DEPARTMENT OF TRANSPORTATION

Pipeline and Hazardous Materials Safety Administration

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

[Docket No. PHMSA–2023–0111 (HM–215R)]

RIN 2137–AF64

Hazardous Materials: Harmonization With International Standards

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

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: PHMSA proposes to amend 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 amendments are intended to maintain consistency with the latest international standards and regulations, and to reduce costs to entities or individuals within the United States or to otherwise lower the cost of regulations on the United States economy.

DATES: Comments must be received by April 13, 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.
- *Fax:* 1–202–493–2251.
- *Mail:* Docket Management System; U.S. Department of Transportation, Docket Operations, M–30, Ground Floor, Room W12–140, 1200 New Jersey Avenue SE, Washington, DC 20590–0001.
- *Hand Delivery:* 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–2023–0111 (HM–215R) or RIN 2137–AF64 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, 1200 New Jersey Avenue SE, DOT: PHMSA–PHH–10, 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: Candace Casey, 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, 2nd Floor, Washington, DC 20590–0001.

SUPPLEMENTARY INFORMATION:

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I. Executive Summary

The Secretary of Transportation is directed by 49 U.S.C. 5120 to ensure that domestic regulations for the transportation of hazardous materials are generally consistent with the latest international standards and requirements, unless such standards or requirements are unnecessary or unsafe, or a more stringent safety standard is in the public interest. Consistent with this statutory requirement, the Pipeline and Hazardous Materials Safety Administration proposes to amend the Hazardous Materials Regulations (HMR) to adopt certain international regulations and standards, including changes to material incorporated by reference, hazardous materials descriptions and proper shipping names (PSN), hazard classes, packing groups (PG), special provisions, packaging authorizations, air transport quantity limitations, and vessel stowage requirements.

PHMSA anticipates that the adoption of the amendments proposed in this NPRM will maintain the current levels of safety achieved under the HMR. Harmonizing the HMR with international consensus standards is expected to also reduce delays and interruptions in the transportation of hazardous materials and promote the efficient and free flow of commerce by eliminating unnecessary, outdated, and conflicting regulatory requirements. Overall, the proposed amendments are intended to reduce costs to entities or individuals within the United States or otherwise lower the cost of regulations on the United States economy.

The following list summarizes noteworthy proposals set forth in this NPRM:

- *Incorporation by Reference:* PHMSA proposes to incorporate by reference updated versions of the following international hazardous materials regulations and standards: the 2025–2026 edition of the International

Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions); Amendment 42–24 to the International Maritime Dangerous Goods Code (IMDG Code); the 2023 edition of Transport Canada's Transportation of Dangerous Goods (TDG) Regulations; and the 23rd revised edition of the United Nations Recommendations on the Transport of Dangerous Goods—Model Regulations (UN Model Regulations).

• *Amendments to the Hazardous Materials Table:* PHMSA proposes amendments to the Hazardous Materials Table (HMT; § 172.101) to add, to revise, or to remove certain PSNs, hazard classes, PGs, SPs, packaging authorizations, bulk packaging requirements, and passenger and cargo aircraft maximum quantity limits.

• *Increase in authorized amounts of certain gases transported as limited quantities:* For modes other than air transportation, PHMSA proposes to extend the relief provided by the limited quantity provisions to four Division 2.2 (non-flammable and non-poisonous) compressed gases. This amendment would authorize these materials for transport as a limited quantity material in quantities up to 1000 ml (34 fluid ounces) per package, when transported in DOT specification cylinders or UN pressure receptacles. These materials are: ''UN1006, Argon,'' ''UN1013, Carbon dioxide,'' ''UN1046, Helium,'' and ''UN1066, Nitrogen.''

• *Amendments to the Organic Peroxides Table:* PHMSA proposes amendments to the organic peroxides table in § 173.225, which lists individual organic peroxide formulations that are authorized for transportation without prior approval. The proposed amendments include the addition of three new formulations: (Dibenzoyl peroxide, 2,5-dimethyl-2,5-di-(tert-butylperoxy) hexane, and methyl ethyl ketone peroxide (with a concentration limit of available oxygen ≤10 percent), that will no longer require prior approval when transported under the conditions outlined in the table, as well as the addition of a new authorized packaging for Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52 percent, stable dispersion, in water.

• *Amendments to provisions for the transport of tetramethylammonium hydroxide:* PHMSA proposes to adopt several changes pertaining to entries for Tetramethylammonium hydroxide (TMAH) to maintain consistency with changes adopted in several international standards in response to new incident and test data showing a toxicity hazard in addition to the previously identified corrosivity hazard. The proposed amendments include the addition of a new HMT entry for aqueous solutions, and revisions to the hazard classification, proper shipping name, or both, for existing entries of PG II and PG III TMAH solutions (UN1835), reclassification of TMAH solids (UN3423), the addition of two new special provisions, and revised packaging authorizations.

• *New provisions for sodium ion batteries:* PHMSA proposes to add new HMT entries and transport provisions for sodium ion batteries to maintain consistency with changes adopted in the 2025–2026 edition of the ICAO Technical Instructions and the 23rd revised edition of the UN Model Regulations. The new provisions in the international regulations regulate sodium ion batteries in the same way as lithium ion batteries and are intended to address anticipated increases in the use of sodium ion batteries as an alternative to lithium ion batteries.

• *New state-of-charge provisions for certain lithium and sodium ion batteries transported by air:* PHMSA proposes expanding current state-of-charge requirements to certain lithium and sodium ion batteries transported by air. The new provision would limit the amount of stored energy to 30 percent or less of the battery's capacity at the time of transport.

• *Improved Emergency Response Information for Lithium Batteries Transported as ''UN3536, Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal batteries:''* PHMSA proposes to amend Special Provision 389 to require that the emergency response information for UN3536 specifically identify the predominant type of energy storage battery installed in the unit (*e.g.,* lithium ion batteries or lithium metal batteries) and provide information on immediate methods for handling fires. When determining the predominant type of energy storage battery, PHMSA encourages shippers to consider which battery type provides electrical power to external devices or the power grid when units transported under UN3536 are in operation.

• *Exceptions for ammonium nitrate hot concentrated solution:* PHMSA proposes to add specific conditions under which solutions of ammonium nitrate *(hot concentrated solution)* can be transported under the HMT entry ''UN2426, Ammonium nitrate'' or can qualify for exception from regulation under the HMR. The proposed requirements for solutions of ammonium nitrate to be transported under UN2426 are based on concentration, water content, combustible material content, chlorine content, pH level, and temperature. These requirements were adopted in the 23rd revised edition of the UN Model Regulations to harmonize transport conditions and requirements multimodally.

• *Exceptions for nitrocellulose membrane filters used in rapid test devices:* PHMSA proposes to add a new special provision with specific packaging requirements for ''UN3270, Nitrocellulose membrane filters, *with not more than 12.6% nitrogen, by dry mass*'' to be excepted from regulation. These materials are most notably used in rapid test devices for infectious diseases and as substrates for bioanalytical tests as well as pregnancy tests. PHMSA's proposal would maintain consistency with changes adopted in the 23rd revised edition of the UN Model Regulations to facilitate further the transport of these items.

PHMSA anticipates that the proposals in the NPRM will produce safety benefits from harmonizing domestic and international regulations. PHMSA solicits comment 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 comment 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 PRIA, PHMSA expects that the aggregate benefits of the amendments proposed in this NPRM for United States entities or individuals justify their aggregate costs.

II. Background

The Federal Hazardous Materials Transportation Law (49 U.S.C. 5101, *et seq.*) directs PHMSA to participate in international standard-setting forums for the transportation of hazardous materials in commerce and encourages alignment of the HMR with those standards (49 U.S.C. 5120). Harmonization of the HMR with international standards and regulations can reduce the costs and other burdens of complying with multiple or inconsistent safety requirements between nations.

PHMSA actively participates in the development of international standards for the transportation of hazardous materials and promotes the adoption of standards consistent with the HMR. Maintaining consistency between

current international standards and the HMR enhances safety by, among other things: (1) ensuring the HMR are informed by the latest international best practices and lessons learned; (2) improving understanding of, and compliance with, pertinent international requirements; (3) facilitating the flow of hazardous materials in commerce and avoiding risks to the public and the environment from handling and potential releases of hazardous materials due to delays or interruptions in transportation; and (4) enabling consistent emergency response procedures in the event of a hazardous materials incident.

When considering alignment of the HMR with new or amended international standards, PHMSA reviews each standard on its own merit, assesses its overall impact on transportation safety, and analyzes the economic implications associated with its adoption. PHMSA's goal is to harmonize with international standards without diminishing the level of safety currently provided by the HMR or imposing undue burdens on the regulated community.

In 1990, PHMSA's predecessor, the Research and Special Programs Administration (RSPA), comprehensively revised the HMR for greater consistency with the UN Model Regulations.[1] The UN Model Regulations constitute a set of recommendations issued by the United Nations Sub-Committee of Experts (UNSCOE) on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). The UN Model Regulations are amended and updated biennially by the UNSCOE and serve as the basis for national, regional, and international modal regulations, including the ICAO Technical Instructions and IMDG Code. PHMSA routinely updates the HMR to incorporate these biennial amendments.

PHMSA has evaluated the latest biennial updates to the international regulations and consensus standards and proposes to revise the HMR to adopt changes consistent with revisions to the 2025–2026 edition of the ICAO Technical Instructions, the Amendment 42–24 to the IMDG Code, and the 23rd revised edition of the UN Model Regulations, all of which were published by or in effect on January 1, 2025.[2] PHMSA also proposes to incorporate by reference these revised international regulations, as well as several new or updated International Organization for Standards (ISO) standards. The regulations incorporated by reference are authorized for use for domestic and international transportation, under specific conditions, in part 171, subpart C of the HMR.

On December 9, 2024, PHMSA issued a notice of enforcement discretion, stating that PHMSA and other Federal agencies that enforce the HMR (*i.e.,* the Federal Railroad Administration (FRA), the Federal Aviation Administration (FAA), the Federal Motor Carrier Safety Administration (FMCSA), and the United States Coast Guard (USCG)) will not take enforcement action against any offeror or carrier who follows the 2025–2026 Edition of the ICAO Technical Instructions and Amendment 42–24 of the IMDG Code when all or part of the transportation is by air with respect to the ICAO Technical Instructions, or all or part of the transportation is by vessel with respect to the IMDG Code, during the pendency of this rulemaking proceeding.[3] For transport by rail and highway to, from, or within the United States, PHMSA also stated that these agencies will not take enforcement action against any offeror or carrier who offers or accepts hazardous materials identified and described on a shipping paper, or packages either marked or labeled in accordance with these standards—provided that appropriate emergency response information consistent with 49 CFR part 172, subpart G accompanies the shipment. The December 9, 2024, notice of enforcement discretion remains in effect until withdrawn or otherwise modified.[4]

III. Incorporation by Reference Discussion Under 1 CFR Part 51

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. PHMSA currently incorporates by reference into the HMR all or parts of numerous standards and specifications published by these bodies, which are otherwise known as standard development organizations (SDOs). In general, SDOs update and revise their published standards every two to five years to reflect modern technology and best technical practices.

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 Section 12(d) of the NTTAA. This circular provides guidance for Federal 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 standards should be added to the HMR, under the NTTAA and Circular A–119.

Revisions to materials incorporated by reference in the HMR are handled via the notice-and-comment rulemaking process. PHMSA must also 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.[5] Proposed changes to the material incorporated by reference in the HMR are discussed in detail in the Section 171.7 discussion in ''Section V. Section-by-Section Review of NPRM Proposals.''

The standards incorporated by reference in this NPRM are reasonably available to interested parties in several ways. The UN Model Regulations and the 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 in ''Section V. Section-by-Section Review of NPRM Proposals'').[6] The ICAO Technical

[1] 55 FR 52401 (Dec. 21, 1990).

[2] Amendment 42–24 of the IMDG Code became mandatory on January 1, 2025. Voluntary compliance began on January 1, 2024.

[3] PHMSA, *Notice of Enforcement Policy Regarding International Standards* (Dec. 9, 2024), available at: *https://www.phmsa.dot.gov/regulatory-compliance/phmsa-guidance/notice-enforcement-policy-regarding-international-standards.*

[4] PHMSA notes that items described and packaged for transportation under the respective international standards as UN0514 and UN3559, ''Fire Suppressant Dispersing Devices,'' must first be approved by the Associate Administrator in accordance with 49 CFR 173.56.

[5] 79 FR 66278 (Nov. 7, 2014).

[6] United Nations, *UN Model Regulations 23rd revised edition,* (October 8, 2023), available at: *https://unece.org/transport/dangerous-goods/un-model-regulations-rev-24;* United Nations, *Manual of Tests and Criteria, Eighth revised edition* (November 27, 2023), available at: *https://unece.org/transport/standards/transport/*

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, free of charge, at the PHMSA Headquarters, 1200 New Jersey Avenue, SE, Washington, DC 20590 during the comment period. Interested persons may email *candace.casey@dot.gov* to arrange for this in-person review.

IV. Amendments Not Being Proposed for Adoption

PHMSA has determined that certain elements of updated international regulations and standards should not be adopted into the HMR (49 U.S.C. 5120). PHMSA has also determined that certain transport requirements should be authorized on a case-by-case basis through special permits rather than adopting them for general applicability in the HMR. Additional information about these topics is provided below:

• *Additional regulation for carbon and charcoal*—The International Maritime Organization (IMO), through its Sub-Committee on Carriage of Cargoes and Containers (CCC), adopted more stringent requirements than currently exist in the HMR for the transport of carbon (*e.g.,* activated carbon or carbon derived from animal or vegetable origin) in Amendment 42–24 to the IMDG Code. Most notably, the IMO removed the ability to exclude such carbon materials from classification as a Division 4.2 (spontaneously combustible material), *i.e.,* a self-heating material, by way of testing, and consequently the ability to be transported as unregulated.

Section 173.124 of the HMR currently requires carbon materials such as charcoal that are potentially spontaneously combustible because of self-heating properties to be tested by performing UN Test N.4, ''Test method for self-heating substances,'' in accordance with the UN Manual of Tests and Criteria (see Section 33.4.3.3) and either classified as a Division 4.2 material or excluded from regulation. This classification or exclusion applies to both bulk and non-bulk (*e.g.,* charcoal packaged for retail sale) quantities of carbon. Materials meeting classification criteria are described as ''UN1361, Carbon, *animal or vegetable origin*'' or ''UN1362, Carbon, activated'', Division 4.2, and are subject to packaging requirements for bulk and non-bulk quantities, respectively. See §§ 173.212 and 173.242 for PG II and §§ 173.214 and 173.241 for PG III. In addition, hazardous materials transported under UN1361 and UN1362 are assigned stowage category ''A'', meaning that these materials may be stowed ''on deck'' or ''under deck'' on a cargo or passenger vessel, and that they must be kept as cool as reasonably practicable and protected from sources of heat. These stowage requirements in the HMR are in alignment with the current requirements under Amendment 42–24 of the IMDG Code. In the absence of safety incidents related to the shipment of these materials, as well as the unlikelihood of unpackaged bulk shipments of carbon materials such as charcoal, PHMSA finds that the current requirements in the HMR provide the appropriate level of safety without imposing unnecessary burdens on transportation.

More specifically, Amendment 42–24 removed Special Provision 925 from the IMDG Code, which previously provided a blanket exception for non-activated carbon blacks of mineral origin, consignments of carbon that passed tests for self-heating substances UN Test N.4, and carbons produced by a steam activation process. Amendment 42–24 also removed packing provision PP12, which previously authorized the use of bags as packaging for materials transported in closed cargo transport units, for ''UN1361, Carbon.'' In addition, Amendment 42–24 removed Special Provision 223—which was previously applicable to carbon materials assigned to PG III—and permitted substances (except for marine pollutants) covered by the description ''UN1361, Carbon, PG III'' or ''UN1362, Activated carbon, PG III'' to be excepted from the IMDG Code when testing showed that the substances did not meet the established defining criteria for any hazard class or division. Amendment 42–24 replaced Special Provisions 925 and 223 with a new Special Provision 978, which specifically prohibits the use of the UN N.4 test to except carbon from the IMDG Code by limiting its application only to carbon produced by pyrolysis of an organic material such as bone, bamboo, coconut shell, jute, or wood. Special Provision 978 also requires additional precautions, such as a 14-day weathering period and periodic monitoring, while the material is stowed during transport. These changes also impacted the stowage requirements for materials transported in bulk containers with the aim of facilitating the dissipation and removal of accumulated heat generated by large amounts of densely stowed charcoal.

The IMO adopted the changes in Amendment 42–24 of the IMDG Code following incidents caused by spontaneous combustion of unpackaged bulk shipments of charcoal on board several vessels. The IMO concluded that removing Special Provisions 223 and 925 was needed because these special provisions could not be applied properly across all shipments given that charcoal is often manufactured at different remote production sites (charcoal piles) and consignments are often comprised of charcoal from different origins with different properties rather than being manufactured under standardized conditions.

PHMSA is not proposing to incorporate the changes adopted in Amendment 42–24 of the IMDG Code. While largely aimed at addressing fires associated with the movement of unpackaged bulk shipments of charcoal, the current IMDG Code requirements also apply to smaller packages of charcoal, such as those available for commercial retail use (*i.e.,* charcoal used for grilling). PHMSA believes that adopting these IMO requirements would unnecessarily burden manufacturers with new testing, handling, and packaging requirements for consumer products, particularly given the lack of domestic incidents and unlikelihood that unpackaged bulk shipments of carbon materials are being transported to and from the U.S.

PHMSA also disagrees with the IMDG Code prohibition on the use of UN Test N.4 to classify or exclude self-heating materials. PHMSA is not aware of any safety concerns or domestic safety incidents that justify the prohibition of the use of this test and believes that harmonizing the HMR with these particular sections of the IMDG Code would impose undue burdens for packaging and handling of carbon material without producing a corresponding safety benefit. Because shipments packaged in accordance with the IMDG Code are authorized for transport in the United States under § 171.22, PHMSA does not anticipate any commercial or economic hardships will result from failing to adopt these requirements.

• *Marking and labeling for battery powered vehicles*—The 23rd revised edition of the UN Model Regulations and Amendment 42–24 of the IMDG Code adopted a new special provision, Special Provision 405, for battery powered vehicles (''UN3556, Vehicle, lithium ion battery powered,'' ''UN3557, Vehicle, lithium metal battery

dangerous-goods/un-manual-tests-and-criteria-rev8-2023.

powered,'' and ''UN3558, Vehicle, sodium ion battery powered''). Special Provision 405 provides an exception for battery powered vehicles from marking and labeling requirements when not fully enclosed by packagings, crates, or other means that prevent ready identification, thereby requiring marking and labeling when fully enclosed by packaging, crates, or other means that prevent ready identification. Special Provision 405 is similar to an existing Special Provision A87 in the ICAO Technical Instructions. Special Provision A87 applies to articles but was assigned to battery powered vehicles in the 2024–2025 edition.

PHMSA is not proposing to adopt Special Provision 405 due to concerns raised in various international working groups regarding the necessity of the additional marking and labeling requirements. PHMSA believes that these requirements, which would require new marks and labels on a wide variety of popular consumer goods—*e.g.,* lawn mowers, scooters, motorcycles, wheelchairs—should be subject to further evaluation. PHMSA seeks comments regarding the potential benefits of additional hazard communication requirements for battery powered vehicles transported in fully enclosed packagings.

• *Non-removable specification markings*—The 23rd revised edition of the UN Model Regulations and the 2025–2026 ICAO Technical Instructions states that UN specification markings must be placed on a non-removable component of the packaging. A transitional exception allows packagings to continue to be marked as required prior to the adoption of the new requirement until December 31, 2026, and for any packagings marked in such manner prior to January 1, 2027, to be permitted for continued use. PHMSA anticipates determining that the transitional exception is unnecessary as the HMR already includes such a requirement in § 178.3(a), which states that packagings manufactured to a DOT specification or a UN standard must be marked with the proper specification marking on a non-removable component of the packaging. However, PHMSA seeks comments regarding the potential need for a similar transitional exception. Note that section 178.503(a) also applies the same requirement in § 178.3(a) to the marking of performance-oriented packagings.[7]

[7] This requirement was added in rulemaking HM–218. 65 FR 50450 (Aug. 18, 2000).

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.

Part 171

Section 171.6

Section 171.6 of the HMR provides information on the OMB control numbers assigned to information collections under the Paperwork Reduction Act of 1995. The paragraph (b)(2) table lists the HMR sections associated with each OMB control number. As this NPRM proposes to add new information collection requirements to HMR, PHMSA proposes to revise this table to include the section references where this new information collection request is specified. See paragraph (K), under the ''Regulatory Analyses Notices'' section for additional details regarding new information collection requests.

Section 171.7

Section 171.7 provides a listing of all consensus standards and regulations incorporated by reference into the HMR. PHMSA is proposing to add or revise the following references in § 171.7 in this NPRM: [8]

• The 2023 edition of the American National Standards Institute (ANSI) N14.1–2023, Nuclear Materials—Uranium Hexafluoride—Packagings for Transport in paragraph (d)(8), which is currently referenced in § 173.420. This standard provides criteria for packagings used for transport of uranium hexafluoride (UF6). It includes specific information on design and fabrication requirements for the procurement of new packagings intended for the transportation of UF6 in quantities of 0.2205 lb. (0.1 kg) or more. It also defines the requirements for in-service inspections, cleanliness, and maintenance for packagings in service. Packagings currently in service and not specifically defined in this standard will continue to be authorized for use, provided they are used within their original design limitations, and are inspected, tested, and maintained to comply with the intent of this standard. This standard also includes requirements for cylinder loading, shipping, and valves, plugs, and valve protectors. PHMSA evaluated this updated standard and believes that the revisions provide an enhanced level of safety without imposing significant compliance burdens. This standard has a well-established and documented safety history, and the adoption of the 2023 edition is expected to maintain the safety standard currently achieved under the HMR. The 2023 edition of ANSI N14.1 is available for purchase on the ANSI website at: *https://webstore.ansi.org/standards/pcc/ansin142023?source=blog.*

• The 2025–2026 edition of the ICAO Technical Instructions in paragraph (t)(1) to replace the 2023–2024 edition, which is currently referenced in §§ 171.8; 171.22–24; 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 international safe transport of dangerous goods (*i.e.,* hazardous materials) by air. The 2025–2026 edition has been amended to align with the 23rd revised edition of the UN Model Regulations. Notable changes include new packing and stowage provisions, new and revised entries on its Dangerous Goods List, and editorial corrections. The 2025–2026 edition of the ICAO Technical Instructions is available for purchase on the ICAO website at *https://store.icao.int/en/shop-by-areas/safety/dangerous-goods.*

• The 2024 edition of the IMDG Code (Amendment 42–24) in paragraph (v)(2) to replace Incorporating Amendment 41–22, which is currently referenced in §§ 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; and 178.274. 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 42–24 of the IMDG Code include new packing and stowage provisions, new and revised entries on its Dangerous Goods List, and editorial corrections. Distributors of the IMDG Code can be found on the IMO website at: *www.imo.org/en/publications/Pages/Distributors-default.aspx.*

• The following ISO documents to add new and updated standards for the specification, design, construction, testing, and use of gas cylinders in paragraph (w):

—*ISO 535:2014, Paper and board—Determination of water absorptiveness—Cobb method* in paragraph (w)(1). PHMSA proposes to

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

remove the 1991 version of this document, ISO 535:1991, which is currently referenced in §§ 178.707, 178.708, and 178.516, and to incorporate by reference the 2014 edition, ISO 535:2014 in its place. ISO 535:2014 specifies a method of determining the water absorptiveness of sized paper and board, including corrugated fiberboard, under standard conditions. This revised version contains changes to the introduction, annexes, and bibliography. The 23rd revised edition of the UN Model Regulations replaced the second edition with the third edition, and PHMSA proposes to mirror these changes for consistency. Replacing the 1991 version will allow references to updated annexed information and bibliographies, as well as for harmonization with other international standards, such as the 23rd revised edition of the UN Model Regulations, in which references to ISO 535:1991 have also been removed.

—*ISO 9809–4:2021, 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 1 100 MPa* in paragraph (w)(40). PHMSA proposes to incorporate by reference the second edition of this document, 9809–4:2021, and phase out the usage of the first edition, 9809–4:2014, by adding a sunset date of December 31, 2028.[9] These documents are to be referenced in §§ 178.71 and 178.75. ISO 9809–4:2021 specifies the minimum requirements for the materials, design, construction and workmanship, manufacturing processes, examinations and testing at time of manufacture for refillable, seamless, stainless steel gas cylinders with water capacities up to and including 150 L (*i.e.,* ~40 gal.). As part of its regular periodic review process, ISO updated 9809–4:2014 and published the second edition, 9809–4:2021. The second edition includes changes to the requirements for inspection and testing, clarifications of drawings of the cylindrical parts of shells in Figure 3, and the addition of a new provision pertaining to shear stress calculations.

—*ISO 11114–1:2020, Gas cylinders—Compatibility of cylinder and valve materials with gas contents Part 1: Metallic materials* in paragraph (w)(51). PHMSA proposes to remove the second edition of this document, ISO 11114–1:2012, and the 2017 supplemental amendment, ISO 11114–1:2012/Amd 1:2017, currently residing in paragraphs (w)(50) and (w)(51), respectively, and referenced in §§ 172.102, 173.301b, and 178.71, and to replace these references with the updated third edition, ISO 11114–1:2020. This document provides requirements for the selection of safe combinations of metallic cylinder and valve materials and cylinder gas contents. This revised third edition includes all changes that were added in ISO 11114–1:2012/Amd.1:2017, clarification of the definition of the term ''dry,'' clarification in the table of compatibility, and various editorial improvements including updated references to incorporate Amendment 1.

—*ISO 11114–2:2021, Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials* in paragraph (w)(52). PHMSA proposes to remove the second edition of this document, ISO 11114–2:2013, which is currently referenced in §§ 173.301b and 178.71, and replace that reference with the third edition, published in 2021. This document provides instruction on the selection and evaluation of compatibility between non-metallic materials for gas cylinders and valves and gas contents. It also applies to tubes, pressure drums, and bundles of cylinders. The third edition has been technically revised to include an update to Table 1 to include new non-metallic materials, and a new Table 2, which addresses non-metallic lining materials for gas cylinders.

—*ISO 11119–1:2020, 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* in paragraph (w)(62). PHMSA proposes to incorporate by reference the third edition of this document in §§ 178.75 and 178.71. The second edition, ISO 11119–1:2012, is currently referenced in these sections. PHMSA proposes to add a sunset date of December 31, 2028, on the use of the second edition. This document is Part 1 in a three-part series. Part 1 specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for certain Type 2 composite hoop wrapped gas cylinders or tubes intended for the storage and conveyance of compressed or liquefied gases, as well as cylinders and tubes with composite reinforcement of carbon fiber, aramid fiber or glass fiber (or a mixture thereof) within a matrix of steel wire with a minimum design life of 15 years. The most significant changes in the revised edition of Part 1 include: updates and corrections to references throughout the document; the addition of minimum fiber stress ratios; changes to the fire resistance test procedure; and newly added criteria for tubes above 150 L.

—*ISO 11119–2:2020, 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*'' in paragraph (w)(66). PHMSA proposes to incorporate by reference the third edition of this document in §§ 178.75 and 178.71. The second edition and a required supplemental amendment, 11119–2:2012/Amd.1:2014, are currently referenced in these sections. PHMSA proposes to add a sunset date of December 31, 2028, on the use of these two documents, and to incorporate by reference the third edition, ISO 11119–2:2020. This document is Part 2 in a three-part series. Part 2 specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for Type 3 fully wrapped cylinders or tubes with a load-sharing metal liner and composite reinforcement on both the cylindrical portion and the dome ends. The most significant changes in the third edition of Part 2 include: updated references; the addition of minimum fiber stress ratios; the addition of a new alternative for the drop test for certain cylinders; the addition of an alternative impact test for tubes 150 L or more; changes to fire resistance test procedure to make the test more consistent; and changes to the torque test.

—*ISO 11119–3:2020, 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* in paragraph (w)(69). PHMSA proposes to incorporate by reference the third edition of this document in §§ 178.71 and 178.75. The second edition, 11119–3:2013, is currently referenced in these sections. PHMSA also proposes to add a sunset date of December 31, 2028, on the use

[9] The sunset dates proposed for adoption in this NPRM are consistent with the phaseout date adopted in the 23rd revised edition of UN Model Regulations.

of the second edition. ISO 11119–3:2020 specifies requirements for composite gas cylinders up to 150 L water capacity and composite tubes above 150 L water capacity and up to 450 L water capacity, for the storage and conveyance of compressed or liquefied gases. This document is Part 3 in a three-part series. Part 3 specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for Type 4 composite fully wrapped cylinders or tubes with a non-load sharing liner and composite reinforcement on both the cylindrical portion and the dome ends, and Type 5 fully wrapped cylinders or tubes without liners and with a test pressure of less than 60 bar, with water capacities up to 450 L. This document is intended for cylinders used for the storage and conveyance of compressed or liquefied gases; cylinders and tubes with composite reinforcement of carbon fiber, aramid fiber or glass fiber (or a mixture thereof) within a matrix; and for cylinders or tubes with a minimum design life of 15 years. The most significant changes in the third edition of part 3 include: the addition of a new alternative for the drop test for cylinders up to and including 50 L water capacity with dedicated compressed gas service; the addition of alternative impact test for tubes 150 L or more; changes to the fire resistance test procedure to make the test more consistent and the addition of a criterion for tubes above 150 L; changes to the torque test; and a new procedure for the pneumatic cycle test. ISO revised the 2020 editions of ISO 11119 Parts 1, 2, and 3 following comments received from regulators, manufacturers, and users of the standards worldwide. These changes were made to improve and to clarify test procedures, particularly in relation to large composite cylinders and tubes.

—*ISO 15105–1:2007, Plastics—Film and sheeting—Determination of gas-transmission rate Part 1: Differential-pressure methods* in paragraph (w)(82). PHMSA proposes to reference this document in Special Provision 43 in § 172.102 as a part of a condition for exception from the HMR for nitrocellulose membrane filters. This document specifies two methods for determining the gas transmission rate of single-layer plastic film or sheet and multi-layer structures under a differential pressure.

—*ISO 16148:2016/Amd 1:2020, 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* in paragraph (w)(86). PHMSA proposes to incorporate by reference Amendment 1 of ISO 16148 into § 180.207 to supplement ISO 16148:2016. Amendment 1 is a short two-page supplemental correction for ISO 16148:2016, which gives procedures for the use of acoustic emission examination and follow-up ultrasonic examination during the periodic inspection and testing of seamless steel cylinders and tubes used for compressed and liquefied gases with a water capacity of up to 3,000 L. The use of this supplemental amendment would be required as this document includes a significant correction of Note 2 to Figure A.1 concerning the calculation of the depth of the notches used for calibration. PHMSA expects that the additional requirement to use this supplemental amendment will improve safety by requiring the use of improved engineering standards.

—*ISO 23826:2021, Gas cylinders—Ball valves—Specification and testing* in paragraph (w)(97). PHMSA proposes to incorporate by reference the first edition of this document into §§ 178.301b and 178.71. ISO 23826:2021 is a new standard specifying the design, type testing, marking, manufacturing tests and examination requirements for ball valves used as closures of refillable transportable gas cylinders, pressure drums, and tubes; main valves for cylinder bundles and valves for cargo transport units and multiple element gas containers (MEGCs) that convey compressed gases, liquefied gases, and dissolved gases. The new document fills an important gap as ball valves are explicitly excluded in other closure standards such as ISO 10297, *Gas cylinders—Refillable gas cylinder valves—Specification and type testing.* PHMSA expects that the addition of this reference document will facilitate the manufacture, design, and testing of various packagings used for the transport of hazardous materials.

All ISO standards can be found at: *www.iso.org/standards.html.*

• The 2023 Edition of Transport Canada's Transportation of Dangerous Goods (TDG) Regulations in paragraph (bb)(1), to replace the 2017 edition, which is currently referenced in §§ 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. 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. This paragraph lists 22 Statutory Orders and Regulations (SORs), which have since been consolidated into one point of reference, SOR/2001–286. PHMSA also proposes to remove references to these 22 SORs and only reference SOR/2001–286 for all of Transport Canada's TDG regulations. Transport Canada's TDG regulations are available online at: *https://laws-lois.justice.gc.ca/eng/regulations/sor-2001-286/.*

• The 23rd Revised Edition (2023) 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 22nd revised edition (2021), which are referenced in §§ 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. The UN Model Regulations present a basic scheme of provisions that allow uniform development of national and international regulations governing the various modes of transport. Amendments adopted in the 23rd revised edition of the UN Model Regulations include new UN numbers and provisions regulating the transport of sodium ion batteries, fire suppressant dispersing devices, disilane, gallium contained in articles, and trifluoromethyl tetrazole-sodium salt in acetone; a new special provision to increase the authorized volume for transport in limited quantities of some compressed gases of Division 2.2 without subsidiary hazards; more specific concentration limits for ammonium nitrate hot concentrated solutions; exceptions for nitrocellulose membrane filters; and an update to the requirements for the use of recycled plastics in packagings. The 23rd revised edition of the UN Model Regulations is available online at: *https://unece.org/transport/dangerous-goods/un-model-regulations-rev-23.*

• The 8th 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 7th Revised Edition, which is currently referenced in §§ 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; 173, appendix H; 175.10; 176.905; and

178.274. PHMSA also proposes to add a new reference to this document in § 173.169 in reference to the performance of test series 6(c) for fire suppressant dispersing devices. 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 UN Model Regulations. Amendments adopted in this eighth revised edition include: the addition of organic peroxides and polymerizing substances to the list of substances that should not be tested in the self-heating test to avoid false positives; a recommendation to use close-cup tests over open-cup tests for determining flash points; new provisions for the testing of sodium ion batteries; amendments to the classification of desensitized explosives according to the Globally Harmonized System of Classification and Labelling of Chemicals. The eighth revised edition of the UN Manual of Tests and Criteria is available online at: *https://unece.org/transport/standards/transport/dangerous-goods/un-manual-tests-and-criteria-rev8-2023.*

- The 10th Revised Edition of the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), in paragraph (dd)(3), to replace the 9th Revised Edition, which currently is referenced in § 172.401. The GHS is an international system standardizing hazard classification and communication. The HMR authorizes its use for labeling of packages. This revised edition contains updates addressing, among other items, further rationalization of precautionary statements to improve user comprehensibility while considering usability for labelling practitioners. PHMSA notes that the classification procedures for desensitized explosives that were added in this edition of the GHS are not related to transport classification and do not represent a requirement or criteria for obtaining an approval under the HMR. The 10th revised edition of the GHS is available online at: *https://unece.org/transport/dangerous-goods/ghs-rev10-2023.*
- The 2025 edition of the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR 2025), in paragraph (dd)(4), to replace the 2021 edition of the ADR (ADR 2021), which is referenced in §§ 171.8 and 171.23. The ADR outlines regulations concerning the international carriage of dangerous goods by road within the European Union (EU) and other countries that are party to the agreement. The HMR authorizes its use regarding the definition of a liquid material and transport of pi marked cylinders. This revised edition contains the amendments adopted in 2024 by the Working Party on the Transport of Dangerous Goods. ADR 2025 is available online at: *https://unece.org/adr-2025-files.*

Section 171.8

Section 171.8 defines terms used throughout the HMR. PHMSA proposes to add a new definition, as adopted in the 23rd revised edition of the UN Model regulations, to this section for ''sodium ion cell or battery'' similar to lithium ion cell or battery. PHMSA expects that adding this definition will provide clarity and enhance safety, primarily by specifying which sodium ion battery types will be subject to the newly proposed provisions in this NPRM applicable to sodium ion batteries.

Section 171.23

Section 171.23 provides conditions and requirements for shipments of certain packages or materials offered for transportation or transported in the United States under the ICAO Technical Instructions, the IMDG Code, the Transport Canada TDG Regulations, or the International Atomic Energy Agency (IAEA) Regulations—as applicable. PHMSA proposes to amend paragraph (b)(5), which specifies conditions and requirements for certain materials, by adding conditions and requirements for fire suppressant dispersing devices. This amendment would be consistent with proposed changes that add new HMT entries ''UN0514, Fire suppressant dispersing devices, 1.4S'' and ''UN3559, Fire suppressant dispersing devices, 9,'' which add a new classification and packaging section and revise the explosives packaging section. Detailed summaries of these proposed changes are found in the discussions of Sections 172.101, 173.62, and 173.169 of the Section-by-Section Review.

Specifically, for this section, PHMSA proposes that prior to being transported under authorized international standards and regulations, the Associate Administrator must approve fire suppressant dispersing devices in accordance with §§ 173.56 and (new) 173.169 of the HMR. PHMSA also proposes to reorganize paragraph (b) so that the subject of each provision appears in alphabetical order. This proposed change is necessary to maintain oversight through the explosives approval process, which will allow PHMSA to ensure safe transportation under the new HMT entries and in accordance with the classification, packaging, and conditional exceptions from movement of these devices domestically and globally. Devices approved in accordance with an international competent authority may rely on that documentation for processing an explosives approval application in the United States.

Part 172

Section 172.101 Hazardous Materials Table (HMT)

The HMT summarizes terms and conditions governing the transportation of listed hazardous materials 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 reference 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 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 and Revisions to the Appendix B to § 172.101—List of Marine Pollutants

Fire Suppressant Dispersing Devices (UN0514 and UN3559)

PHMSA proposes to add two new entries to the HMT for fire suppressant dispersing devices to identify better these articles for purposes of classification, packaging, and handling for transportation. See the Section-by-Section discussion of Section 173.169 for a detailed discussion of fire suppressant dispersing devices and proposed requirements for their classification, handling, and transportation. The proposed new entries are ''UN0514, Fire suppressant dispersing devices, 1.4S'' and ''UN3559, Fire suppressant dispersing devices, 9.'' Fire suppressant dispersing devices are articles containing a pyrotechnic substance that disperse a fire extinguishing agent (or generate an aerosol) when activated, and do not contain any other hazardous materials. To address the prevalence of these articles, the UNSCOE created two new UN ID numbers and added entries to the

Dangerous Goods List (DGL) in the 23rd revised edition of the UN Model Regulations. PHMSA agrees that the addition of these two new entries to the HMT will provide a description that is more appropriate than ''UN3268, Safety devices, *electrically initiated,*'' and expects that the accompanying classification, packaging, and handling provisions will provide more consistency and for a safe method of transporting these articles.

Tetramethylammonium Hydroxide (UN1835, UN3423, UN3560)

PHMSA proposes several changes pertaining to tetramethylammonium hydroxide (TMAH) to align with the 23rd revised edition UN Model Regulations. TMAH is a quaternary ammonium compound used in the chemical industry in its solid form and as an aqueous solution. TMAH solutions are currently transported under ''UN1835, Tetramethylammonium hydroxide solution,'' as PG II or PG III, with TMAH solids being transported under ''UN3423, Tetramethylammonium hydroxide, solid,'' as a PG II. These materials are all classified as Class 8 (corrosive) material and assigned either PG II or PG III using the criteria in § 173.137 of the HMR. However, literature studies of incidents involving accidental human exposure shows that TMAH presents a toxicity hazard in addition to the currently identified corrosivity hazard.[10] The studies indicate that TMAH can cause systemic neurotoxic effects leading to respiratory failure and cardiac arrest in addition to chemical burns in the event of bodily exposure. The studies showed that fatalities occurred from exposure to 25 percent TMAH solution. Furthermore, acute dermal toxicity studies indicated increasing toxic properties as concentration of TMAH solutions increased. Consequently, the UNSCOE determined that there was a need for a revised classification for TMAH materials to account for toxic properties.

The proposed amendments include the addition of a new entry describing a TMAH aqueous solution of at least 25 percent TMAH—''UN3560, Tetramethylammonium hydroxide aqueous solution *with not less than 25 percent tetramethylammonium hydroxide*'' in the HMT. This new entry would have a primary hazard of Division 6.1 (toxic), a subsidiary hazard of Class 8 (corrosive), and be assigned to PG I. Consistent with this new table entry for 25 percent TMAH aqueous solutions, additional changes are proposed for existing TMAH HMT entries to further account for the toxicity hazard and clarify their use, including revisions to the proper shipping names and descriptions, the hazard classification of PG II TMAH solutions (UN1835) reclassification of TMAH solids (UN3423) and revised packaging authorizations, and the assignment of two new special provisions (*i.e.,* 408 and 409).

PHMSA proposes revisions to the TMAH solution (UN1835) shipping description to aid shippers with selecting the most appropriate hazardous materials description and to delineate clearly the classification and PG assignment. For the PSN ''Tetramethylammonium hydroxide solution,'' the term ''aqueous'' is added to clarify that the PSN applies to aqueous solutions of TMAH. See the Section-by-Section Review discussion of Section 172.102, Special Provision 408, for further context. Furthermore, concentration ranges corresponding to the assigned PG are added in italics to be used in addition to the PSN. Specifically, the revised hazardous materials description for the PG II entry would read ''Tetramethylammonium hydroxide aqueous solution *with more than 2.5 percent but less than 25 percent tetramethylammonium hydroxide,*'' and the PG III entry would read ''Tetramethylammonium hydroxide aqueous solution *with not more than 2.5 percent tetramethylammonium hydroxide.*''

With respect to the revised classification for TMAH solution (UN1835), PHMSA proposes to add a Division 6.1 subsidiary hazard for the PG II entry—*i.e.,* TMAH aqueous solutions containing more than 2.5 percent but less than 25 percent TMAH. This amendment addresses the data from human exposure incidents and toxicity studies that demonstrated an increasing toxicity property for TMAH solutions as concentration increased.

Similarly, for TMAH, solid (UN3423), which is currently classified as Class 8, PG II, the UNSCOE reclassified as a primary hazard of Division 6.1, a subsidiary hazard of Class 8, and assigned PG I. PHMSA agrees with this reclassification based on human experience and acute toxicity studies. PHMSA concurs with this determination due to the reclassification of the material to a PG I material. Therefore, PHMSA proposes to change the primary hazard from Class 8 to Division 6.1 in column (3) of the HMT and transition the Class 8 corrosivity hazard to a subsidiary hazard as designated in column (6) of the HMT. In addition, with this hazard reclassification, the PG for UN3423 would be changed from PG II to PG I. PHMSA also notes that in the latest revisions to the DGL in the UN Model Regulations, the limited quantity exception authorization for this entry was removed.

