

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 171 through 179

[Docket No. HM-181, Notice No. 87-4]

Performance-Oriented Packaging Standards; Miscellaneous Proposals

AGENCY: Research and Special Programs Administration (RSPA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes to amend the Hazardous Materials Regulations (HMR) to incorporate features found in the United Nations Committee of Experts' Recommendations on the Transport of Dangerous Goods (U.N. Recommendations) and the Technical Instructions for the Safe Transport of Dangerous Goods by Air of the International Civil Aviation Organization (ICAO Technical Instructions). This action is necessary to: (1) Simplify the HMR, (2) reduce the volume of the regulations, (3) promote flexibility and technological advances in packaging, (4) promote safety through better packaging, (5) reduce the need for exemptions, and (6) facilitate international commerce. The intended effect of this action is to align the HMR with the U. N. Recommendations and ICAO Technical Instructions in the areas of classification, packaging and hazard communication in the transport of hazardous materials.

DATES: Comments: Comments must be received on or before November 2, 1987.

Public hearing: A public hearing will be held on September 15 and 16, 1987 from 9:30 a.m. to 5:00 p.m. daily. If there is sufficient demand, the hearing will be extended through September 17, 1987.

ADDRESSES: Comments: Address comments to Dockets Branch, Research and Special Programs Administration, U.S. Department of Transportation, Washington, DC 20590. Comments should identify the docket and be submitted, if possible, in five copies. Persons wishing to receive confirmation of receipt of their comments should include a self-addressed stamped postcard. The Dockets Branch is located in Room 8428 of the Nassif Building, 400 Seventh Street SW., Washington, DC 20590. Telephone: (202) 366-5048. Public dockets may be reviewed between the hours of 8:30 a.m. to 5:00 p.m., Monday through Friday.

Public hearing: The public hearing will be held at the FAA Auditorium, Third floor, 800 Independence Avenue SW., Washington, DC.

Any person wishing to present an oral statement at a hearing should notify the Dockets Branch, by telephone or in writing, at least two days in advance of the hearing date. Each request must identify the speaker, organization represented, if any; daytime telephone number; and the anticipated length of presentation, not to exceed 10 minutes. The written text (if any) of an oral statement should be presented to the hearing officer prior to its presentation.

FOR FURTHER INFORMATION CONTACT: Thomas J. Charlton or Edward T. Mazzullo, Standards Division, Office of Hazardous Materials Transportation, U.S. Department of Transportation, 400 Seventh Street SW., Washington, DC 20590. Telephone: (202) 366-4488.

SUPPLEMENTARY INFORMATION:**Special Notices**

The proposals presented in this document would entail changes, both editorial and substantive, to substantial portions of the existing Hazardous Materials Regulations (49 CFR, Subchapter C). However, it should be noted that these changes, if promulgated as regulations, would reduce the total volume of the HMR (currently, approximately 1250 pages) by at least 350 pages.

In a rulemaking project of this magnitude it is inevitable that errors and omissions will come to light subsequent to publication. If these errors and omissions are brought to RSPA's attention in a timely manner, it is likely that a supplementary notice of proposed rulemaking will be issued, to make corrections, as soon after publication of this document as is practicable.

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I. Background

The Hazardous Materials Regulations (HMR), issued under authority of the Hazardous Materials Transportation Act (Public Law 93-633; 49 U.S.C. app. 1801 *et seq.*), are found in the Code of Federal Regulations (CFR), Title 49, Subchapter C, which is comprised of Parts 171 through 179. Subchapter C occupies approximately 1250 pages of the CFR. The two largest parts of Subchapter C are Part 173, entitled *SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS*, of about 330 pages, and Part 178, entitled *SHIPPING CONTAINER SPECIFICATIONS*, of about 420 pages. Part 171 of Subchapter C contains administrative information on the HMR, including definitions. Part 172 contains the Hazardous Materials Table of about 2700 entries, the Optional Hazardous Materials Table, and the rules applying to hazard communication by means of shipping papers, package marking, package labeling, and the placarding of transport vehicles.

Part 173 contains the definitions for each of the HMR's 22 hazard classes and the packaging requirements, both specification and non-specification, for all hazardous materials. Parts 174, 175, 176 and 177 contain additional requirements for carriage by rail, air, water and highway, respectively. Part 178 contains the construction specifications for all of the DOT specification packagings, except rail

tank cars, and Part 179 contains the specifications for tank cars.

As new materials with hazardous characteristics have been developed and produced, and as advances in technology have produced new packaging methods, the number of specification packagings has grown until at present they occupy, as previously noted, about 420 pages of the CFR. The specification packaging sections of Part 178 cover packagings required for various hazardous materials. These packagings range from small polyethylene bottles to cargo tanks. However, the major portion of Part 178 is devoted to specifications for non-bulk packagings, having authorized capacities of 110 gallons or less, and includes approximately 100 specifications for carboys, drums, barrels, boxes, cases, trunks, tubes, bags and various sorts of containers designed to be enclosed by larger containers. Not included in these 100 specifications are the specifications for cylinders for compressed gases and packagings designed solely for radioactive materials, none of which are addressed in this proposal. Compliance by packaging manufacturers with all requirements of the packaging specifications is mandatory, and shippers must ship in DOT specification packaging when required by the HMR.

Typical specifications found in Part 178 have requirements for materials of construction, thickness, fastenings, capacity, coatings, openings, joinings and carrying devices. Much of the information contained in a specification is given in great detail and is repetitious. For example, there are fourteen specifications for wooden boxes. Most wooden box specifications list each acceptable type of wood from which the box must be constructed. This list may be repeated in the next specification for a similar, but slightly different box. In addition to listing the acceptable types of wood, the regulations also specify the thickness and width of boards, kinds and dimensions of nails, and spacing of nails used in joining the box.

Many of these DOT specification packagings are obsolete or little used. They are too expensive to make or too labor-intensive to pack. On the other hand, new packagings for hazardous materials are being constantly developed. Since they are not included in the DOT specifications (Part 178), new or innovative packagings for hazardous materials only may be used under the terms and conditions of exemptions issued by DOT granting a person relief from applicable portions of the HMR. The administration of the

exemptions program is very labor-intensive for exemption applicants and for DOT since an exemption application containing much detailed information on a new packaging (including a safety analysis) must be prepared by the applicant and must be carefully analyzed by DOT (including publication in the Federal Register) before it is granted or denied. In addition, an exemption must be renewed every two years, and this requires additional resource expenditures by both applicants and DOT.

In contrast to the DOT system of detailed specifications for packaging construction is a system of performance-oriented packaging standards that has been developed in the form of Recommendations by the United Nations Committee of Experts on the Transport of Dangerous Goods (U.N. Recommendations). These standards address the same types of non-bulk containers (drums, barrels, boxes, bags, carboys and inside containers or receptacles) as the DOT specifications. Typically, these standards have general requirements for materials, construction and a maximum capacity. For example, the U.N. 1A1 steel drum must have welded seams if it is to carry liquids, welded or mechanically seamed chimes, a maximum opening size of 7 centimeters (2.75 inches) and a maximum capacity of 450 liters (118.9 gallons). There are additional requirements for rolling hoops if the drum capacity is greater than 60 liters. Aside from these very general construction requirements, the strength and integrity of the drum are established by a series of performance tests which the drum must either pass or be capable of passing before it is authorized (as indicated by marks to be placed on the drum) for the carriage of hazardous materials; hence, the term "performance-oriented packaging standards". For drums, the principal tests are drop tests, hydraulic and leakage (or "leakproofness") tests and stacking tests. The height specified for the drop test in the U.N. system is determined by the "Packing Group" of the hazardous material to be transported. Within most hazard classes, the U.N. system segregates hazardous materials into three distinct "Packing Groups" based on the relative danger of the materials. Packing Group I consists of very dangerous materials. Packing Group II consists of materials considered to present moderate danger. Packing Group III consists of materials presenting minor danger. The U.N. 1A1 steel drum would have to survive a drop test of 1.8 meters (5.91 feet) if it

were to carry a material in Packing Group I, 1.2 meters (3.94 feet) for Group II materials and 0.8 meters (2.62 feet) for Group III materials. This assumes the specific gravity of the materials does not exceed 1.2. For more dense materials, the drop height or density of the test material would be correspondingly increased.

Within the broad and general construction requirements of these performance-oriented standards, drum manufacturers are free to exercise their design and production ingenuity to produce packagings which are both cost-effective, as determined by the marketplace, and safe, as determined by the performance standards which they meet.

The U.N. Recommendations are not regulations and, in general, do not assign packagings to individual hazardous material. The U.N. system envisions that requirements (i.e., regulations) issued by national or international bodies and addressing one or more modes of transport (highway, rail, air or water) would cover the definitive requirements, tying a particular packaging or packaging system to an individual hazardous material. At present, there are two international (worldwide) modal hazardous material regulatory systems in place, one under the auspices of the International Maritime Organization (IMO) and the second under the International Civil Aviation Organization (ICAO). The IMO system is known as the International Maritime Dangerous Goods Code (or IMDG Code) and the ICAO system is known as the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air. Shipments of hazardous materials (both international and within the U.S.) are at the present time authorized (with certain exceptions) to be shipped under the ICAO system as fully equivalent to the HMR provided that the trip involves transportation by aircraft and motor vehicle only. (See 49 CFR 171.11.)

Thus, there are at present, the U.S. domestic requirements for hazardous materials transportation as found in the HMR, characterized by very precise specifications for the construction of hazardous materials packagings and, on the other hand, an international system based on performance-oriented standards for packagings. The issue which arises from this dichotomy is whether the U. S. should continue to use the well-developed domestic system which has been operating in the U.S. for many years or whether the U.S. should make some accommodation in the interest of international trade by

adopting the emerging international system in whole or in part. If the answer is to make some accommodation with the international system, the issue which must then be addressed is to what extent the international system should be implemented. How much of the DOT system should be abandoned to be replaced by rules based on the U.N. Recommendations?

RSPA is considering extensive amendments to the HMR. Under this proposal, the present domestic regulations would in large part be replaced by rules based on the U.N. Recommendations. The goals of this effort are to: (1) simplify the Hazardous Materials Regulations for both bulk and non-bulk shipments; (2) significantly reduce the volume of the regulations; (3) provide for greater flexibility in the design and construction of many hazardous materials packagings in order to recognize technological advancements; (4) promote safety in transport through the use of better packaging; (5) reduce the need for exemptions; and, (6) facilitate international commerce, including commerce between the United States and Canada.

The simplification of the HMR is a most important goal of this proposal. The existing regulations have their origin in the early efforts of the transportation industry to protect its personnel and equipment from materials with dangerous properties. Some container specifications go back to the early days of this century. The regulations were developed in a piecemeal fashion with recurring adjustments to take care of particular problems. Individuals subject to the HMR have complained that they are so complicated in both content and organization as to be almost unusable except by someone with extensive training or experience. In addition, the complexity of the HMR may penalize the small business person, whether shipper or carrier, who has insufficient hazardous materials business to justify employing an expert in the regulations.

Industry is not the only place where the complexity of the HMR imposes a burden. A staff of nine hazardous materials specialists at RSPA spend approximately half of their time giving explanations of the HMR either in writing or over the telephone. With large numbers of new shippers entering the field because of EPA requirements for hazardous substances and hazardous waste shipments, and with state enforcement of DOT's requirements increasing as states adopt the HMR, the number of these inquiries is increasing.

