limitations (see §§ 173.27 and 175.75)		Location	Vessel stowage		
							Excep- tions	Non-bulk	Bulk	Pas- senger aircraft/ rail only	Cargo aircraft only				
			*	II	8, 6.1	*	IB8, IP2, IP4, N34, T3, TP33.	*	154	212	240	15 kg	50 kg	A	25, 40, 52, 53, 58.
G	Articles containing flammable gas, n.o.s.	2.1	UN3537		2.1		180, 391	*	None	232	232	Forbid- den.	Forbid- den.	D.	
G	Articles containing miscellaneous dangerous goods, n.o.s.	9	UN3548		9		180, 391, A224		None	232	232	Forbid- den.	Forbid- den.	A.	
G	Articles containing non-flam- mable, non-toxic gas, n.o.s.	2.2	UN3538		2.2		391, 396, 411, A225.		None	232	232	Forbid- den.	Forbid- den.	A.	
	Battery-powered vehicle or Bat- tery-powered equipment.	9	UN3171		9		134, 180, 360	*	220	220	None	No limit	No limit	A.	
	Benzene sulfonyl chloride	8	UN2225	III	8		IB3, T4, TP1	*	154	203	241	5 L	60 L	A	40, 53, 58.
	Bromobenzene	3	UN2514	III	3		B1, IB3, T2, TP2	*	150	203	242	60 L	220 L	A.	
	Bromoform	6.1	UN2515	III	6.1		IB3, T4, TP2	*	153	203	241	60 L	220 L	A	12, 25, 40.
	5-tert-Butyl-2,4,6-trinitro-m-xylene or Musk xylene.	4.1	UN2956	III	4.1		159	*	None	223	None	Forbid- den.	Forbid- den.	D	12, 25, 40, 127.
	Chlorobenzyl chlorides, liquid	6.1	UN2235	III	6.1		IB3, T4, TP2	*	153	203	241	60 L	220 L	A.	
	Chloronitrotoluenes, liquid	6.1	UN2433	III	6.1		IB3, T4, TP2	*	153	203	241	60 L	220 L	A	44, 89, 100, 141.
	1,5,9-Cyclododecatriene	6.1	UN2518	III	6.1		IB3, T4, TP2	*	153	203	241	60 L	220 L	A	40.
	Cupriethylenediamine solution	8	UN1761	II III	8, 6.1 8, 6.1		IB2, T7, TP2 IB3, T7, TP2, TP28	*	154 154	202 203	243 242	1 L 5 L	30 L 60 L	A A	52 52, 95.
	Cymenes	3	UN2046	III	3		B1, IB3, T2, TP2	*	150	203	242	60 L	220 L	A.	
	Dangerous goods in articles or Dangerous goods in machinery or Dangerous goods in appa- ratus.	9	UN3363		9		136, 180, A105	*	None	222	None	See A105	See A105	A.	
	1,2-Di-(dimethylamino)ethane	3	UN2372	II	3, 6.1, 8		IB2, T7, TP1, TP28	*	150	202	242	5 L	60 L	B.	

Dinitrophenol solutions	*	6.1	UN1599	.....	II	.....	6.1	*	IB2, T7, TP2	.....	153	*	202	.....	243	*	5 L	.....	60 L	.....	A	.....	36.
					III	.....	6.1	*	IB3, T4, TP2	.....	153	*	203	.....	241	*	60 L	.....	220 L	.....	A	.....	36.
Dipentene	*	3	UN2052	.....	III	.....	3	*	B1, IB3, T2, TP2	....	150	*	203	.....	242	*	60 L	.....	220 L	.....	A.		
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.	*	2.1	UN3529	.....	.....	.....	2.1	*	135, 180, A200	.....	220	*	220	.....	220	*	Forbidden.		No limit	..	E.		
Engine, internal combustion, flammable liquid powered or Engine, fuel cell, flammable liquid powered or Machinery, internal combustion, flammable liquid powered or Machinery, fuel cell, flammable liquid powered.	*	3	UN3528	.....	.....	.....	3	*	135, 180, A200	.....	220	*	220	.....	220	*	No limit	..	No limit	..	E	.....	149.
Engine, internal combustion or Machinery, internal combustion.	*	9	UN3530	.....	.....	.....	9	*	135, 180, A200	.....	220	*	220	.....	220	*	No limit	..	No limit	..	A.		
Environmentally hazardous substance, liquid, n.o.s.	*	9	UN3082	.....	III	.....	9	*	8, 146, 173, 335, 413, 441, IB3, T4, TP1, TP29.	.....	155	*	203	.....	241	*	No limit	..	No limit	..	A.		
Ethylene oxide and carbon dioxide mixture with more than 87% ethylene oxide.	*	2.3	UN3300	.....	.....	.....	2.3, 2.1, 8	*	4	.....	None	*	304	.....	314, 315	*	Forbidden.		Forbidden.		D	.....	40.
Ethylene oxide and carbon dioxide mixture with more than 9% but not more than 87% ethylene oxide.	*	2.1	UN1041	.....	.....	.....	2.1, 8	*	T50	.....	306	*	304	.....	314, 315	*	Forbidden.		25 kg	.....	B	.....	40.
Ethylene oxide or Ethylene oxide with nitrogen up to a total pressure of 1 MPa (10 bar) at 50 degrees C.	*	2.3	UN1040	.....	.....	.....	2.3, 2.1, 8	*	4, 342, T50, TP20	..	None	*	323	.....	323	*	Forbidden.		Forbidden.		D	.....	40.
Hexachlorobutadiene	*	6.1	UN2279	.....	III	.....	6.1	*	IB3, T4, TP2	.....	153	*	203	.....	241	*	60 L	.....	220 L	.....	A.		
Hydrazine, anhydrous	*	8	UN2029	.....	I	.....	8, 3, 6.1	*	74, 601, A7, A10, B7, B16, B53.	.....	None	*	201	.....	243	*	Forbidden.		2.5 L	.....	D	.....	40, 52, 125.
Hydrocarbon gas mixture, liquefied, n.o.s.	*	2.1	UN1965	.....	.....	.....	2.1	*	412, T50	.....	306	*	304	.....	314, 315	*	Forbidden.		150 kg	...	E	.....	40.
Lead perchlorate, solution	*	5.1	UN3408	.....	II	.....	5.1, 6.1	*	IB2, T4, TP2	.....	152	*	202	.....	243	*	1 L	.....	5 L	.....	A	.....	56, 58.
					III	.....	5.1, 6.1	*	IB2, T4, TP2	.....	152	*	203	.....	242	*	2.5 L	.....	30 L	.....	A	.....	56, 58.
Life-saving appliances, not self-inflating containing dangerous goods as equipment.	*	9	UN3072	.....	.....	.....	None	*	180, 182	.....	None	*	219	.....	None	*	No limit	..	No limit	..	A	.....	122.

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification No.	PG	Label codes	Special provisions (§ 172.102)	(8) Packaging (§ 173.24)			(9) Quantity limitations (see §§ 173.27 and 175.75)		(10) Vessel stowage		
							Excep-tions	Non-bulk	Bulk	Pas-senger aircraft/ rail	Cargo aircraft only	Location	Other	
	Life-saving appliances, self-inflating.	9	UN2990	.....	None	180, 338	.....	None	219	.....	None	122.		
	Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal bat-teries.	9	UN3536	.....	*	180, 389	.....	*			Forbid-den.	A.		
	Lithium ion batteries including lith-ium ion polymer batteries.	9	UN3480	.....	9	388, 410, 422, A54, A100.	185	185	185	.....	Forbid-den.	35 kg	A	156.
	Lithium ion batteries contained in equipment including lithium ion polymer batteries.	9	UN3481	.....	9	181, 360, 388, 410, 422, A54, A100.	185	185	185	.....	5 kg	35 kg	A	156.
	Lithium ion batteries packed with equipment including lithium ion polymer batteries.	9	UN3481	.....	9	181, 360, 388, 410, 422, A54, A100.	185	185	185	.....	5 kg	35 kg	A	156.
	Petroleum gases, liquefied or Liq-uefied petroleum gas.	2.1	UN1075	.....	2.1	T50, N95, 412	306	304	314, 315	.....	Forbid-den.	150 kg	E	40.
	Polychlorinated biphenyls, liquid ..	9	UN2315	.....	9	9, 81, 140, IB3, T4, TP2.	155	202	241	.....	100 L	220 L	A	95.
	Silane	2.1	UN2203	.....	2.1		None	302	None	.....	Forbid-den.	Forbid-den.	D	40, 57, 104.
	Sodium ion batteries with organic electrolyte.	9	UN3551	.....	9	400, 401, 410, 422, A54, A100.	185	185	185	.....	Forbid-den.	35 kg	A	156.
	Sodium ion batteries contained in equipment with organic electro-lyte.	9	UN3552	.....	9	181, 360, 400, 401, 410, 422, A54, A100.	185	185	185	.....	5 kg	35 kg	A	156.
	Sodium ion batteries packed with equipment with organic electro-lyte.	9	UN3552	.....	9	181, 360, 400, 401, 410, 422, A54, A100.	185	185	185	.....	5 kg	35 kg	A	156.
	Tetrabromoethane	6.1	UN2504	.....	6.1	IB3, T4, TP2	153	203	241	.....	60 L	220 L	A.	
	Tetrachloroethylene	6.1	UN1897	.....	6.1	IB3, N36, T4, TP2 ..	153	203	241	.....	60 L	220 L	A	40.
	Trichlorobenzenes, liquid	6.1	UN2321	.....	6.1	IB3, T4, TP2	153	203	241	.....	60 L	220 L	A.	