Lastly, PHMSA proposes to assign two new special provisions—Special Provisions 408 and SP 409—to these entries. Special Provision 408 would provide additional hazard communication instructions for certain mixtures containing TMAH and would be assigned to all three TMAH solution entries, stating that the use of those proper shipping names is limited to aqueous solutions comprised of water, tetramethylammonium hydroxide, and no more than one (1) percent of other constituents. This new special provision would also provide instruction that other formulations containing more than one percent surfactants and certain concentration ranges of TMAH (≥8.75 percent or, >2.38 to <8.75 percent, respectively) must be described using ''UN 2927, Toxic liquid, corrosive, organic, n.o.s.,'' while other formulations not meeting the criteria in the SP 408 must be assigned to an alternative appropriate generic or n.o.s. HMT entry.[11] PHMSA expects that providing instruction on the appropriate use of TMAH aqueous solution descriptions and generic or n.o.s. HMT entries for formulations other than aqueous solutions that contain TMAH would make things clearer for shippers of TMAH mixtures with regard to appropriate hazard communication and associated packaging requirements. PHMSA also proposes to assign new Special Provision 409 to all three TMAH solution entries and the TMAH solid entry to allow shipment using the current hazard communication through December 31, 2026, to allow time for offerors to adjust their hazard communication (see the Section-by-Section Review in Section 172.102 for additional information). PHMSA expects these hazard classification and communication changes will enhance safety by providing more appropriate packaging and transport requirements and more accurate hazard information for handlers of TMAH packages and emergency responders.

[10] United Nations Economic Commission for Europe (UNECE), *Additional data on proposal ST/SG/AC.10/C.3/2022/24—Revision of classification of tetramethylammonium hydroxide* (June 16, 2022), available at: *https://unece.org/sites/default/files/2022-06/UN-SCETDG-60-INF22.e_0.pdf.*

[11] For clarity, n.o.s. means not otherwise specified (in the HMT).

Sodium Ion Batteries With Organic Electrolyte and Sodium Ion Batteries Contained in Equipment With Organic Electrolyte/Sodium Ion Batteries Packed With Equipment, With Organic Electrolyte (UN3551 and UN3552)

PHMSA proposes to add three new entries for sodium ion batteries to the HMT: ''UN3551, Sodium ion batteries *with organic electrolyte,*'' ''UN3552, Sodium ion batteries contained in equipment, *with organic electrolyte,*'' and ''UN3552, Sodium ion batteries packed with equipment, *with organic electrolyte.*'' These all describe materials of Class 9. The UN Model Regulations have recently adopted provisions regulating sodium ion cells and batteries in much the same way as lithium ion cells and batteries. Sodium ion technology has the potential to be a low-cost alternative to lithium ion batteries in certain applications. Both sodium ion batteries and lithium ion batteries are rechargeable energy storage devices, with sodium ion batteries using sodium ions to carry a charge and lithium ion batteries using lithium ions to carry a charge. Both present similar hazards due to their energy density. A key operational difference between sodium ion and lithium ion technology is that sodium ion technology can be discharged to zero volts (*i.e.,* a zero state-of-charge) without affecting the performance of the battery. Batteries using sodium ion technology can therefore be stored and transported in a completely discharged state, with terminals shorted if required, greatly reducing their hazard. However, PHMSA and the UNSCOE agree that the same requirements that apply to lithium ion batteries are appropriate for sodium ion batteries given that the two demonstrate similar risks.

Like previous versions of the UN Model Regulations, the HMR does not currently have a hazardous material description for sodium ion batteries. The current entry in the HMT of ''Batteries, containing sodium'' (UN3292) is applicable to various cell chemistries, such as sodium sulfur and sodium metal chloride which contain metallic sodium, but does not specifically address batteries of sodium ion cell chemistry. When evaluating the proposed adoption of requirements for sodium ion batteries, the UNSCOE analyzed the quantity and nature of gases emitted during the thermal runaway of sodium ion batteries from tests conducted at the French National Institute for Industrial Environment and Risks.[12] Results showed similarities between the quantity and nature of the gases emitted during the thermal runaway of sodium ion batteries and during the thermal runaway of certain types of lithium ion battery chemistries.

With the results of these tests, along with information indicating that by 2023 companies were planning to mass produce sodium ion batteries to alleviate supply chain issues with lithium ion batteries, the UNSCOE adopted provisions to regulate sodium ion batteries in the same manner as lithium ion batteries. PHMSA now aims to harmonize with current international regulations by adopting those same provisions.

PHMSA expects that as sodium ion batteries become more widely used, harmonizing the HMR with international standards will provide a baseline of uniform transport standards. For sodium ion batteries being transported domestically or exported by U.S. companies abroad, this standardization will ultimately allow for reduced burdens, increased efficiency, and avoid unnecessary costs for domestic industries—leading to less expensive product options for domestic consumers. See the Section-By-Section Review in Section 173.185 for further detail of the proposed classification, packaging provisions, and exceptions for sodium ion batteries.

In addition, PHMSA proposes to assign a new special provision for sodium ion batteries, and to make many of the existing special provisions related to lithium ion batteries applicable to sodium ion batteries. See the Section-By-Section Review in Section 172.102 for further details of proposed special provisions applicable to sodium ion batteries.

Lastly, PHMSA proposes to make one of the vessel stowage codes that is currently assigned to lithium ion batteries applicable to sodium ion batteries, including sodium ion batteries packed with, or contained in, equipment. PHMSA expects this change will enhance safety by ensuring sodium ion batteries are properly stowed when transported by vessel. See the Section-By-Section Review in Section 172.101, column (10) discussion of for additional details on this amendment.

Disilane (UN3553)

PHMSA proposes to add a new entry, ''UN3553, Disilane, 2.1,'' to the HMT. Disilane is a pyrophoric liquified gas under pressure that is spontaneously flammable in air and does not require spark or flame to ignite. Disilane is used primarily in the manufacture of integrated circuits in various electronics, including computer processors. Despite its pyrophoric properties, disilane is commonly transported under the generic shipping description, ''UN3161, Liquefied gas, flammable, n.o.s. (Disilane).'' As a part of their review of proposed amendments to the UN Model Regulations, the UNSCOE discussed the need for a more specific proper shipping name that would better reflect the flammable and pyrophoric properties of disilane. The UNSCOE concluded that the use of the generic description for disilane only reflects its flammability properties but not the pyrophoric properties. Unlike ''UN2203, Silane'' and other similar pyrophoric materials that are forbidden for transport by cargo aircraft, disilane, as currently transported under ''UN3161, Liquefied gas, flammable, n.o.s. (Disilane),'' is not forbidden for transport by cargo aircraft.[13] The UNSCOE concluded that a separate shipping description for disilane should be created to clarify the pyrophoric properties of the material and ensure that there is no possibility of disilane being transported by air.

Consistent with the ICAO Technical Instructions for disilane, PHMSA proposes to add the entry to the HMT, noting that ''Forbidden'' would be indicated in column (9) for both passenger and cargo aircraft. For shipments by vessel, PHMSA proposes to assign stowage code D, which requires that the material is stowed on deck when transported on a cargo vessel and further limits the stowage of the material by vessel when passengers are present. In addition, PHMSA proposes to assign segregation codes, 40, 57, and 104 in column (10B) to require that disilane be segregated from living quarters, from chlorine, and from bromine to prevent hazardous reactions. These stowage and segregation provisions are consistent with the requirements adopted in Amendment 42–24 to the IMDG Code. PHMSA expects that adding this new entry and the new packaging provisions will enhance safety by providing a clearer hazard identification of disilane and ensuring that there is no possibility of this product being transported by air.

[12] UNECE, *Sodium ion batteries: Assignment of a dedicated UN number and related special provisions—Follow-up on document ST/SG/AC.10/C.3/2020/45/Rev.1* (Sept. 20, 2021), available at: *https://unece.org/sites/default/files/2021-09/ST-SG-AC.10-C.3-2021-55e.pdf.*

[13] Both UN2203 and UN3161 are forbidden for transport aboard passenger aircraft.

Gallium Contained in Manufactured Articles (UN3554)

PHMSA proposes to add ''UN3554, Gallium contained in manufactured articles,'' as a new entry to the HMT. Gallium is a silver white metal with a low melting point and, though corrosive to certain metals like aluminum, is widely considered a safer, non-toxic alternative to mercury. Gallium and its alloys are used in a variety of products in place of mercury products—such as thermometers and UV lamps. This transition away from mercury has been driven largely in response to the 2013 Minamata Convention on Mercury (*i.e.,* Convention).[14] The Convention aimed to reduce mercury emissions and exposure, through the reduced production, import, and export of mercury-containing products. Since 2017, manufacturers have explored substitutes to mercury-containing products.[15] To facilitate the use of this alternative material, PHMSA proposes new packaging provisions for this new entry to mirror the provisions for ''UN3506, Mercury contained in manufactured articles''—which have been authorized in the HMR since 2013 and have a well demonstrated safety record.[16] See the Section-by-Section Review in Section 173.162 for additional information on the new packaging provisions for this entry. PHMSA expects that this new entry will provide consistency with international regulations and allow for a less toxic material to be integrated into the market.

Trifluoromethyltetrazole-Sodium Salt (UN3555)

PHMSA proposes to add a new entry, ''UN3555, Trifluoromethyltetrazole-sodium salt in acetone, *with not less than 68% acetone, by mass,* 3, PG II,'' to the HMT. PHMSA proposes to add a new entry, ''UN3555, Trifluoromethyltetrazole-sodium salt in acetone, *with not less than 68% acetone, by mass,* 3, PG II,'' to the HMT. Trifluoromethyltetrazole, sodium salt (TFMT-Na) in acetone is a desensitized explosive compound used as a precursor material for a new insecticide that is entering the market. Due to the explosive properties of the dry substance, it is only handled and transported as a homogenous solution in acetone. As a result of its unique properties, the UNSCOE agreed to create a new entry on the DGL to facilitate its transport as its use is expected to increase across various countries.

PHMSA proposes to mirror the UN Model Regulations' corresponding packaging provisions for this hazardous material by creating a new special provision, Special Provision 234. This new special provision will specify the authorized packaging for this material. In addition, PHMSA is assigning Special Provision 74 which would require that:

1. The material be protected from direct sunlight; and

2. The material be stored or kept in a cool and well-ventilated place away from all sources of heat.

PHMSA is also assigning Special Provision 162 to permit the material be transported under the provisions of Class 3, provided it is packed so that the percentage of diluent will not fall below the stated amount at any time during transport. PHMSA notes that the entry includes ''Forbidden'' in column (9) for both passenger and cargo aircraft, which is consistent with the ICAO Technical Instructions. PHMSA expects that the addition of this new HMT entry and associated authorized packaging requirements will facilitate the safe transport of this emerging product domestically and internationally.

Lithium Ion Battery Powered Vehicle, Lithium Metal Battery Powered Vehicle, and Sodium Ion Battery Powered Vehicle (UN3556, UN3557, and UN3558, Respectively)

PHMSA proposes to add three new entries to the HMT for vehicles powered by lithium ion batteries, lithium metal batteries, and sodium ion batteries to address the massive market growth in personal mobility devices, such as e-bikes, e-scooters, e-skateboards, and other lightweight vehicles. The proposed new entries are: ''UN3556, Vehicle, lithium ion battery powered,'' ''UN3557, Vehicle, lithium metal battery powered,'' and ''UN3558, Vehicle, sodium ion battery powered.'' These entries will provide more precise descriptions for vehicles powered by various battery chemistries (*e.g.,* lithium or sodium ion cells or lithium metal cells), rather than relying on the broadly used entry ''UN3171, Battery-powered vehicle.'' Currently, there are two distinct entries that cover products containing lithium ion and lithium metal cells and batteries (UN3480 and UN3090); however, the same differentiation does not exist for vehicles powered by various battery types. The UNSCOE addressed this lack of distinction, clarity, and consistency by adding these three new UN numbers and proper shipping names to the DGL in the UN Model Regulations. PHMSA agrees with the UNSCOE's solution and expects that the addition of these specific hazardous materials descriptions will provide a differentiation between vehicles powered by lithium batteries, sodium ion batteries and other battery powered vehicles and help to identify better the batteries in these vehicles for emergency response purposes. PHMSA does not expect that this amendment will impose additional costs as the packaging provisions are the same for each vehicle type. For example, non-spillable battery powered vehicles should continue to use the entry ''UN3171, Battery-powered vehicle.'' PHMSA expects that the addition of these new entries will facilitate the efficient transport of these hazardous materials by providing better shipping descriptions and more precise hazard communication.

Additions to Appendix B to § 172.101—List of Marine Pollutants

Appendix B to § 172.101—List of Marine Pollutants lists potential marine pollutants as defined in § 171.8 of the HMR. To align with Amendment 42–24 to the IMDG Code, PHMSA proposes to add isopropenylbenzene, 2-phenylpropene, and cobalt dihydroxide powder, *containing more than 10 percent respirable particles* to this list. Isopropenylbenzene is currently listed by name in the HMT under UN2303 and has the same chemical structure as 2-phenylpropene, which makes the two names synonymous. Following additional testing—which was required for compliance with the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) regulations in the EU—the IMO agreed to add these entries to the list of marine pollutants in Amendment 42–24 of the IMDG Code. The testing results showed that the substance meets the criteria to be classified as an ''Environmentally hazardous substance (aquatic environment)'' as stipulated in section 2.9.3 of the IMDG Code.

With respect to the addition of cobalt dihydroxide powder *containing more than 10 percent respirable particles* to the marine pollutants list, in a previous rulemaking—HM–215Q—PHMSA added this material to the HMT as ''UN3550, Cobalt dihydroxide powder *containing more than 10 percent respirable particles.*'' [17] PHMSA made that addition to harmonize with changes made to the Amendment 41–22 to the

[14] United Nations, *2013 Minamata Convention on Mercury* (Oct. 10, 2013), available at: *https://treaties.un.org/doc/Treaties/2013/10/20131010%2011-16%20AM/CTC-XXVII-17.pdf.*

[15] UNECE, *Proposal to amend SP 366, making it also adjust to Gallium contained in manufactured articles* (Apr. 16, 2021), available at: *https://unece.org/sites/default/files/2021-04/ST-SG-AC.10-C.3-2021-17e.pdf.*

[16] 78 FR 988 (Jan. 7, 2013).

[17] 89 FR 25434 (Apr. 10, 2024).

IMDG Code and 2023–2024 edition to the ICAO Technical Instructions, and the 22nd revised edition of the UN Model Regulations, after testing required under REACH regulations determined that this material poses an inhalation toxicity hazard. This material was also added to the list of the marine pollutants in Amendment 41–22 of the IMDG Code; however, PHMSA inadvertently omitted this material as an entry on the list of marine pollutants under the HM–215Q rulemaking. Like isopropenylbenzene/2-phenylpropene, PHMSA added cobalt dihydroxide powder, *containing more than 10 percent respirable particles* because that material also meets the criteria under the IMDG Code to be classified as ''Environmentally hazardous substance (aquatic environment).'' PHMSA proposes to correct this unintentional oversight and add ''Cobalt dihydroxide powder *containing more than 10 percent respirable particles*'' to the list of marine pollutants. PHMSA expects that these amendments will help improve safety to the aquatic environment for the transport of these materials and that the harmonization of the list of marine pollutants will facilitate appropriate transport of these materials.

Revisions to the HMT Columns of Information

Column (1) Symbols

Section 172.101(b) describes column (1), which may contain one of six symbols: ''+'', ''A'', ''D'', ''G'', ''I'' and ''W''. The plus (+) sign fixes the proper shipping name, hazard class, and packing group for that entry without regard to whether the material meets the definition of that class, packing group, or any other hazard class definition. When the plus sign is assigned to a proper shipping name in column (1) of the HMT, it means that the material is known to pose a risk to humans.

PHMSA proposes to add a (+) in column (1) of the HMT for the following entries: ''UN1835, Tetramethylammonium hydroxide aqueous solution *with more than 2.5 percent but less than 25% tetramethylammonium hydroxide*'', ''UN3423, Tetramethylammonium hydroxide, solid,'' and ''UN3560, Tetramethylammonium hydroxide aqueous solution *with not less than 25% tetramethylammonium hydroxide.*'' As discussed below, PHMSA proposes to amend the hazard classification for these entries based on additional data regarding their toxicity (see additional discussion of TMAH amendments throughout the Section-by-Section discussion 172.101). The additions in column (1) would reflect the basis for these classification changes.

In addition, this proposed amendment would align with the changes adopted in the 23rd revised edition of the UN Model Regulations, which assigned Special Provision 279 to these entries. Special Provision 279, like the (+) in column (1), fixes the assigned classification or packing group based on human experience rather than the strict application of classification criteria. PHMSA expects this change will enhance safety by ensuring that these materials are properly classified and packaged to address the newly identified toxicity hazard.

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 proposes to revise the hazardous material description for ''UN1835, Tetramethylammonium hydroxide solution, 8, PG II and III.'' For the PG II entry, PHMSA proposes to add the word ''aqueous'' as part of the PSN and include a concentration range in italics to read ''aqueous solution *with more than 2.5 percent but less than 25 percent tetramethylammonium hydroxide.*'' For the PG III entry, PHMSA proposes to add the word ''aqueous'' as part of the PSN and include a concentration range to read ''aqueous solution *with not more than 2.5 percent tetramethylammonium hydroxide.*'' These proposals align with the proposed changes to the classification of TMAH material as discussed above. PHMSA expects that they will provide an additional level of safety for transportation of aqueous solutions of TMAH by more accurately describing the material.

PHMSA also proposes to modify the proper shipping name of ''UN1010, Butadienes and hydrocarbon mixture, stabilized *containing more than 40% butadienes,*'' by revising the concentration range in italics from ''containing more than 40% butadienes'' to ''containing more than 20% butadienes.'' PHMSA modified this hazardous material description in a prior rulemaking, HM–215G, by adding the italicized text that stipulated the 40 percent concentration of butadienes to describe better certain mixtures.[18] This change was intended to facilitate the classification and transport of mixtures of liquefied petroleum gases, which were already being classified under UN1010 in other countries. However, after evaluating typical shipments of butadiene/hydrocarbon-mixtures, the European Chemical Industry Council (Cefic) determined that most fall within the 20 to 40 percent butadiene concentration range. As a result, the current butadiene concentration requirement of 40 percent or more associated with the use of UN1010 means that less accurate PSNs, such as ''UN1965, Hydrocarbon gas mixture, liquefied, n.o.s.,'' or ''UN3161, Liquefied gas, flammable, n.o.s.,'' are used for many shipments of this material (*i.e.,* shipments with concentrations of butadienes below 40 percent). The UNSCOE reasoned that it was preferable to lower the concentration threshold to facilitate the use of the proper shipping description for a wider group of shipments, given that this PSN clearly reflects the specific danger of butadiene (*e.g.,* carcinogenic), as opposed to using a generic ''n.o.s.'' entry, such as ''UN3161, Liquefied gas, flammable, n.o.s.'' This change would provide emergency responders with immediate information regarding the material being transported and removes the need to seek out the shipping paper to determine that butadiene is involved in an incident. PHMSA agrees with this determination and expects that adjusting the concentration range associated with this PSN will improve safety by providing first responders with better information for effectively responding to incidents involving butadiene mixtures, as well as providing important carcinogenicity risk information for handlers of these mixtures.

For the entries ''UN3292, Batteries, containing sodium'' and ''UN3292, Cells containing sodium,'' PHMSA proposes to revise the PSNs to ''Batteries, containing metallic sodium *or* sodium alloy,'' and ''Cells, containing metallic sodium *or* sodium alloy,'' respectively. This change will harmonize the entries with the UN Model Regulations, which revised the UN3292 entry to provide a clear distinction between sodium metal batteries and the new HMT entries for sodium ion batteries. PHMSA expects this proposal will improve safety by providing additional clarity to ensure shipments of batteries, specifically sodium metal batteries and sodium ion batteries, are properly classified, packaged, and transported.

[18] 69 FR 76044 (Dec. 20, 2004).

Column (3) Hazard Class or Division

Section 172.101(d) describes column (3) of the HMT, which designates the hazard class or division corresponding to the PSN of that entry. As part of the changes for TMAH discussed above, PHMSA proposes to change the primary hazard class of ''UN3423, Tetramethylammonium hydroxide, solid'' to align with the with changes adopted in the 23rd revised edition of the UN Model Regulations. Currently, UN3423 is a Class 8 corrosive material, but both human exposure and toxicity studies have demonstrated that solid TMAH has a significant toxicity hazard as well. UN3423 demonstrates a toxicity hazard and meets the criteria for Class 8 and Division 6.1 hazards. In accordance with § 173.2a, a Division 6.1 hazard should be the primary hazard class as it has precedence over a Class 8 hazard when classifying a material with multiple hazards. For that reason, PHMSA proposes to replace ''8'' in column (3) with ''6.1'' and add Class 8 as a subsidiary hazard to column (6). PHMSA expects this proposed action will improve safety by more accurately communicating the primary hazard of the material and providing uniform hazard communication for international shipments.

Column (5) Packing Group

Section 172.101(f) describes column (5) of the HMT, which specifies one or more packing groups (PG I, II, or III) assigned to certain materials. A PG indicates the required level of packaging according to the degree of danger presented by hazardous materials.

PHMSA proposes to remove the PG assigned to two HMT entries: ''UN2028, Bombs, smoke, non-explosive, with corrosive liquid, without initiating device'' and ''UN3165, Aircraft hydraulic unit fuel tank *(containing a mixture of anhydrous hydrazine and monomethyl hydrazine) (M86 fuel).*'' PHMSA proposes to adopt these changes for consistency with the HMR, which does not assign PGs to articles in classes other than Class 1 in the HMT, and to align with the conventions adopted in the UN Model Regulations in 2012, which also removed PGs assigned to all articles in the DGL. PHMSA expects that removing this inconsistency will maintain the current level of safety for transport of these materials.

In addition, as a part of various changes discussed above pertaining to the hazard classification of TMAH, PHMSA proposes to change the PG of ''UN3423, Tetramethylammonium hydroxide, solid'' from PG II to PG I. This change in assignment from PG II to PG I is based on human experience and toxicity data that indicates a PG I toxicity hazard for TMAH solids is appropriate. PHMSA expects that this change will enhance safety by requiring a higher standard for packaging for this material.

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 proper shipping name, 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.

For ''UN3423, Tetramethylammonium hydroxide, solid,'' which is currently classified as a Class 8 corrosive material, PHMSA proposes to revise the label code to indicate a primary Division 6.1 and subsidiary Class 8 hazard. For ''UN3560, Tetramethylammonium hydroxide aqueous solution *with not less than 25% tetramethylammonium hydroxide,*'' PHMSA proposes to add a 6.1 and 8 label code to correspond to this entry's primary and subsidiary hazards. For ''UN1835, TMAH aqueous solutions *with more than 2.5% but less than 25% TMAH,* PGII,'' PHMSA proposes to add a subsidiary Division 6.1 hazard, which would also be reflected in column (6). Accidental human exposure and acute dermal toxicity studies demonstrates the toxic properties of TMAH, which is discussed in greater detail above in the summary of amendments associated with the new TMAH solution HMT entry (*i.e.,* UN3560). PHMSA expects these changes will increase safety by more appropriately communicating the hazards of these materials.

Column (7) Special Provisions

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

For ''UN1006, Argon,'' ''UN1013, Carbon dioxide,'' ''UN1046, Helium,'' and ''UN1066, Nitrogen,'' PHMSA proposes to assign a new Special Provision 406, which would allow these materials to be transported in DOT specification cylinders and UN pressure receptacles as a limited quantity material in quantities not more than 1000 ml (34 fluid ounces) per package. For additional details on this new provision, see the Section-by-Section Review in Section 172.102.

For ''UN1010, Butadienes and hydrocarbon mixture, stabilized *containing more than 20% butadienes,*'' PHMSA proposes to assign new Special Provision 402, which would specify required conditions for transport under this entry. For additional information on this new special provision, see the Section-by-Section Review in Section 172.102.

For ''UN1391, Alkali metal dispersions *or* Alkaline earth metal dispersions,'' and ''UN3482, Alkali metal dispersions, flammable *or* Alkaline earth metal dispersions, flammable,'' PHMSA proposes to assign six special provisions, *i.e.,* Special Provisions 64, 65, T13, TP2, TP7, and a newly proposed Special Provision, TP42. These special provisions would provide clear direction as to which alkali metals and alkaline earth metals are included under these PSNs and would provide packaging flexibility by authorizing the transport of these materials, which are slurries comprised of metal powders and a hydrocarbon solvent, in portable tanks rather than limiting these materials to other bulk and non-bulk packaging provisions in §§ 173.201 and 173.244. These additional portable tank packaging provisions were adopted in the 23rd revised edition of the UN Model Regulations to facilitate the transport of alkali metals that are incorporated in liquid dispersions for the manufacture of items such as lithium battery anodes. As the global demand for lithium increases, particularly given the potential use in energy storage applications, the need has arisen for the international transport of alkali metal and alkaline earth metal dispersions in portable tanks. Prior to changes adopted in the UN Model Regulations, the DGL did not indicate any portable tank instructions for these materials. Consequently, these hazardous materials were not permitted to be transported in UN portable tanks unless a competent authority approval was granted. The newly assigned T and TP code packaging provisions were adopted for consistency with the Guiding Principles for the Development of the UN Model Regulations, which indicates that liquid Division 4.3 substances of PG I are—in principle—considered suitable for transport in portable tanks conforming to portable tank instructions.[19] To facilitate the transport

[19] This document outlines the underlying principles that have been applied in developing the

of these materials, PHMSA proposes to amend the associated packaging provisions to authorize the transport of alkali metal dispersions and alkaline earth metal dispersions in portable tanks that conform to tank instructions in Special Provisions T13, which requires a higher minimum test pressure of 6 bar, a minimum shell thickness of 6 mm, and prohibits bottom outlets; TP2, which provides a specific formula for the maximum degree of filling; and TP7, which requires that the vapor space has to be purged of air by nitrogen or other means. In addition, PHMSA proposes to assign a new Special Provision TP42 to add supplemental provisions for the transport of alkali metal dispersions that are considered highly reactive. PHMSA expects that by expanding the packaging options, these amendments will facilitate access to affordable, reliable, sustainable, and modern energy sources and offer greater flexibility in the packaging that may be used to transport these materials. For additional details on these TP codes, see the Section-by-Section Review in Section 172.102.

For ''UN1835, Tetramethylammonium hydroxide aqueous solution *with more than 2.5 percent but less than 25 percent tetramethylammonium hydroxide,* PGII,'' ''UN1835, Tetramethylammonium hydroxide aqueous solution *with not more than 2.5 percent tetramethylammonium hydroxide,* PGIII,'' ''UN3560, Tetramethylammonium hydroxide aqueous solution *with not less than 25 percent tetramethylammonium hydroxide,*'' and ''UN3423, Tetramethylammonium hydroxide, solid,'' PHMSA proposes to assign two new special provisions—408 and 409. Special Provision 408 would be assigned to UN1835 (PG II and PG III) and UN3560, and Special Provision 409 would be assigned to UN1835 (PG II and PG III), UN3560, and UN3423. Special provision 408 will provide instruction on appropriate hazardous materials descriptions for aqueous solutions of TMAH with differing formulations and constituents, while Special Provision 409 will provide a delayed compliance date for use of the new HMT entries and revised hazard information to allow industry time to adjust their hazard communication and associated packaging and handling provisions. See the Section-by-Section Review in Section 172.102 for additional discussion of these new special provisions. PHMSA expects that these proposed changes will facilitate the safe transport of these materials by clearly outlining the hazardous communications requirements.

For ''UN2795, Batteries, wet, filled with alkali, *electric storage,*'' ''UN3292, Batteries, containing metallic sodium *or* sodium alloy,'' and ''UN3292, Cells, containing metallic sodium *or* sodium alloy,'' PHMSA proposes to assign new Special Provision 401 to help to distinguish between shipping descriptions that describe batteries and cells with sodium as their electrolyte. Special Provision 401 will also be assigned to the proposed new entries for sodium ion batteries, ''UN3551, Sodium ion batteries *with organic electrolyte,*'' ''UN3552, Sodium ion batteries contained in equipment *with organic electrolyte,*'' and ''UN3552, Sodium ion batteries packed with equipment, *with organic electrolyte.*'' For additional information, see the Section-by-Section Review in Section 172.102.

For ''UN2803, Gallium,'' PHMSA proposes to assign Special Provision 365, which is also proposed to be amended in this NPRM. See the Section-by-Section Review in Section 172.102 for further discussion of amendment to Special Provision 365. Currently, ''UN2803, Gallium'' is only assigned to Special Provisions T1 and TP33, which provide requirements for portable tanks. Special Provision 365 would provide instructions on the use of ''UN2803, Gallium,'' or the newly added entry, ''UN3554, Gallium contained in manufactured articles.''

For ''UN3270, Nitrocellulose membrane filters, *with not more than 12.6% nitrogen, by dry mass,*'' PHMSA proposes to amend the special provision that is currently assigned, Special Provision 43. This special provision would provide an exception from regulation for these materials that meet the packaging requirements specified in Special Provision 43. For additional information, see the Section-by-Section Review in Section 172.102.

''UN3423, Tetramethylammonium hydroxide, solid,'' is currently assigned several special provisions, including IB8, which provides the list of authorized intermediate bulk containers (IBCs) for this material. PHMSA proposes to replace IB8 with IB7. This change is consistent with the proposed revisions pertaining to the hazard classification of TMAH solids. Like IB8, IB7 authorizes IBCs made of metal, rigid plastics, composite materials, and wood. But unlike IB8, IB7 does not authorize fiberboard or flexible IBCs. PHMSA finds that removing the authorization for fiberboard and flexible IBCs is an appropriate change to ensure continued safety for the transport of this material given the proposed revised hazards presented during transportation. Consistent with the revised assignment of IB7, PHMSA also proposes to replace IP2 with IP1. IP2 only requires certain IBCs to be offered for transportation in a closed freight container or a closed transport vehicle, whereas IP1 requires the use of closed freight containers or a closed transport vehicle for all IBC types that contain UN3423. Assigning IP1 is consistent with assignment of IP1 to other Division 6.1, PG I materials listed in the HMT. PHMSA proposes to replace T3 with T6 as well. Replacing T3 with T6 will increase the safety and performance requirements of these packagings by increasing the minimum test pressure from 2.65 bar to 4 bar. This change reflects the same change made in the latest edition of the UN Model Regulations.

PHMSA proposes to assign Special Provision 162 (as proposed to be amended, see discussion in Section-by-Section Review in Section 172.102 for additional information) to ten additional entries on the HMT. Currently, Special Provision 162 is only assigned to desensitized explosives classed as Division 4.1 solids. PHMSA proposes to amend the text of Special Provision 162 to include desensitized explosives classified as Class 3 flammable liquids. PHMSA also proposes to assign Special Provision 162 to some additional Division 4.1 hazardous materials for which this standard applies but which were not previously specified. PHMSA proposes to assign Special Provision 162 to the following Class 3 and Division 4.1 hazardous materials as follows:

- ''UN1204, Nitroglycerin solution in alcohol *with not more than 1 percent nitroglycerin,* 3, PG II''.
- ''UN2059, Nitrocellulose, solution, flammable *with not more than 12.6 percent nitrogen, by mass, and not more than 55 percent nitrocellulose,* 3, PG I''.
- ''UN2059, Nitrocellulose, solution, flammable *with not more than 12.6 percent nitrogen, by mass, and not more than 55 percent nitrocellulose,* 3, PG II''.
- ''UN2059, Nitrocellulose, solution, flammable *with not more than 12.6 percent nitrogen, by mass, and not more than 55 percent nitrocellulose,* 3, PG III''.
- ''UN2555, Nitrocellulose with water *with not less than 25 percent water, by mass,* 4.1, PG II''.
- ''UN2556, Nitrocellulose with alcohol *with not less than 25 percent alcohol by mass, and with not more than 12.6 percent nitrogen, by dry mass,* 4.1, PG II''.
- ''UN2907, Isosorbide dinitrate mixture *with not less than 60 percent*

UN Model Regulations and outlines the approach taken during the development of its provisions.

lactose, mannose, starch or calcium hydrogen phosphate, 4.1, PG II''.

• ''UN3064, Nitroglycerin, solution in alcohol, *with more than 1 percent but not more than 5 percent nitroglycerin,* 3, PG II''.

• ''UN3319, Nitroglycerin mixture, desensitized, solid, n.o.s. *with more than 2 percent but not more than 10 percent nitroglycerin, by mass,* 4.1, PG II''.

• ''UN3343, Nitroglycerin mixture, desensitized, liquid, flammable, n.o.s. *with not more than 30 percent nitroglycerin, by mass,* 3, PG II''.

• ''UN3344, Pentaerythrite tetranitrate mixture, desensitized, solid, n.o.s. *or* Pentaerythritol tetranitrate mixture, desensitized, solid, n.o.s. *or* PETN mixture, desensitized, solid, n.o.s., *with more than 10 percent but not more than 20 percent PETN, by mass,* 4.1, PG II''.

• ''UN3357, Nitroglycerin mixture, desensitized, liquid, n.o.s. *with not more than 30% nitroglycerin, by mass,* 3, PG II''.

PHMSA expects that assigning this special provision will enhance safety by ensuring that both solid and liquid desensitized explosives are subject to uniform performance standards for the diluent during transportation.

PHMSA proposes to make corrections to multiple HMT entries that were inadvertently modified in previous rulemakings. Specifically, PHMSA proposes to remove IP8 from column (7) of the HMT for the following assigned UN numbers: ''UN2246 Cyclopentene'', ''UN1593, Dichloromethane,'' ''UN1164 Dimethyl sulfide,'' ''UN1891, Ethyl bromide,'' ''UN2622, Glycidaldehyde,'' ''UN2288, Isohexenes,'' ''UN2612, Methyl propyl ether,'' ''UN2460, 2-Methyl-2butene,'' ''UN1234 Methylal,'' ''UN1265, Pentanes, PGII,'' and ''UN1278, 1-Chloroproane.'' IP8 states that ammonia solutions may be transported in rigid or composite plastic IBCs (31H1, 31H2 and 31HZ1) that have successfully passed, without leakage or permanent deformation, the hydrostatic test specified in § 178.814 of the HMR at a test pressure that is not less than 1.5 times the vapor pressure of the contents at 55 °C (131 °F). IP8 was meant to be assigned to ammonia solutions, but due to an editorial error, IP8 was assigned to these UN numbers, which are not ammonia solutions.

Finally, for ''UN2555, Nitrocellulose with water *with not less than 25 percent water, by mass,* 4.1, PG II'' and ''UN2556 Nitrocellulose with alcohol *with not less than 25 percent alcohol by mass, and with not more than 12.6 percent nitrogen, by dry mass,* 4.1, PG II,'' PHMSA proposes to assign Special Provision 197. This special provision was inadvertently removed from these entries in the HM–215Q final rule.[20] PHMSA expects that this correction will provide enhanced safety by removing conflicting packaging provisions from these entries.

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 ''§ 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 ''UN3423, Tetramethylammonium hydroxide, solid,'' and based on the proposed classification changes to a Division 6.1 (8), PG I material, PHMSA proposes to remove the ''154'' in column (8A), which currently directs the reader to exceptions for Class 8 (corrosive materials) and to replace it with ''None.'' In addition, in column (8B), ''213'' would be replaced by ''211'' to direct users to the requirements for authorized non-bulk packagings for solid hazardous materials in PG I in § 173.211. Lastly, in column (8C), ''240'' would be replaced with ''242'' to direct users to requirements for authorized bulk packagings for certain medium hazard liquids and solids, including solids with dual hazards. PHMSA expects that these changes will improve safety by providing more appropriate packaging requirements based on the newly identified hazards posed by this material.

Column (9) Quantity Limitations

Section 172.101(j) explains the purpose of column (9) in the HMT. Column (9) specifies quantity limitations for packages transported by air and rail. Column (9) is divided into two columns: column (9A) provides quantity limits for passenger aircraft/rail, and column (9B) provides quantity limits for cargo aircraft.

To align with changes adopted in the 2025–2026 edition of the ICAO Technical Instructions, PHMSA proposes to amend the quantity limitations for TMAH solids (UN3423), consistent with reclassification of this entry. With the proposed new Division 6.1, PG I primary hazard for UN3423, different quantity limitations are required. PHMSA proposes to replace ''15 kg'' with ''1 kg'' in column (9A) and to replace ''50 kg'' with ''15 kg'' in Column (9B), which is consistent with the quantity limits for other Division 6.1, PG I entries in the HMT. PHMSA expects this proposed change to improve safety by appropriately limiting the quantities of this material when transported by rail and air.

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 § 176.84.

For ''UN1791, Hypochlorite solutions, PG III,'' PHMSA proposes to make a correction to the HMT entry. In its HM–215Q rulemaking, PHMSA removed the stowage codes 53 and 58, which require stowage ''separated from alkaline compounds'' and ''separated from cyanides,'' respectively.[21] These stowage codes were intended to be applied to several HMT entries to ensure proper segregation between acids and both amines and cyanides, but should not have included ''UN1791, Hypochlorite solutions.'' When this removal of the stowage codes 53 and 58 was implemented in HM–215Q, PHMSA inadvertently omitted the removal of the aforementioned stowage codes for the PG III entry. Therefore, PHMSA proposes to remove the stowage codes 53 and 58 from column (10B) of ''UN1791, Hypochlorite solutions, PG III.'' PHMSA expects that this correction will remove the burden faced by shippers who have had to segregate hypochlorite solutions for compliance with the HMR, which is inconsistent with the requirements of the IMDG Code.

For ''UN2067, Ammonium nitrate-based fertilizer,'' PHMSA proposes to assign stowage code 116 in column (10B) (as proposed to be amended, see discussion in Section-by-Section Review of § 176.84). This stowage code is currently assigned to ''UN1942, Ammonium nitrate, *with not more than*

[20] 89 FR 25434 (Apr. 10, 2024).

[21] 89 FR 25434 (Apr. 10, 2024).

0.2% combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance,'' and PHMSA proposes to also assign it to ''UN2067, Ammonium nitrate-based fertilizer.'' This change in stowage requirements was adopted in Amendment 42–24 of the IMDG Code because these substances have similar chemical properties, pose similar hazards, may be transported in the same way (*e.g.,* conventional reefer ship, and stored in areas that contain multiple compartments or on vessels with tween deck storage). PHMSA expects this new assignment to provide clarity and consistent direction regarding how these ammonium-based hazardous materials are to be stowed to ensure vessel safety.

For ''UN2303, Isopropenylbenzene,'' PHMSA proposes to assign stowage code 25 in column (10B). This stowage code requires that the hazardous material be ''protected from sources of heat.'' This new stowage requirement for UN2303 was added in Amendment 42–24 to the IMDG Code because the material is liable to polymerize and is generally stabilized with a small quantity of 4-*tert*-butylcatechol, which should be stored at temperatures not exceeding 30 °C. PHMSA agrees with the addition of this extra stowage requirement and expects that protecting the material from sources of heat will enhance safety by ensuring that the stabilization methods applied to these packages will not become ineffective during transport by vessel.

For ''UN3129, Water-reactive liquid, corrosive, n.o.s., PG II and III,'' ''UN3130, Water-reactive liquid, toxic, n.o.s., PG II and III,'' and ''UN3148, Water-reactive liquid, n.o.s., PG I, II, and III,'' PHMSA proposes to revise vessel stowage requirements in column (10A). Currently, these entries are assigned stowage category ''E.'' Stowage category ''E'' indicates that a material may be stowed ''on deck'' or ''under deck.'' PHMSA proposes to change the code in column (10A) for these entries to stowage category ''D.'' This would indicate that these entries must be stowed on deck only and would not be permitted to be stowed under deck. As these materials will not be allowed to be stowed under deck, PHMSA also proposes to revise column (10B) by removing assignment of stowage code ''85,'' which states that a material stowed under deck must be in a mechanically ventilated space, from the entries UN3129 and UN3130. PHMSA also proposes to add new stowage code ''160'' to column (10B) to the entries UN3129, UN3130, and UN3148. This new code will indicate that these materials must be stowed away from potential sources of ignition. These changes in stowage requirements mirror those adopted in Amendment 42–24 to the IMDG Code to address a hazard communication conflict.

Currently, there is no general ''n.o.s.'' entry for liquids classified as a Division 4.3 (dangerous when wet) that also meet the flammable liquid definition (*i.e.,* water-reactive liquids, flammable, n.o.s.), because the Division 4.3 classification would take precedence in hazard classification in accordance with § 173.2. Therefore, shippers are required to classify and to describe these materials as ''UN3148, Water-reactive liquid, n.o.s.,'' which does not provide any indication that the liquid also meets a flammable liquid definition. This requires carriers to assess the flashpoint of a Division 4.3 liquid described as ''UN3148 Water-reactive liquid, n.o.s.,'' ''UN3130, Water-reactive liquid, toxic,'' or ''UN3129, Water-reactive liquid, corrosive, n.o.s.,'' by requesting a safety data sheet, which imposes avoidable administrative burdens for both carriers and shippers. To address this, the IMO revised the stowage categories for the entries discussed from ''E'' to ''D,'' which would prohibit these materials from being stored under deck regardless of their flash point. This amendment would alleviate the burden for carriers to determine material flashpoints to identify their prescribed stowage locations. PHMSA agrees with these revisions and proposes to amend the entries as discussed above.

The IMDG code also requires packages containing flammable gases and flammable liquids having a flashpoint of less than 23 °C to be stowed away from potential sources of ignition. However, there are currently no stowage codes that memorialize this requirement. To address this, the IMDG code added new stowage code ''SW31,'' which indicates that flammable liquids having a flashpoint of less than 23 °C must be stowed away from potential sources of ignition, and assigned it to UN3129, UN3130, and UN3148. PHMSA expects that harmonization with these vessel stowage amendments will alleviate carriers from having to determine a material's flash point and its correct stowage location.