One of the principal reasons for this Notice of Proposed Rulemaking (NPRM) is to simplify both shipper requirements and the packaging specifications by the adoption of rules based on the U.N. Recommendations, including performance-oriented packaging standards.

Another reason for considering a shift to performance-oriented packaging standards is to provide greater flexibility in the requirements for the design, construction and use of packagings having capacities of less than 450 liters. The current DOT packaging specifications are very detailed and are not readily adaptable to innovations in packaging technology. The use of an improved packaging which does not meet a detailed specification is prohibited until the specification is amended or an exemption is issued. This imposes a costly burden on both the industry and government, with an uncertain benefit in safety.

In addition, international trade would be facilitated by this proposal. Through both law and policy, it has been decided that standards-related activities shall not be a barrier to trade. Title IV of the Trade Agreements Act of 1979 (Public Law 96-39) addressing technical barriers to trade states in pertinent part:

No Federal agency may engage in any standards-related activity that creates unnecessary obstacles to the foreign commerce of the United States. * * *. Each Federal agency, in developing standards, shall take into consideration international standards and shall, if appropriate, base the standards on international standards * * *. Each Federal agency shall, if appropriate, develop standards based on performance criteria, such as those relating to the intended use of a product and the level of performance that product must achieve under defined conditions, rather than on design criteria, such as those relating to the physical form of the product or the types of material of which the product is made.

The United States' position on the international scene has been to promote a worldwide system of consistent modal and regional transportation requirements to ensure that, insofar as is practicable, hazardous materials shipments move freely and safely between the various modes and regions of the world. Strong U. S. participation in the development of international standards is also essential to the economic interests of the U.S. domestic hazardous materials industry. Application of international standards by governments throughout the world has a direct impact on U.S. shippers and carriers involved in international trade. The Department of Transportation

supports this uniform, global approach to the safe transportation of hazardous materials through participation in the work of five international organizations. These organizations are:

(1) *The United Nations Committee of Experts on the Transport of Dangerous Goods*, and its subsidiary bodies, the Group of Experts on Explosives and the Group of Rapporteurs. This committee is the focal point of international activity regarding the transport of packaged hazardous materials (except radioactive materials) and promulgates the U.N. Recommendations. RSPA is the agency charged to represent the U.S. on this committee and on its subsidiary bodies.

(2) *The International Maritime Organization (IMO)*. IMO is a specialized agency of the United Nations concerned primarily with the promotion of safety in shipping and the prevention of marine pollution from ships. The U.S. participates in the work of the IMO through the U.S. Department of State's Shipping Coordinating Committee (SHC). The U.S. Coast Guard provides the majority of technical expertise to SHC and, with RSPA, represents the Department of Transportation at sessions of the IMO's Subcommittee on the Carriage of Dangerous Goods (CDG). The CDG Subcommittee publishes and maintains the International Maritime Dangerous Goods (IMDG) Code. This Code is recognized as the worldwide standard for transportation of packaged hazardous materials by vessel.

(3) *International Civil Aviation Organization (ICAO)*. The Dangerous Goods Panel (DGP) of ICAO was established to develop an Annex 18 to the Chicago Convention on International Civil Aviation. The implementing regulations to Annex 18, the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air, are recognized worldwide. RSPA represents the U.S. on the DGP, with technical expertise provided by the FAA.

(4) *Economic Commission for Europe (ECE) Group of Experts on the Transport of Dangerous Goods*. The ECE Group of Experts is responsible for updating and revising the European agreements concerning the carriage of Dangerous Goods by Road (ADR) and meets jointly at least once a year with the body responsible for updating the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID) to ensure consistency between the two sets of regulations. RSPA participates in these meetings.

(5) *The International Atomic Energy Agency (IAEA)*. The IAEA is an

intergovernmental body chartered to foster the peaceful contribution of nuclear energy to mankind. The IAEA has developed a regulatory system to help ensure the safe international transportation of radioactive materials. RSPA serves as U.S. Competent Authority to the IAEA.

The following international systems of regulations have been promulgated by these organizations and are based on the U.N. Recommendations:

(1) ICAO Technical Instructions—international—worldwide, fully recognized by the HMR.

(2) IMDG Code—international—worldwide, conditionally recognized by the HMR.

(3) RID—international—regional, European rail rules.

(4) ADR—international—regional, European highway rules.

In addition, at least two nations, Canada and Australia, have implemented national systems based on the U.N. Recommendations.

The regulatory bodies issuing these rules have included plans for terminating transitional or "grandfather" provisions which will render non-U.N. packagings (including DOT's) unacceptable for transport in the modes which they regulate. Most of these "grandfather" provisions end on December 31, 1989. After that time, hazardous materials classed, described and packaged according to the present HMR will only be able to move in domestic U.S. commerce.

Since January 1, 1983, the HMR (at § 171.11) have allowed shippers to use the ICAO Technical Instructions for the shipment of hazardous materials domestically and internationally as long as the journey included some transportation by aircraft. Travel by highway transport to or from the air leg of the journey is permitted under the ICAO rules. Since ICAO fully incorporates the U.N. Recommendations (hazardous material table, hazard classing, packaging standards, and performance tests), U.S. carriers are using it, and enforcement personnel are seeing U.N.-type shipments in domestic transportation. Indeed, some U.S. air carriers are no longer accepting hazardous material shipments tendered under the Title 49 rules and are accepting only shipments conforming to ICAO. Thus, shippers and carriers who wish to be in compliance with the regulations and enforcement personnel charged with enforcing the regulations are already faced with the task of learning both systems.

II. The ANPRM

On April 15, 1982, RSPA published an Advance Notice of Proposed Rulemaking (ANPRM), Notice Number 82-3, entitled: *Performance-oriented Packaging Standards*, Docket HM-181 (47 FR 16268). The goals stated in that notice were to explore the possibility of: (1) Simplifying the Hazardous Materials Regulations, (2) reducing the volume of the regulations; (3) providing greater flexibility in the design and construction of hazardous materials packaging to accommodate advances in packaging technology, (4) promoting safety in transport through the use of better packagings, (5) reducing the need for exemptions, and (6) facilitating international commerce, including commerce between the United States and Canada. In the ANPRM, a packaging system based on the U.N. Recommendations was advanced, using the flammable liquid hazard class for demonstration purposes. The proposal referenced non-bulk packaging requirements for flammable liquids in terms of U.N. packagings rather than existing DOT specifications (for example, a drum reference would be made to a U.N. 1A1 drum rather than a DOT-17E drum). In addition, the ANPRM contained the current U.N. packaging standards for drums, barrels, jerricans, boxes, bags and various other containers. The ANPRM also contained the U.N. performance tests which the packagings must pass. These tests were taken directly from the latest issue of the U.N. Recommendations. However, the U.N. Recommendations do not include a compatibility test for plastic packagings, although they make provision for one. A compatibility test for plastic packagings developed by RSPA was included in the subpart of the ANPRM devoted to testing. The ANPRM also contained packaging provisions for bulk packagings (cargo tanks, portable tanks and tank cars) for flammable liquids, but these provisions came from the HMR rather than the U.N. Recommendations since the U.N. Recommendations generally do not cover bulk shipments.

The ANPRM produced about 95 comments from shippers, carriers, packaging manufacturers, trade associations and interested individuals. They ranged across the entire spectrum from enthusiastic support to total opposition. In general, shippers who engage in international commerce strongly supported the concept. A majority of the commenters supported the proposal with reservations.

RSPA has prepared a detailed analysis of the comments on the

ANPRM. This analysis is included as part of a Regulatory Evaluation prepared for this NPRM and is available for examination in the Docket. Persons interested in RSPA's analysis and disposition in detail of all the issues raised in the comments are referred to that document. The major issues raised in the comments are discussed below.

It should be noted that in the ANPRM (as in this NPRM) RSPA included in its proposed amendments a consolidation and simplification of its bulk packaging requirements as well as non-bulk, even though the U.N. Recommendations do not address bulk packaging other than portable tanks and intermediate bulk containers. However, RSPA is proposing no substantive changes to portable tank, cargo tank or tank car specifications in this Docket. Some of the comments directed at the bulk packaging provisions of the ANPRM do not bear directly on the issue of the U.N. Recommendations.

The greatest number of objections to the proposals in the ANPRM were directed at four areas: (1) Retention of existing HMR requirements; (2) the inadequacy of the U.N. testing regime; (3) U.N. standards for steel drums; and (4) U.N. standards for fiberboard boxes. These specific issues will be dealt with below.

The ANPRM, in a section entitled "Transition", discussed at length the problems which would arise should a change be made from the present HMR to rules based on the performance-oriented packaging standards contained in the U.N. Recommendations. The need for a transition period was discussed, and the ANPRM solicited ideas from the commenters on how long this transition period should be.

Many commenters recommended that the present HMR be retained as an alternative packaging system to any new regulations based on the U.N. Recommendations for a period of time varying from three years to perpetuity. This suggestion, that the present HMR be retained, generally envisioned that DOT would not continue to publish "grandfathered" regulations in the Code of Federal Regulations (CFR). They might be published privately by one of the nongovernment entities, such as the Bureau of Explosives, which presently publishes the HMR as a private tariff, or the Bureau of National Affairs. There is precedent for this since the National Tank Truck Carriers presently publish obsolete cargo tank specifications (such as the MC 300, MC 303, MC 305, MC 310, MC 330, etc.) which DOT stopped printing a number of years ago, but which are still authorized for use. The

scenario envisioned by these commenters is that the existing HMR provisions would be available as an alternative to a new DOT system based on the U.N. Recommendations, but that DOT would not maintain or amend them. Thus, DOT would not have to expend any resources keeping the old regulations current. The use of the existing HMR as an alternative system and the period of time that such use was allowed would constitute the mechanism for transition and the period for transition envisioned in the ANPRM.

A considerable number of commenters raised a question as to whether the performance tests required for packagings in the U.N. system are adequate to assure safety in transport. In particular, the absence of a vibration test and the low pressure levels required for the U.N. leakproofness test for liquid packagings were noted as shortcomings of the U.N. system. The leakproofness test level in the U.N. Recommendations for Packing Group I materials is 30 kilopascals (4.4 pounds per square inch gauge) and for Group II and III materials is 20 kPa (2.90 psig) for material of normal vapor pressure. The comparable test for the most common DOT packaging (17E drum) is 7 psig (48.3 kPa).

A number of commenters speculated as to differences between the transport environments of Europe and the United States as justification for adding tests in Docket HM-181 over and above those presently in the U.N. Recommendations. In the U.S., coast-to-coast hauls of truckloads or railcars of packagings representing 50 or more hours of continuous vibration are commonplace—a situation which commenters claimed would be highly unlikely in Europe. Some commenters felt that the present U.N. performance test series of drop, stacking and leakproofness tests would not be sufficient to replicate the exposure of packagings to abrasion and fatigue stresses that long distance hauls by rail and highway exert on packagings in this country. On the other hand, some complained that the U.N. tests are too severe—especially users and manufacturers of fiberboard boxes.