Vehicle, flammable liquid powered or Vehicle, fuel cell, flammable liquid powered.	*	9	UN3166	.....	.....	9	.....	.....	135, 180, A200	.....	220	.....	220	.....	220	.....	.....	No limit ..	*	No limit ..	A.
	*	9	UN3556	.....	.....	9	.....	.....	134, 135, 180, 360, A100.	.....	220	.....	220	.....	220	.....	None	No limit ..	*	No limit ..	A.
	*	9	UN3557	.....	.....	9	.....	.....	134, 135, 180, 360, A100.	.....	220	.....	220	.....	220	.....	None	No limit ..	*	No limit ..	A.
	*	9	UN3558	.....	.....	9	.....	.....	134, 135, 180, 360, A100.	.....	220	.....	220	.....	220	.....	None	No limit ..	*	No limit ..	A.
	*		*			*			*		*		*		*			*			

* * * * *

■ 7. In § 172.102:

- a. In paragraph (c)(1), revise special provisions 135, 136, 160, 196, 360, 379, and 388, 389, 401, and add new special provisions 75, 410, 411, 412, 413, and 601 in numerical order;
- b. In paragraph (c)(2), revise special provision A53 and add new special provision A239 in numerical order;
- c. Revise paragraph (c)(4) introductory text; and
- d. In paragraph (c)(8)(ii), add new special provision TP43 in numerical order.

The additions and revisions read as follows:

§ 172.102 Special provisions.

* * * * *

(c) * * *

(1) * * *

75 Refrigerating machines include air conditioning units and machines or other appliances which have been designed for the specific purpose of keeping food or other items at low temperature in an internal compartment. Heating machines include machines or other appliances which have been designed for the specific purpose of heating. Machines that are used to perform heating and cooling functions may be transported either under “Refrigerating machines” or “Heating machines.”

* * * * *

135 Internal combustion engines installed in a vehicle must be described using “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 described using “Vehicle, flammable gas powered.” This includes hybrid electric vehicles powered by both an internal combustion engine and wet, nickel-metal hydride, lithium metal, lithium ion, metallic sodium, sodium alloy, or sodium ion batteries installed. If a fuel cell engine is installed in a vehicle, the vehicle must be described using “Vehicle, fuel cell, flammable gas powered” or “Vehicle, fuel cell, flammable liquid powered,” as appropriate. This includes hybrid electric vehicles powered by a fuel cell, an internal combustion engine, and wet, nickel-metal hydride, lithium metal, lithium ion, metallic sodium, sodium alloy, or sodium ion batteries installed. Electric vehicles must be described as “Vehicle, lithium ion battery powered,” “Vehicle, lithium metal battery powered,” and “Vehicle, sodium ion battery powered” as appropriate, for vehicles powered solely by lithium ion, lithium metal or sodium

ion batteries transported with the batteries installed. Electric vehicles powered solely by hybrid batteries containing both lithium ion cells and sodium ion cells must be described as “Vehicle, lithium ion battery powered.” Further, 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-wheeled and four-wheeled vehicles or motorcycles, lawn tractors, self-propelled farming and construction equipment, boats, and aircraft. Lithium batteries or sodium ion batteries installed in a cargo transport unit, designed only to provide power external to the cargo transport unit must be described using the proper shipping name “Lithium ion batteries installed in cargo transport unit,” “Lithium metal batteries installed in cargo transport unit,” or “Sodium ion batteries installed in cargo transport unit,” as appropriate.

136 This entry applies only to articles, machinery, and apparatus containing hazardous materials as an integral element of the article, machinery, or apparatus. It may not be used to describe articles, machinery, or apparatus for which a proper shipping name exists in the § 172.101 Table. Except when approved by the Associate Administrator, these items may only contain hazardous materials for which exceptions are referenced in Column (8) of the § 172.101 Table and are provided in part 173, subparts D and G, of this subchapter. Such articles may contain lithium or sodium ion cells or batteries, provided that the cells or batteries: (1) provide electrical power for the operation of the article; and (2) meet the requirements of §§ 173.185(a) and (c) of this subchapter. Articles containing no other dangerous goods other than lithium cells or batteries or sodium ion cells or batteries shall be transported under “UN3091, Lithium metal batteries contained in equipment,” “UN3481, Lithium ion batteries contained in equipment,” or “UN3552, Sodium ion batteries contained in equipment,” as appropriate.

Hazardous materials shipped under this entry are excepted from the labeling requirements of this subchapter unless offered for transportation or transported by aircraft and are not subject to the placarding requirements of subpart F of this part. Orientation markings as described in § 172.312(a)(2) are required when liquid hazardous materials may escape due to incorrect orientation. The article, machinery, or apparatus, if unpackaged, or the packaging in which it is contained shall be marked

“Dangerous goods in articles” or “Dangerous goods in machinery” or “Dangerous goods in apparatus” as appropriate, with the identification number UN3363. For transportation by aircraft, articles, machinery, or apparatus, may not contain any material forbidden for transportation by passenger or cargo aircraft. The Associate Administrator may except from the requirements of this subchapter articles, machinery, and apparatus provided:

a. It is shown that it does not pose a significant risk in transportation;

b. The quantities of hazardous materials do not exceed those specified in § 173.4a of this subchapter; and

c. The equipment, and machinery or apparatus articles conforms with § 173.222 of this subchapter.

* * * * *

160 This entry applies to safety devices for vehicles, vessels, or aircraft, e.g., air bag inflators, air bag modules, seatbelt pretensioners, and pyromechanical devices containing Class 1 (explosive) materials or materials of other hazard classes. These articles must be tested in accordance with Test Series 6(c) of part I of the UN Manual of Tests and Criteria (IBR; See § 171.7 of this subchapter), with no explosion of the device, no fragmentation of device casing or pressure vessel, and no projection hazard or thermal effect that would significantly hinder firefighting or other emergency response efforts in the immediate vicinity. If the air bag inflator unit satisfactorily passes the series 6(c) test, it is not necessary to repeat the test on the air bag module. This entry does not apply to fire suppressant dispersing devices as described in § 173.169 (UN3559), nor to life-saving appliances described in § 173.219 (UN2990 and UN3072). However, this entry may be used for safety devices of Class 9 transported for installation in life-saving appliances in accordance with § 173.219.

* * * * *

180 Articles, vehicles, or equipment containing damaged, defective, or recalled lithium or sodium ion batteries must either be (1) transported without the battery, or (2) shipped under the article’s original classification while meeting the packaging and marking requirements of § 173.185(f). In addition, for vessel transport, damaged or safety-defective batteries in vehicles must be removed in accordance with § 176.905(a)(3).

* * * * *

196 The nitrocellulose must meet the criteria of the Bergmann-Junk test or

methyl violet paper test in the UN Manual of Tests and Criteria, Appendix 10 (IBR, *see* § 171.7 of this subchapter). Test of type 3(c) is not required for dry or unmodified nitrocellulose.

* * * * *

360 Vehicles powered only by lithium ion batteries, lithium metal batteries, or sodium ion batteries, must be described using one of the following identification numbers “UN3556, Vehicle, lithium ion battery powered,” “UN3557, Vehicle, lithium metal battery powered,” or “UN3558, Vehicle, sodium ion battery powered,” as appropriate, to describe the battery technology providing the motive power for the vehicle. Lithium batteries and sodium ion batteries installed in cargo transport units, designed only to provide power external to the transport unit, must be described using “UN3536, Lithium ion batteries installed in cargo transport unit,” “UN3563, Lithium metal batteries installed in cargo transport unit,” or “UN3564, Sodium ion batteries installed in cargo transport unit.” Hybrid batteries containing both lithium ion and sodium ion cells or batteries installed, designed only to provide power external to the transport unit, must be described using “UN3536, Lithium ion batteries installed in a cargo transport unit.”

* * * * *

379 * * *

d. * * *

(1) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114–1:2020(E) and ISO 11114–1:2020/Amd 1:2023(E) (IBR, *see* § 171.7 of this subchapter);

* * * * *

388 * * *

b. Lithium batteries conforming to paragraph a. of this special provision must be assigned to UN3090 or UN3091, as appropriate. When such batteries are transported in accordance with § 173.185(c), the total lithium content of all lithium metal cells contained in the battery must not exceed 1.5 g and the total watt-hour rating of all lithium ion cells contained in the battery must not exceed 10 Wh.