For ''UN3536, Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries,*'' PHMSA proposes to change the code in column (10A) for this entry to stowage category ''D.'' This code would mean that this entry must be stowed ''on deck only'' on a cargo vessel or on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 meters of overall vessel length, but the material is prohibited on a passenger vessel in which the limiting number of passengers is exceeded. For column (10B), PHMSA proposes to add Codes ''25'' and ''40.'' As stated in § 176.84(b), Code ''25'' means that the material must be protected from sources of heat, and Code ''40'' means that the material must be stowed ''clear of living quarters.'' The thirty-ninth session of the CCC finalized these same changes as adopted in Amendment 42–24 of the IMDG Code for UN3536 based on position papers showing significant safety concerns with the way ''lithium battery energy storage cabinets'' were being regulated for stowage aboard vessels. These papers demonstrated, through simulations of fires and explosions involving the ''energy storage cabinets,'' that a significant risk of rupture of the hull structure of ships exists when these containers are stowed in certain positions below deck. Further, it was shown that there was significant risk to the life and safety of the crew when fires involving these containers occur and they are stowed under deck. For these reasons, the CCC, as provided for in Amendment 42–24 of the IMDG Code, adopted provisions that require stowage on deck, and in some cases, a prohibition of transport on certain vessels. Amendment 42–24 of the IMDG Code also adopted provisions that would add safety precautions by protecting the containers from sources of heat and requiring stowage clear of living quarters. PHMSA expects that these new requirements will address the hazards identified by the simulations discussed in these papers and incidents of thermal runaway associated with the transportation of ''lithium battery energy storage cabinets.''

For ''UN3555, Trifluoromethyltetrazole-sodium salt in acetone, *with not less than 68% acetone, by mass,* 3, PG II'' (TFMT-Na), PHMSA proposes to add two new vessel stowage and handling codes. In Amendment 42–24 to the IMDG Code, under column 16a of the DGL, this new entry was assigned four stowage and handling codes which require for UN3555 that: it must be protected from sources of heat (SW1); cargo transport units be shaded from direct sunlight (SW11); it must be stored in cool ventilated space (H3); and that it must be kept as cool as reasonably practicable (H2). PHMSA is assigning codes ''12'' and ''25,'' which correspond to H2 and SW1, respectively. However, the HMR do not have corresponding vessel stowage and handling codes for ''SW11''

and ''H3,'' therefore, PHMSA proposes harmonizing with the IMDG Code to add corresponding provisions by creating two new vessel stowage codes, Code 158 and Code 159. Code 158, like SW11, would instruct that ''Cargo transport units shall be shaded from direct sunlight. Packages in cargo transport units shall be stowed to allow for adequate air circulation throughout the cargo.'' Code 159, like H3, would instruct ''During transport, it should be stowed (or kept) in a cool ventilated place.'' PHMSA expects that these stowage and handling provisions will provide the appropriate level of safety for the transport of this material on vessels.

For ''UN3560, Tetramethylammonium hydroxide aqueous solution *with not less than 25 percent tetramethylammonium hydroxide,*'' PHMSA proposes to add a new stowage code ''D'' in column (10A). This code would mean that the material must be stowed ''on deck only'' on a cargo vessel, or on a passenger vessel carrying a maximum of 25 passengers, or one passenger for each three meters of overall vessel length, but if the limiting number of passengers is exceeded the material is prohibited onboard the vessel. This new stowage location aligns with provisions in Amendment 42–24 to the IMDG Code. In addition, in column (10B), PHMSA proposes to assign stowage code ''52,'' which states that materials must be stowed ''separated from'' acids. Section 176.83(c)(2)(iii) defines ''separated from'' for ''on deck'' stowage (category D) as separated by a distance of at least six meters (20 feet) horizontally. The assignment of these new stowage and handling requirements aligns with provisions in Amendment 42–24 to the IMDG Code. PHMSA expects this proposed change to improve safety by ensuring that this material is stowed in an appropriate location and under appropriate conditions, such as being separated from packages containing acids when transported by vessel.

Section 172.102 (Special Provisions)

Section 172.102 lists special provisions 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 43

PHMSA proposes to modify Special Provision 43, which is assigned to ''UN3270, Nitrocellulose membrane filters, *with not more than 12.6% nitrogen, by dry mass*'' in the HMT. These materials are most notably used in rapid test devices for infectious diseases like COVID–19, influenza, hepatitis, malaria, borreliosis, and other diseases, and as substrates for bioanalytical tests as well as pregnancy tests. Special Provision 43 states that to use this HMT entry nitrocellulose membrane filters—including paper separators and coating or backing materials—present in transport must not be able to propagate a detonation as tested by UN Manual of Tests and Criteria, Part I, Test Series 1(a). Special Provision 43 further states that nitrocellulose (NC) membrane filters in the form in which they are to be transported that do not meet the criteria for a Division 4.1 material, based on suitable burning rate tests and testing in accordance with the UN Manual of Tests and Criteria, Part III, are not subject to the HMR. Finally, NC membrane filters, each with a mass not exceeding 0.5 g, are not subject to the HMR when contained individually in an article or a sealed packet.

To further facilitate the transport of these items, which are often used in medical testing, the 23rd revised edition of the UN Model Regulations includes a new special provision assigned to UN3270 that adds conditions for exception from regulation without the need for testing. PHMSA proposes to adopt the provisions of this new special provision as part of Special Provision 43 in the HMR instead of a wholly separate special provision. Specifically, the special provision in the UN Model Regulations states that for a NC membrane filter with a nitrocellulose content that does not exceed 53 g/m^2, and where the net mass does not exceed 300 g per inner packaging, the NC membrane filter is not subject to regulation under certain conditions. The conditions are that they are packed with paper separators with a minimum of 80 g/m^2 placed between each layer of NC membrane filters; and that they are packed to maintain alignment of the NC membrane filters and paper separators in accordance with three distinct configurations. This exception was adopted based on additional tests showing that NC membrane filters with a NC content less than 53 g/m^2 and an NC net weight not exceeding 300 g per inner packaging do not propagate a detonation and had burn rates justifying exclusion from classification as a Division 4.1 flammable solid in the configuration(s) defined by the provision. As stated previously, PHMSA proposes to adopt the conditions of the UN Model Regulation special provision as part of SP 43 and expects that doing so will facilitate the transport of these filters and reduce the burden of requesting a competent authority approval for transportation of each NC membrane filter type. In addition, this provision will improve the availability of the NC membrane filters for important medical devices, such as rapid test devices for determination of COVID–19 infections. PHMSA expects that the reduced regulatory burden for these products will translate to reduced costs for consumers of many commonly used products in the American pharmacological market.

Special Provision 134

Special Provision 134, which is assigned to ''UN3171, Battery-powered vehicle or Battery-powered equipment,'' currently indicates that the use of UN3171 only applies to vehicles or equipment powered by wet batteries, sodium batteries, lithium metal batteries, or lithium ion batteries that are transported with such batteries installed. However, with the introduction of three specific proper shipping names for battery-powered vehicles, the range of hazardous materials that can be transported under UN3171 is reduced to vehicles and equipment powered by wet batteries that are transported with such batteries installed. PHMSA proposes to amend Special Provision 134 to clarify that vehicles powered 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,'' and ''UN3558, Vehicle, sodium ion battery powered vehicle,'' respectively, and to assign this special provision to these entries on the HMT. PHMSA also proposes to add language regarding vehicles transported in packagings to reiterate that, except for the battery, some parts of battery powered vehicles may be detached from the frame of the vehicle to fit in the outer packaging. This language reiterates language currently in § 173.220, which states that if a battery is removed from a battery powered vehicle (engines and machinery), and is packed in the same outer packaging, the package must be consigned as ''UN3481, Lithium ion batteries packed with equipment,'' ''UN3091, Lithium metal batteries packed with equipment;'' or ''UN3552, Sodium ion batteries packed with equipment, *with organic*

electrolyte.'' As this is only a clarifying editorial amendment, PHMSA expects the change will enhance safety by facilitating the proper description and classification of these vehicles and does not expect that this change will result in any additional costs for the regulated community.

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. Consistent with discussions of proposed changes to the HMR regarding fire suppressant dispersing devices in §§ 172.101, 173.62, and 173.169, PHMSA proposes to revise Special Provision 160 to include a statement to clarify that the HMT entry for ''UN3268, Safety devices'' does not apply to fire suppressant dispersing devices described in § 173.169, specifically, those articles that are properly classed and described as ''UN3559, Fire suppressant dispersing devices.'' PHMSA expects that these changes will enhance safety by facilitating the proper classification of these devices.

Special Provision 162

Special Provision 162, which is assigned to HMT entries that are explosive materials desensitized by liquid (typically water) and classified as a Division 4.1 flammable solid, specifies that these materials may be transported as a Division 4.1 only if packed so that at no time during transport will the percentage of diluent (*i.e.,* the liquid used to desensitize the explosive material) fall below the percentage that is stated in the shipping description. While developing provisions for UN3555, TFMT-Na, a flammable liquid desensitized explosive (as discussed in the Section-by-Section review), the UNSCOE determined that there are no comparable provisions for entries of flammable liquid desensitized explosives classified as Class 3 flammable liquids. Consequently, the UNSCOE determined that this provision (Special Provision 28 in the UN Model Regulations) should be amended to be applicable to flammable liquid desensitized explosives. PHMSA agrees with the UNSCOE and proposes to amend the text of Special Provision 162 to ensure desensitized explosives to be transported under the provisions of Class 3 or Division 4.1, as appropriate, are packed so that the percentage of diluent will not fall below that is stated, at any time during transportation. In addition, the amendment would require, in cases where the diluent is not stated, that the substance be packed so that the amount of explosive substance does not exceed the stated value. PHMSA expects that these changes will enhance safety by providing uniform requirements for the transport of desensitized explosives.

Special Provision 181

For shippers of lithium ion or lithium metal batteries that are ''contained in'' or ''packed with equipment,'' Special Provision 181 instructs that there are certain requirements when a package includes a combination of these lithium battery packaging configurations. This special provision requires that: the packages meet all applicable requirements in § 173.185; packages cannot exceed the quantity limits in columns (9A) and (9B) for passenger aircraft or cargo aircraft, as applicable; the package must be marked for lithium ion or lithium metal batteries packed with equipment; and the shipping paper must indicate the entry(ies) for lithium metal or lithium ion batteries (or a combination of the two) packed with equipment. With the addition of new entries for sodium ion batteries contained in and packed with equipment, and the application of provisions for lithium batteries to sodium ion batteries, PHMSA proposes to make this special provision applicable to lithium batteries contained in equipment and packed with equipment, as well as to sodium ion batteries contained in equipment and packed with equipment. PHMSA also proposes to assign Special Provision 181 to the following new HMT entries: ''UN3552, Sodium ion batteries contained in equipment *with organic electrolyte*'', and ''UN3552, Sodium ion batteries packed with equipment *with organic electrolyte.*''

This special provision ensures that the appropriate hazard communication for packages containing batteries both contained in and packed with equipment, indicating the slightly greater transport risk when batteries are packed with equipment versus when batteries are contained in equipment. PHMSA expects that extending this requirement will improve the level of safety achieved for lithium batteries to sodium ion batteries. Though the ICAO Dangerous Goods Panel (DGP) did not consider this change for the 2025–2026 ICAO TI, PHMSA expects that this requirement will be proposed and adopted in upcoming DGP meetings to provide consistency in the requirements for sodium ion batteries. PHMSA solicits comments on whether codifying this provision should be delayed until it is adopted in other international standards.

Special Provision 234

PHMSA proposes to add a new Special Provision 234 to provide packaging requirements for the new HMT entry, ''UN3555, Trifluoromethyltetrazole, sodium salt (TFMT-Na).'' This special provision mirrors the corresponding packaging and modal transport provisions in the UN Model Regulations. Specifically, PHMSA proposes that authorized packaging for TFMT-Na in acetone must be designed and constructed to prevent loss of the content of the phlegmatizer (*i.e.,* the acetone), must be transported in an upright position, and must be lead free. In addition, packaging must be limited to a maximum capacity of 250 liters (66 gallons).

Trifluoromethyltetrazole, sodium salt (TFMT-Na) in acetone is a desensitized explosive compound used as a precursor material for production of a new insecticide. Due to the explosive properties of the dry substance, it is handled and transported as a homogenous solution in acetone and currently is transported under a generic n.o.s. HMT entry. Because of its unique properties and expected increased use in insecticide manufacturing, the UNSCOE agreed to create a new entry on the DGL to facilitate its transport. As discussed earlier, Trifluoromethyltetrazole, sodium salt (TFMT-Na) is a product used in new products, such as insecticides. PHMSA expects that the addition of this new packaging provision will contribute to emerging industries by facilitating the transport of this material while providing a high level of safety.

Special Provision 252

PHMSA proposes to add a new Special Provision 252 assigned to ''UN2426, Ammonium nitrate, liquid (*hot concentrated solution*).'' This special provision would outline conditions under which solutions of ammonium nitrate can be transported under the HMT entry UN2426. According to this special provision, use of this entry would be based on concentration, water content, combustible material content, chlorine content, pH level, and temperature. Special Provision 252 would also outline criteria that ammonium nitrate solutions must meet to be excepted from regulation. The characteristics outlined in part (1) of Special Provision 252 reflect the existing requirements for transport of UN2426 in the Agreements Concerning the International Carriage of Dangerous Goods by Rail (RID) and by Road (ADR) and the IMDG Code. Given that these standards for transportation of

UN2426 are already recognized in the RID/ADR and IMDG Codes, incorporation of Special Provision 252 would provide clarity by bringing these standards directly into the HMR. Adopting these prescriptive requirements would add clarity to the classification of the material by communicating the thresholds above which the material is classified as hazardous. These requirements were also adopted in the 23rd revised edition of the UN Model Regulations to harmonize the transport conditions multimodally. PHMSA expects that adopting this special provision in the HMR will facilitate the movement of these solutions and improve safety by providing additional clarity on the classification of ammonium nitrate solutions.

Special Provision 328

Special Provision 328 instructs shippers on how to describe fuel cell systems containing lithium metal or lithium ion batteries. PHMSA proposes to make Special Provision 328 applicable to sodium ion batteries that are a component of a fuel cell system. Currently, the special provision only addresses lithium ion batteries and lithium metal batteries that are components of fuel cell systems. PHMSA expects this revision will help to ensure that fuel cell systems with sodium ion batteries are properly classified and that their hazards are properly communicated. Further, this revision harmonizes the HMR with the UN Model Regulations and ICAO Technical Instructions for the adoption of new provisions for sodium ion batteries.

Special Provision 360

Special Provision 360, which is assigned to ''UN3091, Lithium metal batteries contained in equipment'' and ''UN3481, Lithium ion batteries contained in equipment,'' currently indicates that vehicles powered solely by lithium batteries must be transported as ''UN3171, Battery-powered vehicle.'' This special provision serves to clarify that these batteries should be classified as ''UN3171, Battery-powered vehicle,'' rather than ''UN3091, Lithium metal batteries contained in equipment,'' or ''UN3481, Lithium ion batteries contained in equipment,'' if the battery provides motive power for a vehicle. As discussed in the amendments to the HMT (see the Section-by-Section Review in Section 172.101), in light of PHMSA's proposal to add new entries specifically for vehicles powered by lithium ion batteries, lithium metal batteries, and sodium ion batteries to the HMT, PHMSA proposes to amend Special Provision 360 to stipulate that vehicles powered by these batteries must be assigned to ''UN3556, Vehicle, lithium ion battery powered,'' ''UN3557, Vehicle, lithium metal battery powered,'' or ''UN3558, Vehicle, sodium ion battery powered,'' respectively. This proposal aligns with the proposed amendment to Special Provision 134 (discussed above). PHMSA expects that these changes will enhance safety by facilitating the proper classification of these vehicles. PHMSA does not anticipate there will be any costs associated with this clarification as shippers would be provided time to exhaust stocks of existing markings or labels with the currently used PSN.

Special Provision 365

PHMSA proposes to modify Special Provision 365 to include a reference to the proposed new HMT entry ''UN3554, Gallium contained in manufactured articles,'' and to assign this special provision to ''UN2803, Gallium.'' Currently, Special Provision 365 is assigned to ''UN2809, Mercury,'' which provides instructions to facilitate proper classification of mercury containing articles by directing users to ''UN3506, Mercury contained in manufactured articles'' and its associated provisions rather than UN2809, which is for elemental mercury. PHMSA proposes to amend the special provision to provide the same clarification for gallium by adding a reference to ''UN3554, Gallium contained in manufactured articles,'' and assigning it to the UN entry for elemental gallium, ''UN2803.'' PHMSA expects that this change will facilitate the transport of articles and manufactured items containing gallium and prevent avoidable costs to shippers. PHMSA expects that this will ensure these items are transported under the appropriate proper shipping name and that they will not be packaged and transported in accordance with the elemental gallium (UN2803) provisions for which there are fewer exceptions.

Special Provision 371

PHMSA proposes to revise Special Provision 371 by removing the requirement to follow the witness screen setup requirements provided in paragraph 16.6.1.3.5 of the UN Manual of Tests and Criteria, which conflicts with an exception from the requirement to have a witness screen as specified in 16.6.1.2(g). Special Provision 371 is assigned to ''UN3164, Articles, pressurized pneumatic *or* hydraulic *containing non-flammable gas,*'' and contains provisions to determine whether articles containing a small pressure receptacle with a release device can be transported under the entry ''UN3164, Articles, pressurized pneumatic *or* hydraulic *containing non-flammable gas.*'' Paragraph (a)(6) in Special Provision 371 requires an external fire (bonfire) test that follows the provisions of paragraph 16.6.1.2 (but specifically excepts paragraph (g)), as well as the provisions of 16.6.1.3.1 through 16.6.1.3.6, 16.6.1.3.7(b), and 16.6.1.3.8 of the UN Manual of Tests and Criteria. The requirement to follow 16.6.1.3.5, which outlines how to erect and place witness screens, conflicts with the exception from the requirement to have a witness screen, as provided in letter (g) of paragraph 16.6.1.2. To resolve that conflict, the UNSCOE removed the requirements to follow 16.6.1.3.5. PHMSA agrees with this correction and expects that it will facilitate the proper testing and classification of these materials.

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. Among these conditions, Special Provision 379 requires that receptacles containing adsorbed or absorbed ammonia must be made of a material compatible with ammonia as specified in ISO 11114–1:2012(E), ''Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials,'' and an addendum published in 2017, ISO 11114–1:2012/Amd 1:2017(E). PHMSA proposes to revise Special Provision 379 to require receptacles to be made of compatible material as specified in updated ISO 11114–1:2020(E). This document was updated as part of ISO's regular periodic review and adopted for reference in the 23rd revised edition of the UN Model Regulations. PHMSA expects the use of these updated documents would allow safe transport of a wider variety of gases in newly developed types of metallic cylinders and valves without compromising safety.

Special Provision 389

Special Provision 389 provides packaging instructions and hazard communication requirements for ''UN3536, Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries,* 9.'' PHMSA proposes to revise this special provision to provide clarity regarding the emergency response information that

accompanies shipments of UN3536. Specifically, PHMSA proposes that the emergency response information must specifically identify the predominant type of energy storage battery installed in the unit (*e.g.,* lithium ion batteries) and provide information on immediate methods for handling fires that may take place in these units.

On May 11, 2020, PHMSA published final rule HM–215O—a previous iteration of our recurring biennial rulemaking series to maintain harmonization with international regulations and standards.[22] One of the amendments finalized in HM–215O adopted a new entry in the HMT for the transportation of lithium battery energy storage systems that are transported in the form of a cargo transport unit. UN3536, Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries,* 9'' is intended to facilitate the transportation of large-scale battery energy storage systems. These devices are often used to provide electrical power in harsh, ''off-grid'' locations, or as part of an electrical utility facility that stores energy for subsequent use in the electrical grid.[23] PHMSA's understanding is that shipments assigned UN3536 are for systems that primarily contain rechargeable lithium ion batteries as the means of energy storage.[24] PHMSA seeks comment on our understanding of the types of lithium batteries transported using the UN3536 entry.

Currently, the required portion of the proper shipping name for UN3536—Lithium batteries installed in cargo transport unit—does not distinguish between lithium ion and lithium metal batteries. Instead, this distinction is made through italicized text in the HMT, which is not required to appear on the shipping paper or emergency response information. PHMSA's Emergency Response Guidebook (ERG), a resource for use during the initial phase of a transport incident involving hazardous materials, provides differing guidance for fires involving lithium ion and lithium metal batteries. The ERG recommends applying water to a lithium ion battery fire to cool surrounding cells, while the ERG indicates that water and foam *should not* (emphasis added) be applied to a lithium metal battery fire. The entry in the ERG for UN3536 directs the reader to different guide pages depending on the type of battery used in the system—*i.e.,* Guide 147, if the cargo transport unit contains lithium ion batteries, or Guide 138, if the cargo transport unit contains lithium metal batteries.[25] Furthermore, a vehicle transporting UN3536 is required to carry emergency response information (ERI) with the shipping paper that can be used in the mitigation of an incident involving UN3536, including immediate methods to handle fires.[26] This information must provide the proper instructions for emergency response for the specific type of lithium battery technology contained in the cargo transport unit.

A July 2024 incident in Baker, California, involving a motor vehicle transporting UN3536 and resulting in a fire, demonstrates the importance of providing accurate emergency response information. PHMSA observed that the information contained in the proper shipping name and the ERG guidance created confusion for emergency responders in an accident scenario involving the transportation of a battery energy storage system.[27] In particular, the UN identification (ID) number displayed on the cargo transport unit and the mandatory information from the shipping paper (*i.e.,* UN3536, Lithium batteries installed in cargo transport unit) did not indicate whether the cargo transport unit contained lithium ion batteries or lithium metal batteries. Emergency responders were unclear with respect to immediate measures to mitigate the incident due to uncertainty on whether or not they should apply water during the initial stages of the fire. PHMSA is concerned that similar situations may reoccur during the initial response to future incidents involving UN3536, leading to a reduction in emergency response effectiveness, and increased risks to persons, property, and the environment.

PHMSA proposes to clarify the requirements for the ERI that accompanies the shipment of UN3536 to improve emergency response. Specifically, PHMSA proposes to revise Special Provision 389 to state that the ERI that accompanies the shipment must identify the predominant type of batteries in the cargo transport unit (*i.e.,* lithium ion or metal batteries) and provide specific instructions that can be used in the mitigation of an incident, including a fire, involving the unit. PHMSA also proposes an editorial revision to create a paragraph structure for Special Provision 389 to clarify for the reader. PHMSA does not anticipate there will be any costs associated with this clarification, which aligns with existing emergency response information requirements (see § 172.602(a)). PHMSA expects this revision will result in benefits through increased compliance with the existing requirement, which will result in decreased risks to emergency responders' personal safety, and an improved ability to identify and to apply the correct emergency response actions during an incident. PHMSA seeks comment on these expectations.

Separately, PHMSA intends to work with the UNSCOE to pursue internationally harmonized changes to the HMT to create separate UN ID number and proper shipping name entries for cargo transport units containing lithium ion or lithium metal, as well as a new entry for cargo transport units containing sodium ion batteries to improve hazard communication for these energy storage systems. Following the completion of that work, PHMSA will consider—in a future separate rulemaking—revising the HMT to harmonize with those changes to improve emergency response without impeding international transportation of these devices. Until more specific proper shipping names and UN numbers are adopted to reflect predominant battery (*i.e.,* lithium metal or lithium ion) in cargo transport units specifically, PHMSA intends to consider the predominant battery to be the battery that provides electrical power when the container is in use and supplying power to the grid. PHMSA's understanding is that typically the main source of power for these units is a lithium ion battery because these battery types may be recharged which allows them to be used more than once.

Special Provision 400

PHMSA proposes to add a new Special Provision 400 and to assign it to the following new HMT entries: ''UN3551, Sodium ion batteries *with organic electrolyte,*'' ''UN3552, Sodium ion batteries contained in equipment *with organic electrolyte,*'' and ''UN3552, Sodium ion batteries packed with equipment, *with organic electrolyte.*'' This special provision will allow shippers to offer sodium ion batteries for transportation other than by air without being further subject to requirements of the HMR if certain

[22] 85 FR 27810 (May 11, 2020).

[23] U.S. Energy Information Administration, *Electricity explains—Energy storage for electricity generation* (Last accessed Nov. 19, 2025), available at: *https://www.eia.gov/energyexplained/electricity/energy-storage-for-electricity-generation.php.*

[24] U.S. Dept. of Energy, *U.S. DOE Energy Storage Handbook* (last accessed November 19, 2025), available at: *https://www.sandia.gov/ess/publications/doe-oe-resources/eshb.*

[25] PHMSA, *Emergency Response Guidebook 2024,* available at: *https://www.phmsa.dot.gov/training/hazmat/erg/erg2024-pdf-accessible-english.*

[26] 49 CFR part 172, subpart G.

[27] Caltrans, *Caltrans Statement on San Bernardino County I–15 Fire,* available at: *https://dot.ca.gov/news-releases/news-release-2024-027.*

conditions are met. A similar special provision was adopted in the 23rd revised edition of the UN Model Regulations and Amendment 42–24 of the IMDG Code. As discussed in § 172.101 of the Section-by-Section Review, sodium ion batteries, unlike lithium ion batteries, can be discharged to zero volts without affecting the performance of the cell. This means batteries using sodium ion technology can be stored and transported in a completely discharged state, posing no risk from electrical energy. For that reason, PHMSA believes that adding this special provision to provide an exception from all other HMR requirements (except when transported by air), given that certain conditions are still in place, is appropriate and will maintain safety during transportation of these batteries.

At the 29th meeting of the ICAO DGP, the addition of this special provision to the 23rd revised edition of the UN Model Regulations was discussed but ultimately not adopted into the 2025–2026 ICAO Technical Instructions. The DGP stated that it could be confusing to require a battery mark on the packaging, which could lead to disruptions in the acceptance process. The DGP also stated that it would be difficult for anyone other than the manufacturer to know the other hazardous materials that are components of the battery, and to comply with the condition of the special provision that requires the components to be authorized as limited quantities. Therefore, PHMSA proposes to make this special provision authorized for all modes of transportation except for air.

For modes other than air transportation, Special Provision 400 will instruct those offering sodium ion cells and batteries, including those packed with, or contained in, equipment, that those cells and batteries will not be subject to the HMR if: (1) they are short-circuited to a point that they contain no electrical energy; (2) they meet some of the general design criteria for batteries in § 173.185(a); (3) the package is marked with the battery mark; (4) the package, except for cells or batteries contained in equipment, is capable of withstanding a drop test; (5) the cells and batteries contained in equipment are protected from damage; and (6) the components of the battery must be authorized as limited quantities.

Special Provision 401

PHMSA proposes to add a new Special Provision 401, which would provide instructions on the use of sodium ion battery related proper shipping names. PHMSA proposes to assign Special Provision 401 to the following HMT entries:

- ''UN2795, Batteries, wet, filled with alkali, electric storage''
- ''UN3292, Batteries, containing metallic sodium or sodium alloy''
- ''UN3292, Cells, containing metallic sodium or sodium alloy''
- ''UN3551, Sodium ion batteries with organic electrolyte''
- ''UN3552, Sodium ion batteries contained in equipment with organic electrolyte''
- ''UN3552, Sodium ion batteries packed with equipment, with organic electrolyte''

This same special provision was added to the 23rd edition of the UN Model Regulations and the 2025–2026 ICAO Technical Instructions following the addition of new entries for sodium ion batteries. Special Provision 401 is expected to assist in determining the appropriate proper shipping name given that there are now six possible shipping names for batteries that contain different electrolyte chemistries. The electrolyte chemistry used contributes to the battery and cell hazards, and therefore different packaging methods and hazard communication are required. PHMSA does not expect adding this special provision will impose additional costs, and that it will help shippers to determine the appropriate provisions applicable to the batteries they are intending to transport.

Special Provision 402

PHMSA proposes to introduce a new special provision, Special Provision 402, assigned to ''UN1010, Butadienes and Hydrocarbon mixture, stabilized *containing more than 20 percent butadienes*.'' This special provision would specify required conditions for transport under this entry, such as a specific vapor pressure which must not exceed 1.1 MPa (11 bar) and a density at 50 °C not lower than 0.525 kg/l at 70 °C. This new special provision adds requirements to increase safety and ensure stability during transportation of mixtures containing butadiene. The conditions outlined are in line with the test pressure and maximum permissible mass contents per liter of capacity for pressure receptacles and tanks, and are the basis for the markings of the receptacles and the tanks. PHMSA expects this change to improve safety and provide clarity and consistency for the description and classification of butadienes and hydrocarbon mixtures.

Special Provision 406

PHMSA proposes to add a new Special Provision 406 assigned to ''UN1006, Argon,'' ''UN1013, Carbon dioxide,'' ''UN1046, Helium,'' and ''UN1066, Nitrogen.'' This special provision would allow these materials to be transported, except by air, in the appropriate authorized DOT specification cylinders and UN pressure receptacles as a limited quantity material in quantities not more than 1.0 L (34 fluid ounces) per package. The packagings are further restricted by a maximum test pressure-capacity product not to exceed 152 bar liter (78 psig·ft^3)—*i.e.,* the product of the size (capacity) of the packaging multiplied by the test pressure, cannot exceed 152 bar liters. The Division 2.2 gases assigned to this special provision would not be allowed to be packed together (in the same package) with other hazardous materials.

This proposed amendment would harmonize the HMR with the 23rd revised edition of the UN Model Regulations, which includes this special provision (*i.e.,* 406) for limited quantity transport of these four Division 2.2 non-flammable, non-poisonous compressed gases. Prior to the addition of this special provision to the UN Model Regulations, to be transported as a limited quantity, these gases were limited to quantities not exceeding 120 ml (about four fluid ounces) per inner packaging. The HMR currently includes this limited quantity provision for compressed gases—that are not defined as aerosols—in § 173.306(a)(1). The change to the UN Model Regulations was based on and supported by past experience of safe shipments of these gases in accordance with regulations adopted by European countries (*i.e.,* ADR) in volumes exceeding 120 ml and the implementation of special permits with similar provisions issued by PHMSA.[28] The rationale behind limited quantity provisions, which provide exceptions for certain hazardous materials, is that when appropriately packed in lesser quantities, these materials pose a lower risk in transport than the same hazardous materials packed in larger quantities. As a result of that reduced risk, they are afforded some relief from general transportation requirements such as hazard labels. When transported as a limited quantity in accordance with proposed Special Provision 406, these hazardous

[28] DOT–SP 20796 and DOT–SP 20936. UNECE, *Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals—ST/SG/AC.10/C.3/2022/26 Increase of the limited quantity volume for Division 2.2 compress gases* (June 27–July 6, 2022), available at: *https://unece.org/sites/default/files/2022-04/ST-SG-AC.10-C.3-2022-26e.pdf.*

materials would be excepted from labeling, placarding, and shipping papers. The DGP determined that the special provision as adopted in the UN Model Regulations would not be of any substantial value for adoption for air transportation under the ICAO Technical Instructions because, though allowed to be transported in greater quantities as limited quantity material, they would still be subject to marking, labeling, and shipping papers. PHMSA agrees and proposes to exclude the use of this new special provision for air transport specifically. In addition, PHMSA intends to clarify that this provision does not provide shippers with an alternative classification for cylinders intended to be used as fire extinguishers that would otherwise be described and classified as ''UN1044, Fire extinguishers.''

This proposed amendment would also respond to a petition for rulemaking, P–1974, submitted by Hazmat Safety Consulting.[29] PHMSA expects that this proposed amendment will facilitate the transport of important commercial goods that include small cylinders of inert gases. In addition, PHMSA expects that this change will allow domestic sellers to capture economies of scale by offering consumers compressed gas products in larger size options without additional regulatory burden.

Special Provision 408

PHMSA proposes to add a new Special Provision 408 assigned to proposed revised ''UN1835 Tetramethylammonium hydroxide aqueous solution,'' PG II and III, and new ''UN3560, Tetramethylammonium hydroxide aqueous solution.'' The special provision would limit the use of these amended HMT entries to only aqueous solutions made of water, TMAH, and no more than one percent of other constituents. The special provision would also provide instruction that for other formulations containing TMAH, the material must be described using an alternative appropriate generic or n.o.s. HMT entry, except that formulations containing (1) a surfactant in concentration less than one percent and with not less than 8.75 percent TMAH must be described using ''UN2927, Toxic liquids, corrosive, organic, n.o.s., 6.1, PG I;'' or (2) containing a surfactant in concentration less than one percent and with more than 2.38 percent but less than 8.75 percent TMAH must be described using ''UN2927, Toxic liquids, corrosive, organic, n.o.s., 6.1, PG II.'' PHMSA expects that Special Provision 408 will increase safety by providing clearer instructions for appropriate selection of HMT for solutions containing TMAH, which will ensure the hazards of the material are properly communicated, and appropriate authorized packaging and modal transport requirements are maintained.

Special Provision 409

PHMSA proposes to add a new Special Provision 409 assigned to proposed revised ''UN1835 Tetramethylammonium hydroxide aqueous solution,'' PG II and III; revised ''UN3423, Tetramethylammonium hydroxide, solid;'' and new ''UN3560, Tetramethylammonium hydroxide aqueous solution.'' Special Provision 409 would allow shipments of TMAH materials to continue to be transported in accordance with the HMR requirements prior to the publication of a final rule until December 31, 2026. This special provision provides a delayed compliance date that would allow time for shippers and carriers to adjust to the revisions made to the TMAH HMT entries and associated requirements.

Special Provision A54

Special Provision A54 states that, notwithstanding the quantity limits in column (9B) of the HMT, lithium batteries (including those packed with, or contained in, equipment) may exceed a mass of 35 kg (77 lbs.) on cargo aircraft if they otherwise meet the requirements of § 173.185 and the Associate Administrator provides an approval prior to shipment.

At the 29th meeting of the ICAO DGP, the DGP adopted revisions to Special Provision A99 in the 2025–2026 ICAO Technical Instructions, which has the same requirements as Special Provision A54 in the HMR. These revisions applied the special provision to the new entries for sodium ion batteries. This is consistent with other provisions being adopted that regulate sodium ion batteries in much the same manner as lithium batteries based on their similar applications and similar hazards present during transportation. To make this special provision applicable to sodium ion batteries, PHMSA proposes to amend the special provision to reference both sodium ion batteries and lithium batteries. In addition, PHMSA proposes to assign Special Provision A54 to the following new entries: ''UN3551, Sodium ion batteries with organic electrolyte,'' ''UN3552, Sodium ion batteries contained in equipment with organic electrolyte,'' and ''UN3552, Sodium ion batteries packed with equipment, with organic electrolyte.'' This revision will harmonize the HMR with the UN Model Regulations and the adoption of provisions for sodium ion batteries.

Special Provision A100

Special Provision A100 is assigned to ''UN3480, Lithium ion batteries'' and prescribes state-of-charge requirements. Currently, this special provision states that lithium ion cells and batteries transported by air must be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity. In addition, lithium ion cells and batteries at a state-of-charge greater than 30 percent of their rated capacity may only be transported under conditions as approved by the Associate Administrator. PHMSA proposes to extend applicability of this state-of-charge requirement by assigning this special provision to additional lithium ion battery entries on the HMT and to revise this special provision to clarify its applicability. In addition, PHMSA proposes to apply this provision to new HMT entries for sodium ion batteries and vehicles powered by batteries. These changes are consistent with revisions in the 2025–2026 ICAO Technical Instructions.

Specifically, PHMSA proposes to assign Special Provision A100 to the following entries:

- ''UN3481, Lithium ion batteries contained in equipment *including lithium ion polymer batteries*''
- ''UN3481, Lithium ion batteries packed with equipment *including lithium ion polymer batteries*''
- ''UN3551, Sodium ion batteries *with organic electrolyte*''
- ''UN3552, Sodium ion batteries contained in equipment *with organic electrolyte*''
- ''UN3552, Sodium ion batteries packed with equipment, *with organic electrolyte*''
- ''UN3556, Vehicle, lithium ion battery powered''
- ''UN3557, Vehicle, lithium metal battery powered''
- ''UN3558, Vehicle, sodium ion battery powered''

At the 29th meeting of the ICAO DGP, an amendment was considered that would, under certain conditions, extend the existing provision in A100 to lithium ion batteries packed with, or contained in, equipment (UN3481); vehicles powered by lithium ion, lithium metal, or sodium ion batteries; and sodium ion batteries and sodium ion batteries packed with, or contained in, equipment. The DGP Working Group

[29] *Regulations.gov,* PHMSA–2024–0204–P–1794, *https://www.regulations.gov/docket/PHMSA-2024-0204/document.*

on Energy Storage Devices arrived at this decision based on an assessment and safety risk analysis focused on preventing losses due to incidents involving lithium batteries. The DGP Working Group observed during data collection that between 2017 and 2023 there was a decline in transportation incidents involving ''UN3480, Lithium ion batteries.'' The DGP Working Group hypothesized that the reduction in incidents was due to both the ban on lithium ion batteries on passenger aircraft and the requirement for lithium ion batteries to be offered for transport at a 30 percent state-of-charge on cargo aircraft. The DGP Working Group stated that incidents involving lithium ion batteries contained in and packed with equipment hit a low in 2020–2021 but have since risen. Data also indicated that the number of shipments of lithium ion batteries contained in and packed with equipment almost doubled between 2015 and 2022. The DGP's stated goal was to consider whether risks associated with the air transport of lithium ion batteries packed with equipment and contained in equipment were adequately mitigated in consideration of all available information.

The DGP concluded that the risks associated with lithium ion batteries packed with equipment meeting the requirements of the applicable ICAO Technical Instruction packing instructions were not adequately mitigated because, outside of the transportation requirements for small batteries, there were no limits on the energy capacity of the batteries. Testing showed, however, that lithium cells and batteries up to 2.7 Watt-hour (Wh) posed a negligible hazard. Note that the same is true for the requirements of the HMR when shipping lithium ion batteries packed with equipment by air; currently, there are no limits on the Wh rating for lithium cells and batteries not covered by § 173.185(c) exceptions for smaller lithium cells and batteries. Therefore, the DGP added a specific condition that for transport of lithium ion batteries packed with equipment—batteries that exceed 2.7 Wh must not exceed a state-of-charge of 30 percent of their rated capacity, while it is only recommended that batteries not exceeding 2.7 Wh be shipped at a 30 percent state-of-charge. PHMSA proposes the same conditional requirements and recommendation in Special Provision A100. By including lithium ion batteries packed with equipment in Special Provision A100, the risks associated with transporting lithium ion batteries are further mitigated by limiting the energy in these batteries.

For lithium ion batteries contained in equipment, the DGP adopted a recommendation, rather than a requirement, that the lithium ion batteries be shipped at a 30 percent state-of-charge or should be offered for transport at an indicated battery capacity not exceeding 25 percent for several reasons. First, the DGP assumed that lithium ion batteries contained in equipment posed a lesser risk than lithium ion batteries packed with equipment because of the protection the equipment itself provides to the batteries and the assumed smaller energy densities of the lithium batteries. The DGP did not consider the data presented to be relevant or sufficient to justify a requirement. Second, the panel did not consider the risk high enough to warrant mandating something that would significantly impact industry and impede the shipment by air of certain equipment that needed to be shipped fully charged, including life-saving medical devices, large information technology equipment with embedded lithium ion batteries, and military equipment. Lastly, the panel did not consider the presented data to be relevant or sufficient to justify a requirement because incidents were largely due to non-compliant shipments. PHMSA has reviewed the analysis and agrees with the DGP's conclusions and amendments. Further, PHMSA believes that including the reduced state-of-charge as a recommendation for lithium ion batteries contained in equipment is expected to improve safety by letting shippers know that there is a safety benefit from a reduced risk of thermal runaway at lower states of charge.

For sodium ion batteries, the DGP deemed that the same requirements that apply to lithium ion batteries were appropriate for sodium ion batteries based on the similar risks that the two battery chemistries share. For further discussion on their similarities, see the Section-by-Section in Section 172.101. Consistent with the 2025–2026 ICAO Technical Instructions, PHMSA proposes to extend the 30 percent state-of-charge requirements to sodium ion batteries, similar to the current requirements for lithium ion batteries. However, the ICAO DGP did not adopt this requirement for sodium ion batteries packed with or contained in equipment. Consistent with the 2025–2026 ICAO Technical Instructions, PHMSA is not proposing to adopt the 30 percent state-of-charge requirement for sodium ion batteries packed with, or contained in, equipment, respectively.

PHMSA also proposes to expand this special provision to state clearly that the 30 percent state-of-charge requirement also applies to low production runs and prototypes of lithium ion batteries. This would harmonize the HMR with Special Provision A88 of the 2025–2026 ICAO Technical Instructions. In addition, PHMSA proposes to extend the state-of-charge requirement for low production runs and prototypes to sodium ion batteries, including those transported packed with or contained in equipment, and lithium ion batteries packed with and contained in equipment. This clarification and expansion harmonize the HMR with the 2025–2026 ICAO Technical Instructions.

PHMSA proposes to harmonize further with the ICAO Technical Instructions by extending the 30 percent state-of-charge requirement to sodium ion and lithium ion batteries contained and packed in equipment. PHMSA proposes to state clearly that the 30 percent state-of-charge requirement also applies to lithium ion and sodium batteries, including those packed with and contained in equipment, that are above 35 kg and transported in accordance with Special Provision A54. While not explicitly stated, these large lithium ion batteries have been subject to the state-of-charge requirements, but PHMSA expects this proposed language to improve clarity.

For vehicles powered by lithium ion batteries, lithium metal batteries, and sodium ion batteries, the DGP adopted a state-of-charge requirement for batteries exceeding 100 Wh to be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity or an indicated battery capacity not exceeding 25 percent, and a recommendation for batteries not exceeding 100 Wh to be offered at a state-of-charge not exceeding 30 percent of their rated capacity or an indicated battery capacity not exceeding 25 percent. These limitations were adopted based on there being no limits on the energy capacity of the batteries in the vehicles and the likelihood that a thermal runaway of one of these batteries would have extreme consequences if offered for transport at a full state-of-charge. The DGP decided that a 25 percent driving range would allow for the movement of the vehicle under its own power during loading and unloading, and that 25 percent battery capacity on the vehicle's fuel gauge was considered equivalent to a 30 to 35 percent state-of-charge of the battery based on input from large automobile manufacturers. The reason that the adopted language in the ICAO Technical Instruction differs for vehicles powered

by larger batteries (*i.e.,* must) versus the vehicles powered by smaller batteries (*i.e.,* should) is that the DGP determined that smaller vehicle batteries pose less risk based on their Wh rating. The DGP further supported making a reduced state-of-charge requirement for larger batteries contained in vehicles, but not for batteries contained in equipment, because there is no limit on the mass of the batteries in vehicles, while there was a limit (*i.e.,* 35 kg) for those contained in equipment.