DOT received a number of comments on the adequacy of the steel drums which would be allowed under a system based on the U.N. Recommendations. The steel drum, usually in 55 gallon size, is probably the most popular non-bulk packaging for liquid hazardous materials, especially flammable liquids. The DOT-17E tight head is the most popular of the DOT specification drums. It is authorized for most flammable

liquids in all 18-gauge construction (nominal thickness 0.0478 inches or 1.214 millimeters) and with 18-gauge heads and 20-gauge body (0.0359 inches or 0.912 millimeters) for flammable liquids with flash points above 20 °F (−6.7 °C). DOT has received petitions to allow all 20-gauge drums with triple-seamed chimes (present U.S. manufactured drums use double-seamed chimes) to be used for hazardous material service. These petitions requested that triple-seamed 17E drums with bodies of 20-gauge steel and heads of 18-gauge steel be authorized for flammable liquids with flash points at or below 20 °F, and that triple-seamed 17E drums of all 20-gauge construction be authorized for flammable liquids with flash points above 20 °F. The petitions resulted in an ANPRM, HM-182, which appeared in the Federal Register of June 10, 1982 (47 FR 25167). The reader is referred to that notice for more detailed discussion of these issues.

Comments received on HM-182 are pertinent to HM-181 because, if the petition were granted, all 20-gauge triple-seamed drums would in all likelihood appear as an authorized packaging under rules proposed in the ANPRM. All matters addressed in HM-182 are being handled in this rulemaking. Unlike the present DOT specifications, the U.N. packaging standards do not mention metal thickness. Packagings to be authorized must only meet the very general requirements of the packaging standards and then satisfy the performance tests. When a double-seamed drum fails a drop test, it usually fails at the chime. However, a triple-seamed 20 gauge drum will probably pass the 1.8 meter (5.91 feet) drop test for Packing Group I materials with specific gravities less than or equal to 1.2. Even thinner gauge drums may well pass the lower drop heights associated with Group II and III materials. A number of commenters on both HM-181 and HM-182 questioned whether these thinner walled drums, which would be allowed under a system based strictly on the U.N. Recommendations (because triple seaming would eliminate chime failures in the drop tests), could stand up to the rigors of the U.S. transportation environment. These commenters believed that vibration would place abrasion and fatigue stress on the drums and that they would prove to be unsatisfactory in spite of their ability to survive a drop test. Comments received in HM-182 from shippers and carriers purporting to have had shipping experience with non-hazardous materials service in all 20-gauge drums

were conflicting. Some commenters reported good experience, but others reported significant problems. It should be noted that these 20-gauge drums were, in general, not constructed to either DOT specifications or U.N. standards.

In addition to the issue of whether the U.N. testing procedures are adequate to assure safe performance of packagings in the U.S. transportation environment, another issue has been raised in regard to the light drums which would be allowed under a U.N. based system. The present DOT regulations provide for the following categories of drums based on their reusability: (1) Fully reusable with no restrictions, (2) non-reusable and (3) reusable after reconditioning. The first category generally consists of heavy gauge drums, often of high cost alloys such as nickel, monel, or stainless steel, that are often in dedicated service (i.e., are reused by one shipper for a specific commodity). They may be reused for hazardous materials transport for materials for which they are authorized without restriction. The DOT-5 series drums are in this category. The second category contains lightweight drums which are not approved for general reuse (except as outlined in § 173.28 for waste materials) in the transport of hazardous materials. They are marked "STC" (single-trip container) or "NRC" (non-reusable container). The DOT-37 series drums and some DOT-17 series drums are in this category of drums. The final category contains drums which may be reused after reconditioning. These are the DOT-17C, 17E and 17H drums and they are marked STC in addition to the DOT specification number. These latter drums may be reconditioned, as authorized by § 173.28, and reused for the transport of hazardous materials for which they are authorized as if they were new drums.

An industry devoted to reconditioning drums exists, and DOT-17 series drums marked "STC" which are in good condition have a salvage value for reconditioning. The reuse (or recycling) of these packagings, if properly carried out, has benefits to society in the form of savings in energy and natural resources over the manufacture of new drums. The National Barrel and Drum Association (NABADA), a trade association representing the reconditioning industry, commented on HM-181 and HM-182. In their comments on HM-181, NABADA and individual drum reconditioners maintain that lightweight (i.e., 20 gauge) drums designed to pass the U.N. drop tests cannot be successfully reconditioned because their walls are too thin to stand the cleaning, dedenting

and other processes involved in drum reconditioning. They further maintain that the lightweight drums will drive the reconditionable drums from the market and that the benefits to society which accrue because of the reconditioning of drums will be lost. In other words, they maintain that using a hazardous material transportation regulatory program based only on the U.N. Recommendations will place on society the additional environmental and energy costs which will appear when drum reconditioning ceases.

This argument leaves some questions unanswered. If the 18 gauge DOT drum can be reused and, therefore, has a salvage value, it should have an economic advantage over the lighter gauge drum. The lightweight drum would not only have no salvage value but, as NABADA has pointed out, since it would probably have to be disposed of as a hazardous waste after its use, it would become a definite liability to its owner. The NABADA argument also ignores the existence of nonhazardous material service for reconditioned drums. Thus, commenters did not satisfactorily explain how the continued use and availability of reconditioned drums is threatened.

The ANPRM did not include specific provisions for the reconditioning of packagings. However, it did include provisions for the marking of reconditioned packagings (see § 178.504(c)). These provisions come directly from the U.N. Recommendations (see paragraph 9.5.4 of Chapter 9); so the U.N. envisioned the reconditioning and reuse of packagings, but is silent (except for the requirement that they be able to pass performance tests) on the requirements for reconditioning. One suggestion put forward by NABADA (and other commenters) as a solution to the dilemma of the disappearance of reconditionable drums was the suggestion that the existing HMR be continued indefinitely as an alternative to a U.N.-based system. How such a dual system would solve the alleged problem of light drums replacing heavy ones (which is pictured by NABADA as the natural consequence of economic selection) is unclear.

Another area of extensive comment on the ANPRM concerned fiberboard boxes. The most common DOT specification fiberboard boxes are the DOT-12 series. Of these, the DOT-12B is the most widely used. It is used for hazardous liquids with inner packagings consisting of bottles made of glass or plastic, or metal cans. These inner packagings have a capacity ranging from a few ounces to 5 gallons. A typical and

very common packaging of this type consists of 4 one gallon cans of paint with friction lids packed in a fiberboard box. An estimated 300 million one gallon cans of paint subject to the HMR are shipped every year.

Comments received on the ANPRM indicate that the requirements for fiberboard boxes under the U.N. system produce a packaging that is both more substantial and more costly than the 12B. This is because under the U.N. system, the completed packaging (fiberboard box plus the inner receptacle) must survive a drop test of 1.8, 1.2 or 0.8 meters, depending on whether the hazardous material to be packed falls into Packing Group I, II or III. By contrast, the DOT specification for the 12B box (§ 178.205) requires tests for fiberboard strength but a drop test of the completed package is not required except for special boxes. RSPA has had a number of tests run on various configurations of the 12B box with inner receptacles for liquids, and several commenters provided additional test results on this type of packaging. Results of the tests are available from the RSPA.

In general, it may be said that the 12B, when packed with frangible inner packagings (glass, etc.), did not perform well in drop tests. While the smaller sizes (pints) survived the lower (Packing Group III) drops, the larger size bottles (gallons) would not survive these, and neither would survive the Group I test. The survival rate for small sizes was moderate with the intermediate (Group II) tests.

Metal cans with screw closures packed in the 12B style box performed much better than glass bottles because of their ability to accept some deformation without fracturing. However, friction-closed metal cans in the larger sizes (one-gallon paint cans) would often fail the drop tests when their lids popped open.

Unlike the issue of U.N. 1A1 drums vs. DOT-17 series drums, involving claims that the U.N. packaging was not as substantial as the DOT one, in this instance it is plain that the U.N. 4G fiberboard box, with inner packagings, which must survive a Group I, II or III drop test, must be appreciably more substantial than the DOT-12B. The response of many commenters to the U.N. 4G box standard contrasted with comments on the U.N. 1A1 drum standard. Although the various drop tests (with varying heights depending on whether the material was in Packing Group I, II or III) were considered too lax for testing drum performance, many commenters considered them too severe for box performance. The 12B was cited

as a proven package based on the historical use of millions of shipments annually using this package. The fact that it performed badly in the array of U.N. tests was dismissed or not commented on.

The present incident reporting requirement of § 171.16 does not require reporting of spills of paint or electrolyte from batteries. The paint industry was one of the major commenters on the performance of metal cans packed in fiberboard boxes. It is not possible to look at the spillage record of these packagings since that commodity is excepted from detailed reporting. However, an analysis of DOT's hazardous materials incident reports for other materials shipped in fiberboard boxes was made (see the Regulatory Evaluation) which showed that "Dropped in handling" was by far the most prevalent failure mode, accounting for about half of all incidents involving fiberboard packagings.

The final area of extensive comment (although not nearly as extensive as the issues of drums and fiberboard boxes) was paper bags. The Paper Shipping Sack Manufacturers' Association (PSSMA) believes that the multiwall bags presently specified in the DOT specification (44B, 44C, 44D and 44E) are safer than those meeting the requirements of the U.N. Recommendations (U.N. 5M1 and 5M2), and that the adoption by the U.S. of a regulatory system based on the U.N. Recommendations would result in cheaper, lower quality multiwall bags displacing the present DOT specifications packagings (which easily meet the U.N. standards). PSSMA believes that safety would suffer as a result.

A large class of hazardous materials shipped in multi-wall bags consists of agricultural chemicals—in particular, nitrate fertilizers such as ammonium nitrate and nitrate of soda. These materials are classed as "Oxidizers" by DOT and the U.N. DOT's present rules for this class of materials are found at 49 CFR 173.182. They do not require the use of a DOT specification packaging (i.e., bags) but describe two non-specification bags, one of four ply for up to 110 pounds and one of three ply for up to 80 pounds. The description of these two bags, including performance tests, is very similar to the U.N. standards of the U.N. 5M1 and 5M2 bags, with the exception that the U.N. bags would have to have the U.N. certifying marks while the nitrate bags described in § 173.182(b)(5) are not marked since they are not DOT specification packagings.

It would appear that the purported problem feared by the PSSMA on the adequacy of the U.N. packagings would have appeared before now if these nitrate bags posed a significant problem. An examination of incidents since 1972 in the DOT incident reporting system reveals 127 incidents and two minor injuries involving ammonium nitrate and sodium nitrate in paper bags.

In the course of meetings in Houston, Texas on April 29, 1982, and St. Louis, Missouri on September 14, 1982, the Docket HM-181 ANPRM was discussed. Commenters suggested that additional tests (such as vibration and higher levels of leakproofness) over those specified in the U.N. Recommendations be incorporated into whatever system the U.S. adopts. Since the U.N. document is only a set of recommendations which provides a general framework around which individual countries or other regulatory bodies are free to design their own regulatory systems, there is nothing to prevent DOT (as the Competent Authority for the U.S. in regulating the transportation of hazardous materials) from incorporating additional tests in proposed or final rules. However, the U.S. is only able to apply these more stringent rules to domestic shippers or packaging manufacturers. To apply them to foreign packagings may invite retaliation or complaints that the U.S. was using the regulations as non-tariff barriers to trade in violation of the Trade Agreements Act since they are more stringent than the U.N. requirements. Thus, we would have the situation where the U.S. would be applying more stringent requirements against U.S. shippers and manufacturers than against imported shipments. This situation would defeat one of the objectives of incorporating the U.N. Recommendations, which is international reciprocity. At both the Houston and St. Louis meetings, DOT raised this point and specifically requested comments on whether or not this would place the U.S. at a competitive disadvantage. RSPA received no written or oral comments on this point and can only assume that it is not envisioned as being a problem.