389 Entries assigned this special provision include those for lithium ion batteries, lithium metal batteries, sodium ion batteries, or hybrid batteries containing both lithium ion and sodium ion cells (see § 172.102, special provision 410) and requirements in this special provision apply to these battery types installed in a cargo transport unit which is designed only to provide power external to the cargo transport unit.

a. The batteries must meet the requirements of § 173.185(a) of this subchapter and contain the necessary systems to prevent overcharge and over discharge between the batteries.

b. The batteries must be securely attached to the interior structure of the cargo transport unit (*e.g.*, by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings, and vibrations normally incident to transport. Hazardous materials necessary for the safe and proper operation of the cargo transport unit (*e.g.*, fire extinguishing systems and air conditioning systems), must be properly secured to or installed in the cargo transport unit and are not otherwise subject to this subchapter.

c. Hazardous materials not necessary for the safe and proper operation of the cargo transport unit must not be transported within the cargo transport unit.

d. The batteries inside the cargo transport unit are not subject to marking or labelling requirements of Part 172 subparts D and E of this subchapter.

e. The cargo transport unit shall display the UN number in a manner in accordance with § 172.332 of this subchapter and be placarded on two opposing sides.

f. Where the cargo transport unit is designed with multiple battery chemistries for energy storage, the emergency response information, as required by subpart G of this part, must also identify the additional battery chemistry type contained in the cargo transport unit and provide information on immediate methods for handling fires if different from response measure for the primary battery type.

g. For transportation by aircraft, cargo transport units may only be offered for transportation and transported under conditions approved by the Associate Administrator.

* * * * *

401 Sodium ion cells and batteries with organic electrolyte shall be transported as UN3551 or UN3552, as appropriate. Sodium ion cells and batteries with aqueous alkali electrolyte shall be transported as “UN2795, Batteries, wet, filled with alkali, *electric storage*.” Batteries and cells containing metallic sodium or sodium alloy must be transported as “UN3292, Batteries, containing sodium metallic sodium or sodium alloy” or “UN3292, Cells, containing metallic sodium or sodium alloy,” as appropriate.

* * * * *

410 Hybrid batteries containing both lithium ion cells and sodium ion cells shall be described using one of the four following proper shipping names “UN3480, Lithium ion batteries,” “UN3481, Lithium ion batteries contained in equipment or Lithium ion batteries packed with equipment,” “UN3536, Lithium ion batteries, in cargo transport unit,” or “UN3556, Vehicle, lithium ion battery powered,” as appropriate. These shipments must be prepared and offered for transportation in accordance with the appropriate regulatory requirements. When such batteries are transported in accordance with § 173.185(c), the watt-hour rating must not exceed 100 Wh and shall be marked on the outside case. Hybrid batteries, containing both lithium ion cells and sodium ion cells must meet the following conditions:

a. The lithium ion cells and sodium ion cells are electrically connected;

b. The battery has been tested as a lithium ion battery; and

c. Each component lithium ion and sodium ion cell of the battery must be of a type proved to meet the respective testing requirements of the UN Manual of Tests and Criteria, part III, subsection 38.3 (IBR, *see* § 171.7 of this subchapter).

411 Articles transported under this entry include magnetic resonance imaging (MRI) scanners containing non-flammable, non-toxic gas. The non-flammable, non-toxic gas must be contained within MRI scanner components. The MRI scanners must be designed and constructed to contain the gas and preclude the risk of bursting or cracking the gas retaining components during normal conditions of transport. MRI scanners are not subject to the requirements of this subchapter when containing less than 12 kg of a Division 2.2 gas.

412 This entry may not contain more than 12 percent by mass of dimethyl ether.

413 Substances classified under this entry and used as liquid organic hydrogen carriers (LOHC) may only be transported under this entry when the content of physically dissolved hydrogen does not exceed 0.5 L (H₂)/kg (LOHC).

* * * * *

601 When a cylinder is used to transport this material, the internal pressure at 65 °C (149 °F) shall not exceed the test pressure.

* * * * *

(2) * * *

* * * * *

A53 Refrigerating and heating machines and their components are not

subject to the requirements of this subchapter when containing less than 12 kg (26.4 pounds) of a non-flammable gas or when containing 12 L (3 gallons) or less of ammonia solution (UN2672) (see § 173.307 of this subchapter).

* * * * *

A225 UN3538, Articles containing non-flammable, non-toxic gas, n.o.s. may be transported on passenger and cargo-only aircraft irrespective of the indication of “forbidden” in Columns (9A) and (9B) of the Hazardous Materials Table, provided the following conditions are met:

a. With the exception of lithium and sodium ion cells or batteries that comply with § 173.185(c), as applicable, the only dangerous good contained in the article is a Division 2.2 gas without a subsidiary hazard, but excluding refrigerated liquefied gases and gases forbidden for transport on passenger aircraft;

b. The articles are packed in accordance with § 173.232(h); and

c. Reference to Special Provision A225 is made on the shipping paper.

* * * * *

A239 The technical or chemical group names are not required to be indicated on a shipping paper or on the package if a national law or international convention prohibits its disclosure if it is a controlled substance.

* * * * *

(4) *IB Codes and IP Codes.* These provisions apply only to transportation in IBCs and Large Packagings. Table 1 authorizes IBCs for specific proper shipping names through the use of IB Codes assigned in the § 172.101 table of this subchapter. Table 2 defines IP Codes on the use of IBCs that are assigned to specific commodities in the § 172.101 Table of this subchapter. Table 3 authorizes Large Packagings for specific proper shipping names through the use of IB Codes assigned in the § 172.101 table of this subchapter. Large Packagings are authorized for the Packing Group III entries of specific proper shipping names when either special provision IB3 or IB8 is assigned to that entry in the § 172.101 Table. When no IB code is assigned for a specific proper shipping name in the § 172.101 Table, use of an IBC or Large Packaging for the material may be authorized when approved by the Associate Administrator. However, notwithstanding assignment of an IB code, the following Part 173 packaging sections assigned to certain proper shipping names authorize use of either IBCs or Large Packagings as specified within § 173.185; § 173.232; and § 173.225(e) Organic Peroxide Table for

Type F organic peroxides. The letter “Z” shown in the marking code for composite IBCs must be replaced with a capital code letter designation found in § 178.702(a)(2) of this subchapter to specify the material used for the other packaging. Tables 1, 2, and 3 follow:

* * * * *

(8) * * *

(ii) * * *

* * * * *

TP43 Portable tank instruction T1 may continue to be applied until December 31, 2028.

* * * * *

■ 8. In § 172.202, paragraph(a)(6)(iii) is revised as follows:

§ 172.202 Description of hazardous material on shipping papers.

(a) * * *

(6) * * *

(iii) For dangerous goods in apparatus, articles, or machinery, the individual total quantities or an estimate of the individual total quantities of dangerous goods in solid, liquid or gaseous state, contained in the article must be shown;

* * * * *

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

■ 9. 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.

■ 10. In § 173.2a, revise Note 2 as follows:

§ 173.2a Classification of a material having more than one hazard.

* * * * *

Note 2: A material which meets the definition of Class 8 and has an inhalation toxicity by dusts and mists which meets criteria for Packing Group I specified in § 173.133(a)(1) must be classed as Division 6.1 if the oral or dermal toxicity meet criteria for Packing Group I or II. If the oral and dermal toxicity meet criteria for Packing Group III or less, the material must be classed as Class 8.

* * * * *

■ 11. Revise § 173.14 to read as follows:

§ 173.14 Hazardous materials in devices in use or intended for use during transport.

(a) Except for transportation by aircraft, hazardous materials (e.g., lithium batteries, sodium ion batteries, or fuel cell cartridges) contained in devices, such as data loggers, sensors, and cargo tracking devices, attached to or placed in packages, overpacks, or freight containers, or other types of

cargo transport units are not subject to this subchapter other than the following:

(1) The device must be in use or intended for use during transportation;

(2) The hazardous materials (e.g., lithium batteries, sodium ion batteries, or fuel cell cartridges) must meet the applicable construction and test requirements specified in this subchapter;

(3) The device must be capable of withstanding the shocks and loadings normally encountered during transport and must be safe for use in the environments to which it may be exposed; and

(4) When offered for transport by vessel, the requirements in § 176.76(a)(9) of this subchapter apply.

(b) For transportation by aircraft, data loggers, sensors, and cargo tracking devices with installed lithium or sodium ion cells or batteries, attached to, or placed in packages, overpacks, or unit load devices are not subject to this subchapter provided the following conditions are met:

(1) The devices must be in use or intended for use during transport;

(2) Each cell or battery must meet the requirements of § 173.185(a) and applicable requirements of § 172.102, Special Provision 388 of this subchapter;

(3) For a lithium ion or sodium ion cell or battery, the Watt-hour rating may not exceed 20 Wh;

(4) For a lithium metal cell or battery, the lithium content may not exceed 1 g;

(5) The number of devices in use or used must be no more than the number required to operate for the specific consignment;

(6) The devices must be capable of withstanding the shocks and loadings normally encountered during transport;

(7) The devices must not be capable of generating a dangerous evolution of heat; and

(8) The devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.