PHMSA proposes to add text to the end of the special provision to instruct shippers on where they can find information to determine rated capacity to accurately determining the state-of-charge. While this text has been in previous iterations of the ICAO Technical Instructions, PHMSA believes that the addition provides clarity with the number of entries that this special provision now applies. This additional text also reinforces the importance and safety rationale for why these state-of-charge requirements are necessary.

IBC Special Provision—IP8

IP Codes are special provisions provided for in Table 2 of § 172.102(c)(4) and specify requirements pertaining to the use of IBCs for the transport of specific commodities listed in the HMT. PHMSA proposes to amend the text of IP Code, IP8, which is assigned to ''UN2672, Ammonia solution, *relative density between 0.880 and 0.957 at 15 degrees C in water, with more than 10 percent but not more than 35 percent ammonia*.'' Currently, IP8 states that ammonia solutions may be transported in rigid or composite plastic IBCs (31H1, 31H2, and 31HZ1) that have successfully passed, without leakage or permanent deformation, the hydrostatic test specified in § 178.814 at a test pressure that is not less than 1.5 times the vapor pressure of the contents at 55 °C (131 °F). PHMSA proposes to amend the language in IP8 to reference an IB code, IB3, which will both reiterate and expand on the authorized IBC types. This expansion will allow for a wider range of packaging types to be used in the transport of ammonia solutions, such as new metal IBCs that have been proven to pass the required tests. This change to IP8 was adopted in the 23rd revised edition of the UN Model Regulations to allow for the expanded use of different IBC types, such as metal IBCs that are currently used for higher concentrations of ammonia solutions. PHMSA expects that this amendment will facilitate the transport of this material without sacrificing safety standards by clarifying that, as long as the required safety tests for the IBCs are passed, UN2672 material can be transported in a wider variety of IBC types.

PHMSA proposes to correct a publishing error that occurred in an earlier rulemaking, HM–215Q. In that rulemaking, PHMSA added two new IP codes (IP15 and IP22) to Table 2. Due to a publishing error, code IP16 was inadvertently deleted, and the corresponding requirements of the new codes were printed in the wrong column. PHMSA proposes to add IP16 again and correct the formatting in rows IP15 and IP22. IP16 requires an approval from the Associate Administrator for the use of 31A and 31N IBCs for materials that are assigned this IP code on the HMT (*i.e.,* ''UN3375, Ammonium nitrate emulsion *or* Ammonium nitrate suspension *or* Ammonium nitrate gel, *intermediate for blasting explosives*''). PHMSA expects that this correction will improve safety by ensuring that shippers do not transport these materials in 31A or 31N without PHMSA's oversight.

Portable Tank Special Provision—TP42

TP codes are special provisions that specify requirements pertaining to the use of IM and UN specification portable tanks for the transport of specific commodities listed in column (7) of the HMT. PHMSA proposes to add a new special provision, TP42, assigned to ''UN3482 Alkali metal dispersions, flammable *or* Alkaline earth metal dispersions, flammable,'' and to ''UN1391, Alkali metal dispersions *or* Alkaline earth metal dispersions,'' for portable tanks. TP42 would specify that portable tanks are not authorized for metal dispersions comprised of cesium or rubidium. Technological innovations have allowed for alkali metals incorporated in liquid dispersions to be incorporated seamlessly into manufacturing processes and directly printed onto lithium battery anodes, leading to the increased use of such materials being transported as ''UN3482, Alkali metal dispersions, flammable *or* Alkaline earth metal dispersions, flammable'' or ''UN1391, Alkali metal dispersions *or* Alkaline earth metal dispersions.'' Like cesium and rubidium in their pure forms, metal dispersions containing these materials are not appropriate for transport in portable tanks because they do not do enough to mitigate associated risks, such as exposure to air. Therefore, this change would clarify that not all alkali metals in dispersions are authorized for transport in UN portable tanks. PHMSA expects that this amendment will facilitate the safe transportation of materials that are essential to supporting the use of additional energy technologies while avoiding the inclusion of cesium and rubidium dispersions.

Section 172.203

Section 172.203 details additional description requirements that must be placed on shipping papers for certain shipments of hazardous materials. Paragraph (d) provides instructions for the description of Class 7 (radioactive) materials. Consistent with provisions adopted in the 2025–2026 ICAO Technical Instructions, PHMSA proposes to require that shipping papers for certain packages containing radioactive material include the dimensions of those packages when transported by air. Currently, when packages are required to bear the ''RADIOACTIVE YELLOW–II'' or ''RADIOACTIVE YELLOW–III'' labels, shippers are only required to indicate the transport index assigned to each package as a part of the shipping description. This amendment would further require that when a package bears a ''RADIOACTIVE YELLOW–II'' or ''RADIOACTIVE YELLOW–III'' label, the dimensions (including dimensional units of the package, or, when placed in an overpack or freight container, the dimensions of the overpack or freight container, as applicable) be indicated on the shipping paper. Specifically, the dimensions should be shown in the following order: length then width (or diameter, if applicable). The dimensions may be followed by the letters ''L,'' ''W'' (or ''D''), and ''H'' when listed in this order. Further, if dimensions are listed in an order other than ''length by width (or diameter) by height,'' then the letters ''L'', ''W'' (or ''D''), and ''H'' must be listed in association with the individual measurement (*e.g.,* 10″ (H) x 7″ (W) x 12″ (L)).

The DGP adopted this requirement to facilitate loading procedures by ensuring that the required minimum distance from the surface of a package to the nearest surface of a passenger cabin, flight deck partition, or floors is maintained, as specified in §§ 175.701 and 175.702. The DGP also agreed on these changes, in part, because operators and associations of large aircrafts have already required this information on dangerous goods transport documents for many years. PHMSA expects that standardizing the format in which the dimensions of packages overpacks and freight containers are recorded on shipping papers will enhance safety and benefit operators by making necessary information easier to identify and helping streamline preloading activities.

Section 172.315

Section 172.315 outlines the marking requirements for limited quantities. PHMSA proposes to amend § 172.315 by removing two obsolete transitional exceptions in § 172.315 that permitted the use of older limited quantity marking specifications for size and shape until December 31, 2016. PHMSA expects that removing these paragraphs from the HMR will improve consistency and clarity and prevent misunderstanding by eliminating potentially misleading information.

Section 172.322

Section 172.322 outlines the marking requirements for marine pollutants. PHMSA proposes to amend § 172.322 by removing an obsolete transitional exception in paragraph (e)(3) that permitted the use of older marine pollutant marking specifications for size and shape until December 31, 2016. PHMSA expects that removing this paragraph will improve consistency and clarity within the regulations and prevent misunderstanding of this section by eliminating potentially misleading information.

Section 172.447

Section 172.447 prescribes specifications for lithium batteries labels for shipping. To accommodate the new HMT entries for sodium ion batteries and the adoption of provisions similar to lithium batteries, PHMSA proposes to rename this label the ''LITHIUM BATTERY or SODIUM ION BATTERY'' label. This is consistent with the adoption of sodium ion battery regulations in the 23rd revised edition of the UN Model Regulations and 2025–2026 ICAO Technical Instructions. PHMSA expects that amending this section to identify the label as ''LITHIUM BATTERY or SODIUM ION BATTERY'' will ensure that shippers are aware of proper hazard communication for the new entries for sodium ion batteries and that the hazards associated with those batteries are clearly communicated during transportation.

Part 173

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 devices or equipment are often powered by hazardous materials, such as lithium batteries or cells. PHMSA added this section in a prior rulemaking, HM–215P, but only provided limited exceptions for data loggers and cargo tracking devices when transported by air, which only applied to packages equipped with data loggers that contained COVID–19 pharmaceuticals to allow for additional time to gather safety data involving these devices.[30]

In the 2025–2026 ICAO Technical Instructions, the DGP adopted more expansive provisions for these items. The DGP added an allowance for the transport of data loggers and cargo tracking devices with installed lithium batteries, attached to, or placed in packages, overpacks, or unit load devices on aircraft, under certain provisions. These new provisions address earlier concerns related to the hazards posed by lithium batteries in air transport, specifically related to the energy capacity of the lithium batteries that power these items. In addition, the DGP reviewed requirements developed during a prior working group and engaged with industry to gain an understanding of the size of cells and batteries being used in data loggers and cargo tracking devices, as well as what new technologies may emerge with lithium batteries. The DGP considered the information and adopted limits to the provisions under which the exception would apply including: the data logger or cargo tracking device must be in use or intended for use during transport; the lithium battery must meet UN 38.3 testing; test summary requirements; and quality management program requirements (note, this is not a current HMR requirement) similar to the requirements of Special Provision 388. In addition, a maximum lithium content of one gram for a lithium metal cell or battery and a maximum Watt-hour rating of 20 Wh for lithium ion cell or battery; a limit on the number of data loggers or cargo tracking devices per package; a requirement that these devices be capable of withstanding the shocks and loadings normally encountered during transport; a requirement that the devices must not be capable of generating a dangerous evolution of heat; and a requirement that the devices meet defined standards for electromagnetic radiation to ensure the operation of the device does not interfere with aircraft systems.

PHMSA agrees with the DGP's findings and proposes to adopt these exceptions for data loggers and cargo tracking devices for items transported by air. However, the DGP did not remove the previously added exceptions from marking and documentation applicable to shipments of packages containing COVID–19 pharmaceuticals from the 2025–2026 ICAO Technical Instructions. PHMSA seeks comment on whether to retain this provision in the HMR. PHMSA also proposes to rearrange this section by adding this proposed exception in paragraph (b) and moving the provisions for packages containing COVID–19 pharmaceuticals to a new paragraph (c) along with similar provisions to use the exception.

PHMSA expects that these changes will facilitate the transport of hazardous materials and other important goods by air without compromising safety. PHMSA notes that proposed paragraph (b) only provides an exception from the HMR and does not provide an exception for data loggers or cargo tracking devices from complying with other requirements, such as any applicable FAA regulations, FAA Orders, operator requirements, and ULD manufacturer requirements. This amendment will allow shippers and carriers of goods by air to monitor and record environmental conditions for product quality and to monitor product location without compromising safety of air transportation. PHMSA expects the additional costs shippers may incur to take advantage of this expanded regulatory relief to be minimal.

As stated in the HM–215P final rule, PHMSA reiterates that the intent of § 173.14 is not to capture those hazardous materials within active equipment being offered for transportation as part of a consignment (*i.e.,* offered into commerce). For example, this section does not apply to electronic devices (such as hearing aids that may always be powered on as part of their design) that are themselves being offered for transportation as cargo. Rather, these provisions are only applicable to data loggers and cargo tracking devices that are in use and installed, attached to, or placed in packages to provide monitoring and tracking of those packages, or their handling containers, during transit. PHMSA expects that these changes will facilitate the transport of hazardous materials and other important goods by air without compromising safety.

Section 173.59

Section 173.59 provides informational descriptions of terms for explosives. Consistent with provisions adopted in the 23rd revised edition UN Model Regulations, PHMSA proposes to add the term ''pyrotechnic substance'' in this section. A pyrotechnic substance is an explosive substance designed to produce an effect by heat, light, sound,

[30] 87 FR 44944 (Jul. 26, 2022).

gas, or smoke (or a combination thereof) as the result of non-detonative self-sustaining exothermic chemical reactions. A pyrotechnic substance is a subset of explosive substances, and the term is included in the definition of ''explosive'' in § 173.50(a), which states that an explosive ''includes a pyrotechnic substance or article, unless the substance or article is otherwise classed under the provisions of this subchapter.'' As currently written, the relationship between explosive substance and pyrotechnic substance is not obvious in the definition itself, which may result in confusion in the application of the definition of pyrotechnic substance. While this section already contains a definition for ''Articles, pyrotechnic for technical purposes,'' the underlying energetics of these articles are pyrotechnic substances. PHMSA believes adding the specific definition will add clarity to the design and properties of a pyrotechnic substance and prevent confusion in the understanding and application of the term throughout the HMR.

Section 173.62

Section 173.62 provides specific packaging requirements for explosives. PHMSA proposes to revise the Explosives Table in Table 1 to paragraph (b) to add a new entry for fire suppressant dispersing devices classed as Division 1.4S material, specifically, ''UN0514,'' and assigned Packing Instruction 135, consistent with the new HMT entry as discussed in the Section 172.101 summary above. This proposed revision to the table is consistent with the assignment of Packing Instruction P135 to ''UN0514'' in the 23rd revised edition of the UN Model Regulations DGL and will provide the specific authorized packaging (*i.e.,* inner packaging and outer packaging). See Section V. § 173.169 summary for a detailed discussion of fire suppressant dispersing devices and proposed requirements for their classification, handling, and transportation.

In addition, in a prior rulemaking, HM–215P, PHMSA added new entries to the HMT for ''UN0511, UN0512, and UN0513, Detonators, electronic *programmable for blasting,*'' and assigned § 173.62 for authorized packaging. However, PHMSA did not make corresponding additions of these entries to Table 1 to paragraph (b) (Explosives Table), nor to Table 2 to paragraph (c)(5) (Table of Packing Methods) for Packing Instruction 131, which is assigned to these HMT entries. Consequently, these HMT entries direct users to authorized packaging in § 173.62 without specifying the packaging requirements that apply to UN0511, UN0512, and UN0513. PHMSA proposes to correct this omission by adding these entries to the table and their corresponding packaging instruction consistent with the UN Model Regulations. Specifically, in the Explosives Table in § 173.62(b), PHMSA proposes to add these three UN numbers and assign them Packing Instruction 131, consistent with assignment of these packaging requirements for ''Detonators, electric, *for blasting.*'' Furthermore, in the Table of Packing Methods, for Packing Instruction 131, PHMSA proposes to apply the same packaging requirements that are currently applicable to ''UN0030,'' ''UN0255,'' and ''UN0456'', Detonators, electric, *for blasting*'' to entries ''UN0511'', ''UN0512,'' and ''UN0513.'' While these detonators pose the same hazards in transportation, the new entries were added to distinguish electronic detonators from electric detonators, as they have significantly different design characteristics and safety features for end use operators. Because the hazard in transportation is the same, these entries are assigned the same packaging requirements as those currently prescribed for ''UN0030,'' ''UN0255,'' ''UN0456.''

PHMSA expects that this correction will better facilitate the transport of electronic programmable detonators by specifying the required packaging requirements for these materials.

Section 173.124 and 173.125

Section 173.124 outlines the definitions for Class 4 materials, which include Division 4.1 (flammable solids), Division 4.2 (spontaneously combustible materials), and Division 4.3 (dangerous when wet materials). PHMSA proposes to amend the definition of readily combustible solids in § 173.124(a)(3) by adding language that explicitly states that the criteria for metal powders is also applicable to powders of metal alloys.

Currently, paragraph (a)(3)(iii) of this section defines readily combustible solid materials as ''any metal powders that can be ignited and react over the whole length of a sample in 10 minutes or less, when tested in accordance with the UN Manual of Tests and Criteria.'' However, the UN Manual of Test and Criteria includes two different criteria for flammability—one for ''powdered, granular, or pasty substances or mixtures,'' and another for ''powders of metal or metal alloys.'' In addition, as previously written, some paragraphs related to Test N.1 in the UN Manual of Tests and Criteria and the relevant classification criteria were applicable only to metal powders, rather than explicitly stating that they should also apply to metal alloys. The UNSCOE identified and corrected this conflict in the 23rd revised edition of the UN Model Regulations by adding text that states that the criteria for metal powders is also applicable to powders of metal alloys.

PHMSA agrees with the UNSCOE's assessment that this is an editorial oversight, given that powders of metal alloys share the same flammability characteristics as metal powders. Due to the difficulty of extinguishing a fire involving metal powders, (*i.e.,* normal extinguishing agents such as carbon dioxide or water can increase the hazard) special consideration is needed when determining flammability. Therefore, stating that metal powders are powders of metal or metal alloys will ensure both metal powders and powders of metal alloys are appropriately classified using the criteria for metal powders instead of the criteria for ''other substances or mixtures.''

In addition, in § 173.125, which outlines the criteria for assigning packing groups to Class 4 materials, PHMSA proposes to amend paragraphs (b)(1) and (b)(2) to replace the phrase, ''powders of metals or metal alloys,'' with the term, ''metal powders.'' This change would provide consistency with the newly added definition of metal powders provided in § 173.124. PHMSA expects these amendments will enhance safety by applying the classification criteria for metal powders to powders of metal alloys as opposed to the criteria for other powdered, granular, or pasty substances or mixtures.

Section 173.151

Section 173.151 contains exceptions for Class 4 hazardous materials. In the HM–215Q final rule, PHMSA added ''151'' in column (8a) of the HMT for ''UN3148, Water-reactive liquid, n.o.s.'' for authorized transportation exceptions.[31] PHMSA also revised § 173.151(d) introductory text applying to limited quantities of Division 4.3 (dangerous when wet) material to include both ''solids'' and ''liquids'' to reflect accurately that Division 4.3 materials could be either in a solid or liquid state. However, when making these changes, PHMSA inadvertently omitted revisions to paragraphs (d)(1) and (d)(2), which specify authorized combination packaging to address the addition of inner packaging quantity limits for ''liquids'' to paragraph (d). Therefore, PHMSA proposes to revise

[31] 89 FR 25434 (Apr. 10, 2024).

paragraphs (d)(1) and (d)(2) to include inner packaging quantity limits for liquid and add the appropriate unit of measurement.

Section 173.162

Section 173.162 contains the packaging requirements and exceptions for gallium and includes limited quantity provisions for gallium contained in manufactured articles or apparatuses. As discussed earlier, PHMSA is proposing to add a new entry on the HMT for gallium contained in manufactured articles (UN3554) (see the Section-by-Section Review in Section 172.101 for discussion of these amendments). In this section, PHMSA proposes to modify paragraph (c), which outlines the provisions for gallium in manufactured articles or apparatuses, to include new packaging requirements and modal specific exceptions. Currently, paragraph (c) provides an exception from the HMR for these articles or apparatuses that contain small amounts of gallium (not more than 100 mg) which are packaged so that the quantity of gallium per package does not exceed one gram. It also states that for transportation by aircraft, such articles and apparatuses must be transported as cargo and may not be carried onboard an aircraft by passengers or crewmembers in carry-on baggage, checked baggage, or on their person, unless specifically excepted by § 175.10, which provides exceptions for passengers, crewmembers, and air operators traveling with hazardous materials by air.

Consistent with changes adopted in the 23rd revised edition of the UN Model Regulations and the 2025–2026 ICAO Technical Instructions, PHMSA proposes to revise the packaging requirements and mode specific exceptions for these articles. Specifically, the changes would provide an exception from the HMR when gallium is contained in manufactured articles and packaged in strong outer packagings that have sealed inner liners or bags of strong leakproof and puncture-resistant material impervious to gallium. This exception is in lieu of more stringent specification packaging as outlined in paragraph (a), which is intended for ''UN2803, Gallium.'' In addition, these changes would: (1) provide exceptions for transportation by highway, rail, and vessel when the articles contain less than one kg (35.2 ounces) of gallium; (2) provide an exception for transportation by cargo aircraft when less than 15 g of gallium is contained in articles except for lamps, such as thermometers, switches and relays, that are installed as an integral part of a machine or apparatus; and (3) maintain the exception from the HMR for articles containing under 100 mg (0.0035 ounce) of gallium to be allowed on aircraft, except for lamps, when transported as cargo. PHMSA expects that the addition of these provisions will facilitate the use of gallium in manufactured articles as an alternative to mercury by providing similar regulatory exceptions that provide an equivalent level of safety. PHMSA further expects these modifications to § 173.162(c) will allow for consistency with international regulations and provide clear guidelines for the safe transportation of gallium contained in articles. PHMSA expects the new exceptions provided in this amendment, which provide regulatory burden relief, will provide cost savings for domestic shippers that transport articles that contain gallium.

Lastly, PHMSA proposes to amend the header in § 173.162, which currently reads ''Gallium,'' to read ''Gallium (metallic and articles containing gallium).'' This editorial change would provide clear direction that requirements for articles containing gallium (UN3554) and elemental gallium (UN2803) can both be found in this section.

Section 173.169

PHMSA proposes to add a new section, § 173.169, primarily detailing requirements for the classification, handling, and transport of fire suppressant dispersing devices as a Class 9 material–*i.e.,* those devices intended to be described and transported as ''UN3559, Fire suppressant dispersing devices.'' This section will also provide instruction that materials intended to be transported as fire suppressant dispersing devices must meet certain criteria for Division 1.4S explosive material and must be classed and described as ''UN0514, Fire suppressant dispersing devices, 1.4S'' and transported accordingly if not also meeting the criteria for classification as Class 9. The introductory language of the section will define fire suppressant dispersing devices as articles containing a pyrotechnic substance that are intended to disperse a fire extinguishing agent when activated and which do not contain any other hazardous materials. As an example, the fire extinguishing agent could be an aerosol. The articles, as packaged for transportation, must meet criteria for Division 1.4S explosive material in accordance with test series 6(c) of the Manual of Tests and Criteria.

PHMSA also proposes additional conditions under which the article may be classed as Class 9. Specifically, PHMSA proposes that for a fire suppressant dispersing device to be classed as a Class 9 miscellaneous hazardous material: (1) it must meet criteria for being excluded from Class 1 consistent with section 2.1.3.6.4(b), (c) and (d) of the UN Model Regulations; (2) it must meet criteria such that when activated as packaged during transportation, temperatures on the outside surface of the package must not exceed 200 °C; and (3) the suppressant used in the device must be deemed safe for normally occupied spaces consistent with international or regional standards (*e.g.,* NFPA 2010, Standard for Fixed Aerosol Fire Extinguishing Systems).[32] PHMSA also proposes to require that the article be transported with either the means of activation removed or equipped with at least two independent means to prevent accidental activation. Lastly, PHMSA proposes to include packaging requirements when classified as a Division 1.4S article (*i.e.,* a cross-reference to § 173.62) and Class 9 (*i.e.,* certain PG III performance level packagings).

To recap the proposed changes, for a device to be classed and described as a fire suppressant dispersing device, PHMSA proposes that it must be examined by a laboratory authorized by PHMSA to perform examination and testing of explosives. For a fire suppressant dispersing device described as ''UN0514, Fire suppressant dispersing devices, 1.4S,'' the article, as packaged for transportation, must meet criteria for Division 1.4S explosive material in accordance with test series 6(c) of the Manual of Tests and Criteria, and, to be described as ''UN3559, Fire suppressant dispersing devices, Class 9,'' the article must first meet criteria for Division 1.4S, but must also be examined for the additional performance criteria discussed above, all performed by a PHMSA-authorized explosives test lab. Both entries will then follow the normal process for examination, classification, and approval of a new explosive in accordance with § 173.56, where a recommended shipping description, division, and compatibility group is submitted to PHMSA for approval and, should PHMSA agree that the criteria are met, it will be provided an EX approval and assigned an EX number.

Fire suppressant dispersing devices have numerous practical applications. Initially, they were primarily used in

[32] Means a material which presents a hazard during transportation, but which does not meet the definition of any other hazard class; Occupied spaces, in this context, are those which are occupied by persons.

motive applications such as trains and vessels. However, because of their safety record and effectiveness, their applications have broadened to use in buildings and industrial facilities mostly to protect highly valued electronic equipment. They are used in facilities ranging from wind turbines to buildings with high volume electronic equipment such as server rooms. The traditional sprinkler system, while still effective in firefighting, is likely to cause extensive damage to property not directly involved in a fire yet still exposed to water used to fight a fire. Fire suppressant dispersing devices provide an alternative means of firefighting without associated negative property and environmental impacts. Manufacturers of these devices have indicated that another useful application is in suppressing lithium battery fires, and thus these devices are used more frequently in things like battery energy storage systems and charging systems like electric bike and scooter charging facilities.[33] Devices that perform the same function, but that do not meet the classification criteria for ''UN3268, Safety devices, *electrically initiated,* 9,'' are typically classified as ''UN0432, Articles, pyrotechnic for technical purposes, 1.4S'' for lack of a more appropriate shipping description. According to industry, many of these devices have been safely shipped as cargo under the current system of approvals both domestically and internationally either as Class 9 or unregulated. Yet, with increasing numbers of these devices being transported as cargo and used for fire protection in fixed facilities, uncertainty remains under the currently available system for classifying and describing the devices for transportation. PHMSA expects that adopting the changes proposed in this notice (*e.g.,* adopting the new HMT entries) and including this new section for classifying, packaging, and handling fire suppressant dispersing devices will positively impact the safe transport of these articles and facilitate their broader use in the economy for protection of persons and property.

Section 173.185

Currently, § 173.185 prescribes requirements for classification, packaging, and exceptions for lithium cells and batteries. As discussed previously in § 172.101 of the Section-by-Section Review, the 23rd revised edition of the UN Model Regulations adopted provisions for the regulation of sodium ion batteries that mirror the requirements for lithium batteries due to their similar chemistries and similar safety risks. PHMSA proposes to harmonize with the UN Model Regulations by applying the provisions in § 173.185 for lithium batteries to sodium ion batteries. This will ensure that the new entries for sodium ion batteries meet the same packaging requirements as those that currently apply to entries for lithium batteries.

Specifically, in § 173.185(a)(3), PHMSA proposes to extend the test summary provisions that currently apply to lithium cells and batteries and button cells installed in equipment to sodium ion cells and batteries. With this change, manufacturers and subsequent distributors of sodium ion cells and batteries must make a test summary available, but sodium ion button cells installed in equipment would be excepted. PHMSA notes that neither the UNSCOE nor the ICAO DGP have proposed adopting the exception from the test summary provisions for sodium ion button cells and batteries. However, PHMSA finds that adopting this change at this time is a logical outcome of the amendments adopted by these working groups thus far. While PHMSA expects that this proposed change would reduce the regulatory burden for industry, PHMSA requests comments regarding whether this proposed amendment would cause unintended burdens for the regulated community or emergency responders.

In addition, PHMSA proposes amending the heading of this section to reference sodium ion cells and batteries, amending §§ 173.185(b)(6) and (c)(4), and adopting changes to the requirements for the use of large packagings for cells and batteries. In § 173.185(b)(6), except for transportation by aircraft, certain large packagings are authorized for single lithium batteries as well as single items of equipment that contain lithium batteries. PHMSA proposes to amend paragraph (b)(6) to authorize these large packagings for not only single batteries and single pieces of equipment, but for multiple large cells, large batteries, and pieces of equipment that contain large cells or large batteries. PHMSA also proposes to amend paragraph (b)(6) to require that cells, batteries, and pieces of equipment that are packed in the authorized rigid large packagings must be placed in inner packagings or separated by other means that would protect the cells, batteries, or pieces of equipment against damage that could occur under normal transportation conditions.

The UN Model Regulations have adopted these new allowances and packaging requirements for multiple reasons. First, allowing multiple cells, batteries, and pieces of equipment addresses the already occurring rapid growth and advancements of the lithium battery industry, which includes ''giga-factories'' constructed in or planned to be constructed in many parts of the world, each of which will have the capability of producing billions of lithium ion cells annually. These allowances facilitate the capability to transport larger volumes of batteries from those manufacturing facilities safely. Limiting the use of these large packagings to large cells, large batteries, and pieces of equipment that contain large cells or large batteries, as defined in 38.3.2.3 of the UN Manual of Tests and Criteria, will in effect limit the number of cells, batteries, or pieces of equipment being transported in these large packagings. Therefore, this will prevent the transportation of potentially thousands of smaller cells and batteries in the large packagings, which could increase the potential for damage to the contents and, therefore, have the potential to result in unsafe conditions. To ensure further the safe transportation of multiple cells, batteries, or pieces of equipment, and to harmonize with international standards, PHMSA proposes that cells, batteries, and equipment be placed in inner packagings or otherwise separated by suitable means (such as trays or dividers) to prevent damage under normal conditions of transport from motion or shifting, contact with other cells or batteries, or from superimposed loads within the large packaging. The use of plastic bags does not satisfy this requirement, as they may not be sufficient to prevent damage to cells or batteries, especially from superimposed loads within the large packaging.

Similar to the other provisions in § 173.185 for lithium batteries, PHMSA proposes to extend this packaging provision to sodium ion cells and batteries and equipment containing sodium ion cells and batteries to ensure their safe transportation when in large packages. This is consistent with applying other requirements for lithium ion batteries to sodium ion batteries based on their similar risk profiles and chemistries.

Section 173.185(c)(3) outlines the requirements for the use of the lithium battery mark. Currently, this mark is required on certain packages that contain lithium cells or batteries, including those that are packed with or contained in equipment. PHMSA proposes to amend this paragraph to

[33] UNECE, *Fire suppression devices that contain a pyrotechnic material* (April 11, 2022), available at: *https://unece.org/sites/default/files/2022-04/ST-SG-AC.10-C.3-2022-25e.pdf.*

extend this marking requirement to certain packages that contain sodium ion cells or batteries. PHMSA also proposes to make a corresponding change the title sentence of this paragraph from ''lithium battery mark'' to ''battery mark.'' PHMSA notes that no changes to the marking itself are being made.

Section 173.185(c)(4) provides exceptions for air transportation of smaller lithium cells and batteries packed with, or contained in, equipment. This includes an exception from using UN performance packaging in accordance with the provisions of paragraph (c), an exception that mirrors the provisions of Section II for packing instructions 966, 967, 969, and 970 of the ICAO Technical Instructions. PHMSA proposes to include sodium ion cells and batteries in paragraph (c), which mirrors Section II of packaging instruction 977 and 978 of the ICAO Technical Instructions. In addition, PHMSA proposes to add a new paragraph, § 173.185(c)(4)(v), to mirror a new requirement in the 2025–2026 ICAO Technical Instruction to require packages of smaller lithium and sodium ion cells and batteries packed with, or contained in, equipment to be capable of passing a stack test when excepted from UN performance packaging requirements.

At the 29th meeting of the ICAO DGP, an amendment to add a requirement for packages that were excepted from UN package performance testing to be capable of withstanding a stack test was considered for adoption in the 2025–2026 edition of the ICAO Technical Instructions. The new requirement was adopted for both lithium ion and metal batteries packed with, or contained in, equipment. The 2023–2024 edition of the ICAO Technical Instructions adopted a requirement that packages of lithium ion and metal batteries that were excepted from UN packaging in packing instructions 965 and 968 be capable of withstanding a three-meter stack test for a duration of 24 hours. This requirement was adopted into the HMR with the publication of a previous final rule, HM–215Q, in § 173.185(c)(5), which corresponds to Section IB in ICAO Technical Instructions Packing Instructions 965 and 968. In that final rule, PHMSA agreed with including the stack test for the packages of lithium ion and metal batteries excepted from UN packaging because this was consistent with the requirements for limited quantity packages transported by air in § 173.27(f)(2)(vi). PHMSA also maintained that introducing a stack test would be a preventative safety measure against potential damage to lithium battery packages from stacking of packages.

At the 29th meeting of the ICAO DGP, in discussing the adoption of the stack test for lithium ion and metal batteries packed with, or contained in, equipment, which are exempt from UN packaging requirements, the DGP stated that adopting these requirements for the 2025–2026 edition of the ICAO Technical Instructions aimed at ensuring packaging is robust enough to prevent damage to the cells or batteries contained within those packages. In their report, the DGP stated that an incident involving mobile phones catching fire on an airport ramp while waiting to be loaded on an aircraft provided further justification for these new requirements. PHMSA agrees that adding the stack test requirement for packages of lithium ion and metal batteries packed with, or contained in, equipment enhances air transportation safety by ensuring additional protection of the batteries in those packages. Therefore, PHMSA proposes to adopt this requirement in new paragraph § 173.185(c)(4)(v). PHMSA also proposes to extend this requirement to sodium ion cells and batteries packed with, or contained in, equipment to ensure the safe transportation of packages of sodium ion batteries packages under similar exceptions. This is consistent with applying other requirements for lithium ion batteries to sodium ion batteries based on their similar risk profiles and chemistries.

Section 173.219

Section 173.219 prescribes the transport conditions and packaging requirements for life-saving appliances. Paragraph (b) of this section provides a list of hazardous materials that a life-saving appliance is permitted to contain, as well as other transport requirements. Among the materials allowed in life-saving appliances are lithium batteries. Paragraph (b) states that life-saving appliances containing lithium batteries must be packed in accordance with § 173.185 and Special Provisions A54 and A101, as applicable. PHMSA proposes to revise this section to state that life-saving appliances may also contain sodium ion batteries where it states that they may contain lithium batteries. Adding sodium ion batteries to this section will ensure that sodium ion batteries that are components of lifesaving appliances are properly packaged for safe handling during transportation and that they comply with applicable special provisions specific to air transportation.

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. As previously discussed in the Section-by-Section Review in Section 172.101 of new HMT entries, three new UN identification numbers and proper shipping names are proposed for vehicles powered by lithium ion batteries, lithium metal batteries, and sodium ion batteries (UN3556, UN3557, and UN3558, respectively). PHMSA proposes to make editorial amendments in paragraph (d) of this section to add references to these specific types of battery-powered vehicles.

PHMSA also proposes to revise § 173.220(d) by adding new paragraph (d)(6), which will provide an exception for the new HMT entry ''UN3558, Vehicle, sodium ion battery powered.'' Section 173.220(d)(6) will allow shippers to offer vehicles powered by sodium ion batteries without being subject to other requirements of the HMR if they contain no other hazardous materials, and the battery is short-circuited in a way that the battery does not contain any electrical energy. A similar provision was adopted in the 23rd revised edition of the UN Model Regulations, Amendment 42–24 of the IMDG Code, and the 2025–26 ICAO Technical Instructions. As discussed in § 172.101 of the Section-by-Section Review, sodium ion batteries, unlike lithium ion batteries, can be discharged to zero volts without affecting the performance of the cell. This means batteries using sodium ion technology can be stored and transported in a completely discharged state, posing no risk from electrical energy. Because of this reduced risk, PHMSA believes that adding § 173.220(d)(6) to provide an exception from all other HMR requirements, given certain conditions are still in place, is appropriate and will maintain safety during transportation of these battery-powered vehicles. PHMSA expects that this change will benefit the regulated community by providing greater clarity on the applicability of this section.

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, the 23rd revised edition of UN Model Regulations

updated the list of assigned organic peroxides, which provides for formulations of these materials that are authorized for transportation without prior approval. To maintain consistency with the UN Model Regulations, PHMSA proposes to add three new entries and amend a current entry in the Organics Peroxide Table in Table 1 to paragraph (c). PHMSA also proposes to add an authorized IBC type for an organic peroxide already listed in the Organic Peroxide IBC Table in in Table 3 to paragraph (e).

Specifically, PHMSA proposes to update the Organic Peroxide Table by adding new entries for ''2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane,'' ''Dibenzoyl peroxide,'' and ''Methyl ethyl ketone peroxide(s).'' ''2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane'' would be listed as ''Exempt,'' denoting it as a material that is not regulated as an organic peroxide; ''Dibenzoyl peroxide'' would be identified as ''UN3109, Organic peroxide type F, liquid'' and assigned packing method OP8; and ''Methyl ethyl ketone peroxide(s)'' would be identified as ''UN3105, Organic peroxide type D, liquid'' and assigned packing method OP7. With these changes, PHMSA would also add a new Note 33, and assign it, and Note 5 to the new methyl ethyl ketone peroxide(s) entry, which would specify the required diluent concentrations and limit available oxygen, respectively, for this approved formulation. PHMSA is assigning Note 5, which requires available oxygen to be greater than nine percent, rather than harmonizing with the UN Model Regulations for consistency with applying assignment of Note 5 to other methyl ethyl ketone peroxides in the table. PHMSA requests comment on this approach and potential impacts. PHMSA expects that adding available peroxide formulations will benefit American manufacturers by permitting the transportation of these materials without the need for prior approval while maintaining the HMR's safety standard for transportation.

PHMSA also proposes to reclassify the existing entry for ''Di-2,4-Dichlorobenzoyl peroxide [as a paste with silicone oil],'' from ''UN3106, Organic peroxide type *D,* solid'' to ''UN3104, Organic peroxide type C, solid.'' With this change, the packing method would also be modified from OP7 to OP5. These changes were adopted based on new test data regarding deflagration properties of these organic peroxides. The UNSCOE determined these materials should undergo deflagration testing to be properly classified and assigned the appropriate packing instructions. As a result of these additional tests, it was determined that ''Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil]'' should be reclassified from a Type D to the more stringent classification of Type C organic peroxide. PHMSA expects that the additional packaging requirements associated with this classification change will improve safety of transportation of these organic peroxides while facilitating the continued transport of organic peroxides.

Lastly, PHMSA proposes to add 31HA1 IBCs as an additional authorized packaging type for ''Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52 percent, stable dispersion, in water'' in the Organic Peroxide IBC Table. Currently, a 31A (metal) IBC is the only authorized IBC type for this material, which is inconsistent with the authorizations provided for similar organic peroxide formulations. The UNSCOE corrected this oversight in the 23rd revised edition of the UN Model Regulations by adding 31HA1, which is a composite IBC with a plastic inner receptacle and a steel outer packaging (*i.e.,* casing) as an approved IBC type for this material. PHMSA finds that this is an appropriate packaging and agrees with this addition for this material. PHMSA expects that authorizing the use of a second IBC type will facilitate the transport of this material by providing packaging selection flexibility without compromising safety.

Section 173.232

Section 173.232 outlines the packaging requirements for articles containing hazardous materials. An article is machinery, apparatus, or other device that contains one or more hazardous materials—or residues thereof—that are an integral element of the article, necessary for its functioning, and cannot be removed for the purpose of transport. Articles may contain various types of batteries, including low production run and prototype, and provisions for such articles are outlined in paragraph (b) of this section. Currently, paragraph (b) states that articles containing batteries must meet the requirements of UN Manual of Tests and Criteria, Part III, subsection 38.3. However, this section does not clearly address articles containing low production run and prototype batteries as the requirements for batteries are generally codified in § 173.185. Therefore, PHMSA proposes to amend paragraph (b) to include a direct reference to § 173.185(e), which outlines the requirements and exceptions for low production run and prototype batteries. This change would clarify that articles containing low production run and prototype batteries qualify for certain exceptions from the testing requirements in the UN Manual of Tests and Criteria, Part III, subsection 38.3. PHMSA expects that removing the burden of additional testing prior to shipment of products containing prototype lithium ion will streamline the product development and testing process, benefitting American manufacturers of these products.

Consistent with other proposed amendments addressing the similar regulation of sodium ion batteries and lithium batteries by international regulations (see the Section-by-Section Review in Section 172.101 for further details), PHMSA proposes provisions to account for sodium ion batteries being used to power different types of articles. With the expected increase in demand for sodium ion batteries as an alternative power source to lithium batteries, sodium ion batteries will be used for many of the same applications, including the powering of different types of articles, as defined in this section. To ensure safe transportation, PHMSA proposes to apply the requirement that currently requires lithium batteries in articles to be of a type proven to meet the testing requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3, to sodium ion batteries in articles. PHMSA expects these changes to improve safety by providing an additional level of clarity in the regulations.

Section 173.301b

Section 173.301(b) outlines additional general requirements that apply 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 11114–1:2012(E), *Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials* and its 2017 supplemental amendment, ISO 11114–1:2012/Amd 1:2017(E). In addition, for non-metallic materials, paragraph (a)(2) requires compatibility with ISO 11114–2:2013(E), *Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials.* These documents provide compatibility requirements for the selection of combinations of metallic and non-metallic cylinder and valve materials for use with gas or gas mixtures. To provide uniformity regarding reference standards used

domestically and internationally, PHMSA proposes to revise the compatibility requirements to reference the latest version (third edition) of these documents, ISO 11114–1:2020, *Gas cylinders—Compatibility of cylinder and valve materials with gas contents Part 1: Metallic materials* and ISO 11114–2:2021—*Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials.* These documents were updated as part of ISO's regular periodic review, and the 23rd revised edition of the UN Model Regulations adopted changes that removed references to the previous editions. In addition, for editorial clarity of the HMR and for harmonization with international regulations, including the 23rd revised edition of the UN Model Regulations, PHMSA also proposes to remove references to the earlier editions. PHMSA expects the use of these updated documents would facilitate continued safe transport of gases in metallic cylinders and valves.

Section 173.304b

Section 173.304b prescribes additional requirements for shipment of liquefied compressed gases in UN pressure receptacles. As discussed above, disilane is currently transported under a generic ''n.o.s.'' shipping description, which the UNSCOE and PHMSA find does not accurately represent the appropriate packaging and shipping requirements for the hazard presented by this material. In this rulemaking, PHMSA proposes to create a new HMT entry, ''UN3553, Disilane,'' to communicate better the requirements for packaging and shipping this material. To specify appropriate packaging instructions for disilane, PHMSA proposes to add a new paragraph (e) under § 173.304b. The creation of the new HMT entry for disilane was, in part, to outline clearly the prohibition on the transportation of disilane in MEGCs, and this new paragraph will clarify that prohibition. Section 173.312(a)(1) authorizes use of MEGCs for liquefied and non-liquefied compressed gases ''unless otherwise specified.'' The current commonly used hazardous materials description and UN identification number for disilane, ''UN3161, Liquefied gas, flammable, n.o.s, 2.1,'' is not restricted from authorized use of MEGCs by a specific provision. The DGL entry for disilane in the latest UN Model Regulations is assigned packing instruction P200 and does not include MEGCs as authorized packaging for shipment of disilane. Consistent with that prohibition, PHMSA proposes to create new paragraph (e) to specify that MEGCs are not authorized for the shipment of ''UN3553, Disilane.'' PHMSA expects this change to enhance safety by ensuring that disilane is only transported in appropriate packagings.

Part 175

Section 175.1

Section 175.1 details the purpose, scope, and applicability of the requirements for the carriage of hazardous materials by aircraft in part 175. Paragraph (e) provides a reminder to air carriers that are certificate holders authorized to conduct operations in accordance with 14 CFR part 121 that they must also have a Safety Management System (SMS) in accordance with 14 CFR part 5. This paragraph was added in Final Rule HM–215Q to reiterate and clarify—but not add any additional burden—for part 121 certificate holders of the FAA SMS requirements. In the FAA final rule titled *Safety Management Systems,* the FAA updated the SMS requirements, which included expanding these requirements to certificate holders authorized to conduct operations in accordance with 14 CFR part 135.[34] In this NPRM, PHMSA proposes to add a reference to part 135 certificate holders in paragraph (e) to align with the changes in the FAA final rule. PHMSA and the FAA note that this proposal is not intended to impose any additional requirements or revise any timelines beyond what is required by 14 CFR part 5. PHMSA expects that these editorial amendments will enhance the safety of air operations by providing language that is consistent with the requirements under 14 CFR part 5.