RSPA has carefully considered the points raised in the comments on its ANPRM and reexamined the objectives stated in that document. A Regulatory Evaluation was prepared which looked at the options open to RSPA in light of the comments and events (both national and international) which have happened since then. The reader is referred to the Regulatory Evaluation in Docket HM-181 for a detailed discussion of the

available alternatives. After carefully considering these options, RSPA has decided on the following course of action.

(1) Proceed to develop and publish an NPRM under Docket HM-181.

(2) Retain the six objectives stated in the ANPRM.

(3) Expand the scope of the proposal beyond what was contained in the ANPRM (packaging) to incorporate the U.N. hazardous materials table, the U.N. system of classing, including hazard class definitions and packing groups, and to incorporate some of the communications requirements from the U.N. system.

(4) Retain and expand the effort to systematize, simplify, and enhance the safety provisions of the bulk packaging requirements in the HMR.

(5) Set minimum thickness requirements for the reuse of metal and plastic packagings.

(6) Establish a transition period of 5 years for continued use of existing regulatory provisions, particularly with regard to use of non-bulk packagings and hazard communication requirements.

III. Related Rulemakings

From the publication of the ANPRM on April 15, 1982 until the present time, RSPA has been analyzing comments, preparing a regulatory evaluation, deciding on a course of action and drafting an NPRM. During this period of time, many issues have arisen which required either acknowledgement and postponement or regulatory action. The relationship between Docket HM-181 and these related rulemaking proposals is discussed below.

A. Docket HM-181A

At the time that RSPA began considering the desirability of issuing performance-oriented packaging standards to replace the packaging specifications found in the HMR, it was apparent that explosives would be a major part of any such effort. RSPA's requirements for testing and classing explosives are outdated and many of the packagings are obsolete. Because the size of any regulatory project covering the classing and packaging of explosives is so great, and because the testing, classing and packaging of explosives is so specialized, RSPA decided to handle explosives in another rulemaking action which will be issued under Docket HM-181A. Work has begun on that project and an NPRM will be issued sometime after publication of this notice.

Several areas for this rulemaking address requirements for explosives or have an impact on them. Shipping

descriptions (i.e., shipping names, numerical hazard classes, and identification numbers) for explosives, based on the U.N. Recommendations, appear in the § 172.101 Table. In Subpart E of Part 172 it is proposed to replace the EXPLOSIVE A, B, C and BLASTING AGENT labels with the EXPLOSIVE 1.1, 1.2, 1.3, 1.4, and 1.5 labels. In Subpart F of Part 172 it is proposed to replace the EXPLOSIVE A and B and BLASTING AGENT placards with the EXPLOSIVE 1.1, 1.2, 1.3, 1.4, and 1.5 placards. In Part 178, it is proposed to delete certain packagings used for explosives, such as Specification 23G (special cylindrical fiberboard box for high explosives). It should be understood that these proposals may be modified in Docket HM-181A, and will be given consideration under that docket. They appear in this rulemaking for the sake of completeness only. It is recommended that commenters desiring to address provisions for explosives await publication of Docket HM-181A before submitting comments.

B. Docket HM-182

In January, 1982, RSPA received a petition from Inland Steel Container Company to amend the HMR to allow all 20-gauge drums with triple-seamed chimes to be constructed in the 55 gallon size under the DOT-17E specification. The petition requested that those materials currently authorized to be shipped in a 17E drum with 18-gauge heads and 20-gauge bodies (18/20), be authorized in the all 20-gauge triple-seamed drum, and that materials authorized in the all 18-gauge 17E drum be authorized in the 18/20-gauge triple-seamed drum. RSPA published an ANPRM under Docket HM-182 on June 10, 1982 (47 FR 25167), to deal with this issue. It should be noted that drum manufacturers generally agree that triple-seamed drums, all 20-gauge, can pass the U.N. performance tests, including the drop test, at the performance levels of Packing Groups I, II, and III.

After reviewing the comments received on both the NPRM under Docket HM-182 and the ANPRM under Docket HM-181, RSPA decided that the issue of triple-seamed drums was so intertwined with that of performance-oriented packaging that Docket HM-182 should be incorporated in Docket HM-181. That has been done and the comments on the two dockets have been combined. No further notices will be issued under Docket HM-182.

C. Docket HM-185

On August 26, 1982, RSPA published an NPRM under Docket HM-185 (47 FR 37592) which proposed standards for polyethylene containers. A final rule under that Docket was published on June 14, 1984 (49 FR 24684). The final rule revised the HMR by establishing standards for polyethylene packagings in sizes up to 55 gallons. Previously, most of these packagings had been authorized only under the terms of exemptions. The most important feature of HM-185 was that it established compatibility and permeation testing for polyethylene packagings (see § 173.24 and Appendix B to Part 173). The ANPRM under Docket HM-181 had proposed such tests (see § 178.608 of the ANPRM). The tests proposed in § 178.608 were based on RSPA's judgment of what was required at the time. Comments received on the tests proposed in the ANPRM and in the NPRM under Docket HM-185 led RSPA to modify both test methods and pass-fail criteria. The compatibility and permeation tests contained in this proposal are essentially those which presently exist in the HMR and appeared in the final rule under Docket HM-185. It should be noted, however, that in this proposal they are placed in Part 178 with other performance-oriented tests.

D. Docket HM-194

On October 12, 1984, RSPA published an NPRM under Docket HM-194, entitled *Designation of Testing Laboratories, United Nations Packagings* (49 FR 40056). It was followed by a final rule under the same docket on March 13, 1985 (59 FR 10060) and a corrections document on April 24, 1985 (50 FR 16089). This rulemaking established a procedure whereby testing agencies, upon application, could be approved by RSPA to certify the adequacy of packagings constructed to U.N. standards and marked as U.N. packagings. The purpose of the amendment was to allow manufacturers or users of U.N. hazardous materials packagings to have access to independent testing facilities which had been designated by DOT. The program is a voluntary one, and persons are free to use the option or not. It was set up because of a fear by some companies doing international business that without such a certification by an entity acknowledged by DOT, the U.S.-made packagings would not be accepted by some foreign governments. It was not the intent to replace self certification traditionally used by packaging manufacturers in the U.S. As of

December, 1986, eight agencies have been approved by RSPA under this program.

E. Docket HM-196

On February 7, 1986, RSPA published an NPRM under Docket HM-196, entitled *Packaging and Placarding Requirements for Liquids Toxic by Inhalation* (50 FR 5270). It was followed by a final rule under the same docket on October 8, 1985 (50 FR 41092). This rulemaking was initiated after the tragedy in Bhopal, India involving the release of methyl isocyanate. RSPA realized that the regulatory controls which existed in the HMR for certain volatile liquids that were highly toxic by inhalation were inadequate. The rule imposed additional packaging and communication requirements for liquids which met the criteria for toxic by inhalation. The criteria selected were those which exist in the U.N. Recommendations for Division 6.1 at the Packing Group I level for inhalation toxicity.

Of particular interest in this proposal are the additional packaging requirements. Under Docket HM-196, not all packagings for inhalation toxic liquids were superceded, but many were. The new packagings, both bulk and non-bulk were not specified in the rule, but were to be approved by RSPA when proposed by a shipper of these materials. This notice proposes both bulk and non-bulk packagings for liquids toxic by inhalation, and is the first document to do so. It also proposes additional or improved requirements for gases which are toxic by inhalation, and "Inhalation Hazard" shipping paper and marking requirements for non-bulk packagings with primary receptacles of one liter or less.

F. Docket HM-145F

On October 17, 1986 the President signed into law the Superfund Amendments and Reauthorization Act of 1986. This Act amended the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA" or "Superfund"), and required that the Secretary of Transportation list and regulate hazardous substances listed or designated pursuant to section 202 of CERCLA. On November 21, 1986, RSPA published a final rule under Docket HM-145F, entitled *Hazardous Substances* (51 FR 42174). This rule listed and regulated as hazardous materials all hazardous substances designated under CERCLA and fulfilled DOT's requirements under the Superfund Amendments.

This rule listed all of the hazardous substances and their reportable

quantities designated by the U.S. Environmental Protection Agency, in an Appendix to § 172.101. In addition, it removed the special notation in the § 172.101 Table (the letter "E" in column 1 and the "RQ" and quantities in pounds and kilograms from column 2). In essence, hazardous substances are now hazardous materials and no longer appear in the § 172.101 Table but now appear in the § 172.101 Appendix. This rule specified some additional requirements in selecting proper shipping names and in preparing shipping papers and marking packages. These changes are not reflected in this proposal. The reason is that Docket HM-145F was prepared in a very short time; the Department had 30 days from the time of the President's signature to implement the Amendments and did so in a final rule, not an NPRM. To have incorporated these sudden changes into this proposal would have caused considerable delays in its completion especially because the Table would have had to be revised. Readers should be aware of the fact that the amendments to the HMR which appeared in Docket HM-145F do not appear in, and have not been considered in, this proposal.

IV. Major Features of the NPRM**A. Format Improvements**

The proposals contained in this document are intended to improve the format of the HMR, as follows:

1. The listing of matter incorporated by reference would be made easier to use. (See § 171.7.)
2. All authorized shipping names for hazardous materials would be consolidated into one Hazardous Material Table. (See § 172.101.)
3. Provisions of the IM (intermodal) Portable Tank Table would be incorporated into the HMR, eliminating the need to maintain this publication separate from the HMR. (See § 172.102.)
4. Throughout the HMR, quantities would be expressed in both international (e.g., metric units) and U.S. standard units.
5. The packaging sections in Part 173 would be reduced from approximately 427 to 242 sections.
6. The number of packaging specifications in Part 178 would be reduced from approximately 146 to 68. Approximately 100 specifications for non-bulk packagings would be eliminated and 20 new ones added.
7. The total volume of the HMR would be reduced by at least 350 pages, from 1250 pages.

B. Regulatory Features

Major regulatory features proposed in this document are as follows:

1. U.N. definitions for terms, such as "drum" and "packing group", would be added. (See § 171.8.)

2. The Hazardous Materials Table (see § 172.101) would be revised as follows:

(a) The Optional Table (§ 172.102) would be removed and shipping descriptions would be aligned with the U.N. Recommendations.

(b) The symbols "D" and "I" would be added to designate certain descriptions unique to domestic or international transportation (e.g., "combustible liquid, n.o.s." for domestic transportation).

(c) Numeric hazard classes would replace hazard classes described by words (i.e., "Class 3" instead of "flammable liquid").

(d) Most hazardous materials would be assigned packing groups to indicate their relative degree of hazard (e.g., "Packing Group I" indicates a high degree of hazard).

(e) A "Special Provisions" column would accommodate exceptions or additional requirements for specific materials and would be used to implement IM Portable Tank provisions into the HMR.

(f) Per package quantity limitations for transportation by aircraft would be aligned, generally, with the ICAO Technical Instructions.

(g) Vessel stowage requirements would be aligned with the IMDG Code.

3. A "Special provisions" section would be added. Special provisions would be a series of codes which would be explained in § 172.102. They would prescribe additional packaging requirements, IM portable tank authorizations, exceptions and modal specific requirements. (See § 172.102.)