(c) Notwithstanding paragraph (b), when transported by aircraft, data loggers, sensors and cargo tracking devices with installed lithium cells or batteries or sodium ion batteries, attached to, or placed in packages containing COVID-19 pharmaceuticals, are not subject to the marking and documentation requirements of §§ 173.185(c)(3) and (c)(4)(iv). This same package, when shipped without the COVID-19 pharmaceuticals for the purpose of use or reuse, is also not subject to the marking and

documentation requirements of §§ 173.185(c)(3) and (c)(4)(iv), as applicable, provided prior arrangements have been made with the operator.

(d) The exceptions provided by this section do not apply to hazardous materials shipped as cargo. Hazardous materials contained in devices as described in this section, when transported as a cargo, are subject to, and must be transported in accordance with, all applicable requirements of this subchapter.

* * * * *

■ 12. In § 173.32, revise paragraph (f)(5) to read as follows:

§ 173.32 Requirements for the use of portable tanks.

* * * * *

(f) * * *

(5) Except for a non-flowable solid or a liquid with a viscosity of 2,680 centistokes (millimeters squared per second) or greater at 20 °C (68 °F), an IM or UN portable tank, or compartment thereof, having a volume greater than 7,500 L (1,980 gallons) may not be loaded to a filling density of more than 20% and less than 80% by volume. This filling restriction does not apply if a portable tank is divided by partitions or surge plates into compartments of not

more than 7,500 L (1,980 gallons) capacity; this portable tank must not be offered for transportation in a filling condition liable to produce an unacceptable hydraulic force due to surge.

* * * * *

■ 13. In § 173.62, revise Table 2 to paragraph (c)(5) Packing Instruction 130, to read as follows:

§ 173.62 Specific packaging requirements for explosives.

* * * * *

(c) * * *

(5) * * *

TABLE 2 TO PARAGRAPH (c)(5)—TABLE OF PACKING METHODS

* Packaging instruction	* Inner packagings	* Intermediate packagings	* Outer packagings
130 Particular Packaging Requirements:	Not necessary	Not necessary	Boxes, Drums, Large Packagings
1. The following applies to UN 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0238, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0459, 0488, 0502 and 0510. Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems must be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices.			Steel (4A). Aluminum (4B). Other metal (4N). Wood natural, ordinary (4C1). Wood natural, sift-proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics expanded (4H1). Plastics, solid (4H2). Drums. Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2). Large Packagings. Steel (50A). Aluminum (50B). Metal other than steel or aluminum (50N). Rigid plastics (50H). Natural wood (50C). Plywood (50D). Reconstituted wood (50F). Rigid fiberboard (50G).
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.			
3. For UN0012 and UN0014, notwithstanding the requirements of § 173.60(b)(3) of this subpart, articles in metal packagings may be packed without internal cushioning, fittings, coating or liner.			

* * * * *

■ 14. In § 173.125, revise paragraph (c)(2)(ii) to read as follows:

§ 173.125 Class 4—Assignment of packing group.

* * * * *

(c) * * *

(2) * * *

(ii) Packing Group III, if—

(A) A positive test result is obtained in a test using a 100 mm sample cube

at 140 °C and a negative test result is obtained in a test using a 25 mm sample cube at 140 °C and the substance is transported in packagings with an internal volume of more than 3 cubic meters; or

(B) A positive test result is obtained in a test using a 100 mm sample cube at 120 °C and a negative result is obtained in a test using a 25 mm sample cube at 140 °C and the substance is

transported in packagings with an internal volume of more than 450 L; or

(C) A positive result is obtained in a test using a 100 mm sample cube at 100 °C and a negative result is obtained in a test using a 25 mm sample cube at 140 °C and the substance is transported in packagings with an internal volume of less than 450 L.

* * * * *

■ 15. In § 173.166, revise the introductory text to read as follows:

§ 173.166 Safety devices.

For the purpose of this section, safety devices are articles which contain pyrotechnic substances or hazardous materials of other classes and are used in vehicles, vessels, aircraft, or lifesaving appliances to enhance safety to persons. Examples are air bag inflators, air bag modules, seatbelt pretensioners, inflator components for self-inflating wearable safety equipment, and pyromechanical devices. Pyromechanical devices are assembled components for tasks such as but not limited to separation, locking, release-and-drive or occupant restraint. The term includes “Safety devices, pyrotechnic.”

* * * * *

■ 16. In § 173.185, revise paragraphs (c)(3) introductory text, (c)(3)(i), and (c)(3)(iv) to read as follows:

§ 173.185 Lithium cells and batteries and sodium ion cells and batteries.

* * * * *

(c) * * *

(3) *Battery mark.* Each package must display the battery mark except when a package contains only button cell batteries installed in equipment (including circuit boards), or for a consignment of no more than two packages, each package contains not more than four lithium cells or sodium ion cells or two lithium or sodium ion batteries contained in equipment. Installed button cell batteries do not count toward package or consignment limits.

(i) The mark must indicate the UN number: “UN3090” for lithium metal cells or batteries; “UN3480” for lithium ion cells or batteries; or “UN3551” for sodium ion cells or batteries. If the lithium or sodium ion cells or batteries are contained in, or packed with, equipment, the UN number “UN3091,” “UN3481,” or “UN3552,” as appropriate, must be indicated. If a package contains a combination of lithium or sodium ion cells or batteries assigned to different UN numbers, all applicable UN numbers must be indicated on one or more marks. However, where equipment contains one or more button cells in addition to cells or batteries there is no requirement for the UN number indicating the button cell to be included on the mark. The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

* * * * *

(iv) When the battery mark and labels in accordance with subpart E of Part 172

of this subchapter other than the Class 9 label for lithium batteries or sodium ion batteries (see § 172.447 of this subchapter) are required, the battery mark must be located on the same surface as the labels if the package dimensions are adequate.

* * * * *

■ 17. In § 173.219, revise paragraphs (a) and (b)(6) to read as follows:

§ 173.219 Life-saving appliances.

* * * * *

(a) A life-saving appliance, self-inflating or not self-inflating, containing small quantities of hazardous materials that are required as part of the lifesaving appliance must conform to the requirements of this section. Examples of such appliances include life rafts, life vest, personal flotation devices, self-inflating protective equipment, and self-inflating slides. Packagings must conform to the general packaging requirements of subpart B of this part but need not conform to the requirements of Part 178 of this subchapter. The appliances must be packed, so that they cannot be accidentally activated and, except for life vests, the hazardous materials must be in inner packagings packed so as to prevent shifting within the outer packaging. The hazardous materials must be an integral part of the appliance and in quantities that do not exceed those appropriate for the actual appliance when in use.

(b) * * *

(6) For self-inflating life-saving appliances only, the following devices must be installed for purposes of the self-inflating mechanism and the total quantity of energetic material per life-saving appliance is limited to 3.2 g:

(i) Cartridges, power device of Division 1.4S (UN0323); or

(ii) Safety devices of Class 9 (UN3268); or

* * * * *

■ 18. In § 173.220, revise paragraph (h) as follows

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

* * * * *

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

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

(2) Are not subject to the requirements of subparts D, E, and F (marking,

labeling and placarding, respectively) of Part 172 of this subchapter or § 172.604 of this subchapter (emergency response telephone number) for transportation by aircraft. For transportation by aircraft, the provisions of § 173.159(b)(2) as applicable, the provisions of § 173.230(f), as applicable, other applicable requirements of this subchapter, including shipping papers, emergency response information, notification of pilot-in-command, general packaging requirements, and the requirements specified in § 173.27 must be met; and

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

(4) Notwithstanding the exceptions provided in paragraphs (h)(1) through (h)(3) of this section, packaged lithium or sodium ion battery-powered vehicles are subject to the marking and labeling requirements of subparts D and E of Part 172 of this subchapter.

* * * * *

■ 19. In § 173.222:

■ a. Revise paragraphs (a) and (c).

■ b. Add new paragraph (b)(4).

The addition and revisions read as follows:

§ 173.222 Dangerous goods in articles, machinery, or apparatus.

* * * * *

(a) If the article, machinery, or apparatus contains more than one item of hazardous materials and these could react dangerously with one another during transport, each of the hazardous materials must be enclosed separately.

* * * * *

(b) * * *

(4) Lithium and sodium ion cells and batteries must be protected from damage and short circuit, and the article, machinery, or apparatus must be equipped with an effective means of preventing accidental activation.

(c) The quantity limits, other than for installed lithium and sodium ion cells or batteries, are as follows:

(1) Except for transportation by aircraft, the total net quantity of hazardous materials contained in one item of an article, machinery, or apparatus must not exceed the following:

(i) In the case of solids or liquids, the limited quantity amount specified in the corresponding section referenced in Column (8A) of the § 172.101 Table;

(ii) 0.5 kg (1.1 pounds) in the case of Division 2.2 gases.