Part 176

Section 176.83

Section 176.83 contains the requirements for segregation of hazardous materials on vessels. PHMSA proposes editorial revisions in paragraph (a)(8) that correspond to amendments adopted in Amendment 42–24 of the IMDG Code. To eliminate confusion, the CCC made a clarifying amendment specifying that to be stowed together, materials must not cause combustion or evolution of considerable heat; evolution of flammable, toxic or asphyxiant gases; the formation of corrosive substances; or the formation of unstable substances. PHMSA agrees that the original provision could have been misconstrued and, therefore, proposes to amend the text to clarify that the hazardous materials should not cause any of the reactions listed. This change would mirror the language found in footnote 2 of § 176.84(b) ''Table of provisions,'' which provides a clearer communication of the same causational relationship between potential reactions and the conditions that result from those reactions. PHMSA expects that this editorial change will provide clarity and improve understanding of the intent of these stowage requirements.

Section 176.84

Section 176.84 prescribes the meanings and requirements for numbered or alpha-numeric stowage provisions for vessel shipments listed in column (10B) of the § 172.101 HMT. The provisions in § 176.84 are broken down into general stowage provisions, which are defined in the ''Table of provisions'' in paragraph (b), and the stowage provisions applicable to vessel shipments of Class 1 explosives, which are defined in the table in paragraph (c)(2).

Currently, stowage code 116 states that the cargo space of a vessel must be capable of being opened in an emergency and that, before loading, the crew should consider the need to open hatches in case of fire. Amendment 42–24 of the IMDG Code includes amendments to analogous stowage provisions to clarify that these ventilation requirements also apply to tween and weather deck hatches. PHMSA agrees with these changes and expects that this clarifying language will enhance safety on vessels by specifying that the practicability of opening the tween deck and weather deck hatches must also be considered in the event of an emergency. Moreover, as discussed in the Section-by-Section Review in Section 172.101, PHMSA is proposing to assign stowage code 116 to ''UN2067, Ammonium nitrate based fertilizer.'' PHMSA expects that this change will improve the safety of vessel transport and provide clarity around the proper stowage of this material.

PHMSA proposes to amend vessel stowage code 156 to address sodium ion batteries that may be shipped because they are damaged, defective, or recalled, or for the purposes of disposal or recycling and apply the same ''Category C'' stowage requirements that would currently apply for lithium batteries shipped under those same conditions. PHMSA also proposes to add new stowage codes 158, 159, and 160 to this section. Stowage code 158 would indicate that ''Cargo transport units shall be shaded from direct sunlight. Packages in cargo transport units shall be stowed to allow for adequate air circulation throughout the cargo.''

[34] 89 FR 33068 (Apr. 26, 2024).

Stowage code 159 would indicate that the material should be stowed (or kept) in a cool ventilated place during transport. Lastly, stowage code 160 would indicate that a material must be stowed away from potential sources of ignition. For additional information on these changes see discussion in the Section-by-Section review in Section 172.101, column (10B).

Section 176.905

Section 176.905 outlines the vessel-specific requirements for the stowage of vehicles that are powered by internal combustion engines, fuel cell batteries, or a combination thereof when transported on vessels. PHMSA proposes to add an exception for vehicles powered by sodium ion batteries in paragraph § 176.905(i)(1)(ii). Specifically, and as a part of a larger set of changes throughout the HMR to the provisions for transportation of sodium ion batteries, PHMSA proposes to add a provision that would except vehicles powered solely by a sodium ion battery from the HMR, provided the battery is short-circuited in a way that it does not contain electrical energy. The short-circuiting must be easily identifiable (*e.g.,* busbar between terminals). The proposed addition would clarify that there are exceptions for the newly added sodium ion battery-powered vehicles to the HMR. A similar addition was adopted in Amendment 42–24 to the IMDG Code. PHMSA expects that safety of transportation will be maintained by dissipating the stored energy in the sodium batteries prior to transportation.

Part 178

Section 178.71

Section 178.71 prescribes specifications for UN pressure receptacles. Several updates and sunsetting of older editions to referenced standards pertaining to the design, construction, and maintenance of UN pressure receptacles were adopted in the 23rd revised edition of the UN Model Regulations. To maintain consistency with the UN Model Regulations, PHMSA proposes to make similar updates to those ISO standards incorporated by reference in this section.

In paragraph (d), which specifies requirements for service equipment, including valves, piping, fittings, and other equipment, PHMSA proposes to add a reference to a new ISO document, ISO 23826:2021, *Gas cylinders—Ball valves—Specification and testing.* Currently, paragraph (d) states that the valves must conform to ISO 10297:2014 and this document's 2017 supplemental amendment. However, ball valves are explicitly excluded in ISO 10297 and other closure standards. ISO 23826 was added as a reference document in the 23rd revised edition of the UN Model Regulations to address the need for a separate standard for ball valves, which are used on pressure receptacles and cargo transport units. As provided in § 178.71, UN pressure receptacles and service equipment constructed according to the standards applicable at the date of manufacture may continue in use, subject to the continuing qualification and maintenance provisions of part 180; therefore, PHMSA does not expect cylinders manufactured with ball valves to comply retroactively with ISO 23826. PHMSA expects that the addition of this document will improve safety by ensuring that there is an appropriate reference standard for the design, type testing, marking, manufacturing tests, and examination for this type of valve.

In paragraph (g), which outlines the design and construction requirements for UN refillable seamless steel cylinders, PHMSA proposes to amend the reference to ISO 9809–4, *Gas cylinders—Design, construction and testing of refillable seamless steel gas cylinders and tubes—Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa.* Currently, this paragraph requires that UN refillable seamless steel cylinders conform to ISO standards, ISO 9809 Parts 1 through 4, as applicable. Specifically, PHMSA proposes to amend the reference to ISO 9809–4 in paragraph (g)(4) to include a reference to an updated 2021 version, ISO 9809–4:2021, and to add a sunset date on the authorization to use the 2014 version, ISO 9809–4:2014. The proposed sunset date of December 31, 2028, aligns with the sunset date adopted in the 23rd revised edition of the UN Model Regulations.

ISO 9809–4 specifies the minimum requirements for the materials, design, construction and workmanship, manufacturing processes, examinations and testing at time of manufacture for refillable, seamless, stainless steel gas cylinders with water capacities up to and including 150 liters. As part of its regular periodic review, ISO updated ISO 9809–4:2014 and published the second edition, 9809–4:2021. The second edition of this document, which was adopted in the 23rd revised edition of the UN Model Regulations, includes changes such as modified requirements for inspection and testing, clarifications of drawings of the cylindrical parts of shells in Figure 3, and the addition of a new subclause pertaining to shear stress calculations. PHMSA reviewed this edition as part of its regular participation in the review of amendments proposed for the UN Model Regulations. PHMSA expects that updating the requirements for conformance of UN pressure receptacles with this document will maintain the HMR safety standard for these packagings and facilitate compliance with design and construction requirements domestically and internationally by aligning the HMR with changes adopted in the 23rd revised edition of the UN Model Regulations.

Paragraph (l) outlines the design and construction requirements for UN composite cylinders and tubes. Currently, this paragraph requires that composite cylinders and tubes conform to ISO 11119, Parts 1 through 4, as applicable. This series of ISO standards specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for certain composite gas cylinders and tubes. These standards were updated and revised, as discussed in the Section-by-Section Review discussion of § 171.7 changes. PHMSA proposes to authorize the use of the third edition of ISO 11119, Parts 1 through 3, and to add a phaseout date of December 31, 2028, for continued manufacture of pressure receptacles using the second edition. As part of its regular periodic review, ISO updated and published the third editions of the first three parts of ISO 11119, which were adopted in the 23rd revised edition of the UN Model Regulations. To maintain alignment with the requirements for UN composite cylinders and tubes in the UN Model Regulations, PHMSA proposes to authorize the use of the third edition of Parts 1 through 3, and to add a sunset date of December 31, 2028, on the authorizations to use the second edition that is currently referenced in this paragraph. This proposed sunset date aligns with the end date adopted in the 23rd revised edition of the UN Model Regulations.

Part 1, ISO 11119–1, *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,* specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for certain Type 2 composite hoop wrapped gas cylinders or tubes intended for the storage and conveyance of compressed

or liquefied gases, as well as cylinders and tubes with composite reinforcement of carbon fiber, aramid fiber or glass fiber (or a mixture thereof) within a matrix or steel wire with a minimum design life of fifteen years. The third edition of this document, ISO 11119–1:2020(E), updates the 2012 version, 11119–1:2012, which is currently authorized in this paragraph. The most significant changes in the third edition of Part 1 include updates and corrections to references throughout the document, the addition of minimum fiber stress ratios, changes to the fire resistance test procedure, and newly added criteria for tubes above 150 L.

Part 2, ISO 11119–2, *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,* specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for Type 3 fully wrapped cylinders or tubes with a load-sharing metal liner and composite reinforcement on both the cylindrical portion and the dome ends. The third edition of this document, ISO 11119–2:2020(E), updates the 2012 version, 11119–2:2012, which is currently authorized in this paragraph along with its 2014 supplemental amendment, ISO 11119–2:2012/Amd.1:2014(E). PHMSA proposes to authorize the third edition until further notice, and the use of second edition (ISO 11119–2:2012) in conjunction with the 2014 amendment (ISO 11119–2:2012/Amd.1:2014) until December 31, 2028. The most significant changes in the third edition of Part 2 include updated references, the addition of minimum fiber stress ratios, the addition of new alternatives for the drop test for certain cylinders, the addition of an alternative impact test for tubes 150 L and above, changes to fire resistance test procedure to make the test more consistent, and changes to the torque test.

Part 3, ISO 11119–3, *Gas cylinders of composite construction—Specification and test methods—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,* specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for Type 4, fully wrapped cylinders or tubes with a non-load sharing liner and composite reinforcement on both the cylindrical portion and the dome ends, and certain Type 5 fully wrapped cylinders or tubes without liners and with a test pressure of less than 60 bar and composite reinforcement on both the cylindrical portion and the dome ends with water capacities up to 450 L. This document is intended for cylinders used for the storage and conveyance of compressed or liquefied gases, cylinders, and tubes with composite reinforcement of carbon fiber, aramid fiber or glass fiber (or a mixture thereof) within a matrix, and for cylinders or tubes with a minimum design life of 15 years. The third edition of this document, ISO 11119–3:2020(E), updates the 2013 version, 11119–3:2013, which is currently authorized in this paragraph. As stated above, PHMSA proposes to authorize the use of the third edition until further notice and the continued use of second edition (ISO 11119–3:2013) until December 31, 2028. The most significant changes in the third edition of Part 3 include the addition of new alternatives for the drop test for cylinders up to and including 50 L water capacity with dedicated compressed gas service, the addition of alternative impact test for tubes 150 L and above, changes to the fire resistance test procedure to make the test more consistent and the addition of a criterion for tubes above 150 L, changes to the torque test, and a new procedure for the pneumatic cycle test. In addition, PHMSA proposes to remove references to ISO 11119–2:2012 in this paragraph as the authorization for the use of this document expired on December 31, 2020.

Lastly, in paragraph (o), which specifies material compatibility requirements for UN pressure receptacles, PHMSA proposes to amend the compatibility requirements to require compatibility with the third edition of ISO 11114–1:2020, *Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials,* and ISO 11114–2:2021, *Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials.* Currently, this paragraph prescribes the application of the requirements for material compatibility in accordance with ISO 11114–1:2012(E) and the 2017 supplemental amendment (ISO 11114–1:2012/Amd 1:2017) in sub-paragraph (o)(1), and ISO 11114–2:2013 in sub-paragraph (o)(2). ISO 11114–1 provides requirements for the selection of safe combinations of metallic cylinder and valve materials and cylinder gas contents. ISO 11114–2 provides guidance on the selection and evaluation of compatibility between non-metallic materials for gas cylinders and valves and the gas contents. These documents were updated as part of ISO's regular periodic review of its standards, and the 23rd revised edition of the UN Model Regulations adopted changes that removed references to the previous editions. PHMSA has determined the use of these updated documents would allow safe transport of a wider variety of gases in newly developed types of metallic cylinders and valves without compromising safety. To provide uniformity in reference standards used domestically and internationally, PHMSA proposes to revise the compatibility requirements to authorize and refer only to the updated third edition of these ISO standards.

PHMSA has reviewed each of these documents as part of its regular participation in the review of amendments proposed for the 23rd revised edition of the UN Model Regulations and expects that adding them to the HMR will enhance the current safety of hazardous materials in transportation, in addition to harmonizing the HMR with international requirements.

Section 178.75

Section 178.75 prescribes specifications for MEGCs, which are assemblies of UN cylinders, tubes, or bundles of cylinders interconnected by a manifold and assembled within a framework. PHMSA proposes to revise paragraph (d)(3), which outlines the general design and construction requirements for MEGCs. Currently, this paragraph requires that each pressure receptacle of a MEGC be of the same design type, seamless steel, and constructed and tested according to any of nine ISO standards, including the first edition of 9809–4, *Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa* and the ISO series 11119, *Gas cylinders—Design, construction and testing of refillable composite gas cylinders and tubes.* For Parts 1 through 3 of the series, paragraph (d)(3) references the second edition (and a supplemental amendment for part 2, ISO 11119–2:2012/Amd.1:2014(E)); however, these parts, as well as ISO 9809–4, were updated and revised, as discussed in the Section-by-Section Review discussion of § 171.7 changes. PHMSA proposes to authorize the use of the second edition of ISO 9809–4, the third edition of ISO 11119, Parts 1 through 3, and to add a phaseout date of December 31, 2028, for

continued manufacture of pressure receptacles using the previous editions of both documents.

As discussed earlier, the ISO series 11119 specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes, examination and testing at time of manufacture for composite cylinders or tubes. ISO 9809–4 specifies the minimum requirements for the material, design, construction and workmanship, manufacturing processes, examinations, and tests at manufacture of refillable seamless stainless steel gas cylinders of water capacities from 0.5 L up to and including 150 L for compressed, liquefied, and dissolved gases.

Authorizing the use of these updated references to this document would align the HMR with changes adopted in the 23rd revised edition of the UN Model Regulations, pertaining to the design and construction of pressure vessels, including MEGCs, while maintaining the HMR safety standard for use of MEGCs. PHMSA expects that harmonizing the documents incorporated by reference with standards referenced in international standards, such as the UN Model Regulations, will avoid operational inefficiencies and provide marginal cost savings to these industries by removing the need for users (*e.g.,* manufacturers, inspectors, etc.) to refer to multiple versions of ISO documents to ensure that no testing and design requirements are unfulfilled.

Section 178.504

Section 178.504 prescribes the construction standards for steel drums. Paragraph (b)(4) in this section states that drums with a capacity of at least 60 L (16 gallons) may have at least two expanded rolling hoops or two separate rolling hoops. PHMSA proposes to amend this paragraph by removing reference to the 60 L (16 gallons) capacity and the number of hoops. At the 59th session of the UNSCOE, it was agreed that it is unnecessary to specify when rolling hoops may be used (*i.e.,* specify use for drums with a capacity of at least 60 L) or to specify that a specific number of hoops may be used. Rolling hoops facilitate the handling of drums. Further, competent authorities do not consider the presence or absence of rolling hoops on drums to be a safety issue, because rolling hoops are intended primarily for handling. These changes were recently made in the UN Model Regulations to clarify that rolling hoops were not mandatory and to harmonize the regulatory text from various countries. While the regulatory text in the HMR already made it clear that rolling hoops were not mandatory, PHMSA expects that amending paragraph (b)(4) by removing the 60 L capacity threshold and the number of hoops to state simply that steel drums may have rolling hoops will provide beneficial clarification for manufacturers regarding the permissibility of rolling hoops on steel drums and packaging design flexibility that provide opportunities for cost savings for domestic packaging manufacturers.

Section 178.505

Section 178.505 prescribes the construction standards for aluminum drums. Paragraph (b)(3) in this section states that drums with a capacity of at least 60 L (16 gallons) may have at least two expanded rolling hoops or two separate rolling hoops. PHMSA proposes to amend this paragraph by removing reference to the 60 L (16 gallons) capacity and the number of hoops. For additional information, see the Section-by-Section Review in Section 178.504.

Section 178.506

Section 178.506 prescribes the construction standards for metal drums other than steel or aluminum. Paragraph (b)(3) in this section states that drums with a capacity of at least 60 L (16 gallons) may have at least two expanded rolling hoops or two separate rolling hoops. PHMSA proposes to amend this paragraph by removing reference to the 60 L (16 gallons) capacity and the number of hoops. For additional information, see the Section-by-Section Review in Section 178.504.

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 the requalification of these pressure receptacles that are constructed of seamless steel. Currently, in accordance with the UN Model Regulations, paragraph (d)(1) allows for the internal inspection and hydraulic pressure test to be replaced by a procedure conforming to ISO 16148:2016(E), *Refillable seamless steel gas cylinders and tubes—Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing.* However, ISO has since issued a supplemental amendment (ISO 16148:2016/Amd. 1:2020(E)) for the 2016 edition referenced in this section (ISO 16148:2016). Amendment 1 is a short two-page supplemental correction. The supplement includes a significant correction concerning the calculation of the depth of the notches used for calibration. In light of this correction, the 23rd revised edition of the UN Model Regulations now requires the use of the 2016 document in conjunction with the 2020 supplemental amendment. PHMSA proposes to incorporate by reference the supplemental amendment in paragraph (d)(1). PHMSA expects that the additional requirement to use this supplemental amendment will improve the safety of transporting UN pressure receptacles by requiring the use of improved engineering standards.

VI. Regulatory Analyses and Notices

A. Legal Authority

This NPRM is published under the authority of Federal Hazardous Materials Transportation Law. Section 5103(b) authorizes the Secretary of Transportation to prescribe regulations for the safe transportation, including security, of hazardous materials in intrastate, interstate, and foreign commerce. Section 5120 requires the Secretary to participate in international forums that establish or recommend mandatory standards, and authorizes the Secretary to consult with interested international authorities to ensure that, to the extent 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; Regulatory Planning and Review

Executive Order (E.O.) 12866 (*Regulatory Planning and Review*) 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.'' [35] Similarly, DOT Order 2100.6B (*Policies and Procedures for Rulemakings*) states that if a regulatory action is expected to impose any costs it must include ''a detailed discussion of the rationale supporting the specific regulatory action proposed

[35] 58 FR 51735 (Oct. 4, 1993).

and an explanation of why a less costly alternative is not an option.'' [36]

Under E.O. 12866 and DOT Order 2100.6B, PHMSA must submit ''significant regulatory actions'' to the Office of Management and Budget (OMB) for review. 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. This rulemaking is also not considered a significant rule under DOT Order 2100.6B.

C. Executive Orders 14192 and 14219

This NPRM is expected to be an E.O. 14192 (*Unleashing Prosperity Through Deregulation*) deregulatory action.[37] PHMSA has determined the total costs of the rule imposed on the regulated community will be less than zero and estimates an annualized net cost savings between $0.19–1.12 million. Details on the costs, cost savings, and benefits of this rulemakings are summarized below, and further analysis can be found in the PRIA, which is available in the public docket. PHMSA seeks public comment on its proposed revisions to the HMR and the preliminary cost and benefit analyses in the PRIA.

PHMSA proposes to amend the HMR to align with the latest international regulations and standards, maintaining the high safety standard currently achieved under the HMR and facilitating the safe transportation of hazardous materials. PHMSA examined the likely impacts of finalizing and implementing the provisions proposed in this NPRM to assess the benefits and costs of these amendments. This analysis allowed PHMSA to assess quantitatively the material effects of four of the proposed amendments in the rulemaking. The effects of six remaining proposed amendments are not quantified but are assessed qualitatively.

PHMSA estimates that on an annualized basis costs savings to the regulated community for this rulemaking are greater than costs, yielding an annualized net cost savings between $0.19–1.12 million, at a seven percent discount rate. The following Table 1 presents a summary of the monetized impacts that these proposed changes may have upon codification.

TABLE 1—RANGE OF NET REGULATORY COSTS SAVINGS (MILLIONS, 2023$) ESTIMATES, THREE % AND SEVEN % DISCOUNT RATES, 2025 TO 2034

Quantified topic	10-Year costs (3%)		10-Year cost savings (3%)		10-Year net cost savings (3%)		Annual costs (3%)		Annual cost savings (3%)		Annual net cost savings (3%)	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
2: HMT additions	$0.06	$0.06	$0	$0	$(0.06)	$(0.06)	$0.01	$0.01	$0	$0	$(0.01)	$(0.01)
3: Limited Quantity Gas	0	0	11.14	11.14	11.14	11.14	0	0	1.27	1.27	1.27	1.27
4: Organic Peroxides	0	0	0.01	0.05	0.01	0.05	0	0	0.002	0.01	0.002	0.01
5: TMAH	0.56	8.67	0	0	(8.67)	(0.56)	0.06	0.99	0	0	(0.99)	(0.06)
6: Sodium ion Batteries and State-of-charge	0.51	0.89	0	0	(0.89)	(0.51)	0.06	0.10	0	0	(0.10)	(0.06)
Total	1.13	9.62	11.15	11.19	1.53	10.06	0.13	1.09	1.27	1.27	0.17	1.15

	10-Year costs (7%)		10-Year cost savings (7%)		10-Year net cost savings (7%)		Annual costs (7%)		Annual cost savings (7%)		Annual net cost savings (7%)	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
2: HMT additions	$0.05	$0.05	$0	$0	$(0.05)	$(0.05)	$0.01	$0.01	$0	$0	$(0.01)	$(0.01)
3: Limited Quantity Gas	0	0	9.30	9.30	9.30	9.30	0	0	1.24	1.24	1.24	1.24
4: Organic Peroxides	0	0	0.01	0.04	0.01	0.04	0	0	0.00	0.01	0.00	0.01
5: TMAH	0.46	7.10	0	0	(7.10)	(0.46)	0.06	0.95	0	0	(0.95)	(0.06)
6: Sodium ion Batteries and State-of-charge	0.45	0.77	0	0	(0.77)	(0.44)	0.06	0.10	0	0	(0.10)	(0.06)
Total	0.96	7.92	9.31	9.34	1.39	8.40	0.13	1.05	1.24	1.24	0.19	1.12

Note: Values in parentheses in net costs savings columns indicate costs. Low net cost savings for each amendment are determined by subtracting the highest costs from the lowest cost savings. High net cost savings are determined by subtracting the lowest costs from the highest cost savings.

The safety and environmental benefits of the proposed rule have not been quantified. PHMSA expects the proposed amendments to improve public safety and reduce the risk of environmental harm by maintaining consistency between these international regulations and the HMR. Harmonizing the HMR with international consensus standards as proposed should reduce delays and interruptions of hazardous materials during transportation.

Overall, the revisions adopted in this rulemaking promote the continued safe transportation of hazardous materials while producing a net cost savings. PHMSA finds this NPRM does implicate any of the factors identified in section 2(a) of E.O. 14219 indicative of a regulation that is ''unlawful . . . [or] that undermine[s] the national interest.'' [38]

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 the United States' inadequate energy development production, transportation, refining, and generation capacity.[39] Similarly, E.O. 14154 (*Unleashing American Energy*) asserts a Federal policy to unleash American energy by ensuing access to abundant supplies of reliable, affordable energy

[36] DOT Order 2100.6B, available at: *https://www.transportation.gov/regulations/dot-order-21006b-policies-and-procedures-rulemakings.*

[37] 90 FR 9065 (Jan. 31, 2025).

[38] 90 FR 10583 (Feb. 19, 2025).

[39] 90 FR 8353 (Jan. 29, 2025).

from (inter alia) the removal of ''undue burden[s]'' on the identification, development, or use of domestic energy resources.[40] PHMSA preliminarily finds this NPRM is consistent with each of E.O. 14156 and E.O. 14154.

This NPRM 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 Executive Orders 14156 (*Declaring a National Energy Emergency*) and 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 streamline such transportation. Many of the proposals in this NPRM include provisions that provide flexibility to domestic shippers, such as those that allow for the use of additional packaging types or allow for hazardous materials to be transported in larger quantities. Other provisions remove the requirement for shippers in the United States to apply for an approval prior to transport certain hazardous materials or providing general exceptions from regulation. This NPRM includes various editorial changes that clarify regulatory requirements that may prevent the frustration of energy-related shipments upon entry to, or departure from, the United States.

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*) that was published in the **Federal Register** on May 22, 2009.[41] Executive Order 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 national 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 Native American tribe requirements, but does not propose any regulation that has substantial direct effects on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. 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. Therefore, the consultation and funding requirements of E.O. 13132 do not apply.

F. Regulatory Flexibility Act

The Regulatory Flexibility Act (5 U.S.C. 601, *et seq.*) requires agencies to review proposed regulations to assess their impact on small entities, unless the agency head certifies that a proposed rulemaking will not have a significant economic impact on a substantial number of small entities, including small businesses, not-for-profit organizations that are independently owned and operated and are not dominant in their fields, and governmental jurisdictions with populations under 50,000. The Regulatory Flexibility Act directs agencies to establish exceptions and differing compliance standards for small businesses, where possible to do so and still meet the objectives of applicable regulatory statutes. Executive Order 13272 (*Proper Consideration of Small Entities in Agency Rulemaking*) requires agencies to establish procedures and policies to promote compliance with the Regulatory Flexibility Act and to ''review draft rules to assess and take appropriate account of the potential impact'' of the rules on small businesses, governmental jurisdictions, and small organizations.[42] The DOT posts its implementing guidance on a dedicated web page.[43]

This NPRM has been developed in accordance with E.O. 13272 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. This NPRM 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 and other entities engaged in domestic and international commerce, including trans-border 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

This proposed rule does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It does not result in costs of $100 million or more to either State, local, or tribal governments, in the aggregate, or to the private sector, and is least burdensome alternative that achieves the objective of the rulemaking.

[40] 90 FR 8353 (Jan. 29, 2025).

[41] 64 FR 43255 (Aug. 10, 1999); 74 FR 24693 (May 22, 2009).

[42] 67 FR 53461 (Aug. 16, 2002).

[43] DOT, *Rulemaking Requirements Related to Small Entities,* available at: *www.transportation.gov/regulations/rulemaking-requirements-concerning-small-entities.*

H. National Environmental Policy Act

1. Introduction

The National Environmental Policy Act of 1969 (NEPA; 42 U.S.C. 4321 *et seq.*), requires that Federal agencies analyze proposed actions to determine whether the action would have a significant impact on the human and natural environment. When a proposed action does not have a reasonably foreseeable significant effect on the quality of the human environment, or if the significance of such effect is unknown, Federal agencies are required to prepare an environmental assessment. If, based on the finding of the environmental review, the agency determines not to prepare an Environmental Impact Statement (EIS) because the proposed action will not have significant effects on the human or natural environment, the agency can conclude the NEPA process with a finding of no significant impact (FONSI) (42 U.S.C. 4336(b)(2)).

2. Purpose and Need

The purpose of this proposed rulemaking is to comply with the Federal Hazardous Materials Transportation Law (49 U.S.C. 5101, *et seq.*), which directs PHMSA to participate in relevant international standard-setting bodies and encourages alignment of the HMR with international transport standards, as consistent with promotion of safety and the public interest.[44]

The need for this proposed rulemaking stems from recent amendments to international standards and regulations (*e.g.,* UN Model Regulations), which have created inconsistencies with the HMR. These inconsistencies can impose burdens, such as cost or reduced efficiency on entities complying with multiple or varying safety requirements. Harmonization has become increasingly important as the volume of hazardous materials transported in international commerce grows. The harmonization amendments that PHMSA is proposing would minimize the burdens of complying with multiple standards for the transportation of hazardous materials. It would also enhance safety by ensuring consistency between domestic and international standards, which reduces the potential for confusion and encourages compliance with safety standards throughout the supply chain, from the manufacturer or shipper to the end-users and emergency responders.

The preamble and regulatory text sections of this NPRM provide additional information of the policy background and need for this rulemaking.

3. Description of Alternatives

3.1 No Action Alternative

If PHMSA were to select the No Action Alternative, current regulations would remain in place and no provisions would be amended or added. This alternative would not be consistent with the Federal Hazardous Materials Transportation Law (49 U.S.C. 5101, *et seq.*), which encourages alignment of the HMR with international transport standards, and would not reduce burdens imposed by multiple or varying safety requirements. Thus, the no action alternative does not fulfill the purpose and need of the proposed rule.

3.2 Proposed Action Alternative (Proposed Rule)

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

Topic	Proposed amendments
Incorporation by reference	PHMSA proposes to incorporate by reference updated versions of the following international hazardous materials regulations and standards: • The 2025–2026 edition of the International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions) • Amendment 42–24 to the International Maritime Dangerous Goods Code (IMDG Code) • The 2023 edition of Transport Canada's Transportation of Dangerous Goods (TDG) Regulations • The 23rd revised edition of the United Nations Recommendations on the Transport of Dangerous Goods—Model Regulations (UN Model Regulations)
Hazardous Materials Table	PHMSA proposes amendments to the Hazardous Materials Table (HMT; § 172.101) to add, to revise, or to remove certain proper shipping names (PSN), hazard classes, packing groups (PG), special provisions, packaging authorizations, bulk packaging requirements, and passenger and cargo aircraft maximum quantity limits.
Increase in authorized amounts of certain gases transported as limited quantities.	PHMSA proposes, for modes other than air transportation, to authorize four Division 2.2 (non-flammable and non-poisonous) compressed gases for transport in DOT specification cylinders and UN pressure receptacles as a limited quantity material in quantities up to 1000 ml (34 fluid ounces) per package. These materials are: ''UN1006, Argon,'' ''UN1013, Carbon dioxide,'' ''UN1046, Helium,'' and ''UN1066, Nitrogen.''
Specific concentration limits for ammonium nitrate hot concentrated solutions.	PHMSA proposes to add specific conditions under which solutions of ammonium nitrate hot concentrate can be transported under the HMT entry ''UN2426, Ammonium nitrate'' or qualify for exception from regulation under the HMR. These proposed requirements for solutions of ammonium nitrate to be transported under UN2426 are based on concentration, water content, combustible material content, chlorine content, pH level, and temperature. These requirements were adopted in the 23rd revised edition of the UN Model Regulations to harmonize transport conditions and requirements multimodally.
Amendments to provisions for the transport of tetramethylammonium hydroxide.	PHMSA proposes to adopt several changes pertaining to entries for Tetramethylammonium hydroxide (TMAH) which were adopted in response to new incident and test data that shows that this material presents a toxicity hazard in addition to the previously identified corrosivity hazard. The proposed amendments include the addition of a new HMT entry for aqueous solutions, revisions to the hazard classification and proper shipping names of the existing entries for PG II and PG III TMAH solutions (UN1835), reclassification of TMAH solids (UN3423), the addition of two new special provisions, and revised packaging authorizations.

[44] 49 U.S.C. 5120.

Topic	Proposed amendments
Exceptions for nitrocellulose membrane filters used in rapid test devices.	PHMSA proposes to add a new special provision, that would provide specific packaging requirements that would allow for ''UN3270, Nitrocellulose membrane filters, *with not more than 12.6% nitrogen, by dry mass*'' to be excepted from regulation. These materials are most notably used in rapid test devices for infectious diseases like COVID–19, influenza, hepatitis, malaria, borreliosis and other diseases, and as substrates for bioanalytical tests as well as pregnancy tests. These changes were adopted in 23rd revised edition of the UN Model Regulations to facilitate further the transport of these items, which are often used in medical testing.
New requirements for sodium ion batteries.	PHMSA proposes to add new HMT entries and transport provisions for sodium ion batteries. The proposed provisions mirror those adopted in the 2025–2026 edition of the ICAO Technical Instructions and the 23rd revised edition of the UN Model Regulations, which ultimately regulate sodium ion batteries in the same way as lithium ion batteries. These new provisions were developed and adopted in various international regulations in response to the anticipated increases in the use of sodium ion batteries as an alternative to lithium ion batteries.
Improved emergency response for lithium batteries transported as UN3536.	PHMSA proposes to amend Special Provision 389 to require that the emergency response information for UN3536 specifically identify the predominant type of energy storage battery installed in the unit (*i.e.,* lithium ion or metal batteries) and provide information on immediate methods for handling fires. PHMSA also proposes an editorial revision to create a paragraph structure for Special Provision 389 to increase clarity for the reader.

3.3 Alternatives Considered but Dismissed

Full Harmonization

This alternative would incorporate all changes adopted in the 23rd revised edition of the UN Model Regulations, the 2025–2026 edition of the ICAO Technical Instructions, and Amendment 42–24 to the IMDG Code. The Federal Hazardous Materials Transportation Law directs the Secretary of Transportation to ensure that domestic regulations are generally consistent with international standards, except where such standards are unnecessary, unsafe, or where a more stringent safety requirement is not in the public interest.[45] In evaluating potential alignment with international standards, PHMSA assesses each amendment individually, considering its merits, overall impact on transportation safety, and associated economic implications. Automatically adopting all international changes without regard to their relevance or appropriateness for domestic transportation would create unnecessary compliance burdens, complicate implementation, and increase regulatory complexity without improving safety or efficiency. Thus, this alternative does not meet the purpose and need of the rulemaking and has been dismissed from further consideration in this EA.

4. Affected Environment

The proposed rule amends certain provisions of the HMR to maintain alignment with international consensus standards and regulations. The proposed rule would apply to the transportation of hazardous materials by various transport modes (highway, rail, vessel, and aircraft) that occur nationwide. Because the proposed rule is national in scope, it can be assumed the affected environment includes environmental resources such as air, land, water, and cultural features throughout the entirety of the United States.

5. Environmental Consequences

5.1 No Action Alternative

If PHMSA were to select the No Action Alternative, the HMR would remain unchanged, and no provisions would be amended or added. However, any economic benefits gained through harmonization of the HMR with updated international consensus standards (including, but not limited to, the 23rd revised edition of the UN Model Regulations, the 2025–2026 ICAO Technical Instructions and Amendment 42–24 of the IMDG Code) governing shipping of hazardous materials would not be realized.

In addition, the No Action Alternative would not adopt enhanced and clarified regulatory requirements expected to maintain the high level of safety in transportation of hazardous materials provided by the HMR. As explained in the preamble to the NPRM, consistency between the HMR and current international standards can enhance safety by (1) ensuring that the HMR are informed by the latest best practices and lessons learned; (2) improving understanding of, and compliance with, pertinent requirements; (3) facilitating the flow of hazardous materials from their points of origin to their points of destination, thereby avoiding risks to the public and the environment from handling and potential release of hazardous materials due to delays or interruptions in the transportation of those materials; and (4) enabling consistent emergency response procedures in the event of a hazardous materials incident. PHMSA would not capture those benefits if it were to pass on incorporating updated international standards into the HMR under the No Action Alternative.

5.2 Proposed Action Alternative (Proposed Rule)

The changes proposed under the Proposed Action Alternative is expected to maintain the high safety standards currently achieved under the HMR by maintaining alignment with international consensus standards by incorporating various standards by reference. Harmonization of the HMR with updated international consensus standards would capture economic efficiencies gained from avoiding shipping delays and compliance costs associated with having to comply with divergent U.S. and international regulatory regimes for transportation of hazardous materials. Further, revision of the HMR as proposed in the NPRM will accommodate safe transportation of emerging technologies (in particular, components of lithium battery technologies) by aligning HMR requirements with anticipated increases in the volume of lithium and sodium batteries transported in interstate commerce and facilitate safe shipment of hazardous materials.

5.2.1 Public Health & Safety

In addition, harmonization would reduce the risk of spills, explosions, fire, package failure, natural forces, or other transportation-related hazards resulting from improperly preparing and transporting a hazmat shipment by streamlining the transportation process. It would also improve communication with emergency responders in the event of an incident, mitigating potential impacts. Hazardous materials can be extremely harmful to the environment

[45] 49 U.S.C. 5120(c).

and human health, since exposure to toxic chemicals could lead to the injury or death of plants, animals, and humans (Erkut et al., 2007; Erkut et al., 1998). The risk (*i.e.,* the probability or severity of harm to exposed ''receptors''—persons, the environment, or property) of a hazardous materials transportation incident depends on several factors including travel duration, the incident location, notably whether the incident occurs near a heavily populated area or sensitive environment, and whether the incident involves a spill/release, fire, or explosion. PHMSA is unable to identify hazardous materials being transported within the United States with an international destination or point of origin (*i.e.,* imports and exports), or the frequency with which these shipments, while being transported within the United States, are compliant with international regulations but in violation of the HMR and are associated with an accident involving the release of a hazardous material. As a result, PHMSA is unable to quantify the benefits associated with avoided incidents.

Further, proposed changes to the Hazardous Materials Table (HMT) provide shippers the flexibility and regulatory clarification and certainty to classify, to describe, and to package properly materials for transportation in the U.S. and internationally. Clear communication (such as appropriate labels, markings, placards, shipping papers, etc.) of the hazardous materials shipments is critical in ensuring shippers take appropriate precautions to prevent incidents and to handle materials correctly and responders take appropriate response measures.

The primary effect of the proposed new HMT entries for battery-powered vehicles and equipment is to harmonize the HMT with the UN Model Regulations Dangerous Goods List, thus facilitating the international shipping of these materials. Furthermore, this amendment would increase safety by giving first responders more notice about the specific battery technology installed in the electric vehicle or equipment and thus the risks associated with the battery should the material be involved in an accident. For example, lithium metal batteries necessitate a different firefighting technique than lithium ion batteries. Thus, the more specific the hazard communication for each battery type that powers a transported vehicle (or equipment) the better first responders (and those persons handling the material) are prepared to react more capably to incidents.

The proposed rule would also increase safety by giving handlers of TMAH notice of the toxicity hazard of TMAH, especially for higher concentrations of this item. TMAH has alkaline corrosive properties that can cause chemical skin burns, as well as toxic properties that can cause systemic neurotoxic effects that can lead to respiratory failure and cardiac arrest. The corrosivity of TMAH solutions damages the skin allowing for increased dermal uptake of TMAH. Solid TMAH is hygroscopic and will take up water or dissolve into the surface moisture of the skin. Adoption of a new UN number specifically for more toxic versions of this material would give greater notice to handlers and reduce the impact of the reported toxicity, however these specific benefits are unquantifiable compared to the No Action, which already includes notice that TMAH is dangerous to humans as a hazardous material.

6. Public Involvement

This DEA and the proposed rule will be released for public review and comment in docket PHMSA–2023–0111 (HM–215R). To access the docket, which contains background documents and any comments that PHMSA has received, go to *https://www.regulations.gov.* Follow the online instructions for accessing the docket. Alternatively, you may review the documents in person at DOT's Docket Management Office at the address listed below.

E-Gov Web: This site allows the public to enter comments on any **Federal Register** notice issued by any agency. Follow the online instructions for submitting comments.

Mail: Docket Management System: U.S. Department of Transportation, 1200 New Jersey Avenue SE, West Building Ground Floor, Room W12–140, Washington, DC 20590–0001.

Hand Delivery: DOT Docket Management System: West Building Ground Floor, Room W12–140, 1200 New Jersey Avenue SE, between 9:00 a.m. and 5:00 p.m. ET, Monday–Friday, except Federal holidays.

7. Agencies and Persons Consulted

PHMSA has coordinated with FAA, FMCSA, FRA, and USCG in the development of this proposed rule. PHMSA solicits, and will consider, comments on the NPRM's potential impacts on the human environment submitted by members of the public, State, and local governments, tribal communities, and industry.

8. Proposed Finding of No Significant Impact

PHMSA is soliciting comments on the environmental and safety impacts of the proposed rule and on this DEA. Following the public comment period, if determined appropriate, a FONSI will be prepared. All comments received during this period will be addressed and attached to any final NEPA document.

9. List of Preparers and Reviewers

Preparers:
Lydia Wang, PHMSA
Reviewers:
Carolyn Nelson, PHMSA
Sandy Hoover, Volpe

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*).[46] 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 better its rulemaking process. DOT posts these comments, without edit and including any personal information that the commenter includes, in the system of records notice. DOT's complete Privacy Act Statement is in the **Federal Register** published on April 11, 2000, or on DOT's website at *http://www.dot.gov/privacy.*

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

[46] 65 FR 67249 (Nov. 6, 2000); Dep't of Transportation, *DOT Order 5301.1A* (Aug. 10, 2023), available at: *https://www.transportation.gov/mission/department-transportation-tribal-consultation-policy-and-procedures.*

Reduction Act. See discussions on the OMB control numbers affected below: *2137–0034,* ''*Shipping Papers and Emergency Response Information*''

PHMSA accounts for shipping paper burdens under OMB Control Number 2137–0034, *Hazardous Materials Shipping Papers and Emergency Response Information.* PHMSA is proposing two amendments in this NPRM that may have minor impacts to this OMB Control Number: (1) the addition of two chemicals to the marine pollutants list in Appendix B to § 172.101 and (2) an additional requirement in § 172.203 for material transported by air and bearing ''RADIOACTIVE YELLOW–II'' or ''RADIOACTIVE YELLOW–III'' labels to include dimensions including the dimensional units of each package, or when placed in an overpack or freight container, the dimensions of the overpack or freight container as applicable on the shipping paper. PHMSA expects that the addition of two marine pollutants will have a negligible effect on the overall burden associated with this information collection. PHMSA already accounts for the information required on a shipping paper in § 172.203 and expects that the overall impact of adding the package dimension to a subset of shipping papers will be negligible in relation to the number of burden hours currently associated with this information collection. PHMSA welcomes comments from stakeholders on these assumptions.

In addition, PHMSA is proposing a third amendment in this NPRM that is expected to result in a measurable increase in the burden hour associated with this OMB control number. Currently, the requirements in § 173.185(a)(3) to produce and to share a test summary document apply only to lithium cells and batteries as finalized in the HM–224F Final Rule. In this NPRM, PHMSA is proposing to change the applicability in § 173.185(a)(3) to apply to lithium and sodium ion cells and batteries. This will result in sodium ion battery manufacturers having to produce and to share a test summary document that is currently only required by lithium cells and batteries.

PHMSA identified four domestic sodium ion cell or battery manufacturers per U.S. Census' Annual Survey of Manufactures (ASM) (NAICS code 335912). PHMSA estimated that each one of these manufacturers will test one sodium ion battery type per year. Therefore, four new test summaries must be created for sodium ion cells or batteries (four manufacturers × one sodium ion cells or batteries per manufacturer). The time to create a test summary is estimated conservatively at 30 minutes per document as PHMSA estimated for lithium cells and batteries in the HM–224F final rule. Thus, PHMSA estimates that this proposal will increase the burden by two hours (four test reports × 30 minutes).