4. Shipping paper requirements would be changed to conform to U.N. terminology (see Subpart C of Part 172):

(a) Class or division numbers would replace hazard classes described by words.

(b) The packing group would be required as part of the shipping description.

(c) Technical names would be required for "n.o.s." entries.

5. Marking requirements for packagings would be revised (see Subpart D of Part 172):

(a) Technical names would be required as part of the package marking for "n.o.s." entries on all non-bulk packages and on those bulk packages for which proper shipping name markings are required.

(b) Minimum size requirements (100 millimeters on tank cars, 75 millimeters

on cargo tanks and 50 millimeters on other bulk packages) would be prescribed for markings on bulk vehicles.

(c) The requirement to mark "INHALATION HAZARD" on packages would be extended to bulk packages, to non-bulk packages having primary receptacles of one liter or less, and to packages containing poisonous gases.

6. Labeling requirements would be aligned with the U.N. Recommendations (see Subpart E of Part 172):

(a) Text (e.g., "FLAMMABLE LIQUID") on labels for Classes 2, 3, 4, 6.1, and 8 would be optional. Class numbers would be required on "no text" primary hazard labels.

(b) The EXPLOSIVES A, B and C, BLASTING AGENT, OXYGEN and IRRITANT labels would be removed.

(c) The EXPLOSIVES 1.2, 1.2, 1.3, 1.4 and 1.5, KEEP AWAY FROM FOOD (St. Andrew's cross) and INFECTIOUS SUBSTANCES labels would be added.

(d) Design provisions would accommodate existing DOT and U.N. label dimensions, where practicable.

7. Placarding requirements (see Subpart F of Part 172) would be revised as follows:

(a) Text on placards for Classes 2, 3, 4, 5, 6.1 and 8 would be optional.

(b) Placards conforming to the U.N. Recommendations or the TDG Regulations would be permitted in place of the corresponding DOT placards to accommodate any minor design differences.

(c) The EXPLOSIVES A, B and C, BLASTING AGENTS, OXYGEN, CHLORINE AND FLAMMABLE SOLID W placards would be removed.

(d) The EXPLOSIVES 1.1, 1.2, 1.3, 1.4 and 1.5, SPONTANEOUSLY COMBUSTIBLE, DANGEROUS WHEN WET and KEEP AWAY FROM FOOD placards would be added.

(e) Identification numbers would not be permitted on subsidiary hazard placards. They would be permitted on the POISON GAS placard.

8. General requirements applicable to packaging hazardous materials (see Subparts A and B of Part 173) would be revised as follows:

(a) For determining the classification of materials with multiple hazards, a precedence of hazards table from the U.N. Recommendations would be used. (See § 173.2a.)

(b) Packaging requirements would be enhanced with respect to compatibility, filling limits and closures on packagings. (See §§ 173.24, 173.24a and 173.23.)

(c) A base level vibration test performance standard would be added. (See § 173.24a and Appendix C to Part 173.)

(d) The metric equivalency provisions would be removed from § 173.27.

(e) Packaging requirements for transportation by aircraft generally would be based on the ICAO Technical Instructions. (See § 173.27.)

(f) Reuse of metal and plastic drums and composite packagings would be linked to minimum thickness requirements. Reuse of paper, textile, plastic film and fiberboard packagings would be prohibited. (See § 173.28.)

(g) The leak test from the U.N. Recommendations would replace the reconditioning provisions of § 173.28(m).

(h) General use requirements and restrictions for portable tanks, cargo tanks and tank cars would be aligned in a manner consistent with the proposals for cargo tanks under Docket HM-183 and 183A. (See §§ 173.24b, 173.31, 173.32, and 173.33.)

(i) Packaging equivalency provisions would be added to permit use of higher integrity portable tanks and cargo tanks where lower integrity tanks are specified. (See §§ 173.32 and 173.33.)

(j) General requirements for packaging extremely toxic materials in cylinders would be added. (See § 173.40.)

9. Hazard class definitions for materials other than explosives and radioactives would be consolidated into one subpart and revised. (See Subpart D of Part 173.)

(a) Compressed gases would be divided into Division 2.1 (flammable gases), Division 2.2 (non-flammable gases) and Division 2.3 (poisonous gases). Division 2.3 would be divided into Packing Group IA (LC50 less than or equal to 200 ppm), Packing Group IB (LC50 greater than 200 ppm and less than or equal to 1000 ppm), Packing Group II (LC50 greater than 1000 ppm and less than or equal to 3000 ppm), and Packing Group III (LC50 greater than 3000 ppm or less than or equal to 5000 ppm). (See § 173.115.)

(b) The flammable liquid upper limit would be changed from 100 °F (38 °C) to 60.5 °C (141 °F), consistent with the U.N. Recommendations. The combustible liquid definition would include materials with flash points above 60.5 °C and below 93.3 °C (200 °F), materials with flash points above 93.3 °C that are transported as liquids at or above their flash points and, for domestic transportation, materials with flash points between 38 °C and 60.5 °C (See § 173.120.)

(c) Class 4 definitions consistent with the U.N. prior to December 1986 would be adopted; Division 4.1 for flammable solids, Division 4.2 for spontaneously combustible materials, and Division 4.3

for dangerous when wet materials. (See § 173.124.)

(d) Existing DOT definitions for oxidizers (Division 5.1) and organic peroxides (Division 5.2), which are consistent with the U.N. Recommendations, would be retained. (See § 173.132.)

(e) For poisonous materials other than gases (Division 6.1), the U.N. criteria for toxicity, including packing group criteria, would be adopted. (See § 173.133.)

(f) A definition for infectious substances (Division 6.2) would be adopted which refers to the regulations of the Department of Health and Human Services, as does the present definition for etiologic agents, but which is generally consistent with the U.N. Recommendations. (See § 173.134.)

(g) No changes would be made to radioactive materials (Class 7) definitions.

(h) The U.N. criteria for corrosive materials (Class 8) would be adopted and the ORM-B hazard class would be eliminated. (See § 173.136.)

(i) The U.N. definition for miscellaneous hazardous materials (Class 9) would be adopted and the ORM-A and OMR-C hazard classes would be eliminated. (See § 173.140.)

(j) The ORM-D and ORM-E hazard classes would be retained. (See § 173.144.)

10. Non-bulk packaging authorizations and exceptions would be revised to align them with performance-oriented packaging standards. (See Subpart E of Part 173.)

(a) Limited quantity and consumer commodity exceptions would generally be limited to Packing Group II and III materials and to packages not exceeding 30 kilograms (66.1 pounds) gross weight. Other exceptions would be similar to existing provisions. (See §§ 173.150 through 173.156.)

(b) Packing Group III packaging requirements would be made applicable to most Class 9 materials, to all ORM-E materials, and to all Packing Group III materials, including those in Class 3 and Division 6.1.

(c) Packagings for most materials would be authorized by packing group and physical form of a material rather than by hazard class. Generic non-bulk packaging sections would be added for Packing Group I, III, and III liquids and solids. These sections would present arrays of performance-oriented packagings. (See §§ 173.201-203 and 173.211-213.)

(d) Packagings for organic peroxides (Division 5.2) would be based on Chapter 11 of the U.N. Recommendations. (See § 173.225.)

(e) Provisions for packaging liquids which are toxic by inhalation, based on approval provisions, would be added. (See §§ 173.226 and 173.227.)

(f) Provisions for packaging lithium batteries, based on exemption requirements, would be added. (See § 173.185.)

11. Bulk packagings authorizations would be revised. (See Subpart F of Part 173.)

(a) Packagings would be authorized based on degree of hazard rather than historical precedent.

(b) Bulk packagings provisions for materials toxic by inhalation, based on approval provisions, would be added.

(c) Provisions of the IM Portable Tank Table would appear in the HMR. (See § 172.102.)

(d) General requirements applicable to filling limits for bulk packagings would be added or clarified. (See § 173.24b.)

(e) The bulk transport of hydrogen peroxide in strengths of 8 to 52% would be regulated.

12. Part 178 would be revised to adopt packaging standards and tests based on the U.N. Recommendations.

(a) One hundred existing specifications for non-bulk packagings would be removed and twenty performance standards would be added. (See Subpart L of Part 178.)

(b) Performance tests based on Chapter 9 of the U.N. Recommendations would be added, to include a drop test, leakproofness test, hydrostatic pressure test, stacking test, cooperage test for wooden barrels and chemical compatibility test for plastic receptacles. (See Subpart M of Part 178.)

(c) Manufacturers would be required to notify persons to whom packagings are transferred of any specification requirements which have not been met at time of transfer and retain copies of the notification for a one year period. (See § 178.0-2.)

(d) Manufacturers would be required to repeat performance tests at least once each year and retain records of test results for a one year period. (See § 178.601.)

V. Review by Sections

A. Part 171: General Information, Regulations, Definitions

Sections 171.1 through 171.5. The general provisions in Part 171 would remain essentially unchanged. Paragraph (e) of § 171.3 would be deleted and the existing provision, which allows the use of open-head drums for hazardous waste liquids containing solids or semi-solids, would be relocated to § 173.12. Sections 171.1,

171.2, 171.4 and 171.5 would not be changed.

Section 171.7. Section 171.7 would be revised to present material incorporated by reference in an easy-to-use format, to consolidate all references in one section and to update the material to reflect changes proposed in this notice. The proposed format is identical to that used by the Federal Register in the "FINDING AIDS" portions of the CFR. RSPA believes this format is much easier to use than the existing format in § 171.7. The proposed *Table of Material Incorporated by Reference* provides citations of the applicable 49 CFR sections in which material is referenced and clearly identifies sources for reference material. The listing would include some reference materials which are not found in the "FINDING AIDS" because the materials are informational rather than regulatory and, thus, not suitable for incorporation by reference under 5 U.S.C. 552(a) and 1 CFR Part 51 (e.g., DOT's "Guidelines for Selecting Preferred Highway Routes for Large Quantity Shipments of Radioactive Materials.") For purposes of this notice, the listing in § 171.7 is presented as a demonstration. It does not necessarily represent a complete listing of all additions, revisions and deletions that would be necessary to update the section.

Section 171.8. Section 171.8 would be revised to accommodate U.N. terminology and definitions and to define other terms which are used in this proposal, such as "international transportation", "kPa", "n.o.s. entry" and "subsidiary hazard". Approximately 38 definitions would be added and 11 would be revised. Numerous cross references would be added or revised. Definitions for terms rendered obsolete by this proposal, such as "STC" and "Poison A" would be deleted.

Sections 171.10 through 171.20. Section 171.10 would be revised to point out the distinction between "bulk packaging" as defined in § 171.8 and "bulk carriage by vessel or barge" as addressed in 46 CFR, Subchapters D, I, O and N. Section 171.12a would be revised editorially to reflect changes in terminology and a new paragraph (g) would be added containing requirements, currently found in Part 179, applicable to couplers on Canadian tank cars. Section 171.14 would be removed and the provision for continued use of packagings marked "ICC" would be relocated to proposed § 173.23(b). No changes are proposed to §§ 171.1, 171.2, 171.4, 171.5, 171.9, 171.13, and 171.15 through 171.20.

B. Part 172: Hazardous Materials Table, Special Provisions and Hazardous Materials Communication Regulations

1. Subpart A of Part 172; General

Subpart A of Part 172 would not be changed.