(iii) When an article, machinery, or apparatus contains multiple hazardous materials, the quantity of each

hazardous material must not exceed the quantity specified in the corresponding section referenced in Column (8A) of the § 172.101 Table, or for gases, paragraph (c)(1)(ii) of this section.

(2) For transportation by aircraft, the total net quantity of hazardous materials contained in one item of an article, machinery, or apparatus must not exceed the following:

(i) 1 kg (2.2 pounds) in the case of solids;

(ii) 0.5 L (0.1 gallons) in the case of liquids;

(iii) 0.5 kg (1.1 pounds) in the case of Division 2.2 gases. Division 2.2 gases with subsidiary risks and refrigerated liquefied gases are not authorized; and

(iv) A total quantity of not more than the aggregate of that permitted in paragraphs (c)(2)(i) through (iii) of this section, for each category of material in the package, when a package contains hazardous materials in two or more of the categories in paragraphs (c)(2)(i) through (iii) of this section.

* * * * *

■ 20. In § 173.224:

■ a. Revise paragraphs (a), (c)(4) introductory text, and (c)(4)(v)(B)(1).

■ b. Add paragraph (c)(5).

The addition and revisions read as follows:

§ 173.224 Packaging and control and emergency temperatures for self-reactive materials.

(a) *General.* When the § 172.101 table of this subchapter specifies that a Division 4.1 material is packaged in accordance with this section, only packagings which conform to the provisions of this section may be used. Each packaging must conform to the general packaging requirements of subpart B of this part and the applicable requirements of Part 178 of this subchapter. Non-bulk packagings must meet Packing Group II performance levels. To avoid unnecessary confinement of liquids, metallic non-bulk packagings meeting hydrostatic pressure test criteria at the Packing Group I level are not authorized. Self-reactive materials which require temperature control are subject to the provisions of § 173.21(f). Packagings required to bear a Class 1 subsidiary label must conform to §§ 173.60 through 173.62.

* * * * *

(c) * * *

(4) Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the UN Manual of Tests and Criteria (IBR, *see* § 171.7 of this subchapter) may be transported under UN3224 or UN3223,

as applicable, of Division 4.1 provided that:

* * * * *

(v) * * *

(B) * * *

(1) The individual substance is contained in an inner packaging of glass or plastics of maximum capacity of 30 mL placed in an expandable polyethylene foam matrix of at least 130 mm thickness having a density of 18 ± 1 g/L or 24 ± 2.4 g/L;

* * * * *

(5) Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the UN Manual of Tests and Criteria may be assigned to one of the appropriate entries for self-reactive substances, type C (UN3223, UN3224, UN3233, UN3234, as applicable) of Division 4.1 and transported under the provisions of paragraph (c)(3) of this section in amounts of not more than 200 g for solids or 200 mL for liquids per outer package provided that:

(i) The sample complies with paragraphs (c)(4)(i)–(iii) of this section;

(ii) The sample decomposition energy is:

(A) Less than 1,500 J/g for salts or complexes of organic compounds; or, where 1,500 J/g or greater, UN C.1 test results do not indicate that the material propagates a rapid deflagration (*i.e.*, not “yes, rapidly”) and in any one of the UN test series F the result indicates low or no explosive power (*i.e.*, not “not low”); or

(B) Less than 2,000 J/g for other organic substances; or, where 2,000 J/g or greater for other organic substances, UN C.1 test results do not indicate that the material propagates rapid deflagration (*i.e.*, not “yes, rapidly”) and in any one of UN test series F the result indicates low or no explosive power (*i.e.*, not “not low”); and

(iii) The assessment in paragraphs (c)(5)(ii)(A) and (B) may be based on a single C.1 test and a single UN test series F test. If the criteria are achieved, it can be assumed that the sample is not more dangerous than self-reactive substance, type B. An appropriate method to determine temperature control requirements is described in section 20.3.4 of the UN Manual of Tests and Criteria. Samples not achieving the criteria may be transported if approved by the Associate Administrator. Alternatively, the sample may be dissolved or diluted with an inert compound to form a homogenous mixture that has a decomposition energy of less than 1,500 J/g for salts or complexes of organic compounds or less

than 2,000 J/g for other organic substances, as applicable.

■ 21. In § 173.225:

■ a. Revise paragraph (a);

■ b. In Table 1 to Paragraph (c): Organic Peroxide Table, remove the entry for “[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), ≤100.”

■ c. In Table 1 to Paragraph (c): Organic Peroxide Table, add the following entries in alphabetical order by technical name: “tert-Amyl peroxy-pivalate,” “Arteether (including stereoisomers),” “Artemether (including stereoisomers),” “Artemisinin,” “Artesunate (including stereoisomers),” and “Dihydroartemisinin (including stereoisomers).”

■ d. In Table 1 to Paragraph (c): Organic Peroxide Table, add new Note 34 after the table.

■ e. In Table 3 to Paragraph (e): Organic Peroxide IBC Table; add new entry for “UN3119, tert-Butyl peroxy-2-ethylhexanoate, not more than 52 percent, in diluent type A.”

The revisions read as follows:

§ 173.225 Packaging requirements and other provisions for organic peroxides.

(a) *General.* When the § 172.101 table specifies that an organic peroxide must be packaged under this section, the organic peroxide must be packaged and offered for transportation in accordance with the provisions of this section. Each packaging must conform to the general requirements of subpart B of Part 173 and to the applicable requirements of Part 178 of this subchapter. Non-bulk packagings must meet Packing Group II performance levels. To avoid unnecessary confinement of liquids, metallic non-bulk packagings meeting hydrostatic pressure test criteria at the Packing Group I level are not authorized. No used material, other than production residues or regrind from the same production process, may be used in plastic packagings. Organic peroxides that require temperature control are subject to the provisions of § 173.21(f). When an IBC or bulk packaging is authorized and meets the requirements of paragraph (f) or (h) of this section, respectively, lower control temperatures than those specified for non-bulk packaging may be required. An organic peroxide not identified in paragraph (c), (e), or (g) of this section by technical name, or not assigned to a generic type in accordance with the provisions in paragraph (b)(3) of this section, must conform to the provisions of paragraph (c) of § 173.128.

* * * * *

(c) * * *

(8) * * *

TABLE 1 TO PARAGRAPH (c)—ORGANIC PEROXIDE TABLE

Technical name (1)	ID No. (2)	Concen- tration (mass %) (3)	Diluent (mass %)			Water (mass %) (5)	Packing method (6)	Temperature (°C)		Notes (8)
			A	B	I			Control	Emer- gency	
			(4a)	(4b)	(4c)			(7a)	(7b)	
([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).	[REMOVE]. UN3106	≤100	.....	.....	.....	.....	OP7 .....	.....	.....	.....
		*			*		*		*	
* * *	[ADD].	*			*		*		*	
		*			*		*		*	
tert-Amyl peroxy-pivalate	UN3115	≤72	≥28	.....	.....	.....	OP7	10	15	.....
* * *		*			*		*		*	
Arteether (including stereoisomers)	UN3106	≤100	.....	.....	.....	.....	OP7 .....	.....	.....	.....
Artemether (including stereoisomers)	UN3106	≤100	.....	.....	.....	.....	OP7 .....	.....	.....	.....
Artemisinin	UN3106	≤100	.....	.....	.....	.....	OP7 .....	.....	.....	.....
Artesunate (including stereoisomers)	UN3106	≤100	.....	.....	.....	.....	OP7 .....	.....	.....	.....
* * *		*			*		*		*	
Dihydroartemisinin (including stereoisomers)	UN3106	≤100	.....	.....	.....	.....	OP7 .....	.....	.....	.....
		*			*		*		*	
* * *		*			*		*		*	
1,2,4,5,7,8-Hexoxonane, 3,6,9-Trimethyl -3,6,9-tris (ethyl and propyl) derivatives.	UN3105	≤41	≥59	.....	.....	.....	OP7 .....	.....	.....	34
* * *		*			*		*		*	

Notes:

* * * * *

34. Available oxygen ≤7.3%.

* * * * *

(e) * * *

TABLE 3 TO PARAGRAPH (e)—ORGANIC PEROXIDE IBC TABLE

UN No.	Organic peroxide	Type of IBC	Maximum quantity (liters)	Control temperature	Emergency temperature
* * *	* * *	* * *	*	*	*
3119	ORGANIC PEROXIDE, TYPE F, LIQUID, TEMPERATURE CONTROLLED:				
* * *	* * *	* * *	*	*	*
	tert-Butyl peroxy-2-ethylhexanoate, not more than 52%, in diluent type A.	31HA1	1,000	+30 °C	+35 °C
		31A	1,250	+30 °C	+35 °C
* * *	* * *	* * *	*	*	*

* * * * *

■ 22. In § 173.230, revise paragraph (f)(4) to read as follows:

§ 173.230 Fuel cell cartridges containing hazardous material.