PHMSA estimates that 316 respondents, including sodium ion cell and battery manufacturers and subsequent distributors, may need to make the test summary available. This estimate includes downstream distributors of sodium ion cells and batteries comprised of product manufacturers and distributors/retails and domestic sodium ion cell and battery manufactures. It is estimated that these 316 respondents will annually provide the test summary document 1,252 times. PHMSA estimates it will take seven minutes to provide a copy of the test summary document resulting in an additional 146 burden hours (1,252 responses × seven minutes per response).

Lastly, PHMSA estimates that 292 respondents will produce 7,292 shipping papers annually for the shipment of sodium ion cells and batteries. PHMSA estimates it takes one minute and 30 seconds to produce a shipping paper resulting in an additional 182 burden hours per year (7,291 responses × one minute 30 seconds per response). PHMSA estimates that there are no out-of-pocket burden costs associated with these information collections.

OMB Control No. 2137–0034: Hazardous Materials Shipping Papers and Emergency Response Information.

Increase in Annual Number of Respondents: 324.

Increase in Annual Responses: 8,549.

Increase in Annual Burden Hours: 330.

Increase in Annual Burden Cost: $0.

2137–0557, Approvals for Hazardous Materials

PHMSA accounts for the burdens from approval applications in OMB Control Number 2137–0557, *Approvals for Hazardous Materials.* In this NPRM, PHMSA is proposing to add new entries to the § 173.225 Organic Peroxide Table, which PHMSA expects estimates would decrease the number of annual approval applicants. However, PHMSA expects that these proposed changes are negligible to the number of burden hours associated with this information collection.

PHMSA is also proposing a new requirement in § 173.169 to require a competent authority approval for the shipment of fire suppressant dispersing devices. These proposed requirements in § 173.169 address the classification, handling and transport of fire suppressant dispersing devices as a Class 9 material. Specifically, PHMSA proposes that these fire suppressant dispersing devices must be examined and successfully tested by a person or agency who is authorized by the Associate Administrator to perform examination and testing of explosives as explained in § 173.56(b)(1), followed by submittal to the Associate Administrator and issuance of an EX approval.

PHMSA conservatively estimates shippers will submit an approval request for 100 fire suppressant dispersing devices on an annual basis. PHMSA estimates each approval will take 1 hour for a shipper to complete. This will result in 100 annual burden hours associated with this approval and test report (100 responses × one hour per approval). PHMSA estimates that there are no out-of-pocket burden costs associated with this information collection.

OMB Control No. 2137–0557: Approvals for Hazardous Materials.

Increase in Annual Number of Respondents: 100.

Increase in Annual Responses: 100.

Increase in Annual Burden Hours: 100.

Increase in Annual Burden Cost: $0.

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

Per E.O. 13609 (*Promoting International Regulatory Cooperation*), agencies must consider whether the impacts associated with significant variations between domestic and international regulatory approaches are

unnecessary or may impair the ability of American business to export and to compete internationally.[47] In meeting shared challenges involving health, safety, labor, security, environmental, and other issues, international regulatory cooperation can identify approaches that are at least as protective as those that are or would be adopted in the absence of such cooperation. International regulatory cooperation can also reduce, eliminate, or prevent unnecessary differences in regulatory requirements.

Similarly, the Trade Agreements Act of 1979 (Pub. L. 96–39), as amended by the Uruguay Round Agreements Act (Pub. L. 103–465) (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, so long as the standards have a legitimate domestic objective, such as providing for safety, and do not operate to exclude imports that meet this objective. The statute also requires consideration of international standards and, where appropriate, that they 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 Executive Order 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

Pursuant to E.O. 14028 (*Improving the Nation's Cybersecurity*), ''the prevention, detection, assessment, and remediation of cyber incidents is a top priority and essential to national and economic security.'' [48] The E.O. directed the Federal Government to improve its efforts to identify, deter, and respond to ''persistent and increasingly sophisticated malicious cyber campaigns.'' 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. 5101–5128, 44701; Pub. L. 101–410 section 4; Pub. L. 104–134, section 31001; Pub. L. 114–74 section 4 (28 U.S.C. 2461 note); 49 CFR 1.81, 1.97.

■ 2. In § 171.6:

■ a. Designate the table immediately following paragraph (b)(2) as ''Table 1 to Paragraph (b)(2)—OMB Control Numbers under the Paperwork Reduction Act''.

■ b. Revise entries in the newly designated Table 1 to paragraph (b)(2) for ''OMB No. 2137–0034'', ''OMB No. 2137–0557'', and ''OMB No. 2137–0572''.

The revisions read as follows:

§ 171.6 Control numbers under the Paperwork Reduction Act.

* * * * *

(b) * * *

(2) * * *

[47] 77 FR 26413 (May 4, 2012).

[48] 86 FR 26633 (May 17, 2021).

TABLE 1 TO PARAGRAPH (b)(2)—OMB CONTROL NUMBERS UNDER THE PAPERWORK REDUCTION ACT

Current OMB control No.	Title	Title 49 CFR part or section where identified and described
*	*	*
2137–0034	Hazardous Materials Shipping Papers and Emergency Response Information.	§§ 172.200, 172.201, 172.202, 172.203, 172.204, 172.505, 172.600, 172.602, 172.604, 172.606, 173.6, 173.7, 173.22, 173.56, 173.185, 174.24, 174.26, 174.114, 175.30, 175.31, 175.33, 176.24, 176.27, 176.30, 176.36, 176.89, 177.817.
*	*	*
2137–0557	Approvals for Hazardous Materials	§§ 107.402, 107.403, 107.405, 107.502, 107.503, 107.705, 107.713, 107.715, 107.717, 107.803, 107.805, 107.807, 110.30, 172.101, 172.102, Special Provisions 19, 26, 53, 55, 60, 105, 118, 121, 125, 129, 131, 133, 136, B45, B55, B61, B69, B77, B81, N10, N72, 173.2a, 173.4, 173.7, 173.21, 173.22, 173.24, 173.31, 173.38, 173.51, 173.56, 173.58, 173.59, 173.124, 173.128, 173.159, 173.166, 173.169, 173.171, 173.214, 173.222, 173.224, 173.225, 173.245, 173.301, 173.305, 173.306, 173.314, 173.315, 173.316, 173.318, 173.334, 173.340, 173.411, 173.433, 173.457, 173.471, 173.472, 173.476, 174.50, 174.63, 175.8, 175.85, 175.701, 175.703, 176.168, 176.340, 176.704, 178.3, 178.35, 178.47, 178.53, 178.273, 178.274, 178.503, 178.509, 178.605, 178.606, 178.608, 178.801, 178.813, 180.213.

* * * * *

■ 3. In § 171.7, add paragraph (d)(8), and revise paragraphs (t)(1), (v)(2), (w), (bb)(1), and (dd) to read as follows:

§ 171.7 Reference material.

* * * * *

(d) * * *

(8) ANSI N14.1 Uranium Hexafluoride—Packaging for Transport, 2023 Edition, into §§ 173.417; 173.420.

* * * * *

(t) * * *

(1) ICAO Doc 9284 Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions), 2025–2026 Edition, copyright 2024, 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) * * *

(2) International Maritime Dangerous Goods Code (IMDG Code), Incorporating Amendment 42–24 (English Edition), 2024 Edition; 2024; 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 42–24 (Vol. 1).

(ii) Volume 2, Incorporating Amendment 42–24 (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 535–2014(E) Paper and board—Determination of water absorptiveness—Cobb method, 2014, Third edition, 2014–02, into §§ 178.707; 178.708; 178.516.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(22) ISO 4706:2008(E), Gas cylinders—Refillable welded steel cylinders—Test pressure 60 bar and below, First Edition, 2008–04–15, Corrected Version, 2008–07–01, into § 178.71.

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

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

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

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

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

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

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

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

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

(32) ISO 9809–1:2019(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 Rm value of less than 1 100 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 1 100 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 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.

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

(49) 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.

(50) 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.

(51) ISO 11114–1:2020(E), Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials, Third edition, 2020–05; into §§ 172.102; 173.301b; 178.71.

(52) 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.

(53) 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.

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

(55) 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.

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

(57) ISO 11118(E), Gas cylinders—Non-refillable metallic gas cylinders—

Specification and test methods, First edition, October 1999; into § 178.71.

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

(59) 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.

(60) 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.

(61) 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.

(62) 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.

(63) 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.

(64) 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.

(65) 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.

(66) 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.

(67) 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.

(68) 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.

(69) 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.

(70) 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.

(71) 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.

(72) 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.

(73) 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.

(74) 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.

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

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

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

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

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

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

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

(82) 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.

(83) 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.

(84) 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.

(85) 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.

(86) 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.

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

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

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

(90) 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.

(91) ISO 20475:2018(E), Gas cylinders—Cylinder bundles—Periodic

inspection and testing, First edition, 2018–02; into § 180.207.

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

(93) 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.

(94) 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.

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

(96) 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.

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

(98) 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.

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(bb) * * *

(1) Transportation of Dangerous Goods Regulations (Transport Canada TDG Regulations), SOR 2001–286, as last amended on October 25, 2023, 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.

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(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), 23rd revised edition, (2023), 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.

(i) Volume I, ST/SG/AC.10/1/Rev.23 (Vol. I).

(ii) Volume II, ST/SG/AC.10/1/Rev.23 (Vol. II).

(2) Manual of Tests and Criteria, Eighth Revised Edition, 2023, 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), 10th revised edition, ST/SG/AC.10/30/Rev.10 (2023), 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.

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■ 4. In § 171.8, add ''sodium ion cell or battery'' in the appropriate alphabetical order to read as follows:

§ 171.8 Definitions and abbreviations.

* * * * *

Sodium ion cell or battery means a rechargeable electrochemical system, where the positive and negative electrodes are both intercalation or insertion compounds with no metallic sodium (or sodium alloy) in either electrode, and with an organic nonaqueous compound as electrolyte.

* * * * *

■ 5. In § 171.23, revise paragraph (b) to read as follows:

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

* * * * *

(b) Conditions and requirements specific to certain materials—(1) *Aerosols.* Except for a limited quantity of a compressed gas in a container of not more than 4 fluid ounces capacity meeting the requirements in § 173.306(a)(1) of this subchapter, the proper shipping name ''Aerosol,'' UN1950, may be used only for a non-refillable receptacle containing a gas compressed, liquefied, or dissolved under pressure the sole purpose of which is to expel a nonpoisonous (other than Division 6.1, Packing Group III material) liquid, paste, or powder and fitted with a self-closing release device (see § 171.8). In addition, an aerosol must be in a metal packaging when the packaging exceeds 7.22 cubic inches.

(2) *Chemical oxygen generators.* Chemical oxygen generators must be approved, classed, described, packaged, and transported in accordance with the requirements of this subchapter.

(3) *Class 1 (explosive) materials.* Prior to being transported, Class 1 (explosive) materials must be approved by the Associate Administrator in accordance with § 173.56 of this subchapter. Each package containing a Class 1 (explosive) material must conform to the marking requirements in § 172.320 of this subchapter.

(4) *Class 7 (radioactive) materials.* (i) Highway route-controlled quantities (see § 173.403 of this subchapter) must be shipped in accordance with §§ 172.203(d)(4) and (d)(10); 172.507, and 173.22(c) of this subchapter;

(ii) For fissile materials and Type B, Type B(U), and Type B(M) packagings, the competent authority certification and any necessary revalidation must be obtained from the appropriate competent authorities as specified in §§ 173.471, 173.472, and 173.473 of this subchapter, and all requirements of the certificates and revalidations must be met;

(iii) Type A package contents are limited in accordance with § 173.431 of this subchapter;

(iv) The country of origin for the shipment must have adopted the edition of SSR–6 of the IAEA Regulations referenced in § 171.7.

(v) The shipment must conform to the requirements of § 173.448, when applicable;

(vi) The definition for ''radioactive material'' in § 173.403 of this subchapter must be applied to radioactive materials transported under the provisions of this Subpart;

(vii) Except for limited quantities, the shipment must conform to the requirements of § 172.204(c)(4) of this subchapter; and

(viii) Excepted packages of radioactive material, instruments or articles, or articles containing natural uranium or thorium must conform to the requirements of § 173.421, § 173.424, or § 173.426 of this subchapter, as appropriate.

(ix) Packages containing fissile materials must conform to the requirements of § 173.453 to be otherwise excepted from the requirements of subpart I of part 173 for fissile materials.

Safety devices for vehicles, vessels, or aircraft, (*e.g.,* air bag inflators, air bag modules, seatbelt pretensioners, and

pyromechanical devices). For each safety device, the shipping paper description must conform to the requirements in § 173.166(c) of this subchapter.

(5) *Fire suppressant dispersing devices.* Prior to being transported, fire suppressant dispersing devices of Class 1 and Class 9 must be approved by the Associate Administrator in accordance with §§ 173.56 and 173.169, respectively, of this subchapter. Each package containing a Class 1 (explosive) material must conform to the marking requirements in § 172.320 of this subchapter.

(6) *Hazardous substances.* A material meeting the definition of a hazardous substance as defined in § 171.8, must conform to the shipping paper requirements in § 172.203(c) of this subchapter and the marking requirements in § 172.324 of this subchapter:

(i) The proper shipping name must identify the hazardous substance by name, or the name of the substance must be entered in parentheses in association with the basic description and marked on the package in association with the proper shipping name. If the hazardous substance meets the definition for a hazardous waste, the waste code (for example, D001), may be used to identify the hazardous substance;

(ii) The shipping paper and the package markings must identify at least two hazardous substances with the lowest reportable quantities (RQs) when the material contains two or more hazardous substances; and

(iii) The letters ''RQ'' must be entered on the shipping paper either before or after the basic description, and marked on the package in association with the proper shipping name for each hazardous substance listed.

(7) *Hazardous wastes.* A material meeting the definition of a hazardous waste (see § 171.8) must conform to the following:

(i) The shipping paper and the package markings must include the word ''Waste'' immediately preceding the proper shipping name;

(ii) The shipping paper must be retained by the shipper and by each carrier for three years after the material is accepted by the initial carrier (see § 172.205(e)(5)); and

(iii) A hazardous waste manifest must be completed in accordance with § 172.205 of this subchapter.

(8) *Marine pollutants.* Except for marine pollutants (see § 171.8) transported in accordance with the IMDG Code, marine pollutants transported in bulk packages must meet the shipping paper requirements in § 172.203(l) of this subchapter and the package marking requirements in § 172.322 of this subchapter.

(9) *Organic peroxides.* Organic peroxides not identified by technical name in the Organic Peroxide Table in § 173.225(c) of this subchapter must be approved by the Associate Administrator in accordance with § 173.128(d) of this subchapter.

(10) *Poisonous by inhalation materials.* A material poisonous by inhalation (see § 171.8) must conform to the following requirements:

(i) The words ''Poison-Inhalation Hazard'' or ''Toxic-Inhalation Hazard'' and the words ''Zone A,'' ''Zone B,'' ''Zone C,'' or ''Zone D'' for gases, or ''Zone A'' or ''Zone B'' for liquids, as appropriate, must be entered on the shipping paper immediately following the basic shipping description. The word ''Poison'' or ''Toxic'' or the phrase ''Poison-Inhalation Hazard'' or ''Toxic-Inhalation Hazard'' need not be repeated if it otherwise appears in the shipping description;

(ii) The material must be packaged in accordance with the requirements of this subchapter;

(iii) The package must be marked in accordance with § 172.313 of this subchapter; and

(iv) Except as provided in subparagraph (B) of this paragraph (b)(10)(iv) and for a package containing anhydrous ammonia prepared in accordance with the Transport Canada TDG Regulations, the package must be labeled or placarded with POISON INHALATION HAZARD or POISON GAS, as appropriate, in accordance with subparts E and F of part 172 of this subchapter.

(A) For a package transported in accordance with the IMDG Code in a closed transport vehicle or freight container, a label or placard conforming to the IMDG Code specifications for a ''Class 2.3'' or ''Class 6.1'' label or placard may be substituted for the POISON GAS or POISON INHALATION HAZARD label or placard, as appropriate. The transport vehicle or freight container must be marked with the identification numbers for the hazardous material in the manner specified in § 172.313(c) of this subchapter and placarded as required by subpart F of part 172 of this subchapter.

(B) For a package transported in accordance with the Transport Canada TDG Regulations in a closed transport vehicle or freight container, a label or placard conforming to the TDG Regulations specifications for a ''Class 2.3'' or ''Class 6.1'' label or placard may be substituted for the POISON GAS or POISON INHALATION HAZARD label or placard, as appropriate. The transport vehicle or freight container must be marked with the identification numbers for the hazardous material in the manner specified in § 172.313(c) of this subchapter and placarded as required by subpart F of part 172 of this subchapter. While in transportation in the United States, the transport vehicle or freight container may also be placarded in accordance with the appropriate TDG Regulations in addition to being placarded with the POISON GAS or POISON INHALATION HAZARD placards.

(11) [Reserved]

(12) *Safety devices for vehicles, vessels, or aircraft, e.g., air bag inflators, air bag modules, seatbelt pretensioners, and pyromechanical devices.* For each safety device, the shipping paper description must conform to the requirements in § 173.166(c) of this subchapter.

(13) *Self-reactive materials.* Self-reactive materials not identified by technical name in the Self-reactive Materials Table in § 173.224(b) of this subchapter must be approved by the Associate Administrator in accordance with § 173.124(a)(2)(iii) of this subchapter.

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:

■ a. In the Hazardous Materials Table, amend by removing the entries under ''[REMOVE]'' and by adding the entries under ''[ADD]'' in the appropriate alphabetical sequence.

■ b. In appendix B, revise the List of Marine Pollutants by adding entries for Cobalt dihydroxide powder, *containing more than 10 percent respirable particles,* Isopropenylbenzene, and 2-phenylpropene in alphabetical order. The additions and revisions read 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) Packaging (§ 173.***)			(9) Quantity limitations (see §§ 173.27 and 175.75)		(10) Vessel stowage	
							Exceptions	Non-bulk	Bulk	Passenger aircraft/ rail	Cargo aircraft only	Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	[REMOVE].												
	*		*		*	*	*		*	*			
	Aircraft hydraulic power unit fuel tank (*containing a mixture of anhydrous hydrazine and monomethyl hydrazine*) (*M86 fuel*).	3	UN3165	I	3, 6.1, 8		None	172	None	Forbidden	42 L	E	21, 40, 49, 100.
	*		*		*	*	*		*	*			
	Alkali metal dispersions, flammable *or* Alkaline earth metal dispersions, flammable.	4.3	UN3482	I	4.3, 3	A2, A7, W31	None	201	244	Forbidden	1 L	D	13,52,148.
	Alkali metal dispersions, *or* Alkaline earth metal dispersions.	4.3	UN1391	I	4.3	A2, A7, W31	None	201	244	Forbidden	1 L	D	13,52,148.
	*		*		*	*	*		*	*			
	Ammonium nitrate-based fertilizer	5.1	UN2067	III	5.1	52, 148, 150, B120, IB8, IP3, T1, TP33.	152	213	240	25 kg	100 kg	B	25, 59, 60, 66, 117, 124.*
	*		*		*	*	*		*	*			
	Ammonium nitrate, liquid (*hot concentrated solution*).	5.1	UN2426		5.1	148, B5, T7	None	None	243	Forbidden	Forbidden	D	59, 60, 124.
	*		*		*	*	*		*	*			
	Argon, compressed	2.2	UN1006		2.2		306, 307	302	314, 315	75 kg	150 kg	A.	
	*		*		*	*	*		*	*			
	Batteries, containing sodium	4.3	UN3292		4.3		189	189	189	Forbidden	400 kg	A	13, 148.
	*		*		*	*	*		*	*			
	Batteries, wet, filled with alkali, *electric storage.*	8	UN2795		8	A51	159	159	159	30 kg	400 kg	A	52, 146.
	*		*		*	*	*		*	*			
	Bombs, smoke, non-explosive, *with corrosive liquid, without initiating device.*	8	UN2028	II	8		None	160	None	Forbidden	50 kg	E	40.
	*		*		*	*	*		*	*			
	Butadienes stabilized *or* Butadienes and Hydrocarbon mixture, stabilized *containing more than 40% butadienes.*	2.1	UN1010		2.1	387, T50	306	304	314, 315	Forbidden	150 kg	B	25, 40.
	*		*		*	*	*		*	*			
	Carbon dioxide	2.2	UN1013		2.2		306	302, 304	302, 314, 315	75 kg	150 kg	A.	
	Cells, containing sodium	4.3	UN3292		4.3		189	189	189	25 kg	No limit	A.	
	*		*		*	*	*		*	*			
	1-Chloropropane	3	UN1278	II	3	IB2, IP8, N34, T7, TP2	150	202	242	Forbidden	60 L	E.	
	*		*		*	*	*		*	*			
	Cyclopentene	3	UN2246	II	3	IB2, IP8, T7, TP2	150	202	242	5 L	60 L	E.	
	*		*		*	*	*		*	*			
	Dichloromethane	6.1	UN1593	III	6.1	IB3, IP8, N36, T7, TP2	153	203	241	60 L	220 L	A.	
	*		*		*	*	*		*	*			
	Dimethyl sulfide	3	UN1164	II	3	IB2, IP8, T7, TP2	150	202	242	5 L	60 L	E	40.
	*		*		*	*	*		*	*			
	Ethyl bromide	3	UN1891	II	3, 6.1	IB2, IP8, T7, TP2, TP13.	150	202	243	1 L	60 L	B	40, 85.
	*		*		*	*	*		*	*			
	Gallium	8	UN2803	III	8	T1, TP33	154	162	240	20 kg	20 kg	B	25.
	*		*		*	*	*		*	*			
	Glycidaldehyde	3	UN2622	II	3, 6.1	IB2, IP8, T7, TP1	150	202	243	1 L	60 L	A	40.

*	*	*	*	*	*	*	*	*	*	*	*	*	*
Helium, compressed	2.2	UN1046		2.2		306, 307	302	302, 314	75 kg	150 kg	A		85.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Hypochlorite solutions	8	UN1791	II	8	148, A7, B2, B15, IB2, IP5, N34, T7, TP2, TP24.	154	202	242	1 L	30 L	B		26.
			III	8	386, IB3, N34, T4, TP2, TP24.	154	203	241	5 L	60 L	B		26, 53, 58.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Isohexenes	3	UN2288	II	3	IB2, IP8, T11, TP1	150	202	242	5 L	60 L	E.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Isopropenylbenzene	3	UN2303	III	3	B1, IB3, T2, TP1	150	203	242	60 L	220 L	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Isosorbide dinitrate mixture with not less than 60 percent lactose, mannose, starch or calcium hydrogen phosphate.	401	UN2907	II	401	IB6, IP2, N85	None	212	None	15 kg	50 kg	E		28, 36.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries.*	9	UN3536			389				Forbidden	Forbidden	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Lithium ion batteries contained in equipment *including lithium ion polymer batteries.*	9	UN3481		9	181, 360, 388, 422, A54.	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, 422, A54.	185	185	185	5 kg	35 kg	A		156.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
2-Methyl-2-butene	3	UN2460	II	3	IB2, IP8, T7, TP1	150	202	242	5 L	60 L	E.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Methyl propyl ether	3	UN2612	II	3	IB2, IP8, T7, TP2	150	202	242	5 L	60 L	E		40.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Methylal	3	UN1234	II	3	IB2, IP8, T7, TP2	150	202	242	5 L	60 L	E.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Nitrocellulose, solution, flammable *with not more than 12.6% nitrogen, by mass, and not more than 55 percent nitrocellulose.*	3	UN2059	I	3	198, T11, TP1, TP8, TP27.	None	201	243	1 L	30 L	E.		
Nitrocellulose, solution, flammable *with not more than 12.6% nitrogen, by mass, and not more than 55 percent nitrocellulose.*	3	UN2059	II	3	198, IB2, T4, TP1, TP8	150	202	242	5L	60L	B.		
Nitrocellulose, solution, flammable *with not more than 12.6% nitrogen, by mass, and not more than 55 percent nitrocellulose.*	3	UN2059	III	3	198, B1, IB3, T2, TP1	150	203	242	60L	220L	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Nitrocellulose with alcohol *with not less than 25% alcohol by mass, and with not more than 12.6% nitrogen, by dry mass.*	4.1	UN2556	II	4.1	W31	None	212	None	1 kg	15 kg	D		12, 25, 28, 36.
Nitrocellulose with water *with not less than 25% water, by mass.*	4.1	UN2555	II	4.1	W31	None	212	None	15 kg	50 kg	E		28, 36.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Nitrogen, compressed	2.2	UN1066		2.2		306, 307	302	314, 315	75 kg	150 kg	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Nitroglycerin mixture, desensitized, liquid, flammable, n.o.s. with not more than 30 percent nitroglycerin, by mass.	3	UN3343		3	129	None	214	None	Forbidden	Forbidden	D.		
Nitroglycerin mixture, desensitized, liquid, n.o.s. *with not more than 30% nitroglycerin, by mass.*	3	UN3357	II	3	142	None	202	243	5 L	60 L	E.		
Nitroglycerin mixture, desensitized, solid, n.o.s. *with more than 2% but not more than 10% nitroglycerin, by mass.*	4.1	UN3319	II	4.1	118	None	None	None	Forbidden	0.5 kg	E.		

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification No.	PG	Label codes	Special provisions (§172.102)	(8) Packaging (§173.***)			(9) Quantity limitations (see §§173.27 and 175.75)		(10) Vessel stowage	
							Exceptions	Non-bulk	Bulk	Passenger aircraft/ rail	Cargo aircraft only	Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	Nitroglycerin, solution in alcohol, *with more than 1 percent but not more than 5 percent nitroglycerin.*	3	UN3064	II	3	N8	None	202	None	Forbidden	5 L	E.	
	* * * * * * * * * * * * *												
	Nitroglycerin solution in alcohol *with not more than 1% nitroglycerin.*	3	UN1204	II	3	IB2, N34	150	202	None	5 L	60 L	B.	
	* * * * * * * * * * * * *												
	Pentaerythrite tetranitrate mixture, desensitized, solid, n.o.s. *or* Pentaerythritol tetranitrate mixture, desensitized, solid, n.o.s. *or* PETN mixture, desensitized, solid, n.o.s., *with more than 10% but not more than 20% PETN, by mass.*	4.1	UN3344	II	4.1	118, N85	None	214	None	Forbidden	Forbidden	E.	
	* * * * * * * * * * * * *												
	Pentanes	3	UN1265	I	3	T11, TP2	150	201	243	1 L	30 L	E.	
				II	3	IB2, IP8, T4, TP1	150	202	242	5 L	60 L	E.	
	* * * * * * * * * * * * *												
	Tetramethylammonium hydroxide, solid	8	UN3423	II	8	B2, IB8, IP2, IP4, T3, TP33.	154	213	240	15 kg	50 kg	A	52.
	* * * * * * * * * * * * *												
	Tetramethylammonium hydroxide solution	8	UN1835	II	8	B2, IB2, T7, TP2	154	202	242	1 L	30 L	A	52.
				III	8	B2, IB3, T7, TP2	154	203	241	5 L	60 L	A	52.
	* * * * * * * * * * * * *												
G	Water-reactive liquid, corrosive, n.o.s	4.3	UN3129	I	4.3, 8	T14, TP2, TP7, TP13	None	201	243	Forbidden	1 L	D	13, 148.
				II	4.3, 8	IB1, T11, TP2, TP7	151	202	243	1 L	5 L	E	13, 85, 148.
				III	4.3, 8	IB2, T7, TP2, TP7	151	203	242	5 L	60 L	E	13, 85, 148.
G	Water-reactive liquid, n.o.s	4.3	UN3148	I	4.3	T13, TP2, TP7, W31	None	201	244	Forbidden	1 L	E	13, 40, 148.
				II	4.3	IB1, T7, TP2, TP7, W31.	151	202	243	1 L	5 L	E	13, 40, 148.
				III	4.3	IB2, T7, TP2, TP7, W31.	151	203	242	5 L	60 L	E	13, 40, 148.
G	Water-reactive liquid, toxic, n.o.s	4.3	UN3130	I	4.3, 6.1	A4	None	201	243	Forbidden	1 L	D	13, 148.
				II	4.3, 6.1	IB1	151	202	243	1 L	5 L	E	13, 85, 148.
				III	4.3, 6.1	IB2	151	203	242	5 L	60 L	E	13, 85, 148.
	* * * * * * * * * * * * *												
	[ADD].												
	* * * * * * * * * * * * *												
	Aircraft hydraulic power unit fuel tank (*containing a mixture of anhydrous hydrazine and monomethyl hydrazine) (M86 fuel*).	3	UN3165		3,6.1,8		None	172	None	Forbidden	42 L	E	21, 40, 49, 100.
	* * * * * * * * * * * * *												
	Alkali metal dispersions, flammable *or* Alkaline earth metal dispersions, flammable.	4.3	UN3482	I	4.3, 3	64, 65, A2, A7, T13, TP2, TP7, TP42, W31.	None	201	244	Forbidden	1 L	D	13, 52, 148.
	Alkali metal dispersions, *or* Alkaline earth metal dispersions.	4.3	UN1391	I	4.3	64, 65, A2, A7, T13, TP2, TP7, TP42, W31.	None	201	244	Forbidden	1 L	D	13, 52, 148.
	* * * * * * * * * * * * *												
	Ammonium nitrate-based fertilizer	5.1	UN2067	III	5.1	52, 148, 150, B120, IB8, IP3, T1, TP33.	152	213	240	25 kg	100 kg	B	25, 59, 60, 66, 116, 117,124.
	* * * * * * * * * * * * *												
	Ammonium nitrate, liquid (*hot concentrated solution*).	5.1	UN2426		5.1	148, 252, B5, T7	None	None	243	Forbidden	Forbidden	D	59, 60, 124.

*	*	*	*	*	*	*	*	*	*	*	*	*	*
Argon, compressed	2.2	UN1006		2.2	406	306, 307	302	314, 315	75 kg	150 kg	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Batteries, containing metallic sodium *or* sodium alloy.	4.3	UN3292		4.3	401	189	189	189	Forbidden	400 kg	A		13, 148.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Batteries, wet, filled with alkali, *electric storage.*	8	UN2795		8	401, A51	159	159	159	30 kg	400 kg	A		52, 146.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Bombs, smoke, nonexplosive, *with corrosive liquid, without initiating device.*	8	UN2028		8		None	160	None	Forbidden	50 kg	E		40.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Butadienes, stabilized *or* Butadienes and Hydrocarbon mixtures, stabilized *containing more than 20 percent butadienes.*	2.1	UN1010		2.1	387, 402, T50	306	304	314, 315	Forbidden	150 kg	B		25, 40.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Carbon dioxide	2.2	UN1013		2.2	406	306	302, 304	302, 314, 315	75 kg	150 kg	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cells, containing metallic sodium *or* sodium alloy.	4.3	UN3292		4.3	401	189	189	189	25 kg	No Limit	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
1-Chloropropane	3	UN1278	II	3	IB2, N34, T7, TP2	150	202	242	Forbidden	60 L	E.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Cyclopentene	3	UN2246	II	3	IB2, T7, TP2	150	202	242	5 L	60 L	E.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Dichloromethane	6.1	UN1593	III	6.1	IB3, N36, T7, TP2	153	203	241	60 L	220 L	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Dimethyl sulfide	3	UN1164	II	3	IB2, T7, TP2	150	202	242	5 L	60 L	E		40.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Disilane	2.1	UN3553		2.1		None	304	None	Forbidden	Forbidden	D		40, 57, 104.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Ethyl bromide	3	UN1891	II	3, 6.1	IB2, T7, TP2, TP13	150	202	243	1 L	60 L	B		40, 85.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Fire suppressant dispersing devices	1.4S	UN0514		1.4S	A200	None	62, 169	None	25 kg	100 kg	A		25.
Fire suppressant dispersing devices	9	UN3559		9	A200	None	169	None	25 kg	100 kg	A.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gallium	8	UN2803	III	8	365, T1, TP33,	154	162	240	20 kg	20 kg	B		25.
Gallium contained in manufactured articles	8	UN3554		8		162	None	None	No limit	No limit	B		25.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Glycidaldehyde	3	UN2622	II	3, 6.1	IB2, T7, TP1	150	202	243	1 L	60 L	A		40.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Helium, compressed	2.2	UN1046		2.2	406	306, 307	302	302, 314	75 kg	150 kg	A		85.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Hypochlorite Solutions	8	UN1791	II	8	148, A7, B2, B15, IB2, IP5, N34, T7, TP2, TP24.	154	202	242	1 L	30 L	B		26.
			III	8	386, IB3, N34, T4, TP2, TP24.	154	203	241	5 L	60 L	B		26.
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Isohexenes	3	UN2288	II	3	IB2, T11, TP1	150	202	242	5 L	60 L	E.		
*	*	*	*	*	*	*	*	*	*	*	*	*	*
Isopropenylbenzene	3	UN2303	III	3	B1, IB3, T2, TP1	150	203	242	60 L	220 L	A		25.

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class or division	Identification No.	PG	Label codes	Special provisions (§ 172.102)	(8) Packaging (§ 173.***)			(9) Quantity limitations (see §§ 173.27 and 175.75)		(10) Vessel stowage	
							Exceptions	Non-bulk	Bulk	Passenger aircraft/ rail	Cargo aircraft only	Location	Other
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)
	*	*	*	*	*	*	*	*	*	*			
	Isosorbide dinitrate mixture with not less than 60 percent lactose, mannose, starch or calcium hydrogen phosphate.	401	UN2907	II	401	162, IB6, IP2, N85	None	212	None	15 kg	50 kg	E	28, 36.
	*	*	*	*	*	*	*	*	*	*			
	Lithium batteries installed in cargo transport unit *lithium ion batteries or lithium metal batteries.*	9	UN3536			389				Forbidden	Forbidden	D	25, 40.
	*	*	*	*	*	*	*	*	*	*			
	Lithium ion batteries contained in equipment *including lithium ion polymer batteries.*	9	UN3481		9	181, 360, 388, 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, 422, A54, A100.	185	185	185	5 kg	35 kg	A	156.
	*	*	*	*	*	*	*	*	*	*			
	2-Methyl-2-butene	3	UN2460	II	3	IB2, T7, TP1	150	202	242	5 L	60 L	E.	
	*	*	*	*	*	*	*	*	*	*			
	Methyl propyl ether	3	UN2612	II	3	IB2, T7, TP2	150	202	242	5 L	60 L	E	40.
	*	*	*	*	*	*	*	*	*	*			
	Methylal	3	UN1234	II	3	IB2, T7, TP2	150	202	242	5 L	60 L	E.	
	*	*	*	*	*	*	*	*	*	*			
	Nitrocellulose, solution, flammable *with not more than 12.6% nitrogen, by mass, and not more than 55% nitrocellulose.*	3	UN2059	I	3	162, 198, T11, TP1, TP8, TP27.	None	201	243	1 L	30 L	E.	
				II	3	162, 198, IB2, T4, TP1, TP8.	150	202	242	5L	60L	B.	
				III	3	162, 198, B1, IB3, T2, TP1.	150	203	242	60L	220L	A.	
	*	*	*	*	*	*	*	*	*	*			
	Nitrocellulose with alcohol *with not less than 25% alcohol by mass, and with not more than 12.6% nitrogen, by dry mass.*	4.1	UN2556	II	4.1	162, 197, W31	None	212	None	1 kg	15 kg	D	12, 25, 28, 36.
	Nitrocellulose with water *with not less than 25% water, by mass.*	4.1	UN2555	II	4.1	162, 197, W31	None	212	None	15 kg	50 kg	E	28, 36.
	*	*	*	*	*	*	*	*	*	*			
	Nitrogen, compressed	2.2	UN1066		2.2	406	306, 307	302	314, 315	75 kg	150 kg	A.	
	*	*	*	*	*	*	*	*	*	*			
	Nitroglycerin mixture, desensitized, liquid, flammable, n.o.s. with not more than 30 percent nitroglycerin, by mass.	3	UN3343		3	129, 162	None	214	None	Forbidden	Forbidden	D.	
	Nitroglycerin mixture, desensitized, liquid, n.o.s. *with not more than 30% nitroglycerin, by mass.*	3	UN3357	II	3	142, 162	None	202	243	5 L	60 L	E.	
	Nitroglycerin mixture, desensitized, solid, n.o.s. *with more than 2% but not more than 10% nitroglycerin, by mass.*	4.1	UN3319	II	4.1	118, 162	None	None	None	Forbidden	0.5 kg	E.	
	Nitroglycerin, solution in alcohol, *with more than 1 percent but not more than 5 percent nitroglycerin.*	3	UN3064	II	3	162, N8	None	202	None	Forbidden	5 L	E.	
	*	*	*	*	*	*	*	*	*	*			
	Nitroglycerin solution in alcohol *with not more than 1% nitroglycerin.*	3	UN1204	II	3	162, IB2, N34	150	202	None	5 L	60 L	B.	

	*		*		*	*	*		*	*					
	Pentaerythrite tetranitrate mixture, desensitized, solid, n.o.s. *or* Pentaerythritol tetranitrate mixture, desensitized, solid, n.o.s. *or* PETN mixture, desensitized, solid, n.o.s., *with more than 10% but not more than 20% PETN, by mass.*	4.1	UN3344	II	4.1	118, 162, N85	None	214	None	Forbidden	Forbidden	E.		
	*		*		*	*	*		*	*					
	Pentanes	3	UN1265	I	3	T11, TP2	150	201	243	1 L	30 L	E.		
				II	3	IB2, T4, TP1	150	202	242	5 L	60 L	E.		
	*		*		*	*	*		*	*					
	Sodium ion batteries *with organic electrolyte.*	9	UN3551		9	400, 401, 422, A54, A100.	185	185	185	Forbidden	35 kg	A	156.		
	Sodium ion batteries contained in equipment *with organic electrolyte.*	9	UN3552		9	181, 360, 400, 401, 422, A54, A100.	185	185	185	5 kg	35 kg	A	156.		
	Sodium ion batteries packed with equipment *with organic electrolyte.*	9	UN3552		9	181, 360, 400, 401, 422, A54, A100.	185	185	185	5 kg	35 kg	A	156.		
	*		*		*	*	*		*	*					
+	Tetramethylammonium hydroxide aqueous solution *with more than 2.5% but less than 25% tetramethylammonium hydroxide.*	8	UN1835	II	8, 6.1	408, 409, B2, IB2, T7, TP2.	154	202	243	1 L	30 L	A	52.		
	Tetramethylammonium hydroxide aqueous solution *with not more than 2.5% tetramethylammonium hydroxide.*	8	UN1835	III	8	408, 409, B2, IB3, T7, TP2,.	154	203	241	5 L	60 L	A	52.		
+	Tetramethylammonium hydroxide aqueous solution *with not less than 25% tetramethylammonium hydroxide.*	6.1	UN3560	I	6.1, 8	408, 409, B2, T14, TP2	None	201	243	0.5 L	2.5 L	D	52.		
	*		*		*	*	*		*	*					
+	Tetramethylammonium hydroxide, solid	6.1	UN3423	I	6.1, 8	409, B2, IB7, IP1, T6, TP33,.	None	211	242	1 kg	15 kg	A	52.		
	*		*		*	*	*		*	*					
	Trifluoromethyltetrazole-sodium salt in acetone, *with not less than 68% acetone, by mass.*	3	UN3555	II	3	74, 162, 234	None	None	None	Forbidden	Forbidden	D	12, 25, 158, 159.		
	*		*		*	*	*		*	*					
	Vehicle, lithium ion battery powered	9	UN3556		9	134, 135, 360, A100	220	220	None	No limit	No limit	A.			
	Vehicle, lithium metal battery powered	9	UN3557		9	134, 135, 360, A100	220	220	None	No limit	No limit	A.			
	Vehicle, sodium ion battery powered	9	UN3558		9	134, 135, 360, A100	220	220	None	No limit	No limit	A.			
	*		*		*	*	*		*	*					
G	Water-reactive liquid, corrosive, n.o.s	4.3	UN3129	I	4.3, 8	T14, TP2, TP7, TP13	None	201	243	Forbidden	1 L	D	13, 148, 160.		
				II	4.3, 8	IB1, T11, TP2, TP7	151	202	243	1 L	5 L	D	13, 148, 160.		
				III	4.3, 8	IB2, T7, TP2, TP7	151	203	242	5 L	60 L	D	13, 148, 160.		
G	Water-reactive liquid, n.o.s	4.3	UN3148	I	4.3	T13, TP2, TP7, W31	None	201	244	Forbidden	1 L	D	13, 40, 148, 160.		
				II	4.3	IB1, T7, TP2, TP7, W31.	151	202	243	1 L	5 L	D	13, 40, 148, 160.		
				III	4.3	IB2, T7, TP2, TP7, W31.	151	203	242	5 L	60 L	D	13, 40, 148, 160.		
G	Water-reactive liquid, toxic, n.o.s	4.3	UN3130	I	4.3, 6.1	A4	None	201	243	Forbidden	1 L	D	13, 148, 160.		
				II	4.3, 6.1	IB1	151	202	243	1 L	5 L	D	13, 148, 160.		
				III	4.3, 6.1	IB2	151	203	242	5 L	60 L	D	13, 148, 160.		

* * * * *

Appendix B to § 172.101—List of Marine Pollutants

* * * * *

LIST OF MARINE POLLUTANTS

S.M.P. (1)	Marine pollutant (2)
* * * * *	
	Cobalt dihydroxide powder, *containing more than 10 percent respirable particles*.
* * * * *	
	Isopropenylbenzene.
* * * * *	
	2-phenylpropene.

* * * * *

■ 7. In § 172.102:

■ a. In paragraph (c)(1), revise special provisions 43, 160, 162, 181, 360, 365, 371, 379, and 389 and add special provisions 134, 234, 252, 328, 400, 401, 402, 406, 408 and 409 in numerical order;

■ b. In paragraph (c)(2), revise special provisions A54 and A100;

■ c. In paragraph (c)(4), rename ''Table 2—IP Codes'' to ''Table 2 to Paragraph (c)(4)—IP Codes'' and revise the renamed table; and

■ d. In paragraph (c)(8), add special provision TP42;

The additions and revisions read as follows:

§ 172.102 Special provisions.