2. Subpart B; § 172.101, Consolidated Hazardous Materials Table

The present HMR contain two tables that list hazardous materials: the Hazardous Materials Table ("§ 172.101 Table; or, "Table") in § 172.101 and the Optional Table in § 172.102. The § 172.101 Table is used to describe materials in domestic transportation by surface or air. The Optional Table may be used to describe a material being shipped internationally or domestically provided at least one leg of the journey is by vessel. A third table, the IM Tank Table, does not appear in the HMR but is implemented through the provisions of §§ 173.32c and 173.32d. It is used to specify conditions and limitations for the transport of hazardous materials in intermodal (IM) portable tanks. In addition to these three tables, the HMR allow two other tables to be used. One, implemented through the provisions of § 171.11, is found in the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions). It may be used both internationally and domestically for transportation by aircraft and associated transportation by motor vehicle. The second, implemented through the provisions of § 171.12a, is in the Canadian Transport of Dangerous Goods Regulations (TDG Regulations) and may be used for import shipments from Canada.

Shipping names in the Optional Table, the ICAO Technical Instructions, the TDG Regulations and the IM Tank Table derive from the listing of materials in the U.N. Recommendations. Many of the shipping names in the § 172.101 Table also derive from the U.N. Recommendations. However, a substantial number of them do not. A major objective of RSPA in this rulemaking is a consolidation of the existing tables of the HMR. This consolidation would greatly simplify use of the HMR, would reduce the volume of the HMR, and is necessary to facilitate alignment with the U.N. Recommendations with regard to harmonizing shipping names and hazard classes for materials. Also, in making the transition to performance-oriented packaging standards, it would be necessary to revise the § 172.101 Table to accommodate packing group assignments and to revise packaging

authorizations. Therefore, a new § 172.101 Table is being proposed. The proposed Table is a consolidation of the existing tables and contains approximately 3000 entries. It is derived from the existing §§ 172.101 and 172.102 Tables and from the ICAO Technical Instructions. For purposes of this notice, the proposed Table lists only shipping name, hazard class and identification number for each entry in the explosives hazard class (Class 1). Provisions for explosives are to be revised as part of a separate rulemaking project. For other than explosives, complete columnar entries are given, as discussed in the following paragraphs.

Column 1 of the proposed Table, entitled *Symbols*, retains the features of existing Column 1. To the existing symbols, "+", "A", "W" and "E", whose meanings would not be changed, two additional symbols, "D" and "I", would be added.

The letter "D" is an indicator that the shipping description is inappropriate when transportation of the material is for import from or export to a country other than Canada. The letter "D" is intended to alert the shipper that another proper shipping name may have to be selected for international transportation or the material may not be regulated as a hazardous material outside the U.S. and Canada. Most descriptions preceded by the letter "D" are hazardous substances which are not specifically listed in international regulations, but are regulated internationally under different proper shipping names. Others, in the ORM-E hazard class, may not be regulated under international regulations. To facilitate the through-shipment of the former materials, proposed paragraph (c)(14) would permit use of the internationally recognized shipping description in place of the more specific technical name. However, as the material may be a hazardous substance, the package markings and shipping paper descriptions may require identification of the technical constituent for these materials.

The letter "I" is an indicator that the shipping description is not acceptable for purely domestic transportation, but may be used for shipments of materials which originate or terminate at a point outside the U.S. For the most part, these descriptions are vague or unnecessary, or describe materials that present such a minimal risk that they may not meet the DOT definition of a hazardous material. Most of these descriptions were removed from the HMR (48 FR 52306, November 17, 1983), and RSPA is actively seeking to have those

descriptions also removed from international standards.

Column 2, entitled *Hazardous Materials Descriptions and Proper Shipping Names*, would list the hazardous materials entries which have been consolidated from the aforementioned tables and integrated into the proposed Table. Provisions of existing Column 2 for selecting appropriate shipping names would be retained. Shipping names, for the most part, would be aligned with the U.N. Recommendations. In general, where an existing DOT shipping name is deleted in favor of an entry from the U.N. Recommendations, a cross reference from the old name to the new name would be included.

Column 3, entitled *Hazard Class*, would specify the hazard class or division for each proper shipping name, or the word "Forbidden" to indicate that a material may not be offered for transportation or transported. In general, the class or division numbers for each material are identical to those in the U.N. Recommendations, (e.g., Class 3, Division 6.1). Exceptions involve Class 2, for which gases would be divided into three divisions: Division 2.1 (flammable gases), Division 2.2 (non-flammable gases) and Division 2.3 (toxic gases). These divisions do not appear in the U.N. Recommendations. Also, it is proposed to retain the existing hazard classes of ORM-D (for consumer commodities and small arms ammunition) and ORM-E (for hazardous substances and hazardous wastes). Discussion of each of the proposed numerical hazard classes appears elsewhere in this notice.

Column 4, entitled *Identification Number*, would list the four digit identification number assigned to each proper shipping name, preceded by the letters "UN" or "NA". Those preceded by "UN" are listed in the U.N. Recommendations, and those preceded by "NA" are peculiar to domestic transportation.

Column 5, entitled *Packing Group*, would list the packing group assignment for each listed material except for explosives (Class 1), radioactive materials (Class 7) and non-toxic gases (Divisions 2.1 and 2.2). The packing group system is designed to identify the relative hazard of each material within a hazard class and then require a packaging performance standard appropriate to the risk. In most cases a material would be assigned to only one packing group. The assignment usually would be based on RSPA's knowledge of the material in its technical grade, and an understanding that the material,

as prepared for shipment, is rarely reduced to a state which would take it outside the limits for the specified packing group. In other cases, there are specified criteria, in Subpart D of Part 173, which identify the proper packing group and the user must make a determination of the appropriate packing group based on these criteria.

Column 6, entitled *Labels*, would specify the hazard warning label or labels required for non-bulk packagings filled with the listed hazardous materials. Proposed changes to labeling requirements, based on alignment with the U.N. Recommendations, are discussed elsewhere in this notice. Where a hazardous material is known to pose multiple hazards, Column 6 would list the label corresponding to the primary hazard (i.e., the specified hazard class) followed by labels corresponding to any subsidiary hazards.

In Column 7, entitled *Special Provisions*, there is proposed a series of codes for special provisions which grant exceptions from the regulations (in addition to those specified in Column 8a) or impose additional packaging requirements. The meaning and requirements for each special provision would be set forth in § 172.102. A code consisting of numbers only would apply to bulk and non-bulk packagings and to each mode of transportation. For example, "11" states "Package as a liquid or solid, as appropriate, depending on the form of the material at 55 °C (131 °F)." A code preceded by the letter "A", "H", "R", or "W" would apply respectively only to air, highway, rail or water modes of transportation. A code preceded by the letter "B" or "N" would apply, respectively, only to bulk or nonbulk packagings. A code preceded by the letter "T" would apply to use of IM portable tanks. The absence of a special provision in association with a hazardous material description would not automatically permit that packaging arrangement. The requirements indicated are known by RSPA to be essential to the safe transportation of the referenced materials. However, other materials may also require similar consideration. For instance, a shipper may not package in a steel drum a material which is incompatible with steel just because the special provisions column fails to list "N25" (Steel single packagings are not authorized). The general requirements for all packages prescribed in proposed § 173.24 effectively prohibit such packages in transportation.

Authorizations for use of specific IM portable tanks which are currently

found in the IM Tank Table would be relocated to the HMR as a series of "T" codes listed in Column 7 of the § 172.101 Table and explained in § 172.102. For additional explanation of special provisions, refer to the preamble discussion for § 172.102, which follows this discussion of the § 172.101 Table.

Column 8, entitled *Packaging Authorizations*, would specify applicable packaging sections in Part 173 for materials. Column 8a would specify section references for exceptions from packagings requirements, or "None", indicating that no packaging exceptions are provided and is similar to the existing Column 5(a). Columns 8b and 8c would specify section references for non-bulk and bulk packagings, respectively. Another proposed revision deals with the presentation of packaging sections in Part 173. Columns 8a, 8b and 8c are each headed by the term "§ 173.***" to indicate that each of the numerical data elements in those columns replaces the asterisks (*) and the completed term is a section reference. For example, the material Allyl chloride has the entries "None", "201" and "240" in Columns 8a, 8b and 8c, respectively. This indicates: (1) in Column 8a, there are no limited quantity exceptions available for this material; (2) in Column 8b, the nonbulk packaging instructions prescribed in § 173.201 shall be complied with; and (3) in Column 8c, the bulk packaging instructions prescribed in § 173.240 shall be complied with. A "None" appearing in either of these latter columns would indicate that non-bulk or bulk packaging, as applicable, is not authorized.

Column 9, entitled *Quantity Limitations*, would be similar to existing Column 6 and would specify the maximum quantities that may be offered for transportation in one package aboard passenger-carrying aircraft or railcar (Column 9a) or by cargo aircraft (Column 9b). Quantity limitations are stated in metric units and in most instances are identical to limitations found in the ICAO Technical Instructions. Application of these limits to articles and devices is clarified in the introduction to the § 172.101 Table.

Column 10, entitled *Vessel Stowage Requirements*, would specify codes for stowage requirements for specific hazardous materials, similar to the presentation in Column 7 of the existing table. Column 10c would specify "Other stowage provisions" by means of numbered notes as opposed to written text. The meaning of each note is set forth in § 176.84. These notes provide stowage information above and beyond

that given in Part 176. Examples of these notes are: "Stow 'away from' corrosives," "segregation same as for oxidizers." Column 10 requirements have been aligned to correspond to those in the International Maritime Dangerous Goods (IMDG) Code. During the analysis of the present Column 7 stowage provisions, numerous discrepancies were found internally within the present table and also in the comparison between the § 172.101, and § 172.102 Tables and the present IMDG Code. Since one effort of this rulemaking will be the elimination of the § 172.102 Table, the proposed Column 10 has been redone to conform with the IMDG Code (including Amendment 22, effective July 1, 1986) thereby filling the gap for international shipments. The net result should be greater uniformity and fewer problems with improperly stowed cargo. Any amendments subsequently adopted in the IMDG Code which affect Column 10 are planned to be incorporated into the final rule.

The existing provisions in § 172.101(j) would be retained in proposed § 172.101(1). This allows a period of time to use up preprinted shipping papers and package markings when a shipping description is changed by an amendment to the table. Section 172.101(1) would also contain approval functions similar to existing provisions, to allow the Director, OHMT, to approve changes to shipping descriptions or packing authorizations which may be found to be in error or to align descriptions with changes to the IMDG Code, until such time as the § 172.101 Table could be amended through rulemaking action.

3. Subpart B; § 172.102, Special Provisions and Appendix A

It is proposed to delete the Optional Hazardous Materials Table found at § 172.102 and substitute a new section, entitled *Special provisions*, in its place. Special provisions would be a series of alphanumeric codes which would appear in Column 7 of the § 172.101 Table and which would be explained in new § 172.102. There are eight different types of codes proposed. A code consisting of numbers only would be a general provision applying to all modes of transportation and to both bulk and non-bulk packagings. For example, the § 172.101 Table entry for Sodium metal, dispersion, would specify "22" in Column 7. Referring to § 172.102, the "22" special provision would state "If the hazardous material is in dispersion in organic liquid, the organic liquid must have a flash point above 50 °C (122 °F)."