* * * * *

(f) * * *

(4) When packed with equipment, fuel cell cartridges must be packed in an intermediate packaging along with the equipment they are capable of powering, and the intermediate packagings packed in a strong outer packaging. The number of fuel cell

cartridges in the intermediate packaging must not exceed the number required for the equipment’s operation, plus two spare sets. A “set” of fuel cell cartridges is the number of individual fuel cell

cartridges that are necessary to power each piece of equipment.

* * * * *

■ 23. In § 173.232, add paragraph (f)(3) and revise (h) to read as follows:

§ 173.232 Articles containing hazardous materials, n.o.s.

* * * * *

(f) * * *

(3) Except for transportation by aircraft, large packagings must conform to the Packing Group II performance level. The following large packagings are authorized:

- (i) Metal (50A, 50B, 50N);
- (ii) Rigid plastic (50H);
- (iii) Wooden (50C, 50D, 50F); and
- (iv) Rigid fiberboard (50G).

* * * * *

(h) For transport by aircraft, the following additional requirements apply:

(1) Articles transported under UN3548, which do not have an existing proper shipping name, and which contain only environmentally hazardous substances where the quantity of the environmentally hazardous substance in the article exceeds 5 L or 5 kg, must be prepared for transport in accordance with this section for transport by air. In addition to the environmentally hazardous substance, the article may also contain lithium or sodium ion cells or batteries that comply with § 173.185(c)(4).

(2) Articles transported under UN3538, which do not have an existing proper shipping name, and which contain only gases of Division 2.2 without a subsidiary hazard, but excluding refrigerated liquefied gases and gases forbidden for transport on passenger aircraft, where the quantity of the Division 2.2 gas exceeds the quantity limits for UN 3363, as prescribed in § 173.222 must be prepared for transport in accordance with this section. Articles transported under this provision are limited to a maximum net quantity of gas of 75 kg by passenger aircraft and 150 kg by cargo-only aircraft. In addition to the Division 2.2 gas, the article may also contain lithium or sodium ion cells or batteries that comply with § 173.185(c)(4).

■ 24. In § 173.301b, revise paragraphs (a)(2) and (c)(1) 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 11114–1:2020 and ISO 11114–1:2020/Amd 1:2023(E) (IBR, *see* § 171.7 of this subchapter) and for non-metallic materials in ISO 11114–2:2020(E) (IBR, *see* § 171.7 of this subchapter).

* * * * *

(c) * * *

(1) When the use of a valve is prescribed, the valve must conform to the requirements in ISO 10297:2014(E) and ISO 10297:2014/Amd 1:2017 or clause 5.4.2 of ISO 10297:2024 (IBR, *see* § 171.7 of this subchapter). Quick release cylinder valves for specification and type testing must conform to the requirements in ISO 17871:2020 or, until December 31, 2026, ISO 17871:2015(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2026, a quick release valve conforming to the requirements in ISO 17871:2015(E) (IBR, *see* § 171.7 of this subchapter) continues to be authorized for use.

* * * * *

■ 25. In § 173.306, revise paragraphs (e) introductory text, (e)(1) introductory text, and (e)(2).

The revisions read as follows:

§ 173.306 Limited quantities of compressed gases.

* * * * *

(e) *Refrigerating or heating machines.*

(1) New (unused) refrigerating or heating machines or components thereof are excepted from the specification packaging requirements of this part if they meet the following conditions. In addition, shipments are not subject to subpart F of Part 172 of this subchapter, to Part 174 of this subchapter except § 174.24 and to Part 177 of this subchapter except § 177.817.

* * * * *

(2) *Used refrigerating or heating machines—*

(i) *Packaging.* Reconditioned (used) refrigerating or heating machines (UN2857, Div. 2.2) may be excepted from the marking requirements of § 172.302(c) of this subchapter and transported by motor vehicle when they conform to the requirements prescribed in § 173.306(e)(1), are secured or permanently attached to the motor vehicle, and are:

(A) Permanently affixed to a steel base structure;

(B) Permanently affixed to a trailer; or

(C) Manufactured with a rigid internal structure designed for transportation and stacking conditions such that they do not leak and do not deteriorate, distort, or become damaged in a manner that could adversely affect their safety or reduce their strength in transportation, cause instability in

stacks of machines, or cause damage to these machines in a way that is likely to reduce safety in transportation.

(ii) *Testing.* Used machines returned from their rental locations must be transported back to an authorized original equipment manufacturer service facility and undergo maintenance, repair and/or replacement that renders these machines operational at the same level as that of new machines and must undergo a leak test by a certified technician, prior to re-shipment.

* * * * *

■ 26. In § 173.307, revise paragraph (a)(4) introductory text to read as follows:

§ 173.307 Exceptions for compressed gases.

(a) * * *

(4) Refrigerating or heating machines, including dehumidifiers and air conditioners, and components thereof, such as precharged tubing containing:

* * * * *

PART 175—CARRIAGE BY AIRCRAFT

■ 27. 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.

■ 28. In § 175.10, revise paragraphs (a)(17)(v), (a)(17)(vi), and (a)(18)(iv) as follows:

§ 175.10 Exceptions for passengers, crew members, and air operators.

(a) * * *

(17) * * *

(v) Where a lithium ion battery-powered wheelchair or other mobility aid does not provide adequate protection to the battery:

(A) The battery must be removed from the wheelchair or other mobility aid according to instructions provided by the wheelchair or other mobility aid owner or its manufacturer;

(B) The battery must be carried in the cabin;

(C) Battery terminals must be protected from short circuits by placement in original retail packaging or otherwise insulating the terminal, *e.g.*, by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch;

(D) The battery must not exceed a Watt-hour (Wh) rating of 300 Wh; and

(E) A maximum of one spare battery not exceeding 300 Wh or two spares not exceeding 160 Wh each may be carried; and

(vi) The pilot-in-command is advised either orally or in writing, prior to

departure, as to the location of the lithium ion battery aboard the aircraft.

* * * * *

(18) * * *

(iv) Articles containing lithium metal or lithium ion cells or batteries with the primary purpose of providing power to another device (*e.g.*, power banks, portable chargers, or power stations), must be carried as spare batteries in accordance with the provisions of this paragraph. In addition, no more than two of these articles may be carried per person, they must not be recharged while onboard the aircraft, and they should not be used to recharge a portable electronic device while onboard the aircraft.

* * * * *

■ 29. In § 175.33, revise paragraph (a)(13) as follows:

§ 175.33 Shipping paper and information to the pilot-in-command.

(a) * * *

(13)(i) For UN3480, Lithium ion batteries, UN3090, Lithium metal batteries, and UN3551, Sodium ion batteries, the information required by paragraph (a) of this section may be replaced by the UN number, proper shipping name, hazard class, total quantity at each specific loading location, the airport at which the package(s) is to be unloaded, and whether the package must be carried on cargo-only aircraft.

(ii) For UN3480, Lithium ion batteries, UN3090, Lithium metal batteries, and UN3551, Sodium ion batteries, carried under a special permit or a State exemption as prescribed in the ICAO Technical Instructions (IBR, *see* § 171.7 of this subchapter), must meet all of the requirements of this section.

(iii) UN3481, UN3091, and UN3552 are not required to appear on the information provided to the pilot-in-command when prepared in accordance with § 173.185(c).

* * * * *

■ 30. In § 175.78, revise paragraphs (c)(4)(iii) and (iv), and add (c)(4)(v) to read as follows

§ 175.78 Stowage compatibility of cargo.

* * * * *

(c) * * *

(4) * * *

(iii) Except for Division 1.4B explosives, Compatibility Group G explosives, and as otherwise provided in this Note, explosives of different compatibility groups may be stowed together whether or not they belong to the same division. Division 1.4B explosives must not be stowed together with any other explosive permitted

aboard aircraft except Division 1.4S, unless segregated as prescribed in paragraph (c)(4)(iv) of this section (“Note 1”). Compatibility Group G explosives may not be stowed together with Compatibility Groups C, D, or E explosives, unless they are separated as prescribed in paragraph (c)(4)(v) of this section.

(iv) Division 1.4B and Division 1.3 explosives may not be stowed together. Division 1.4B explosives must be loaded into separate unit load devices and, when stowed aboard the aircraft, the unit load devices must be separated by other cargo with a minimum separation of 2 m (6.5 feet). When not loaded in unit load devices, Division 1.4B and Division 1.3 explosives must be loaded into different, non-adjacent loading positions and separated by other cargo with a minimum separation of 2 m (6.5 feet).

(v) Explosives in Compatibility Group G must not be stowed together with explosives in Compatibility Groups C, D, or E. When loaded into unit load devices, the unit load device containing Compatibility Group G must be separated from unit load devices containing Compatibility Groups C, D, or E by other cargo with a minimum separation of 2 m (6.5 feet). When not loaded in unit load devices, they must be loaded into different, non-adjacent loading positions and separated by other cargo with a minimum separation of 2 m (6.5 feet).

* * * * *

PART 176—CARRIAGE BY VESSEL

■ 31. 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.