* * * * *

(c) * * *

(1) * * *

43 The membrane filters, including paper separators and coating or backing materials, that are present in transport, must not be able to propagate a detonation as tested by one of the tests described in the UN Manual of Tests and Criteria, Part I, Test series 1(a) (IBR, see § 171.7 of this subchapter). On the basis of the results of suitable burning rate tests, and taking into account the standard tests in the UN Manual of Tests and Criteria, Part III, subsection 33.2.1 (IBR, see § 171.7 of this subchapter), nitrocellulose membrane filters in the form in which they are to be transported that do not meet the criteria for a Division 4.1 material are not subject to the requirements of this subchapter. Packagings must be so constructed that explosion is not possible by reason of increased internal pressure. Nitrocellulose membrane filters covered by this entry, each with a mass not exceeding 0.5 g, are not subject to the requirements of this subchapter when contained individually in an article or a sealed packet. Nitrocellulose membrane filters with a nitrocellulose content not exceeding 53 g/m^2 and a nitrocellulose net mass not exceeding 300 g per inner packaging are not subject to the requirements of this subchapter subject to the following conditions:

a. Membrane filters are packed with paper separators of minimum 80 g/m^2 placed between each layer of nitrocellulose membrane filters;

b. Membrane filters are packed to maintain the alignment of the nitrocellulose membrane filters and the paper separators in any of the following configurations:

i. Rolls tightly wound and packed in plastic foil of minimum 80 g/m^2 or aluminum pouches with an oxygen permeability of equal or less than 0.1 percent according to ISO 15105 part 1 (IBR; *see* § 171.7 of this subchapter);

ii. Sheets packed in cardboard of minimum 250 g/m^2 or aluminum pouches with an oxygen permeability of equal or less than 0.1 percent according to standard ISO 15105 part 1 (IBR; *see* § 171.7 of this subchapter), or;

iii. Round filters packed in disc holders or cardboard packaging of minimum 250 g/m^2 or single packed in pouches of paper and plastic material of total minimum 100 g/m^2.

* * * * *

134 The UN3171 entry only applies to vehicles powered by wet batteries, and equipment powered by wet batteries that are transported with these batteries installed.

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

b. Vehicles powered by lithium ion batteries, lithium metal batteries, or sodium ion batteries must be appropriately described using table entries ''UN3556, Vehicle, lithium ion battery powered,'' ''UN3557, Vehicle lithium metal battery powered,'' or ''UN3558, Vehicle sodium ion battery powered,'' respectively.

c. Examples of equipment are lawnmowers, cleaning machines, or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be assigned to the entries ''UN3091, Lithium metal batteries contained in equipment'' or ''UN3091, Lithium metal batteries packed with equipment'' or ''UN3481, Lithium ion batteries contained in equipment'' or ''UN3481, Lithium ion batteries packed with equipment'' as appropriate. Equipment powered by sodium ion batteries must be assigned to the entries ''UN3552, Sodium ion batteries contained in equipment'' or ''UN3552, Sodium ion batteries packed with equipment'' as appropriate.

d. Self-propelled vehicles or equipment that also contain an internal combustion engine must be assigned to the entries ''UN3529, Engine, internal combustion, flammable gas powered'' or ''UN3528, Engine, internal combustion, flammable liquid powered'' or ''UN3166, Vehicle, flammable gas powered'' or ''UN3166 Vehicle, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and batteries. In addition, self-propelled vehicles or equipment that contain a fuel cell engine must be assigned to the entries ''UN3529, Engine, fuel cell, flammable gas powered'' or ''UN3528, Engine, fuel cell, flammable liquid powered'' or ''UN3166, Vehicle, fuel cell, flammable gas powered'' or ''UN3166, Vehicle, fuel cell, flammable liquid powered,'' as appropriate. These entries include hybrid electric vehicles powered by a fuel cell engine, an internal combustion engine, and batteries.

e. Lithium batteries installed in cargo transport units, designed only to provide power external to the transport unit, must be described and classified using the table entry ''UN3536, Lithium batteries installed in cargo transport unit.''

* * * * *

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).

162 This material may be transported under the provisions of Class 3 or Division 4.1, as appropriate, only if it is packed so that, during the course of transportation, the percentage of diluent will not fall below the percentage stated in the shipping description. In cases where the diluent is not stated, the substance shall be packed so that the amount of explosive substance does not exceed the stated value.

* * * * *

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

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

b. Except as provided in § 173.185(c)(3) of this subchapter, the package must be marked ''UN3091, Lithium metal batteries packed with equipment,'' ''UN3481, Lithium ion batteries packed with equipment,'' or ''UN3552, Sodium ion batteries packed with equipment,'' as appropriate. If a package contains a combination of lithium metal batteries, lithium ion batteries, or sodium ion batteries either packed with or contained in equipment, the package must be marked as required for each battery type contained in the package. However, button cell batteries installed in equipment (including circuit boards) need not be considered; and

c. The shipping paper must indicate ''UN3091, Lithium metal batteries packed with equipment,'' ''UN3481, Lithium ion batteries packed with equipment,'' or ''UN3552, Sodium ion batteries packed with equipment,'' as appropriate. If a package contains a combination of lithium metal batteries, lithium ion batteries, or sodium ion batteries either packed with and contained in equipment, the shipping paper must indicate ''UN 3091, Lithium metal batteries packed with equipment,'' ''UN 3481, Lithium ion batteries packed with equipment,'' or ''UN3552, Sodium ion batteries packed with equipment,'' as appropriate.

* * * * *

234 For Trifluoromethyltetrazole, sodium salt (TFMT-Na) in acetone (UN3555) as a desensitized explosive, plastics drums (1H1) with a maximum capacity of 250 L (66 gallons) are authorized. Packagings must be designed and constructed to prevent loss of the content of the phlegmatizer, transported in an upright position, and be lead free.

* * * * *

252 Ammonium nitrate hot concentrated solutions can be transported under this entry provided:

(a) The solution contains not more than 93% ammonium nitrate;

(b) The solution contains at least 7% water;

(c) The solution contains not more than 0.2% combustible material;

(d) The solution contains no chlorine compounds in quantities such that the chloride ion level exceeds 0.02%;

(e) The pH of an aqueous solution of 10% of the substance is between 5 and 7, measured at 25 °C (77 °F); and

(f) The maximum allowable transport temperature of the solution is 140 °C (284 °F).

In addition, ammonium nitrate hot concentrate solutions are not subject to the requirements of this subchapter provided:

(a) The solution contains not more than 80% ammonium nitrate;

(b) The solution contains not more than 0.2% combustible material;

(c) The ammonium nitrate remains in solution under all conditions of transport; and

(d) The solution does not meet the criteria of any other hazard Class or Division.

* * * * *

328 When lithium metal, lithium ion, or sodium ion batteries are contained in the fuel cell system, the item must be described under this entry and the appropriate entries for ''UN3091, Lithium metal batteries contained in equipment,'' ''UN3481, Lithium ion batteries contained in equipment,'' or ''UN3552, Sodium ion batteries contained in equipment.''

* * * * *

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 installed in cargo transport units, designed only to provide power external to the transport unit, must be described using ''UN 3536. Lithium batteries installed in a cargo transport unit.''

* * * * *

365 For manufactured instruments and articles containing mercury, see UN3506, and for manufactured instruments and articles containing gallium, see UN3554.

* * * * *

371 a. This entry also applies to articles not conforming to the requirements of §§ 173.302, 173.304, or 173.306 of this subchapter, containing a small pressure receptacle with a release device. Such articles must comply with the following requirements:

(1) The water capacity of the pressure receptacle must not exceed 0.5 L and the working pressure must not exceed 25 bar (363 psi) at 15 °C (59 °F);

(2) The minimum burst pressure of the pressure receptacle must be at least four times the pressure of the gas at 15 °C (59 °F);

(3) Each article must be manufactured in such a way that unintentional firing or release is avoided under normal conditions of handling, packing, transport and use. This may be fulfilled by an additional locking device linked to the activator;

(4) Each article must be manufactured in such a way as to prevent hazardous projections of the pressure receptacle or parts of the pressure receptacle;

(5) Each pressure receptacle must be manufactured from material which will not fragment upon rupture;

(6) The design type of the article must be subjected to a fire test. For this test, the provisions of paragraphs 16.6.1.2 except (g), 16.6.1.3.1 to 16.6.1.3.4, 16.6.1.3.6, 16.6.1.3.7(b) and 16.6.1.3.8 of the UN Manual of Tests and Criteria (IBR; see § 171.7 of this subchapter) must be applied. It must be demonstrated that the article relieves its pressure by means of a fire degradable seal or other pressure relief device, in such a way that the pressure receptacle will not fragment and that the article or fragments of the article do not rocket more than 10 meters; and

(7) The design type of the article must be subjected to the following test. A

stimulating mechanism must be used to initiate one article in the middle of the packaging. There must be no hazardous effects outside the package such as disruption of the package, metal fragments or a receptacle which passes through the packaging.

b. The manufacturer must produce technical documentation of the design type, manufacture as well as the tests and their results. The manufacturer must apply procedures to ensure that articles produced in series are made of good quality, conform to the design type and are able to meet the requirements in (a). The manufacturer must provide such information to a representative of the Department upon request.

* * * * *

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

a. The adsorption or absorption presents the following properties:

(1) The pressure at a temperature of 20 °C (68 °F) in the receptacle is less than 0.6 bar (8.7 psi);

(2) The pressure at a temperature of 35 °C (95 °F) in the receptacle is less than 1 bar (14.5);

(3) The pressure at a temperature of 85 °C (185 °F) in the receptacle is less than 12 bar (174 psi).

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

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

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

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

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

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

(4) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar (218 psi) without violent rupture, explosion or projection; and

(5) Each receptacle shall be able to withstand a pressure of 20 bar (290 psi) without leakage when the pressure relief device is deactivated.

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

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

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

* * * * *

389 This entry only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit.

a. The lithium 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. Emergency response information, as required by subpart G of this part must identify the predominant type of energy storage battery (*i.e.,* lithium ion or lithium metal battery) contained in the cargo transport unit and provide information on immediate methods for handling fires.

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

* * * * *

400 Except for transportation by aircraft, sodium ion cells and batteries and sodium ion cells and batteries packed with, or contained in, or packed with equipment are not subject to the requirements of this subchapter if they meet the following:

a. The cell or battery is short-circuited in a way that the cell or battery does not contain electrical energy. The short-circuiting of the cell or battery shall be easily verifiable (*e.g.,* busbar between terminals);

b. Each cell or battery meets the provisions in § 173.185 paragraphs (a)(1), (a)(3), (a)(4)(i), and (a)(4)(iii);

c. Each package shall be marked according to § 173.185(c)(3);

d. Except when cells or batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m (3 ft) drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact, and without release of contents;

e. Cells and batteries, when installed in equipment, shall be protected from damage. When batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained; and

f. Each cell, including when it is a component of a battery, shall only contain hazardous materials in quantities that are authorized to be transported as limited quantities in accordance with the provisions of part 173 of this subchapter.

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.*''

402 Hazardous materials transported under this entry shall have a vapor pressure at 70 °C not exceeding 1.1 MPa (159.5 psi) and a density at 50 °C (112 °F) not lower than 0.525 kg/L.

406 Notwithstanding § 173.306 of this subchapter, and except for transportation by air, a hazardous material assigned this entry may be transported as a limited quantity material in DOT specification cylinders and UN pressure receptacles in quantities up to 1.0 L. The packaging must be constructed, qualified, and filled as required by § 173.302 and is limited to a test pressure capacity product not to exceed 152 bar·L (78 psig· ft3). The packagings must be placed in suitable outer packaging. The completed package must not exceed 30 kg (66 lbs) gross weight and may not contain any other hazardous materials. Division 2.2 gases, with no subsidiary hazards, packed in accordance with this special provision are not subject to shipping papers, labeling, or placarding, however, the package must display the limited quantity mark in accordance with § 172.315(a)(1) and (a)(2) of this Part.

* * * * *

408 This entry applies only to aqueous solutions comprised of water, tetramethylammonium hydroxide (TMAH), and no more than 1 percent of other constituents. Other formulations containing TMAH must be assigned to an appropriate generic or n.o.s. entry (*e.g.,* ''UN2927, Toxic liquids, corrosive, organic, n.o.s.'', etc.), except as follows:

a. Other formulations containing a surfactant in a concentration of more than 1 percent and with not less than 8.75 percent tetramethylammonium hydroxide must be assigned to ''UN2927, Toxic liquids, corrosive, organic, n.o.s., PG I.''

b. Other formulations containing a surfactant in a concentration of more than 1 percent and with more than 2.38 percent but less than 8.75 percent TMAH must be assigned to ''UN2927, Toxic liquids, corrosive, organic, n.o.s., PG II.''

409 This hazardous material may continue to be classified, described and transported in accordance with the requirements of this subchapter in effect prior to [INSERT EFFECTIVE DATE OF THE FINAL RULE] until December 31, 2026. Also, hazardous material offered into transportation prior to December 31, 2026, and still in transportation at the expiration of December 31, 2026, may remain in transportation to its destination.

* * * * *

(2) * * *

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A54 Irrespective of the quantity limits in Column 9B of the § 172.101 table, a lithium cell or battery or a sodium ion cell or battery, including when a cell or battery is packed with, or contained in, equipment that otherwise meets the applicable requirements of § 173.185, may have a mass exceeding 35 kg (77 lbs) if approved by the Associate Administrator prior to shipment.

* * * * *

A100 Cells and batteries assigned this special provision are subject to state-of-charge limits. Cells and batteries at a state-of-charge greater than authorized limits may only be transported under conditions approved by the Associate Administrator. The requirements are as follows:

a. For UN3480, lithium ion cells and batteries must be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity.

b. Beginning January 1, 2026, for UN3481, lithium ion cells and batteries *packed with equipment* with a Watt-hour (Wh) rating exceeding 2.7 Wh must be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity. Lithium ion cells and batteries not exceeding 2.7 Wh should be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity.

c. Beginning January 1, 2026, for UN3481, lithium ion batteries *contained in equipment,* equipment should be offered for transport with the cells and batteries at a state-of-charge not exceeding 30 percent of their rated capacity or should be offered for transport at an indicated battery capacity not exceeding 25 percent.

d. Beginning January 1, 2026, for UN3551, sodium ion cells and batteries must be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity.

e. For low production runs and prototypes of UN3480, UN3481, UN3551, and UN3552, lithium ion cells and batteries and sodium ion cells and batteries (UN3480 and UN3551), including when packed with or contained in equipment (UN3481 and UN 3552), must be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity.

f. For UN3480, UN3481, UN3551, and UN3552, where the cell or battery has a mass exceeding 35 kg, and approved in accordance with Special Provision A54, lithium ion cells and batteries and sodium ion cells and batteries (UN3480 and UN3551), including when packed with or contained in equipment (UN3481 and UN3552), must be offered for transport at a state-of-charge not exceeding 30 percent of their rated capacity.

g. Beginning January 1, 2026, for UN3556, UN3557, and UN3558, vehicles powered by batteries exceeding 100 Wh must be offered for transport with the battery(ies) at a state-of-charge not exceeding 30 percent of their rated capacity, or an indicated battery capacity not exceeding 25 percent. Vehicles powered by batteries not exceeding 100 Wh should be offered for transport with the battery(ies) at a state-of-charge not exceeding 30 percent of their rated capacity, or an indicated battery capacity not exceeding 25 percent.

Note that guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria. Cells and batteries shipped at a reduced state-of-charge are less prone to thermal runaway.

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(4) * * *

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TABLE 2 TO PARAGRAPH (c)(4)—IP CODES

IP code	
IP1	IBCs must be packed in closed freight containers or a closed transport vehicle.
IP2	When IBCs other than metal or rigid plastics IBCs are used, they must be offered for transportation in a closed freight container or a closed transport vehicle.
IP3	Flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.
IP4	Flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.
IP5	IBCs must have a device to allow venting. The inlet to the venting device must be located in the vapor space of the IBC under maximum filling conditions.
IP6	Non-specification bulk bins are authorized.
IP7	For UN identification numbers 1327, 1363, 1364, 1365, 1386, 1408, 1841, 2211, 2217, 2793 and 3314, IBCs are not required to meet the IBC performance tests specified in part 178, subpart N, of this subchapter.

TABLE 2 TO PARAGRAPH (c)(4)—IP CODES—Continued

IP code	
IP8	Ammonia solutions may be transported in IBCs as authorized in IB3, provided that they have successfully passed, without leakage or permanent deformation, the hydrostatic test specified in § 178.814 of this subchapter at a test pressure that is not less than 1.5 times the vapor pressure of the contents at 55 °C (131 °F).
IP13	Transportation by vessel in IBCs is prohibited.
IP14	Air must be eliminated from the vapor space by nitrogen or other means.
IP15	For UN2031 with more than 55% nitric acid, the permitted use of rigid plastic IBCs, and the inner receptacle of composite IBCs with rigid plastics, shall be two years from their date of manufacture.
IP16	IBCs of type 31A and 31N are only authorized if approved by the Associate Administrator.
IP19	For UN identification numbers 3531, 3532, 3533, and 3534, IBCs must be designed and constructed to permit the release of gas or vapor to prevent a build-up of pressure that could rupture the IBCs in the event of loss of stabilization.
IP20	Dry sodium cyanide or potassium cyanide is also permitted in sift-proof, water-resistant, fiberboard IBCs when transported in closed freight containers or transport vehicles.
IP21	When transported by vessel, flexible, fiberboard or wooden IBCs must be sift-proof and water-resistant or be fitted with a sift-proof and water-resistant liner.
IP22	UN3550 may be transported in flexible IBCs (13H3 or 13H4) with sift-proof liners to prevent any egress of dust during transport.

* * * * *

(8) ''*TP*'' *codes.*

* * * * *

TP42 Portable tanks are not authorized for the transport of cesium or rubidium dispersions.

* * * * *

■ 8. In § 172.203, revise paragraph (d)(5) to read as follows:

§ 172.203 Additional description requirements.

* * * * *

(d) * * *

(5) For each package in the shipment bearing RADIOACTIVE YELLOW–II or RADIOACTIVE YELLOW–III labels:

(i) The transport index.

(ii) For transport by air, the dimensions of the package including dimensional units, or when placed in an overpack or freight container, the dimensions of the overpack or freight container, as applicable. The length, width (or diameter, as applicable), and height must be indicated. The dimensions should be shown in the following standard order: length then width (or diameter) then height. Dimensions may be indicated by ''L,'' ''W'' (or ''D''), and ''H'', respectively, immediately preceding the respective dimension. However, if a different order is used, the letters ''L,'' ''W'' (or ''D''), and ''H'' must be included with the dimensions accordingly.

* * * * *

■ 89. In § 172.315, revise paragraphs (a)(2) and (b)(2) to read as follows:

§ 172.315 Limited quantities.

* * * * *

(a) * * *

(2) The square-on-point must be durable, legible and of a size relative to the packaging, readily visible, and must be applied on at least one side or one end of the outer packaging. The width of the border forming the square-on-point must be at least 2 mm and the minimum dimension of each side, as measured from the outside of the lines forming the border, must be 100 mm unless the packaging size requires a reduced size marking that must be no less than 50 mm on each side and the width of the border forming the square on point may be reduced to a minimum of 1 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown. When intended for transportation by vessel, a cargo transport unit (see § 176.2 of this subchapter) containing packages of hazardous materials in only limited quantities must be marked once on each side and once on each end of the exterior of the unit with an identical mark which must have minimum dimensions of 250 mm on each side. For domestic transportation, a 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.

* * * * *

(b) * * *

(2) The square-on-point must be durable, legible and of a size relative to the package as to be readily visible. The square-on-point must be applied on at least one side or one end of the outer packaging. The width of the border forming the square-on-point must be at least 2 mm and the minimum dimension of each side, as measured from the outside of the lines forming the border, must be 100 mm unless the package size requires a reduced size marking that must be no less than 50 mm on each side and the width of the border forming the square on point may be reduced to a minimum of 1 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown. For domestic transportation, a 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.

* * * * *

§ 172.322 [Amended].

■ 10. In § 172.322, remove and reserve paragraph (e)(3).

■ 11. In § 172.447, revise the section heading, paragraph (a) introductory text and paragraph (b) to read as follows:

§ 172.447 LITHIUM BATTERY or SODIUM ION BATTERY label.

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

* * * * *

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

* * * * *

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

■ 12. 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.

■ 13. Revise § 173.14 to read as follows:

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

* * * * *

(b) For transportation by aircraft, data loggers and cargo tracking devices with installed lithium 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 data loggers or cargo tracking 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 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 data loggers or cargo tracking devices in use or used must be no more than the number required to track or to collect data for the specific consignment;

(6) The data loggers or cargo tracking devices must be capable of withstanding the shocks and loadings normally encountered during transport;

(7) The data loggers or cargo tracking devices must not be capable of generating a dangerous evolution of heat; and

(8) The data loggers or cargo tracking 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 air, data loggers and cargo tracking devices with installed lithium cells or 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 equipment 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.

■ 14. In § 173.59, add the term ''pyrotechnic substance'' in alphabetical order to read as follows:

§ 173.59 Description of terms for explosives.

* * * * *

Pyrotechnic substance is an explosive substance that is designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative self-sustaining exothermic chemical reactions.

* * * * *

■ 15. In § 173.62:

■ a. In Table 1 to Paragraph (b): Explosives Table, add the following entries UN0511, UN0512, UN0513, and UN0514 in alphanumeric order; and

■ b. In Table 2 to paragraph (c)(5): Table of Packing Methods, revise Packing Instruction 131.

The revisions read as follows:

§ 173.62 Specific packaging requirements for explosives.

* * * * *

(b) * * *

TABLE 1 TO PARAGRAPH (b)—EXPLOSIVES TABLES

ID No.	PI
* * * * *	
UN0511	131
UN0512	131
UN0513	131
UN0514	135
* * * * *	

(c) * * *

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
101	This Packing Instruction may be used as an alternative to a specifically assigned packing method with the approval of the Associate Administrator prior to transportation. When this packing instruction is used, the following must be marked on the shipping documents: ''Packaging approved by the Competent Authority of the United States of America (USA)''.		
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. Samples of new or existing explosive substances or articles may be transported as directed by the Associate Administrator for purposes including: testing, classification, research and development, quality control, or as a commercial sample. Explosive samples which are wetted or desensitized must be limited to 25 kg. Explosive samples which are not wetted or desensitized must be limited to 10 kg in small packages as specified by the Associate Administrator for Hazardous Materials Safety			
110(a)	Bags, Receptacles	Bags, Receptacles	Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: The intermediate packagings must be filled with water saturated material such as an antifreeze solution or wetted cushioning, Outer packagings must be filled with water saturated material such as an antifreeze solution or wetted cushioning. Outer packagings must be constructed and sealed to prevent evaporation of the wetting solution, except when 0224 is being carried dry.	*Bags:* Plastics, Textile, plastic coated or lined Rubber textile, rubberized Textile *Receptacles:* Wood	*Bags:* Plastics, Textile, plastic coated or lined Rubber Textile, rubberized *Receptacles:* Plastics Metal Wood	Steel (1A1 or 1A2). Other metal (1N1 or 1N2). Plastics (1H1 or 1H2).
110(b)	Bags, Receptacles	Dividing partitions	Boxes.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0074, 0113, 0114, 0129, 0130, 0135 and 0224, the following conditions must be satisfied: a. Inner packagings must not contain more than 50 g of explosive substance (quantity corresponding to dry substance); b. Each inner packaging must be separated from other inner packagings by dividing partitions; and c. The outer packaging must not be partitioned with more than 25 compartments.	*Bags:* Rubber, conductive Plastics, conductive *Receptacles:* Metal Wood Rubber, conductive Plastics, conductive	Metal Wood Plastics Fiberboard	Natural wood, sift-proof wall (4C2). Plywood (4D). Reconstituted wood (4F).
111	Bags, Sheets, Receptacles	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN0159, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastics (1H1 or 1H2) drums are used as outer packagings.	*Bags:* Paper, waterproofed Plastics Textile, rubberized *Sheets:* Plastics Textile, rubberized *Receptacles:* Wood		*Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Natural wood, ordinary (4C1). Natural wood, sift proof (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). Fiberboard (1G). Plastics (1H1 or 1H2).
112(a)	Bags, Receptacles	Bags, Receptacles	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN0004, 0076, 0078, 0154, 0219 and 0394, packagings must be lead free. Intermediate packagings are not required if leakproof drums are used as the outer packaging. For UN0072 and UN0226, intermediate packagings are not required.	*Bags:* Paper, multiwall Water resistant plastics Textile Textile, rubberized Woven plastics *Receptacles:* Metal Plastics Wood	*Bags:* Plastics Textile, plastic coated or lined *Receptacles:* Metal Plastics Wood	*Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Natural wood, ordinary (4C1). Natural wood, sift proof (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).
112(b)	Bags	Bags	Bags, Boxes, Drums.
This packing instruction applies to dry solids other than powders PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings must be lead free. For UN0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state and a maximum net mass of 30 kg. For UN0222, inner packagings are not required.	Paper, kraft, Paper, multiwall, water resistant Plastics Textile Textile, rubberized plastics Woven plastics	For UN0150 only: Plastics Textile, plastic coated or lined	*Bags:* Woven plastics sift-proof (5H2/3). Plastics, film (5H4). Textile, sift-proof (5L2). Textile, water resistant (5L3). Paper, multiwall, water resistant (5M2). *Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Natural wood, ordinary (4C1). Natural wood, sift proof (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics, expanded (4H1). Plastics, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Plywood (1D). Other metal (1N1 or 1N2). Fiber (1G). Plastics (1H1 or 1H2).
112(c)	Bags, Receptacles	Bags, Receptacles	Boxes, Drums.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
This packing instruction applies to solid dry powders PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packagings must be lead free. For UN0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state. Bags must not exceed a maximum net mass of 30 kg. Inner packagings are not required if drums are used as the outer packaging. At least one of the packagings must be sift-proof. For UN 0504, metal packagings must not be used. Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in part 178 of this subchapter, are not considered metal packagings.	*Bags:* Paper, multiwall, water resistant Plastics Woven plastics *Receptacles:* Fiberboard Metal Plastics Wood	*Bags:* Paper, multiwall, water resistant with inner lining plastics *Receptacles:* Metal Plastics Wood	*Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Natural wood, ordinary (4C1). Natural wood, sift proof (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). Plastics, solid (4H2). *Drums:* Plastics (1H1 or 1H2). Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G).
113 PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN0094 and UN0305, no more than 50 g of substance must be packed in an inner packaging For UN0027, inner packagings are not necessary when drums are used as the outer packaging. At least one of the packagings must be sift-proof. Sheets must only be used for UN0028.	Bags, Receptacles, Sheets *Bags:* Paper Plastics Textile, rubberized *Receptacles:* Fiberboard Metal Plastics Wood *Sheets:* Paper, kraft Paper, waxed	Not necessary	Boxes, Drums. *Boxes:* Steel (4A) Aluminum (4B) Other metal (4N) Natural wood, ordinary (4C1) Natural wood, sift-proof walls (4C2) Plywood (4D) Reconstituted wood (4F) Fiberboard (4G) Plastics, solid (4H2) *Drums:* Plastics (1H1 or 1H2) Steel (1A1 or 1A2) Aluminum (1B1 or 1B2) Other metal (1N1 or 1N2) Plywood (1D) Fiber (1G)
114(a)	Bags, Receptacles	Bags, Receptacles, Dividing Partitions	Boxes, Drums.
This packing instruction applies to wetted solids PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0077, 0234, 0235 and 0236, packagings must be lead free. For UN0342, inner packagings are not required when metal (1A1, 1A2, 1B1, 1B2, 1N1 or 1N2) or plastics (1H1 or 1H2) drums are used as outer packagings. Intermediate packagings are not required if leakproof removable head drums are used as the outer packaging.	*Bags:* Plastics Textile Woven plastics *Receptacles:* Metal Plastics Wood	*Bags:* Plastics Textile, plastic coated or lined *Receptacles:* Metal Plastics *Dividing partitions:* Wood	*Boxes:* Steel (4A). Other metal (4N). Natural wood, ordinary (4C1). Natural wood, sift-proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). 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).
114(b) PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN Nos. 0077, 0132, 0234, 0235 and 0236, packagings must be leadfree. For UN0160 and UN0161, when metal drums (1A2, 1B2 or 1N2) are used as the outer packaging, metal packagings must be so constructed that the risk of explosion, by reason of increased internal pressure from internal or external causes, is prevented. For UN0160, UN0161, and UN0508, inner packagings are not necessary if drums are used as the outer packaging. For UN0508 and UN0509, metal packagings must not be used Packagings of other material with a small amount of metal, for example metal closures or other metal fittings such as those mentioned in part 178 of this subchapter, are not considered metal packagings.	Bags, Receptacles *Bags:* Paper, kraft, Plastics Textile, sift-proof Woven plastics, sift-proof *Receptacles:* Fiberboard Metal Paper Plastics Wood Plastics, sift-proof	Not necessary	Boxes, Drums. *Boxes:* Natural wood, ordinary (4C1). Natural wood, sift-proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
115	Receptacles	Bags, Drums, Receptacles	Boxes, Drums.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For liquid explosives, inner packagings must be surrounded with non-combustible absorbent cushioning material in sufficient quantity to absorb the entire liquid content. Metal receptacles should be cushioned from each other. The net mass of explosive per package may not exceed 30 kg when boxes are used as outer packaging. The net volume of explosive in each package other than boxes must not exceed 120 liters. For UN 0075, 0143, 0495 and 0497 when boxes are used as the outer packaging, inner packagings must have taped screw cap closures and be not more than 5 liters capacity each. A composite packaging consisting of a plastic receptacle in a metal drum (6HA1) may be used in lieu of combination packagings. Liquid substances must not freeze at temperatures above −15 °C (+5 °F). For UN0144, intermediate packagings are not necessary. Aluminum drums (1B1 and 1B2) and metal, other than steel or aluminum, drums (1N1 and 1N2) must not be used.	*Receptacles:* Metal Plastics Wood	*Bags:* Plastics in metal receptacles *Drums:* Metal *Receptacles:* Wood	*Boxes:* Natural wood, ordinary (4C1). Natural wood, sift-proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). *Drums:* Plastics (1H1 or 1H2). Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Specification MC–200 containers may be used for transport by motor vehicle.
116	Bags, Receptacles, Sheets	Not necessary	Bags, Boxes, Drums, Jerricans.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0082, 0241, 0331 and 0332, inner packagings are not necessary if leakproof removable head drums are used as the outer packaging. For UN 0082, 0241, 0331 and 0332, inner packagings are not required when the explosive is contained in a material impervious to liquid. For UN 0081, inner packagings are not required when contained in rigid plastic that is impervious to nitric esters. For UN 0331, inner packagings are not required when bags (5H2, 5H3 or 5H4) are used as outer packagings. For UN0081, bags must not be used as outer packagings	*Bags:* Paper, water and oil resistant Plastics Textile, plastic coated or lined Woven plastics, sift-proof *Receptacles:* Fiberboard, water resistant metal Plastics Wood, sift-proof *Sheets:* Paper, water resistant Paper, waxed Plastics		*Bags:* Woven plastics (5H1/2/3). Paper, multiwall, water resistant (5M2). Plastics, film (5H4). Textile, sift-proof (5L2). Textile, water resistant (5L3). *Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Wood, natural, ordinary (4C1). Natural wood, sift-proof walls (4C2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). 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). *Jerricans:* Steel (3A1 or 3A2). Plastics (3H1 or 3H2).
117	Not necessary	Not necessary	IBCs.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: This packing instruction may only be used for explosives of UN 0082 when they are mixtures of ammonium nitrate or other inorganic nitrates with other combustible substances that are not explosive ingredients. Such explosives must not contain nitroglycerin, similar liquid organic nitrates, liquid or solid nitrocarbons, or chlorates. This packing instruction may only be used for explosives of UN 0241 that consist of water as an essential ingredient and high proportions of ammonium nitrate or other oxidizers, some or all of which are in solution. The other constituents may include hydrocarbons or aluminum powder, but must not include nitro-derivatives such as trinitrotoluene. Metal IBCs must not be used for UN 0082, UN 0222 and UN 0241. Flexible IBCs may only be used for solids. For UN 0222, when other than metal or rigid plastics IBCs are used, they must be offered for transportation in a closed freight container or a closed transport vehicle. For UN 0222, flexible IBCs must be sift-proof and water-resistant or must be fitted with a sift-proof and water-resistant liner.			*Metal:* (11A), (11B), (11N), (21A), (21B), (21N), (31A), (31B), (31N). *Flexible:* (13H2), (13H3), (13H4), (13L2), (13L3), (13L4), (13M2). *Rigid plastics:* (11H1), (11H2), (21H1), (21H2), (31H1), (31H2). *Composite:* (11HZ1), (11HZ2), (21HZ1), (21HZ2), (31HZ1), (31HZ2).
130	Not necessary	Not necessary	Boxes, Drums, Large Packagings.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS ..... 1. The following applies to UN 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0238, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0459, 0488, 0502 and 0510. Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems must be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling devices. 2. Subject to approval by the Associate Administrator, large explosive articles, as part of their operational safety and suitability tests, subjected to testing that meets the intentions of Test Series 4 of the UN Manual of Tests and Criteria with successful test results, may be offered for transportation in accordance with the requirements of this subchapter.			*Boxes:* 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).
131	Bags, Receptacles, Reels	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN0029, 0267, and 0455, bags and reels may not be used as inner packagings. For UN 0030, 0255, 0456, 0511, 0512, and 0513, inner packagings are not required when detonators are packed in pasteboard tubes, or when their leg wires are wound on spools with caps either placed inside the spool or securely taped to the wire on the spool, so as to restrict free moving of the caps and to protect them from impact forces. For UN0360, 0361, and 0500, detonators are not required to be attached to the safety fuse, metal-clad mild detonation cord, detonating cord, or shock tube. Inner packagings are not required if the packing configuration restricts free moving of the caps and protects them from impact forces.	*Bags:* Paper Plastics *Receptacles:* Fiberboard Metal Plastics Wood *Reels.*		*Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Wood, natural, ordinary (4C1). Natural wood, sift-proof walls (4C2). Plastics, solid (4H2). Plywood (4D). Reconstituted wood (4F). Fiberboard (4G). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
132(a)	Not necessary	Not necessary	Boxes.
For articles consisting of closed metal, plastic or fiberboard casings that contain detonating explosives, or consisting of plastics-bonded detonating explosives.			*Boxes:* 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, solid (4H2).
132(b)	Receptacles, Sheets	Not necessary	Boxes.
For articles without closed casings	*Receptacles:* Fiberboard Metal Plastics Wood *Sheets:* Paper Plastics		*Boxes:* 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, solid (4H2).
133	Receptacles, Trays	Intermediate packagings are only needed when trays are used as inner packagings	Boxes.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0043, 0212, 0225, 0268 and 0306 trays are not authorized as inner packagings.	*Receptacles:* Fiberboard Metal Plastics Wood *Trays, fitted with dividing partitions:* Fiberboard Plastics Wood	*Receptacles:* Fiberboard Metal Plastics Wood	*Boxes:* 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, solid (4H2).
134	Bags, Receptacles, Sheets, Tubes *Bags:* Water resistant *Receptacles:* Fiberboard Metal Plastics Wood *Sheets:* Fiberboard, corrugated *Tubes:* Fiberboard	Not necessary	Boxes, Drums. *Boxes:* 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:* Fiberboard (1G). Plastics (1H1 or 1H2). Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D).
135	Bags, Receptacles, Sheets	Not necessary	Boxes, Drums.
None	*Bags:* Paper Plastics *Receptacles:* Fiberboard Metal Plastics Wood *Sheets:* Paper Plastics		*Boxes:* 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).
136	Bags, Boxes, Dividing partitions	Not necessary	Boxes, Drums.
None	*Bags:* Plastics Textile *Boxes:* Fiberboard Plastics Wood *Dividing partitions:* In the outer packagings.		*Boxes:* 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, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2. Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
137	Bags, Boxes, Tubes, Dividing partitions	Not necessary	Boxes, Drums.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked with orientation markings meeting the requirements of § 172.312(a)(2) of this subchapter. When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.	*Bags:* Plastics *Boxes:* Fiberboard Wood *Tubes:* Fiberboard Metal Plastics *Dividing partitions:* In the outer packagings.		*Boxes:* 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, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). plastics (1H1 or 1H2).
138	Bags	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: If the ends of the articles are sealed, inner packagings are not necessary.	Plastic		*Boxes:* 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, solid (4H2). *Drums:* Fiberboard (1G). Plastics, solid (1H1 or 1H2). Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2).
139	Bags, Receptacles, Reels, Sheets	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS 1. For UN0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord must be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of CORD DETONATING flexible must be fastened securely. 2. For UN0065, 0104, 0289, 0290 the ends of the detonating cord are not required to be sealed provided the inner packaging containing the detonating cord consists of a static-resistant plastic bag of at least 3 mil thickness and the bag is securely closed. 3. For UN0065 and UN0289, inner packagings are not required when they are fastened securely in coils.	*Bags:* Plastics *Receptacles:* Fiberboard Metal Plastics Wood *Reels.* *Sheets:* Paper Plastics		*Boxes:* 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, Solid (4H2). *Drums:* Steel (1A1 Or 1A2). Aluminum (1B1 Or 1B2). Other Metal (1N1 Or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 Or 1H2).
140	Bags, Reels, Sheets, Receptacles	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: If the ends of UN0105 are sealed, no inner packagings are required For UN0101, the packaging must be sift-proof except when the fuse is covered by a paper tube and both ends of the tube are covered with removable caps For UN0101, steel or aluminum boxes or drums must not be used.	*Bags.* Plastics *Reels.* *Sheets.* Paper, kraft Plastics *Receptacles.* Wood		*Boxes:* 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, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
141	Receptacles, Trays, Dividing partitions	Not necessary	Boxes, Drums.

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

Packing instruction	Inner packagings	Intermediate packagings	Outer packagings
None	*Receptacles:* Fiberboard Metal Plastics Wood *Trays,* fitted with dividing partitions: Plastics Wood *Dividing partitions:* In the outer packagings.		*Boxes:* 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, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
142	Bags, Receptacles, Sheets, Trays	Not necessary	Boxes, Drums.
None	*Bags:* Paper Plastics *Receptacles:* Fiberboard Metal Plastics Wood *Sheets:* Paper *Trays,* fitted with dividing partitions: Plastics		*Boxes:* 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, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
143	Bags, Receptacles, Trays	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN 0271, 0272, 0415 and 0491 when metal packagings are used, metal packagings must be so constructed that the risk of explosion, by reason of increase in internal pressure from internal or external causes is prevented. Composite packagings (6HH2) (plastic receptacle with outer solid box) may be used in lieu of combination packagings.	*Bags:* Paper, kraft Plastics Textile Textile, rubberized *Receptacles:* Fiberboard Metal Plastics Wood *Trays,* fitted with dividing partitions: Plastics Wood		*Boxes:* 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, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plywood (1D). Fiber (1G). Plastics (1H1 or 1H2).
144	Receptacles, Dividing partitions	Not necessary	Boxes, Drums.
PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: For UN0248 and UN 0249, packagings must be protected against the ingress of water. When CONTRIVANCES, WATER ACTIVATED are transported unpackaged, they must be provided with at least two independent protective features that prevent the ingress of water.	*Receptacles:* Fiberboard Metal Plastics Wood *Dividing partitions:* In the outer packagings.		*Boxes:* Steel (4A). Aluminum (4B). Other metal (4N). Wood, natural, ordinary (4C1) with metal liner. Plywood (4D) with metal liner. Reconstituted wood (4F) with metal liner. Plastics, expanded (4H1). Plastics, solid (4H2). *Drums:* Steel (1A1 or 1A2). Aluminum (1B1 or 1B2). Other metal (1N1 or 1N2). Plastics (1H1 or 1H2) Plywood (1D).

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1. A jet perforating gun, charged, oil well may be transported under the following conditions:

a. Initiation devices carried on the same motor vehicle or offshore supply vessel must be segregated; each kind from every other kind, and from any gun, tool or other supplies, unless approved in accordance with § 173.56. Segregated initiation devices must be carried in a container having individual pockets for each such device or in a fully enclosed steel container lined with a non-sparking material. No more than two segregated initiation devices per gun may be carried on the same motor vehicle.
b. Each shaped charge affixed to the gun may not contain more than 112 g (4 ounces) of explosives.
c. Each shaped charge if not completely enclosed in glass or metal, must be fully protected by a metal cover after installation in the gun.
d. A jet perforating gun classed as 1.1D or 1.4D may be transported by highway by private or contract carriers engaged in oil well operations.
(i) A motor vehicle transporting a gun must have specially built racks or carrying cases designed and constructed so that the gun is securely held in place during transportation and is not subject to damage by contact, one to the other or any other article or material carried in the vehicle; and
(ii) The assembled gun packed on the vehicle may not extend beyond the body of the motor vehicle.
e. A jet perforating gun classed as 1.4D may be transported by a private offshore supply vessel only when the gun is carried in a motor vehicle as specified in paragraph (d) of this packing method or on offshore well tool pallets provided that:
(i) All the conditions specified in paragraphs (a), (b), and (c) of this packing method are met;
(ii) The total explosive contents do not exceed 95 kg (209.43 pounds) per tool pallet;
(iii) Each cargo vessel compartment may contain up to 95 kg (209.43 pounds) of explosive content if the segregation requirements in § 176.83(b) of this subchapter are met; and
(iv) When more than one vehicle or tool pallet is stowed "on deck" a minimum horizontal separation of 3 m (9.8 feet) must be provided.

■ 16. In § 173.124, revise paragraph (a)(3)(iii) to read as follows:

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

(a) * * *

(3) * * *

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

* * * * *

■ 17. In § 173.125, revise paragraph (b)(1) and (b)(2)(i) to read as follows:

§ 173.125 Class 4—Assignment of packing group.

* * * * *

(b) * * *

(1) Powdered, granular or pasty materials must be classified in Division 4.1 when the time of burning of one or more of the test runs, in accordance with the UN Manual of Tests and Criteria, is less than 45 seconds or the rate of burning is more than 2.2 mm/s. Metal powders must be classified in Division 4.1 when they can be ignited and the reaction spreads over the whole length of the sample in 10 minutes or less.

(2) * * *

(i) For readily combustible solids (other than metal powders), Packing Group II if the burning time is less than 45 seconds and the flame passes the wetted zone. Packing Group II must be assigned to metal powders if the zone of reaction spreads over the whole length of the sample in 5 minutes or less.