Four types of codes would be used for modal-specific requirements and consist of a letter preceding a two-digit number. The letters "A", "H", "R" and "W" would be used to precede codes applying to, respectively, the air, highway, rail and water modes of transportation. For example, the § 172.101 Table entry for Aluminum hydride would specify "A19" in Column 7. The § 172.102 reference to this special provision would state "Combination packagings consisting of outer fiber drums or plywood drums, with inner plastic packagings, are not authorized for transportation by aircraft."

Two types of codes, preceded by the letters "B" and "N", would be used for special provisions applying, respectively, to bulk and non-bulk packagings. For example, the § 172.101 Table entries for Chlorosilanes, n.o.s., would refer in Column 8c to § 173.242 for bulk packaging authorizations and to "B2", in Column 7. Referring to § 172.102, the "B2" special provision would state "MC 306 cargo tanks, DOT 57 portable tanks, and riveted tank cars are not authorized", thus limiting the packaging authorizations found in § 173.242. The § 172.101 Table entry for Ethylamine, aqueous solution, would refer in Column 8b to § 173.202 for non-bulk packagings and in Column 7 to "N15". The "N15" special provision would state "Plastic materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material." Further explanation of bulk and non-bulk packaging provisions is found in the preamble discussion for Subparts E and F of Part 173.

One other code, preceded by the letter "T", would be used to specify authorizations for use of IM portable tanks. For example, the § 172.101 Table entry for Ethyl acetate would specify "T2" in Column 7. Referring to § 172.102, the "T2" special provision would authorize, in a manner similar to the existing IM Tank Table, use of an IM 102 portable tank. Appropriate provisions, in "T2", would address tank test pressure rating, use of bottom outlets and pressure relief device settings. For a number of reasons, RSPA has not been able to update the IM Tank Table in a timely manner. The "T" codes would be used to incorporate provisions of the IM Tank Table into the HMR and would eliminate the need for maintaining this publication separate from the HMR.

The "A", "N", and numeric special provisions and the use of a "Special Provisions" column are based, in general, on comparable provisions found in the ICAO Technical Instructions. The

other types of special provisions would be implemented to accommodate modal-specific requirements and to specify IM portable tank authorizations. Through the use of special provisions, it would be possible to eliminate the repetitious language that appears throughout Part 173 of the existing regulations and to reduce the volume of the HMR.

Appendix A to Subpart B of Part 172 would be revised to provide a cross reference of identification numbers and proper shipping names. This appendix was not available at the time of publication, and therefore, has not been included in the regulatory text portion of this notice.

4. Subpart C, Shipping Papers

The shipping paper requirements of Subpart C of Part 172 would be changed to incorporate features found in the U.N. Recommendations. The use of class or division numbers would replace the words used to describe the present hazard classes (e.g., "6" in place of "Corrosive Material" or "6.1" in place of "Poison B"). Packing group numbers would be added to the basic description after the identification number (e.g. "PG II"), to indicate the level of packaging integrity required. When an "n.o.s." entry is used, the constituent or constituents which make the material hazardous must be added to the description. The present HMR require that hazardous constituents be identified only in the descriptions of poisons and hazardous substances. The U.N. system and this proposal extend this practice to all hazard classes. It is possible under the present HMR to describe a shipment of Corrosive liquid, n.o.s., without identifying the technical constituents or indicating whether the material is acidic or basic. The proposal allows the use of hazard class words (e.g. "Flammable liquid") to be used in addition to the required U.N. class (e.g., "3") or division numbers for shippers who wish to show both. The requirement to identify "Poison-Inhalation Hazard" materials is extended to nonbulk packagings having primary receptacles of one liter (1.06 quarts) or less and to Division 2.3 gases. Editorial changes include deletion of references to the § 172.102 Table and to the ORM-A, B and C hazard classes.

5. Subpart D, Marking

Sections 172.301 and 172.302. Package marking requirements found in Subpart D of Part 172 would be changed to reflect the features of the U.N. Recommendations. Section 172.301 would contain general marking requirements for non-bulk packagings and § 172.302 would contain general

marking requirements for bulk packagings. A requirement to mark exemption numbers on packagings used under the terms of exemptions would be relocated from Part 107 to §§ 172.301 and 172.302, for non-bulk and bulk packagings, respectively. As in the case of shipping papers, when an "n.o.s." proper shipping name is selected to describe a hazardous material, the technical name of the hazardous constituent or constituents (up to two) would be required, as a package marking on those packagings for which marking of shipping names is required. In § 172.302, minimum size requirements for markings on bulk packagings would be added, to include minimum height requirements of 100mm (3.94 inches) on rail cars, 75mm (2.95 inches) on cargo tanks and 50mm (1.97 inches) on other bulk packagings.

Section 172.303. A new § 172.303 would be added containing a prohibition against offering or transporting a package marked with a proper shipping name or identification number unless the package actually contains the identified material. An exception would permit the transport of such packages, under certain conditions, when markings are not visible in transportation. These provisions parallel existing provisions in § 173.29(d).

Section 172.312. This section would be revised for clarity and to require arrows for orientation markings, instead of "THIS SIDE UP" or "THIS END UP". These text statements cause confusion, such as when "THIS SIDE UP" appears on an end or "THIS END UP" appears on a side.

Section 172.313. A new § 172.313, entitled "Poisonous hazardous materials.", would be added to Subpart D. The requirement for permanently marking "POISON" on plastic packagings used for poisonous materials would be relocated to this new section from § 173.24. The requirement for marking "Inhalation Hazard" on packages containing inhalation toxic materials would be relocated from § 172.301 and would be made applicable to both non-bulk and bulk packagings.

Section 172.332. In § 172.332, a provision would be added, at subparagraph (c)(3), to prohibit the display of identification numbers on placards corresponding to the subsidiary, rather than the primary, hazard of a material. This is believed necessary to avoid confusion that might result from the display of identification numbers on subsidiary placards.

Other sections in Subpart D. Sections 172.306, 172.308, 172.312, 172.316, 172.324, and 172.334 would be revised editorially

to delete references to § 172.102 and to ORM-A, B, and C and for clarity. Section 172.334 would be revised to permit display of identification numbers on POSITION GAS placards. In §§ 172.326, 172.328 and 172.330, many of the existing provisions would be consolidated and relocated to § 172.302. Remaining provisions in these sections would be revised editorially.

6. Subpart E; Labeling

Package labeling requirements found in Subpart E of Part 172 would be changed to reflect the features of the U.N. Recommendations. Numerous editorial and format changes would be made for clarity and ease of use. Label graphics would be revised to permit display of hazard class or division numbers in the lower corners of square-on-point labels. Size requirements on labels would be changed slightly with regard to overall label size and inner border size to accommodate labels conforming to the U.N. Recommendations without rendering obsolete many labels which conform to existing HMR requirements. Use of text on labels for Classes 2, 3, 4, 5, 6 and 8 would be optional. The EXPLOSIVE A, B and C and BLASTING AGENT, OXYGEN and IRRITANT labels would be removed. EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 and KEEP AWAY FROM FOOD and INFECTIOUS SUBSTANCE labels would be added. Specific changes are discussed in the following paragraphs.

Section 172.400. Section 172.400 would be revised in its entirety. Proposed paragraph (a) would set forth the types of packaging to which labeling requirements apply, i.e., non-bulk packagings, DOT-106 and 110 multi-unit tank car tanks, portable tanks of less than 1000 gallons capacity, and overpacks, freight containers and unit load devices of no greater than 640 cubic feet (18.1 cubic meters) capacity which contain labeled packages. Proposed paragraph (b) would set forth in tabular form, the labels corresponding to each hazard class and the applicable sections containing label designs.

Section 172.400a. A new § 172.400a would set forth exceptions from labeling requirements which would remain essentially unchanged.

Section 172.401. In § 172.401, paragraph (d) would be removed as unnecessary, because once the shipping name and hazard class are tentatively assigned for a material under the provisions of proposed § 172.101(c)(11), the appropriate label is set forth in the § 172.101 Table.

Section 172.402. Additional labeling requirements in § 172.402 would be revised to reflect numerical hazard class

nomenclature. Existing paragraphs (c) through (i) of § 172.401 are believed unnecessary and would be removed.

Sections 172.403 and 172.404. Sections 172.403 and 172.404 would not be changed.

Section 172.405. Section 172.405 would be revised to make optional the display of hazard warning text (i.e., "POISON", "FLAMMABLE LIQUID", etc.) on labels for Classes 2, 3, 4, 5, 6 and 8. The appropriate hazard class or division number would have to be displayed on labels representing the primary hazard class of the materials. Class or division numbers would not be required on subsidiary hazard labels for the aforementioned classes. Existing provisions in § 172.405, for display of "OXYGEN" on OXIDIZER labels and "CHLORINE" on POISON labels, would be eliminated.

Section 172.406. Section 172.406 would be revised for clarity.

Section 172.407. It is proposed to change the format in § 172.407, for ease of use. Several changes to label designs are proposed to accommodate labels made in conformance to existing HMR requirements and labels made in conformance with IMO, ICAO or U.N. label specifications. These changes would entail a proposed minimum label size of 100 mm (3.9 inches) instead of 4 inches and a solid line inner border of 5.0 to 6.3 mm (0.20 to 0.25 inches) from the edge of the label instead of ¼ inch. Text indicating a hazard would not have to appear exactly "as shown" in the pictorial displays (§§ 172.411 through 172.448) but, in general, would have to conform to a minimum height of 7.6 mm (0.30 inches). Minimum and maximum sizes of 6.3 mm (0.25 inches) and 12.7 mm (0.5 inches), respectively, are proposed for the height of the U.N. class or division numbers. Provisions permitting inscriptions required by the country of origin (existing § 172.407(h)) and, for import or export purposes, inscriptions on Explosives A, B and C labels, would be deleted and replaced by a provision (proposed § 172.407(f)) which would allow use of any label conforming to the U.N. Recommendations in place of the corresponding label in Subpart E of Part 172.

Section 172.411. In § 172.411, the existing EXPLOSIVE A, B, C and BLASTING AGENTS labels would be replaced with EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 labels conforming to the U.N. Recommendations. Text would be mandatory on the Explosive 1.1, 1.2 and 1.3 labels. Division numbers and compatibility group letters would also be mandatory, and minimum size

requirements would be specified for them.

Sections 172.415 through 172.427. The NON-FLAMMABLE GAS, POISON GAS, FLAMMABLE GAS and FLAMMABLE LIQUID labels (§§ 172.415, 172.416, 172.417 and 172.419 respectively) would be changed only to show hazard class numbers in the lower corners of the square-on-point designs. In § 172.420, provision would be made to permit text to be printed over the vertical stripes (per the U.N. Recommendations) or placed in a white rectangle (per the existing HMR). The class number would be displayed in the lower corner of the label. The DANGEROUS WHEN WET, OXIDIZER, ORGANIC PEROXIDE and POISON labels (§§ 172.423, 172.426, and 172.427, respectively) would be changed only to show hazard class or division numbers in the lower corners.

Sections 172.431 and 172.432. A new § 172.431 would be added to specify the design and color of the KEEP AWAY FROM FOOD label, also known as the St. Andrew's Cross label. In § 172.432, both existing IRRITANT labels would be removed. A new § 172.432 would accommodate the INFECTIOUS SUBSTANCE label from the U.N. Recommendations.