■ 32. In § 176.708, revise paragraph (d) to read as follows:

§ 176.708 Segregation distances.

* * * * *

(d) The separation distances for crew members and passengers may be determined by one of three methods:

(1) By using Table IV to determine the minimum distances between the radioactive material packages and regularly occupied spaces or living quarters; or

(2) For one or more consignments of Class 7 (radioactive) material to be loaded on board a vessel under the exclusive use conditions described in § 176.704(f), by demonstration through direct measurement, made and documented by a suitably qualified person, that for the indicated exposure times the dose rate in regularly

occupied spaces or living quarters is less than—

(i) For the crew: 7.0 μ Sv/h (0.70 mrem/h) up to 700 hours in a year, or 1.8 μ Sv/h (0.18 mrem/h) up to 2750 hours in a year; and

(ii) For the passengers: 1.8 μ Sv/h (0.18 mrem/h) up to 550 hours in a year, taking into account any relocation of cargo during the voyage; or

(3) By using Table 7.1.4.5.18 of the IMDG Code (IBR, *see* § 171.7 of this subchapter).

* * * * *

■ 33. Revise § 176.905 to read as follows:

§ 176.905 Stowage of vehicles.

(a) Except for vehicles driven on board under their own power by a passenger, when vehicles are carried on roll-on/roll-off (ro-ro) passenger ships as defined in SOLAS II–2/regulation 3 (IBR, *see* § 171.7 of this subchapter), a vehicle carried as cargo on a vessel powered by an internal combustion engine, a fuel cell, batteries, or a combination thereof is subject to the following requirements:

(1) The offeror must assess the safety condition of each vehicle prior to offering for transport. A vehicle must not be offered for transport if it is forbidden in accordance with § 173.21(e) of this subchapter or if it:

(i) Has or shows signs of damage to electric equipment (including but not limited to frayed or damaged cables);

(ii) Has or shows signs of damage to supplemental restraint systems (*e.g.*, airbags and seatbelt tensioners); or

(iii) Has been impacted by extreme events (*e.g.*, flood, hurricane, tsunami, fire, submersion).

(2) If any of the conditions in paragraph (a)(1) of this section apply, the vehicle must not be offered for transport unless corrective actions have been taken. Such corrective actions must be evaluated regarding their effectiveness in ensuring the condition(s) no longer apply.

(3) Lithium or sodium ion cells or batteries that have been damaged or identified by the manufacturer as being defective for safety reasons provided in § 173.185(f) must be removed.

(b) Vehicles which are not prohibited for transport in accordance with paragraph (a) of this section are not subject to the requirements of this subchapter other than:

(1) UN3556, UN3557, and UN3558 vehicles must be secured in a strong, rigid outer packaging in accordance with § 173.220(d)(4). Vehicles with an individual net mass of 30 kg (66 pounds) or more may be loaded into crates or secured to pallets, or may be

transported unpackaged providing that the vehicle is capable of remaining upright during transport without additional support and the vehicle provides adequate protection to the battery so that no damage to the battery can occur, or may be transported unpackaged in cargo transport units fitted with the means to prevent toppling in transport such as by use of bracing, frames, or racking;

(2) Except for low production run and prototype batteries, each lithium or sodium ion battery must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria (IBR, *see* § 171.7 of this subchapter), as specified in § 173.185, unless approved by the Associate Administrator; and

(3) Must meet one of the following conditions:

(i) 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 system, or braking system 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;

(ii) For vehicles powered by a flammable liquid fuel with a flashpoint of 38 °C (100 °F) or above, there are no leaks in any portion of the fuel system, the fuel tank(s) contains 450 L (119 gallons) of fuel or less, and installed batteries are electrically insulated to protect from short-circuit;

(iii) For vehicles powered by a flammable liquid fuel with a flashpoint less than 38 °C (100 °F), the fuel tank(s) are empty, and installed batteries are electrically insulated to protect 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, be drained, or be purged to be considered empty. The fuel tank does not need to be cleaned or be purged;

(iv) For vehicles powered by a flammable gas (liquefied or compressed), the fuel tank(s) 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 electrically insulated to protect from short circuit;

(v) For vehicles solely powered by a wet or dry electric storage battery, or a sodium battery, the battery is

electrically insulated to protect from short-circuit;

(vi) For vehicles solely powered by a sodium ion battery, the battery is short-circuited in a way that the battery does not contain electrical energy. The short circuiting shall be easily identifiable (e.g., busbar between terminals); or

(vii) For vehicles powered by both a flammable liquid fuel and a flammable gas, all applicable conditions from paragraphs (b)(3)(ii) through (iv) of this section apply. Paragraphs (b)(3)(ii) through (iv) of this section do not apply to hybrid electric vehicles identified in special provision 388 of § 172.102 of this subchapter. Paragraph (b)(3)(v) of this section does not apply to vehicles powered by lithium batteries.

(c) Vehicles that are not prohibited for transport in accordance with paragraph (a) of this section but do not meet the conditions of paragraph (b) of this section must meet the following conditions in addition to meeting all other applicable requirements of this subchapter:

(1) For flammable liquid-powered vehicles, the fuel tank(s) containing the flammable liquid must not be more than one-fourth full and in any case the flammable liquid must not exceed 250 L (66 gal) unless otherwise approved by the competent authority;

(2) For flammable gas-powered vehicles, the fuel shutoff valve of the fuel tank(s) must be securely closed;

(3) Except for low production run and prototype batteries, each lithium or sodium ion battery must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria (IBR, *see* § 171.7 of this subchapter), as specified in § 173.185, unless approved by the Associate Administrator.

Installed batteries must be protected from damage, accidental activation during transport, and electrically insulated to protect from short circuits;

(4) Unpackaged vehicles are excepted from the marking and labeling requirements in subparts D and E of Part 172 of this subchapter;

(5) 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; and

(6) When transported in a cargo transport unit the cargo transport unit must be placarded on each side and each end regardless of whether the vehicle is packaged or unpackaged.

(7) 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.

(8) 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.

(9) “NO SMOKING” signs must be conspicuously posted at each access opening to the hold or compartment.

(10) 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.

(11) Each hold or compartment must be ventilated and fitted with an overhead water sprinkler system or fixed fire extinguisher system.

(12) Each hold or compartment must be equipped with a smoke or fire detection system capable of alerting personnel on the bridge.

(13) 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.

PART 178—SPECIFICATIONS FOR PACKAGINGS

■ 34. 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.

■ 35. In § 178.71:

■ a. Revise paragraphs (d)(2), (o)(1), and (t) introductory text.

■ b. Add new paragraph (t)(5).

The additions and revisions 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 shutoff valves must be sufficiently flexible to protect the valves and the piping from shearing or releasing the pressure receptacle contents. The filling and discharge valves and any protective

caps must be secured against unintended opening. The valves must conform to ISO 10297:2014(E) and ISO 10297:2014/Amd 1:2017(E) or clause 5.4.2 of ISO 10297:2024(E) (IBR, *see* § 171.7 of this subchapter), or, specifically for ball valves, must conform to ISO 23826:2021 (IBR, *see* § 171.7 of this subchapter) or for non-refillable pressure receptacles valves manufactured until December 31, 2020, ISO 13340:2001(E), and be protected as specified in § 173.301b(f) of this subchapter. Until December 31, 2022, the manufacture of a valve conforming to the requirements of ISO 10297:2014(E) is authorized. Until December 31, 2020, the manufacture of a valve conforming to the requirements in ISO 10297:2006(E) (IBR, *see* § 171.7 of this subchapter) was authorized. Until December 31, 2008, the manufacture of a valve conforming to the requirements in ISO 10297:1999(E) (IBR, *see* § 171.7 of this subchapter) was authorized. In addition, valves must be initially inspected and tested in accordance with ISO 14246:2022(E), (IBR, *see* § 171.7 of this subchapter). Until December 31, 2030, valves may continue to be inspected and tested initially in accordance with ISO 14246:2014(E) and ISO 14246:2014/Amd 1:2017(E). For self-closing valves with inherent protection, the requirements of ISO 17879:2017(E) (IBR, *see* § 171.7 of this subchapter) shall be met until further notice.

* * * * *

(o) * * *

(1) ISO 11114–1:2020(E) and ISO 11114–1:2020/Amd 1:2023(E) (IBR, *see* § 171.7 of this subchapter).

* * * * *

(t) *Marking of UN non-refillable pressure receptacles.* Unless otherwise specified in this paragraph, each UN non-refillable pressure receptacle must be clearly and legibly marked as prescribed in paragraph (q) of this section. In addition, permanent stenciling or etching is authorized. Except when stenciled or etched in accordance paragraph (t)(5), the marks must be on the shoulder, top end or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle (e.g., a welded collar).

* * * * *

(5) Non-refillable UN cylinders of seamless construction with a diameter of less than or equal to 40 mm may be permanently marked on their side walls provided no harmful stress concentration is created, and the minimum cylindrical shell wall thickness is maintained.