* * * * *

■ 18. In § 173.151, revise paragraph (d) to read as follows:

§ 173.151 Exceptions for Class 4.

* * * * *

(d) *Limited quantities of Division 4.3.* Limited quantities of dangerous when wet solids or liquids (Division 4.3) in Packing Groups II and III are excepted from labeling requirements, unless the material is offered for transportation or transported by aircraft, and are excepted from the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. For transportation by aircraft, the package must also conform to applicable requirements of § 173.27 of this part (*e.g.,* authorized materials, inner packaging quantity limits and closure securement) and only hazardous material authorized aboard passenger-carrying aircraft may be transported as a limited quantity. A limited quantity package that conforms to the provisions of this section is not subject to the shipping paper requirements of subpart C of part 172 of this subchapter, unless the material meets the definition of a hazardous substance, hazardous waste, marine pollutant, or is offered for transportation and transported by aircraft or vessel. In addition, shipments of limited quantities are not subject to subpart F (Placarding) of part 172 of this subchapter. Each package must conform to the packaging requirements of subpart B of this part and may not exceed 30 kg (66 pounds) gross weight. Except for transportation by aircraft, the following combination packagings are authorized:

(1) For dangerous when wet solids or liquids in Packing Group II, inner packagings not over 0.5 kg (1.1 pounds) or 500 ml (16.9 fluid ounces) net capacity each, respectively, packed in a strong outer packaging.

(2) For dangerous when wet solids or liquids in Packing Group III, inner packagings not over 1.0 kg (2.2 pounds) or 1 liter (33.8 fluid ounces) net capacity each, respectively, packed in a strong outer packaging.

* * * * *

■ 19. In § 173.162, revise the section heading and paragraph (c) to read as follows:

§ 173.162 Gallium (metallic and articles containing gallium).

* * * * *

(c) Manufactured articles or apparatuses. Manufactured articles or apparatuses containing gallium in quantities and form provided in this paragraph are excepted from the requirements of this subchapter, however, when transported by aircraft, such excepted articles and apparatuses must be transported as cargo and may not be carried onboard an aircraft by passengers or crewmembers in carry-on baggage, checked baggage, or on their person unless specifically excepted by § 175.10.

(1) Manufactured articles or apparatuses of which metallic gallium is a component part, such as manometers, pumps, thermometers, switches, are excepted from the specification packaging requirements of paragraph (a) when packaged in strong outer packagings and have sealed inner liners or bags of strong leakproof and puncture-resistant material impervious to gallium, which will prevent the escape of gallium from the package irrespective of its position.

(2) Except for transportation by aircraft manufactured articles or apparatuses containing not more than 1 kg (35.2 ounces) of gallium are not subject to the requirements of this subchapter.

(3) For transportation by aircraft, manufactured articles and apparatuses, except for lamps, each containing a total quantity of not more than 15 g (0.53 ounces) of gallium, are excepted from the requirements of this subchapter if installed as an integral part of a machine or apparatus and so fitted that shock of impact damage, leading to leakage of gallium, is unlikely to occur under conditions normally incident to transport.

(4) Manufactured articles or apparatuses each containing not more than 100 mg (0.0035 ounce) of gallium and packaged so that the quantity of gallium per package does not exceed 1

g (0.035 ounce) are not subject to the requirements of this subchapter. This exception does not apply to lamps when transported by aircraft.

* * * * *

■ 20. In subpart E, add new section § 173.169 to read as follows:

§ 173.169 Fire suppressant dispersing devices.

For the purpose of this section, a fire suppressant dispersing device is an article, containing a pyrotechnic substance, which is intended to disperse a fire extinguishing agent when activated, and does not contain any other hazardous materials.

(a) *Classification.* Articles as described must be examined and successfully tested by a person or agency who is authorized by the Associate Administrator to perform examination and testing of explosives in accordance with § 173.56(b)(1) of this subchapter. The person or agency may not manufacture or market explosives or fire suppressant dispersing devices or may not be owned in whole or in part, or financially dependent upon any entity that manufactures or markets explosives or fire suppressant dispersing devices. The manufacturer must submit to the Associate Administrator a report of the examination and assignment of a recommended shipping description, division, and compatibility group, and if the Associate Administrator finds the approval request meets regulatory criteria, the explosive may be approved in writing and assigned an EX number. The Associate Administrator may also approve a new explosive on the basis of an approval issued for the explosive by the competent authority of a foreign government.

(1) Division 1.4S. For an article to be transported as Division 1.4S fire suppressant dispersing device (UN0514), the article, as packaged for transportation, must meet criteria for Division 1.4S explosive material in accordance with test series 6(c) of the Manual of Tests and Criteria (IBR, see § 171.7 of this subchapter). Articles classed as Division 1.4S not further meeting Class 9 criteria must comply with all applicable requirements for explosives.

(2) Class 9. In addition to meeting criteria for Division 1.4S, an article may be assigned to Class 9 if the following conditions are met:

(i) Three unpackaged articles, each individually activated by its own means of initiation, ignition, or external means to function as designed, meet the following criteria—

(A) No rupture or fragmentation of the external casing of the article, or motion of the article or detached parts of the article of more than one meter in any direction;

(B) No audible report exceeding 135 dB(C) peak at a distance of one meter; and

(C) No flash or flame capable of igniting a material such as a sheet of 80 ± 10 g/m^2 paper in contact with the article;

(ii) The article, must be packaged in a manner such that when activated, temperatures of the outside surface of the package do not exceed 200 °C (392 °F); and

(iii) The suppressant contained in the article must be deemed safe for normally occupied spaces in compliance with standards for fixed fire extinguishing systems.

(b) *Authorized Packaging.* (1) General packing requirement. The article, whether Division 1.4S or Class 9, must be transported with either the means of activation removed or equipped with at least two independent means to prevent accidental activation.

(2) Division 1.4S articles. Must be packaged in accordance with § 173.62 of this part.

(3) Class 9 articles. Must be packaged in the following UN specification packagings at the Packing Group III performance level.

(i) 1A2, 1B2, 1N2, 1D, 1G, or 1H2 drums.

(ii) 3A2, 3B2, 3H2 jerricans.

(iii) 4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, or 4H2 boxes.

■ 21. Revise § 173.185 to read as follows:

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

As used in this section, *consignment* means one or more packages of hazardous materials accepted by an operator from one shipper at one time and at one address, receipted for in one lot and moving to one consignee at one destination address. *Equipment* means the device or apparatus for which the lithium or sodium ion cells or batteries will provide electrical power for its operation. *Lithium cell(s)* or *battery(ies)* includes both lithium metal and lithium ion chemistries. *Sodium cell(s)* or *battery(ies)* means sodium ion cell(s) or battery(ies) and does not include batteries containing metallic sodium. *Medical device* means an instrument, apparatus, implement, machine, contrivance, implant, or in vitro reagent, including any component, part, or accessory thereof, which is intended for use in the diagnosis of disease or other conditions, or in the cure, mitigation, treatment, or prevention of disease, of a person.

(a) *Classification.*

(1) Each lithium or sodium ion cell or battery must be of the type proven to meet the criteria in part III, sub-section 38.3 of the UN Manual of Tests and Criteria (IBR; *see* § 171.7 of this subchapter). Lithium and sodium ion cells and batteries are subject to these tests regardless of whether the cells used to construct the battery are of a tested type. A single cell battery as defined in part III, sub-section 38.3 of the UN Manual of Tests and Criteria is considered a ''cell'' and must be offered for transportation in accordance with the requirements for cells.

(i) Cells and batteries manufactured according to a type meeting the requirements of sub-section 38.3 of the UN Manual of Tests and Criteria, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be transported, unless otherwise provided in this subchapter.

(ii) Cell and battery types only meeting the requirements of the UN Manual of Tests and Criteria, Revision 3, are no longer valid. However, cells and batteries manufactured in conformity with such types before July 2003 may continue to be transported if all other applicable requirements are fulfilled.

(2) Each person who manufactures lithium or sodium ion cells or batteries must create a record of satisfactory completion of the testing (*e.g.,* test report) required by this paragraph prior to offering the lithium or sodium cell or battery for transport and must:

(i) Maintain this record for as long as that design is offered for transportation and for one year thereafter; and

(ii) Make this record available to an authorized representative of the Federal, State, or local government upon request.

(3) Each manufacturer and subsequent distributor of lithium cells or batteries or sodium ion cells or batteries manufactured on or after January 1, 2008, must make a test summary available. This requirement does not apply to lithium button cells or sodium ion button cells installed in equipment (including circuit boards). The test summary must include the following elements:

(i) Name of cell, battery, or product manufacturer, as applicable;

(ii) Cell, battery, or product manufacturer's contact information to include address, telephone number, email address, and website for more information;

(iii) Name of the test laboratory, to include address, telephone number,

email address, and website for more information;

(iv) A unique test report identification number;

(v) Date of test report;

(vi) Description of cell or battery to include at a minimum;

(A) Lithium ion, lithium metal, or sodium ion cell or battery;

(B) Mass of cell or battery;

(C) Watt-hour rating or lithium content;

(D) Physical description of the cell or battery; and

(E) Cell or battery model number or, alternatively, if the test summary is established for a product containing a cell or battery, the product model number.

(vii) List of tests conducted and results *(i.e.,* pass/fail);

(viii) Reference to assembled battery testing requirements (if applicable);

(ix) Reference to the revised edition of the UN Manual of Tests and Criteria used and to amendments thereto, if any; and

(x) Name and title of a responsible person as an indication of the validity of information provided.

(4) Except for cells or batteries meeting the requirements of paragraph (c) of this section, each lithium or sodium ion cell or battery must:

(i) Incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport;

(ii) Be equipped with means of preventing external short circuits; and

(iii) Be equipped with a means of preventing dangerous reverse current flow (*e.g.,* diodes or fuses) if a battery contains cells, or a series of cells that are connected in parallel.

(5) Beginning May 10, 2024, each lithium ion battery must be marked with the Watt-hour rating on the outside case. Beginning January 1, 2026, each sodium ion battery must be marked with the Watt-hour rating on the outside case.

(b) *Packaging.*

(1) Each package offered for transportation containing lithium or sodium ion cells or batteries, including lithium or sodium ion cells or batteries packed with, or contained in, equipment, must meet all applicable requirements of subpart B of this part.

(2) Lithium or sodium ion cells or batteries, including lithium or sodium ion cells or batteries packed with, or contained in, equipment, must be packaged in a manner to prevent:

(i) Short circuits;

(ii) Damage caused by shifting or placement within the package; and

(iii) Accidental activation of the equipment.

(3) For packages containing lithium or sodium ion cells or batteries offered for transportation:

(i) The lithium or sodium ion cells or batteries must be placed in non-metallic inner packagings that completely enclose the cells or batteries, and separate the cells or batteries from contact with equipment, other devices, or electrically conductive materials (*e.g.,* metal) in the packaging.

(ii) The inner packagings containing lithium or sodium ion cells or batteries must be placed in one of the following packagings meeting the requirements of part 178, subparts L and M, of this subchapter at the Packing Group II level:

(A) Metal (4A, 4B, 4N), wooden (4C1, 4C2, 4D, 4F), fiberboard (4G), or solid plastic (4H1, 4H2) box;

(B) Metal (1A2, 1B2, 1N2), plywood (1D), fiber (1G), or plastic (1H2) drum;

(C) Metal (3A2, 3B2) or plastic (3H2) jerrican.

(iii) When packed with equipment, lithium or sodium ion cells or batteries must:

(A) Be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements as specified in paragraph (b)(3)(ii) of this section; or

(B) Be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a package that meets the Packing Group II performance requirements as specified in paragraph (b)(3)(ii) of this section.

(C) For transportation by aircraft, the number of cells or batteries in each package is limited to the minimum number required to power the piece of equipment, plus two spare sets. A set of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.

(4) When lithium or sodium ion cells or batteries are contained in equipment:

(i) The outer packaging, when used, must be constructed of suitable material of adequate strength and design in relation to the capacity and intended use of the packaging, unless the lithium or sodium ion cells or batteries are afforded equivalent protection by the equipment in which they are contained;

(ii) Equipment must be secured to prevent damage caused by shifting within the outer packaging and be packed so as to prevent accidental operation during transport; and

(iii) Any spare lithium or sodium ion cells or batteries packed with the equipment must be packaged in accordance with paragraph (b)(3) of this section.

(iv) For transportation by aircraft, where multiple pieces of equipment are packed in the same outer packaging, each piece of equipment must be packed to prevent contact with other equipment.

(5) Lithium or sodium ion batteries that weigh 12 kg (26.5 pounds) or more and have a strong, impact-resistant outer casing may be packed in strong outer packagings; in protective enclosures (for example, in fully enclosed or wooden slatted crates); or on pallets or other handling devices, instead of packages meeting the UN performance packaging requirements in paragraphs (b)(3)(ii) and (iii) of this section. Batteries must be secured to prevent inadvertent shifting, and the terminals may not support the weight of other superimposed elements. Batteries packaged in accordance with this paragraph may be transported by cargo aircraft if approved by the Associate Administrator.

(6) For lithium and sodium ion cells and batteries, except for transportation by aircraft, rigid large packagings are authorized for large cells and large batteries, and equipment containing large cells or large batteries. Large cells are those with a gross mass of more than 500 g (1.1 pounds), and large batteries are those with a gross mass of more than 12 kg (26.5 pounds).

(i) The following rigid large packagings are authorized a single battery and for cells, batteries, and equipment containing cells or batteries, provided they meet the provisions in paragraphs (b)(1) and (2) of this section and the requirements of part 178, subparts P and Q, of this subchapter at the Packing Group II level:

(A) Metal (50A, 50B, 50N) metal packagings must be fitted with an electrically non-conductive lining material (*e.g.,* plastics) of adequate strength for the intended use;

(B) Rigid plastic (50H);

(C) Wooden (50C, 50D, 50F);

(D) Rigid fiberboard (50G).

(ii) Cells, batteries, or equipment must be placed in inner packagings or be separated by other suitable means, such as placement in trays or use of dividers, to ensure protection against damage that may occur under normal conditions of transportation by:

(A) Its shifting or placement within the large packaging;

(B) Contact with other cells, batteries, or equipment within the large packaging; and

(C) Any loads arising from the superimposed weight of cells, batteries, equipment, and packaging components

above the cell, battery, or equipment within the large packaging.

(iii) When multiple cells, batteries, or equipment are packed in the large packaging, bags (*e.g.,* plastics) alone shall not be used to satisfy the requirements in paragraph (b)(6)(ii).

(7) For transportation by aircraft, lithium or sodium ion cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids), or Division 5.1 (oxidizers).

(c) *Exceptions for smaller cells or batteries.* Other than as specifically stated below, a package containing lithium or sodium ion cells or batteries, or lithium or sodium ion cells or batteries packed with, or contained in, equipment, that meets the conditions of this paragraph is excepted from the requirements in subparts C through H of part 172 of this subchapter and the UN performance packaging requirements in paragraphs (b)(3)(ii) and (iii) of this section under the following conditions and limitations.

(1) *Size limits.*

(i) The Watt-hour (Wh) rating may not exceed 20 Wh for a lithium ion or sodium ion cell or 100 Wh for a lithium ion or sodium ion battery. Beginning January 1, 2016, each lithium ion battery subject to this provision must be marked with the Wh rating on the outside case. Beginning January 1, 2026, each sodium ion battery subject to this provision must be marked with the Wh rating on the outside case.

(ii) The lithium content may not exceed 1 g for a lithium metal cell or 2 g for a lithium metal battery.

(iii) Except for lithium or sodium ion cells or batteries packed with or contained in equipment in quantities not exceeding 5 kg net weight, the outer package must be appropriately marked: ''PRIMARY LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT''; ''LITHIUM METAL BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT''; ''LITHIUM ION BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT'', ''LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT''; or ''SODIUM ION BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT'', or labeled with a ''CARGO AIRCRAFT ONLY'' label as specified in § 172.448 of this subchapter.

(iv) For transportation by highway or rail only, the lithium content of a lithium metal cell and battery may be increased to 5 g and 25 g, respectively, and the Wh rating for a lithium ion or sodium ion cell and battery may be increased to 60 Wh and 300 Wh, respectively, provided the outer package is marked: ''LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL'' or ''SODIUM ION BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL.'' A package marked in accordance with this paragraph does not need to display the marking required in paragraph (c)(1)(iii) of this section.

(v) The marking specified in paragraphs (c)(1)(iii) and (iv) of this section must have a background of contrasting color, and the letters in the marking must be:

(A) At least 6 mm (0.25 inch) in height on packages having a gross weight of 30 kg (66 pounds) or less, except that smaller font may be used as necessary when package dimensions so require.

(B) At least 12 mm (0.5 inch) in height on packages having a gross weight of more than 30 kg (66 pounds).

(vi) When a package marked or labeled in accordance with paragraph (c)(1)(iii) or (iv) of this section is placed in an overpack, the selected marking or label must either be clearly visible through the overpack, or the marking or label must also be affixed on the outside of the overpack.

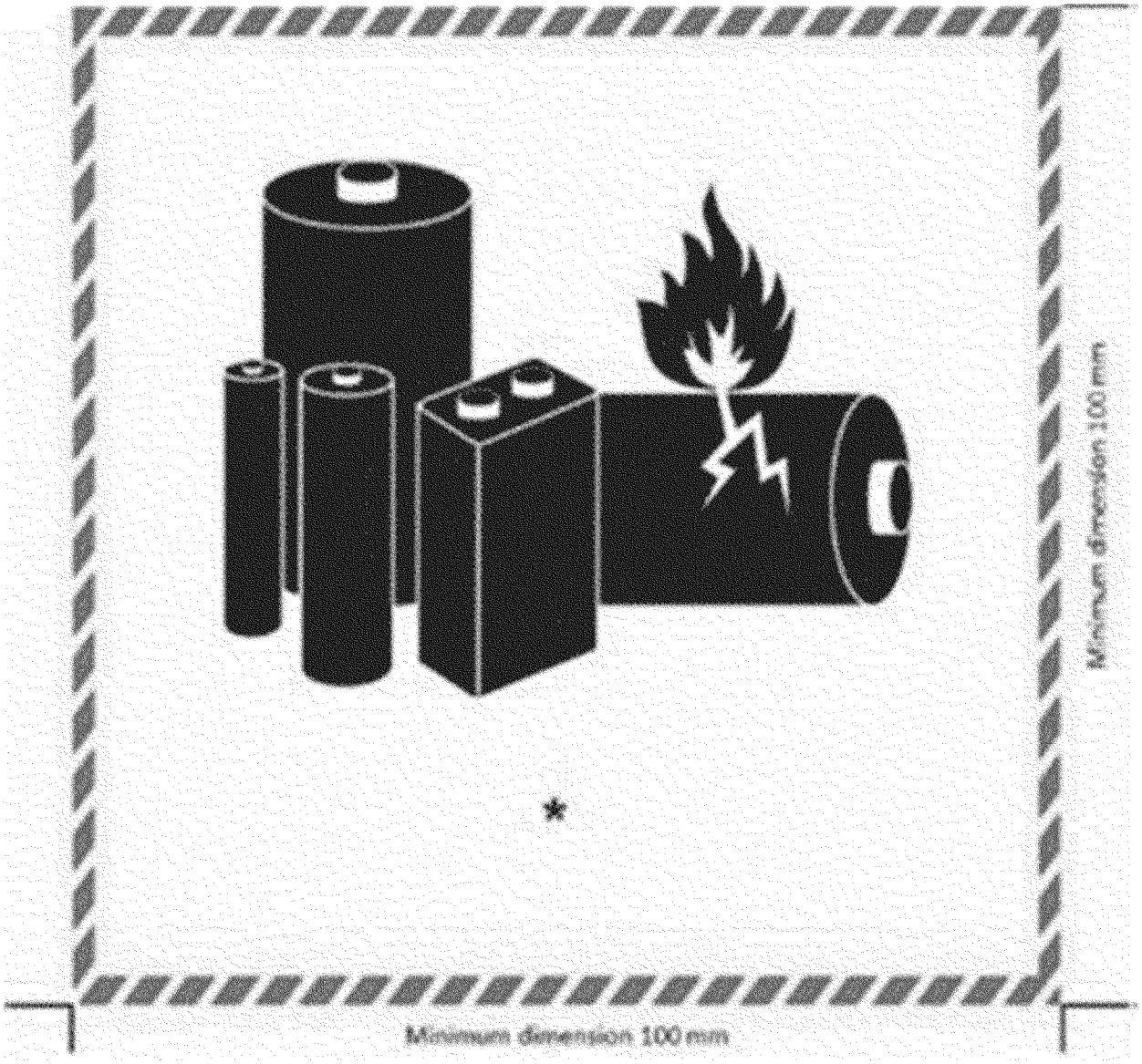
(vii) Except when lithium or sodium ion cells or batteries are packed with, or contained in, equipment, each package must not exceed 30 kg (66 pounds) gross weight.

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

(3) *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 when 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.

(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. The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

Figure 1 to Paragraph (c)(3)(i) Introductory Text



(A) The mark must be in the form of a rectangle or a square with hatched edging. The mark must be not less than 100 mm (3.9 inches) wide by 100 mm (3.9 inches) high and the minimum width of the hatching must be 5 mm (0.2 inches), except marks of 100 mm (3.9 inches) wide by 70 mm (2.8 inches) high may be used when the package is too small for the larger mark;

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

(C) The ''*'' must be replaced by the appropriate UN number(s); and

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

(ii) The battery mark, in conformance with the requirements of this paragraph, in effect on May 9, 2024, may continue to be used until December 31, 2026.

(iii) For packages placed in an overpack, the battery mark shall either be clearly visible through the overpack or be reproduced on the outside of the overpack and the overpack shall be marked with the word ''OVERPACK.'' The lettering of the ''OVERPACK'' mark shall be at least 12 mm (0.47 inches) high.

(4) *Air transportation for smaller lithium or sodium ion cells or batteries packed with, or contained in, equipment.*

(i) The number of cells or batteries in each package is limited to the minimum number required to power the piece of equipment, plus two spare sets, and the total net quantity (mass) of the lithium or sodium ion cells or batteries in the completed package must not exceed 5 kg (11 pounds). A set of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.

(ii) For packages placed in an overpack, the packages must be secured within the overpack, and the intended function of each package must not be impaired by the overpack.

(iii) Each shipment with packages required to display the paragraph (c)(3)(i) battery mark must include on the air waybill an indication of compliance with this paragraph (c)(4) (or the applicable ICAO Technical Instructions Packing Instruction), when an air waybill is used.

(iv) Each person who prepares a package for transport containing lithium or sodium ion cells or batteries, packed with, or contained in, equipment in accordance with the conditions and limitations of this paragraph (c)(4), must receive instruction on these conditions

and limitations, corresponding to their functions.

(v) Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (9.8 ft) (including the test sample) for a duration of 24 hours.

(5) *Air transportation for smaller lithium or sodium ion cells and batteries.*

(i) A package prepared in accordance with the size limits in paragraph (c)(1) is subject to all applicable requirements of this subchapter, except that a package containing not more than 2.5 kg (5.5 pounds) lithium metal cells or batteries, or 10 kg (22 pounds) lithium ion or sodium ion cells or batteries, is not subject to the UN performance packaging requirements in paragraph (b)(3)(ii) of this section, when the package displays both the battery mark in paragraph (c)(3)(i) and the Class 9 Lithium or Sodium Battery label specified in § 172.447 of this subchapter. This paragraph does not apply to cells or batteries packed with, or contained in, equipment.

(ii) Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (9.8 ft) (including the test sample) for a duration of 24 hours.

(d) *Lithium or sodium ion cells or batteries shipped for disposal or recycling.* A lithium or sodium ion cell or battery, including a lithium or sodium ion cell or battery contained in equipment, that is transported by motor vehicle to a permitted storage facility or disposal site, or for purposes of recycling, is excepted—

(1) From the testing and record keeping requirements of paragraph (a) and the UN performance packaging requirements in paragraphs (b)(3)(ii), (b)(3)(iii) and (b)(6) of this section, when packed in a strong outer packaging conforming to the applicable requirements of subpart B of this part; and

(2) From subparts C through H of part 172 of this subchapter when the lithium or sodium ion cell or battery meets the size, packaging, and hazard communication conditions in paragraph (c)(1)–(3) of this section.

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

(1) Except as provided in paragraph (e)(5) of this section, each cell or battery is individually packed in a non-metallic inner packaging, inside an outer packaging, and is surrounded by cushioning material that is non-combustible and electrically non-conductive, or contained in equipment. Equipment must be constructed or packaged in a manner as to prevent accidental operation during transport;

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

(3) The lithium or sodium ion cells or batteries are packed in inner packagings or contained in equipment. The inner packaging or equipment is placed in one of the following outer packagings that meet the requirements of part 178, subparts L and M, of this subchapter at the Packing Group I level. Cells and batteries, including equipment of different sizes, shapes or masses must be placed into an outer packaging of a tested design type listed in this section provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested. A cell or battery with a net mass of more than 30 kg (66 pounds) is limited to one cell or battery per outer packaging;

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

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

(4) For a single battery, and for a single item of equipment containing cells or batteries, the following rigid large packagings are authorized:

(i) Metal (50A, 50B, 50N) metal packagings must be fitted with an electrically non-conductive lining material (*e.g.,* plastics) of adequate strength for the intended use;

(ii) Rigid plastic (50H);

(iii) Plywood (50D);

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

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

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

(8) Shipping papers must include the following notation: ''Transport in accordance with (e).''

(f) *Damaged, defective, or recalled cells or batteries.* Lithium or sodium ion cells or batteries that have been damaged or identified by the manufacturer as being defective for safety reasons, that have the potential of producing a dangerous evolution of heat, fire, or short circuit (*e.g.,* those being returned to the manufacturer for safety reasons) may be transported by highway, rail, or vessel only, and must be packaged as follows:

(1) Each cell or battery must be placed in individual, non-metallic inner packaging that completely encloses the cell or battery;

(2) The inner packaging must be surrounded by cushioning material that is non-combustible, electrically non-conductive, and absorbent; and

(3) Each inner packaging must be individually placed in one of the following packagings meeting the applicable requirements of part 178, subparts L, M, P, and Q of this subchapter at the Packing Group I level:

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

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

(iii) For a single battery, and for a single item of equipment containing cells or batteries, the following rigid large packagings are authorized:

(A) Metal (50A, 50B, 50N);

(B) Rigid plastic (50H);

(C) Plywood (50D); and

(4) The outer package must be marked with an indication that the package contains a ''Damaged/defective lithium ion battery,'' ''Damaged/defective

lithium metal battery,'' or ''Damaged/defective sodium ion battery,'' as appropriate. The marking required by this paragraph must be in characters at least 12 mm (0.47 inches) high.

(g) *Limited exceptions to restrictions on air transportation of medical device batteries.* Notwithstanding the quantity limits specified in Column (9A) of the § 172.101 Hazardous Materials Table of this subchapter, up to two replacement lithium or sodium ion cells or batteries specifically used for a medical device as defined in this section may be transported as cargo on a passenger aircraft. Packages containing these cells or batteries are not subject to the marking requirement in paragraph (c)(1)(iii) of this section or the ''CARGO AIRCRAFT ONLY'' label required by § 172.402(c) of this subchapter and may be transported as cargo on a passenger aircraft when approved by the Associate Administrator and provided the following conditions are met:

(1) The intended destination of the cells or batteries is not serviced daily by cargo aircraft if a cell or battery is required for medically necessary care; and

(2) Lithium ion or sodium ion cells or batteries for medical devices are excepted from the state-of-charge limitations in § 172.102, Special Provision A100, of this subchapter, provided each cell or battery is:

(i) Individually packed in an inner packaging that completely encloses the cell or battery;

(ii) Placed in a rigid outer packaging; and

(iii) Protected to prevent short circuits.

(h) *Approval.* A lithium or sodium ion cell or battery that does not conform to the provisions of this subchapter may be transported only under conditions approved by the Associate Administrator.

■ 23. In § 173.219, revise paragraph (b)(3) to read as follows:

§ 173.219 Life-saving appliances.

* * * * *

(b) * * *

(3) Electric storage batteries (Class 8) and lithium and sodium ion batteries (Class 9). Life-saving appliances containing lithium and sodium ion batteries must be packed in accordance with § 173.185 and Special Provisions A54 and A101, as applicable;

* * * * *

■ 24. In § 173.220, revise paragraph (d) to read as follows:

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

* * * * *

(d) *Vehicles, Engines, and Machinery Powered by Lithium ion, Lithium Metal and Sodium ion Batteries are subject to the following:*

(1) Except as provided in § 172.102, Special Provision A101, of this subchapter, vehicles, engines, and machinery powered by lithium metal batteries, that are transported with these batteries installed, are forbidden aboard passenger-carrying aircraft.

(2) Lithium and sodium ion batteries contained in vehicles, engines, or mechanical equipment must be securely fastened in the battery holder of the vehicle, engine, or mechanical equipment, and be protected in such a manner as to prevent damage and short circuits (*e.g.,* by using non-conductive caps that cover the terminals entirely).

(3) Except for vehicles, engines, or machinery transported by highway, rail, or vessel with prototype or low production lithium or sodium ion batteries securely installed, 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.

(4) Where a vehicle could possibly be handled in other than an upright position, the vehicle must be secured in a strong, rigid outer packaging. The vehicle must be secured by means capable of restraining the vehicle in the outer packaging to prevent any shifting during transport which would change the orientation or cause the vehicle to be damaged.

(5) Where the lithium or sodium ion battery is removed from the vehicle and is packed separate from the vehicle in the same outer packaging, the package must be consigned as ''UN3481, Lithium ion batteries packed with equipment;'' ''UN3091, Lithium metal batteries packed with equipment;'' or ''UN3552, Sodium ion batteries packed with equipment'' and prepared in accordance with the requirements specified in § 173.185.

(6) Not withstanding other requirements of this section, vehicles powered by sodium ion batteries, containing no other hazardous materials, are not subject to this subchapter if the battery is short-circuited in a way that the battery does not contain electrical energy. The short-circuiting of the battery must be easily verifiable (such as busbar between terminals).

* * * * *

■ 25. In § 173.225:

■ a. In Table 1 to Paragraph (c): Organic Peroxide Table, remove the entry for ''UN3106, Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil], ≤52.''

■ b. In Table 1 to Paragraph (c): Organic Peroxide Table, add the following entries in alphabetical order by technical name: ''UN3109, Dibenzoyl peroxide,'' ''UN3104, Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil],'' ''Exempt, 2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane,'' and ''UN3105, Methyl ethyl ketone peroxide(s).''

■ c. In Table 1 to Paragraph (c): Organic Peroxide Table, add new Note 33 after the table.

■ d. In Table 3 to Paragraph (e): Organic Peroxide IBC Table, remove the entry for ''UN3119, Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water.''

■ e. In Table 3 to Paragraph (e): Organic Peroxide IBC Table, add new entry for ''UN3119, Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water.''

The revisions read as follows:

§ 173.225 Packaging requirements and other provisions for organic peroxides.

* * * * *

(c) * * *

(8) * * *

TABLE 1 TO PARAGRAPH (c)—ORGANIC PEROXIDE TABLE

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)

[REMOVE].

TABLE 1 TO PARAGRAPH (c)—ORGANIC PEROXIDE TABLE—Continued

Technical name	ID No.	Concentration (mass %)	Diluent (mass %)			Water (mass %)	Packing method	Temperature (°C)		Notes
			A	B	I			Control	Emergency	
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5)	(6)	(7a)	(7b)	(8)
*	*	*		*		*	*		*	
Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil].	UN3106	≤52					OP7			
*	*	*		*		*	*		*	
	[ADD].									
*	*	*		*		*	*		*	
Dibenzoyl peroxide	UN3109	≤42	≥38			≥13	OP8			
*	*	*		*		*	*		*	
Di-2,4-dichlorobenzoyl peroxide [as a paste with silicone oil].	UN3104	≤52					OP5			
*	*	*		*		*	*		*	
2,5-Dimethyl-2,5-di-(tert-butylperoxy) hexane.	Exempt	≤22			≥78					29
*	*	*		*		*	*		*	
Methyl ethyl ketone peroxide(s)	UN3105	Available oxygen ≤9%.	≥41			≥9	OP7			5, 33
*	*	*		*		*	*		*	

Notes:

* * * * * * *

■ 33. Sum of diluents type A and water being ≥ 55%, and in addition to methyl ethyl ketone.

* * * * *

(e) * * *

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

UN No.	Organic peroxide	Type of IBC	Maximum quantity (liters)	Control temperature	Emergency temperature
	[REMOVE].				
*	* * * *	*		*	*
UN3119	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water.	31A	1250	+10 °C	+15 °C
*	* * * *	*		*	*
	[ADD].				
UN3119	Di-(3,5,5-trimethylhexanoyl) peroxide, not more than 52%, stable dispersion, in water.	31HA1	1000	+10 °C	+15 °C
		31A	1250	+10 °C	+15 °C
*	* * * *	*		*	*

* * * * *

■ 26. In 173.232, revise paragraph (b) to read as follows:

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

* * * * *

(b) Such articles may contain batteries. Lithium batteries or sodium ion batteries that are integral to the article must be of a type proven to meet the testing requirements of the UN Manual of Tests and Criteria, part III, subsection 38.3 (IBR, see § 171.7 of this subchapter), except as specified in 173.185(e) or when otherwise specified by this subchapter.

* * * * *

■ 27. In § 173.301b, revise paragraph (a)(2) 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(E) (IBR, see § 171.7 of this subchapter) and for non-metallic

materials in ISO 11114–2:2021(E) (IBR, *see* § 171.7 of this subchapter).

* * * * *

■ 28. In § 173.304b, add new paragraph (e) to read as follows:

§ 173.304b Additional requirements for shipment of liquefied compressed gases in UN pressure receptacles.

* * * * *

(e) Disilane, UN3553 is not authorized in MEGCs.

PART 175—CARRIAGE BY AIRCRAFT

■ 29. 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.

■ 30. In § 175.1, revise paragraph (e) to read as follows:

§ 175.1 Purpose, scope, and applicability.

* * * * *

(e) In addition to the requirements of this part, air carriers that are certificate holders authorized to conduct operations in accordance with 14 CFR parts 121 and 135 are also required to have a Safety Management System that meets the requirements and conditions of 14 CFR part 5 and is acceptable to the Federal Aviation Administration (FAA) Administrator.

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 § 176.83, revise paragraph (a)(8) to read as follows:

§ 176.83 Segregation.

(a) * * *

(8) Notwithstanding the requirements of paragraphs (a)(6) and (a)(7) of this section, hazardous materials of the same class may be stowed together without regard to segregation required by secondary hazards (subsidiary risk label(s)), provided the hazardous materials do not react dangerously with each other and do not cause:

(i) Combustion or evolution of considerable heat;

(ii) Evolution of flammable, toxic or asphyxiant gases;

(iii) The formation of corrosive substances; or

(iv) The formation of unstable substances.

* * * * *

■ 34. In § 176.84, in paragraph (b), Table of Provisions:

■ a. Revise codes 116 and 156; and

■ b. Add codes 158, 159 and 160 in numerical order; The revisions read as follows:

§ 176.84 Other requirements for stowage, cargo handling, and segregation for cargo vessels and passenger vessels.

* * * * *

(b) * * *

Code	Provisions
	* * * * *
116	In a cargo space capable of being opened up in an emergency. The possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency and the consequent risk to the stability of the ship through flooding of the cargo space should be considered before loading. The requirement for opening the cargo space hatches applies to the weather deck and tween deck hatches (if any).
	* * * * *
156	For lithium or sodium ion batteries transported in accordance with § 173.185(f) or for purposes of disposal or recycling, stowage category C applies.
	* * * * *
158	Cargo transport units shall be shaded from direct sunlight. Packages in cargo transport units shall be stowed to allow for adequate air circulation throughout the cargo.
159	During transport, it should be stowed (or kept) in a cool ventilated place.
160	Must be stowed away from potential sources of ignition.
	* * * * *

* * * * *

■ 35. In § 176.905, revise paragraph (i)(1)(ii) to read as follows:

§ 176.905 Stowage of vehicles.

* * * * *

(i) * * *

(1) * * *

(ii) For vehicles powered solely by sodium ion batteries and hybrid electric vehicles powered by both an internal combustion engine and sodium ion batteries offered in accordance with this paragraph, the sodium ion batteries, except for prototype or those produced in low production, must be of a type that has successfully passed each test in the UN Manual of Tests and Criteria, as specified in § 173.185(a) of this subchapter and the batteries are 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). Where a sodium ion battery installed in a vehicle is damaged or defective, the battery must be removed.

* * * * *

PART 178—SPECIFICATIONS FOR PACKAGINGS

■ 36. 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.

■ 37. In § 178.71, revise paragraphs (d)(2), (g)(4), (l)(1), and (o) to read as follows:

§ 178.71 Specifications for UN pressure receptacles.

* * * * *

(d) * * *

(2) Service equipment must be configured, or designed, to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and transport. Manifold piping leading to shut-off valves must be sufficiently flexible to protect the valves and the piping from shearing or releasing the pressure receptacle contents. The filling and discharge valves and any protective caps must be secured against unintended opening. The valves must conform to ISO 10297:2014(E) and ISO 10297:2014/Amd 1:2017(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) was 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 14246:2014(E) and ISO 14246:2014/Amd 1:2017(E), (IBR, *see* § 171.7 of this subchapter). 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.

* * * * *

(g) * * *

(4) 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 1 100 MPa (IBR, see § 171.7 of this subchapter), or until December 31, 2028, ISO 9809–4:2014(E), Gas cylinders—Refillable seamless steel gas cylinders—Design, construction, and testing—Part 4: Stainless steel cylinders with an Rm value of less than 1,100 MPa (IBR, see § 171.7 of this subchapter).

* * * * *

(l) * * *

(1) In addition to the general requirements of this section, UN composite cylinders and tubes must be designed for a design life of not less than 15 years. Composite cylinders and tubes with a design life longer than 15 years must not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test program. The service life test program must be part of the initial design type approval and must specify inspections and tests to demonstrate that cylinders manufactured accordingly remain safe to the end of their design life. The service life test program and the results must be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder or tube must not be extended beyond its initial approved design life. In addition, composite cylinders and tubes must conform to the following ISO standards, as applicable:

(i) ISO 11119–1:2020(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2028, cylinders may be designed and constructed to ISO 11119–1:2012(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 11119–1(E).

(ii) ISO 11119–2:2020(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2028, cylinders may be designed and constructed to ISO 11119–2:2012/Amd.1:2014(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 11119–2(E) (IBR, see § 171.7 of this subchapter) are authorized.

(iii) ISO 11119–3:2020(E) (IBR, see § 171.7 of this subchapter). Until December 31, 2028, cylinders be design and constructed to ISO 11119–3:2013(E) (IBR, *see* § 171.7 of this subchapter). Until December 31, 2020, cylinders conforming to the requirements in ISO 11119–3(E) (IBR, see § 171.7 of this subchapter) are authorized.

(iv) ISO 11119–4:2016(E) (IBR, see § 171.7 of this subchapter).

* * * * *

(o) *Material compatibility.* In addition to the material requirements specified in the UN pressure receptacle design and construction ISO standards, and any restrictions specified in part 173 for the gases to be transported, the requirements of the following standards must be applied with respect to material compatibility:

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

(2) ISO 11114–2:2021(E) (IBR, *see* § 171.7 of this subchapter).

* * * * *

■ 38. In § 178.75, revise paragraph (d)(3)(iv), (vi), (vii), and (viii) to read as follows:

§ 178.75 Specifications for MEGCs.

* * * * *

(d) * * *

(3) * * *

(iv) ISO 9809–4:2021(E) Gas cylinders—Refillable seamless steel gas cylinders—Design, construction, and testing—Part 4: Stainless steel cylinders with an Rm value of less than 1100 MPa (IBR, *see* § 171.7 of this subchapter). Until December 31, 2028, cylinders may be designed and constructed to ISO 9809–4:2014 (IBR, *see* § 171.7 of this subchapter).

* * * * *

(vi) ISO 11119–1:2020(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 (IBR, *see* § 171.7 of this subchapter). Until December 31, 2028, cylinders may be designed and constructed to ISO 11119–1:2012 (IBR, *see* § 171.7 of this subchapter).

(vii) 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 (IBR, *see* § 171.7 of this subchapter). Until December 31, 2028, cylinders may be designed and constructed to ISO 11119–2:2012/Amd.1:2014 (IBR, *see* § 171.7 of this subchapter).

(viii) 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 (IBR, *see* § 171.7 of this subchapter). Until December 31, 2028, cylinders may be designed and constructed to ISO 11119–3:2012 (IBR, *see* § 171.7 of this subchapter).

* * * * *

■ 39. In § 178.504, revise paragraph (b)(4) to read as follows:

§ 178.504 Standards for steel drums.

* * * * *

(b) * * *

(4) The body of a drum may have rolling hoops, either expanded or separate. If there are separate rolling hoops, they must be fitted tightly on the body and so secured that they cannot shift. Rolling hoops may not be spot-welded.

* * * * *

■ 40. In § 178.505, revise paragraph (b)(3) to read as follows:

§ 178.505 Standards for aluminum drums.

* * * * *

(b) * * *

(3) The body of a drum may have rolling hoops, either expanded or separate. If there are separate rolling hoops, they must be fitted tightly on the body and so secured that they cannot shift. Rolling hoops may not be spot-welded.

* * * * *

■ 41. In § 178.506, revise paragraph (b)(3) to read as follows:

§ 178.506 Standards for metal drums other than steel or aluminum.

* * * * *

(b) * * *

(3) The body of a drum may have rolling hoops, either expanded or separate. If there are separate rolling hoops, they must be fitted tightly on the body and so secured that they cannot

shift. Rolling hoops may not be spot-welded.

* * * * *

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 paragraph (d)(1)(i) to read as follows:

§ 180.207 Requirements for requalification of UN pressure receptacles.

* * * * *

(d) * * *

(1) * * *

(i) Each seamless steel UN pressure receptacle, including pressure receptacles exceeding 150 L capacity installed in multiple-element gas containers (MEGCs) or in other service, must be requalified in accordance with ISO 6406:2005(E) (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 6406:2005(E). For seamless steel cylinders and tubes, the internal inspection and hydraulic pressure test may be replaced by a procedure conforming to ISO 16148:2016 in combination with ISO 16148:2016/Amd 1:2020(E) (IBR, see § 171.7 of this subchapter).

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Deputy Administrator, Pipeline and Hazardous Materials Safety Administration.

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