Notwithstanding the paragraph (q) minimum size requirements for marks, the minimum size of the marks must be 1.5 mm and the minimum size of the UN packaging symbol must be 3 mm. Further, notwithstanding the paragraph (t)(2) minimum size requirement, the letters in the “DO NOT REFILL” mark must be at least 3 mm.

* * * * *

■ 36. In § 178.277, revise paragraph (d)(1) to read as follows:

§ 178.277 Requirements for the design, construction, inspection and testing of portable tanks intended for the transportation of refrigerated liquefied gases.

* * * * *

(d) * * *

(1) Each filling and discharge opening in portable tanks used for the transport of flammable refrigerated liquefied gases must be fitted with at least three mutually independent shutoff devices in series: the first being a stop-valve situated as close as reasonably practicable to the jacket, the second being a stop-valve and the third being a blank flange or equivalent device. Filling and discharge openings also include the openings in the vapor phase of the portable tank that are used for vapor recovery. The shut off device closest to the jacket must be a self-closing device, which is capable of being closed from an accessible position on the portable tank that is remote from the valve within 30 seconds of actuation. This device must actuate at a temperature of not more than 121 °C (250 °F). Portable tanks constructed before January 1, 2029, that do not conform to the requirements regarding the filling and discharge openings in the vapor phase may continue to be used.

* * * * *

■ 37. In § 178.703, revise paragraphs (a)(1)(vii), (a)(2)(iii), and (b)(7)(iv) to read as follows:

§ 178.703 Marking of IBCs.

(a) * * *

(1) * * *

(vii) The superimposed stacking test mass in kilograms (kg). For IBCs not designed for stacking, the figure “0” must be shown.

* * * * *

(2) * * *

(iii) For a rigid plastic IBC containing liquids, made from plastic with structural equipment withstanding the superimposed stacking test mass and with a manufacturer’s symbol in place of the manufacturer’s name and address:

(b) * * *

(7) * * *

(iv) For IBCs designed for stacking, the maximum permitted superimposed stacking mass applicable when the IBC is in transportation must be displayed with the symbol. The mass in kilograms (kg) marked above the symbol must not exceed the load imposed during the design test, as indicated in § 178.815(c)(5) of this part, divided by 1.8. The letters and numbers indicating the mass must be at least 12 mm (0.48 inches).

■ 38. In § 178.815, revise paragraph (c)(5) to read as follows:

§ 178.815 Stacking test.

* * * * *

(c) * * *

(5) *Calculation of superimposed test load.* For all IBCs, the mass placed on the IBC surface to create the superimposed test load must be 1.8 times the combined maximum permissible gross mass of the number of similar IBCs that may be stacked on top of the IBC during transportation.

* * * * *

■ 39. In § 178.910, revise paragraphs (a)(1)(vii), (a)(2)(i), (a)(2)(iv), and (b) to read as follows:

§ 178.910 Marking of Large Packagings.

* * * * *

(a) * * *

(1) * * *

(vii) The superimposed stacking test mass in kilograms (kg). For Large Packagings not designed for stacking the figure “0” must be shown.

* * * * *

(2) * * *

(i) For a steel Large Packaging suitable for stacking; superimposed stacking test mass: 2,500 kg; maximum gross mass: 1,000 kg.

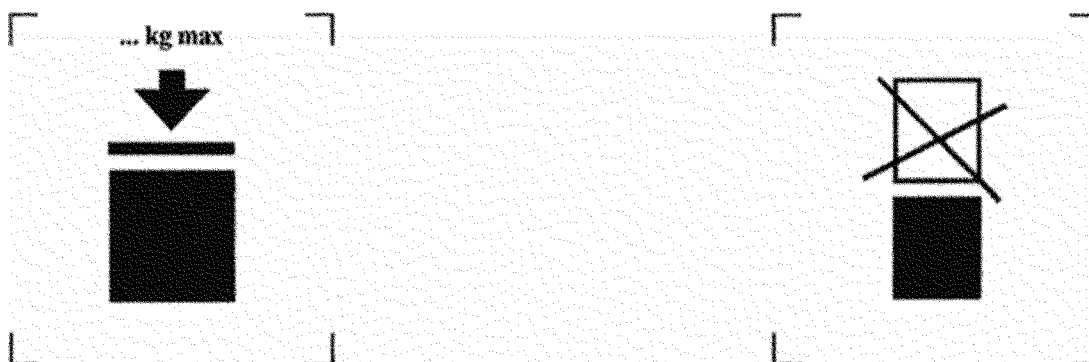
* * * * *

(iv) For a steel Large Salvage Packaging suitable for stacking; superimposed stacking test mass: 2,500 kg; maximum gross mass: 1,000 kg.

(b) All Large Packagings manufactured, repaired or remanufactured after January 1, 2015, must be marked with the symbol applicable to a Large Packaging designed for stacking or not designed for stacking, as appropriate. For Large Packagings designed for stacking, the maximum permitted superimposed stacking mass must be displayed with the symbol. The mass marked above the symbol must not exceed the load imposed during the design test, as indicated in § 178.980(c)(5), of this part, divided by 1.8. The symbol must be a square with each side being not less than 100 mm (3.9 inches) by 100 mm (3.9 inches) as measured from the corner

printer marks shown on the following figures. Where dimensions are not

specified, all features must be in approximate proportion to those shown.



(1) *Transitional exception*—A marking in conformance with the requirements of this paragraph in effect on December 31, 2014, may continue to be applied to all Large Packagings manufactured, repaired or remanufactured between January 1, 2015, and December 31, 2016.

(2) For domestic transportation, a Large Packaging marked prior to January 1, 2017, and in conformance with the requirements of this paragraph in effect on December 31, 2014, may continue in service until the end of its useful life.

* * * * *

■ 40. In § 178.980, revise paragraph (c)(5) to read as follows:

§ 178.980 Stacking test.

* * * * *

(c) * * *

(5) *Calculation of superimposed test load.* For all Large Packagings, the mass placed on the Large Packaging surface to create the superimposed test load must be 1.8 times the combined maximum permissible gross mass of the number of similar Large Packaging that may be stacked on top of the Large Packaging during transportation.

* * * * *

■ 41. In § 178.1010, revise paragraphs (a)(1)(vii) and (a)(2) to read as follows:

§ 178.1010 Marking of Flexible Bulk Containers.

* * * * *

(a) * * *

(1) * * *

(vii) The superimposed stacking test mass in kilograms (kg).

* * * * *

(2) The following is an example of symbols and required markings for a Flexible Bulk container suitable for stacking; superimposed stacking test

mass: 1,000 kg; maximum gross mass: 2,500 kg.

* * * * *

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

■ 42. 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.

■ 43. In § 180.207, revise paragraphs (d)(1), (d)(2), (d)(4), and (d)(6) to read as follows:

§ 180.207 Requirements for requalification of UN pressure receptacles.

* * * * *

(d) * * *

(1) *Seamless steel.*

(i) Each seamless steel UN pressure receptacle, including pressure receptacles exceeding 150 L capacity installed in MEGCs or in other service, must be requalified in accordance with ISO 18119 (IBR, *see* § 171.7 of this subchapter). However, UN cylinders with a tensile strength greater than or equal to 950 MPa must be requalified by ultrasonic examination in accordance with ISO 18119. For seamless steel cylinders and tubes, the internal inspection and hydraulic pressure test may be replaced by a procedure conforming to ISO 16148:2016(E) (IBR, *see* § 171.7 of this subchapter).

(ii) Each seamless steel UN pressure receptacle that is horizontally mounted on a motor vehicle or in a framework and that: is 12 feet or longer; has an outside diameter greater than or equal to 18 inches; and is supported by a neck mounting surface during transportation must be inspected at the time of requalification in accordance with CGA

C-23 (IBR, *see* § 171.7 of this subchapter). Notwithstanding the periodic inspection, if the seamless steel UN pressure receptacle shows visible corrosion, as outlined in Section 4.2 of CGA C-23, around the neck or under the flange/sleeve, then it must be removed and examined in accordance with Section 6 of CGA C-23 prior to returning to service.

(2) *Seamless UN aluminum:* Each seamless aluminum UN pressure receptacle must be requalified in accordance with ISO 18119 (IBR, *see* § 171.7 of this subchapter).

* * * * *

(4) *Composite UN cylinders:* Each composite cylinder must be inspected and tested in accordance with ISO 11623:2023(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2028, ISO 11623:2015(E) (IBR, *see* § 171.7 of this subchapter) may be used.

* * * * *

(6) *Valves:* Inspection and maintenance of cylinder valves must be carried out in accordance with ISO 22434:2022, Gas cylinders—Cylinder valves—Manufacturing tests and examinations (IBR, *see* § 171.7 of this subchapter). Until December 31, 2028, ISO 22434:2006 Transportable gas cylinders—Inspection and maintenance of cylinder valves (IBR, *see* § 171.7 of this subchapter) may be used.

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Administrator, Pipeline and Hazardous Materials Safety Administration.

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