Sections 172.438, 172.438, 172.440 and 172.442. The RADIOACTIVE WHITE-I, YELLOW-II and YELLOW-III labels and the CORROSIVE label (§§ 172.436, 172.438, 172.440 and 172.442, respectively) would be changed only to show hazard class numbers in the lower corners.

Section 172.444. The ETIOLOGIC AGENT label in § 172.444 would not be changed, but paragraphs (b) and (c) of this section would be removed to delete obsolete provisions.

Section 172.448. The CARGO AIRCRAFT ONLY label (§ 172.448) would not be changed. Paragraphs (b) and (c) would be removed.

7. Subpart F; Placarding

The changes proposed to placarding requirements are similar to those proposed for labeling. Editorial and format changes would be made throughout the subpart for clarity and ease of use. Placard graphics would be revised to display hazard class or division numbers on placards. Use of text (e.g., "POISON GAS", "FLAMMABLE") on placards for classes 2, 3, 4, 5, 6 and 8 would be optional. Minor changes would be made to accommodate placards conforming to the U.N. Recommendations without rendering obsolete many placards which conform to existing HMR requirements.

For those existing placards which would be rendered obsolete, a "grandfather" clause would provide for their continued use until December 31, 1992.

U.N. placards, other than RADIOACTIVE, are essentially labels enlarged from 100 millimeters to 250 millimeters on edge. Symbols generally take up the upper half of the placard, with the lower half reserved for class or division numbers, hazard warning text and four-digit identification numbers. Placards in existing Subpart F of Part 172 measure 10 and $\frac{3}{4}$ inches (273 millimeters) on edge and have symbols in the upper third of the placard, with the middle third reserved for hazard warning text or four-digit, 3 and $\frac{1}{2}$ -inch (89 mm) high, identification numbers and the bottom third either left blank or used to display a 1 and $\frac{3}{4}$ -inch (44.45 mm) high hazard class number. In this notice, it is proposed to use existing size and graphics on placards, to accommodate 3 and $\frac{1}{2}$ -inch identification numbers. Use of graphics on placards sized in accordance with the U.N. Recommendations would necessitate a reduction in the size of identification numbers to approximately a 2-inch (50.8 mm) height, with potential for rendering the identification numbers more difficult to read in emergency situations.

Specific changes are discussed in the following paragraphs.

Section 172.500. Section 172.500 would be revised to delete references to etiologic agents and to ORM-A, B and C materials and to clarify that placarding provisions do not apply to combustible liquids in non-bulk packagings, to Class 9 materials or to materials packaged under the "small quantity" provisions of § 173.4.

Section 172.502. Section 172.502 would be revised for clarity. A new paragraph (e) would clarify that placarding is permitted, even when not required, if the placards are appropriate for the materials being transported.

Sections 172.504 through 172.516. Section 172.504 would be revised editorially for ease of use and substantively to present new placarding tables based on the numerical hazard classes proposed in this notice. Section 172.505 would be revised editorially. Sections 172.506 and 172.507 would not be changed. Minor editorial changes would be made to §§ 172.508, 172.510 and 172.512. The provisions of § 172.514 would be made applicable to all bulk packagings, other than tank cars, and would be revised editorially. The introductory text of paragraph (c) of § 172.516 would be revised editorially, and subparagraph (c)(7) would be added to require that a placard either be

affixed to a background of contrasting color or have an outer border which contrasts with the background color.

Section 172.519. It is proposed to change the format in § 172.519 for ease of use. Instead of specifying the exact sizes for graphic symbols, as is done in Appendix B to Part 172, it is proposed that symbols be "as shown" in §§ 172.521 through 172.558, as is done in Subpart E with respect to labels. Also, rather than specifying 17 different heights for letters as is done at present, minimum heights of 45.0 mm (1.77 inches) for printing (with certain exceptions) and 41.0 mm (1.62 inches) for hazard class numbers would be specified. Hazard warning text on placards for Classes 2, 3, 4, 5, 6 and 8 would be made optional. The hazard class or division number would be required on a placard representing the primary hazard of a material and prohibited on subsidiary placards to aid in identifying the primary hazard of materials with multiple hazards. Except on the CORROSIVE and RADIOACTIVE placards, the placard color would be permitted to extend to the outer edge rather than only to the inner border, as an optional means of conforming to placard color specifications in the U.N. Recommendations. A "grandfather" provision would be added to § 172.519 to permit use until December 31, 1992, of existing placards (e.g., the OXYGEN placard) which may be rendered obsolete. Exceptions to the placard specifications would be provided for placards conforming to the U.N. Recommendations or the Canadian Transport of Dangerous Goods Recommendations to accommodate any minor differences in the placarding systems.

Sections 172.522 through 172.558. In §§ 172.522 through 172.558 the specifications for placards would be revised to reflect the proposed placarding provisions. Placards deleted would include EXPLOSIVES A (§ 172.522), EXPLOSIVES B (§ 172.523), BLASTING AGENTS (§ 172.524), OXYGEN (§ 172.530), CHLORINE (§ 172.536) and FLAMMABLE SOLID W (§ 172.548). Placards added would include EXPLOSIVES 1.1, 1.2 and 1.3 (§ 172.522), EXPLOSIVES 1.4 (§ 172.523), EXPLOSIVES 1.5 (§ 172.524), SPONTANEOUSLY COMBUSTIBLE (§ 172.547), DANGEROUS WHEN WET (§ 172.548) and KEEP AWAY FROM FOOD (§ 172.553).

Hazard class numbers (or in the case of Division 5.1 and 5.2, division numbers) would appear on all except the DANGEROUS placard in numbers proportionately sized to a height of 1

and $\frac{3}{4}$ inches on full-sized placards. For other than the CORROSIVE and RADIOACTIVE placards, placard colors would be depicted as running to the outer edges in conformance with the U.N. Recommendations. The DANGEROUS (§ 172.521) and RESIDUE (§ 172.525) placards and the square white background in § 172.527 would not be changed.

Specific changes are discussed in the following paragraphs.

Section 172.500. Section 172.500 would be revised to delete references to etiologic agents and to ORM-A, B and C materials and to clarify that placarding provisions do not apply to combustible liquids in non-bulk packagings, to Class 9 materials or to materials packaged under the "small quantity" provisions of § 173.4.

Section 172.502. Section 172.502 would be revised for clarity. A new paragraph (e) would clarify that placarding is permitted, even when not required, if the placards are appropriate for the materials being transported.

Sections 172.504 through 172.516. Section 172.504 would be revised editorially for ease of use and substantively to present new placarding tables based on the numerical hazard classes proposed in this notice. Section 172.505 would be revised editorially. Sections 172.506 and 172.507 would not be changed. Minor editorial changes would be made to §§ 172.508, 172.510 and 172.512. The provisions of § 172.514 would be made applicable to all bulk packagings, other than tank cars, and would be revised editorially. The introductory text of paragraph (c) of § 172.516 would be revised editorially and subparagraph (c)(7) would be added to require that a placard either be affixed to a background of contrasting color or have an outer border which contrasts with the background color.

Section 172.519. It is proposed to change the format in § 172.519 for ease of use. Instead of specifying the exact sizes for graphic symbols, as is done in Appendix B to Part 172, it is proposed that symbols be "as shown" in §§ 172.521 through 172.558, as is done in Subpart E with respect to labels. Also, rather than specifying 17 different heights for letters as is done at present, minimum heights of 45.0 mm (1.77 inches) for printing (with certain exceptions) and 41.0 mm (1.62 inches) for hazard class numbers would be specified. Hazard warning text on placards for Classes 2, 3, 4, 5, 6 and 8 would be made optional. The hazard class or division number would be required on a placard representing the primary hazard of a material and

prohibited on subsidiary placards to aid in identifying the primary hazard of materials with multiple hazards. Except on the CORROSIVE and RADIOACTIVE placards, the placard color would be permitted to extend to the outer edge rather than only to the inner border, as an optional means of conforming to placard color specifications in the U.N.

Recommendations. A "grandfather" provision would be added to § 172.519 to permit use until December 31, 1992, of existing placards (e.g., the OXYGEN placard) which may be rendered obsolete. Exceptions to the placard specifications would be provided for placards conforming to the U.N. Recommendations or the Canadian Transport of Dangerous Goods. Recommendations to accommodate any minor differences in the placarding systems.

Sections 172.522 through 172.558. In §§ 172.522 through 172.558 the specifications for placards would be revised to reflect the proposed placarding provisions. Placards deleted would include EXPLOSIVES A (§ 172.522), EXPLOSIVES B (§ 172.523), BLASTING AGENTS (§ 172.524), OXYGEN (§ 172.530), CHLORINE (§ 172.536) and FLAMMABLE SOLID W (§ 172.548). Placards added would include EXPLOSIVES 1.1, 1.2 and 1.3 (§ 172.522), EXPLOSIVES 1.4 (§ 172.523), EXPLOSIVES 1.5 (§ 172.524), SPONTANEOUSLY COMBUSTIBLE (§ 172.547), DANGEROUS WHEN WET (§ 172.548) and KEEP AWAY FROM FOOD (§ 172.553).

Hazard class numbers (or in the case of Division 5.1 and 5.2, division numbers) would appear on all except the DANGEROUS placard in numbers proportionately sized to a height of 1 and ¾ inches on full-sized placards. For other than the CORROSIVE and RADIOACTIVE placards, placard colors would be depicted as running to the outer edges in conformance with the U.N. Recommendations. The DANGEROUS (§ 172.521) and RESIDUE (§ 172.525) placards and the square white background in § 172.527 would not be changed.

8. Appendices to Part 172.

Appendix A to Part 172, containing color tolerance charts and tables, would not be changed. Appendix B, containing dimensional specifications for placard designs, would be removed. Appendix C, containing recommended dimensions for placard holders, would not be changed.

C. Part 173; Shippers, General Requirements for Shipments and Packagings

1. Subpart A of Part 173, General

Section 173.1. In § 173.1, a paragraph would be added to indicate that, although the provisions in Subchapter C of 49 CFR generally are based on the U.N. Recommendations and are consistent with the regulations of ICAO and IMO, they are not identical in all respects and compliance with the HMR will not guarantee compliance with international regulations.

Section 173.2. Section 173.2 would be revised to list the various hazard classes, by class or division number and name, and to provide an index to the hazard class definitions which appear throughout Part 173.

Section 173.2a. Proposed § 173.2a would replace existing § 173.2 and provide requirements for classification of hazardous materials with multiple hazards. A precedence of hazard table, which is based on the U.N. Recommendations, would be used to classify those materials posing multiple hazards involving Classes 3, 4.1, 4.2, 4.3, 5.1, 6.1, and 8. For other hazards, a precedence of hazard ranking, similar to that in existing § 173.2, would be used to determine the appropriate hazard class. Under these proposed criteria, materials which are toxic by inhalation receive emphasis, in keeping with concerns expressed during the rulemaking process under Docket HM-196.

Section 173.3. Changes proposed to § 173.3 include an editorial revision of paragraph (a) and (b). Also, in paragraph (c) provisions for use of salvage drums are revised to permit use of plastic drums and to require that salvage drums conform to U.N. standards 1A2, 1B2, 1N2 or 1H2.

Section 173.3a. This section would be revised to address new packaging provisions for liquids which are toxic by inhalation.

Sections 173.4 and 173.5. These sections would be revised to conform to U.N. terminology (e.g., "Class 3" instead of "flammable liquid") and to include measurements in both U.S. standard and international units. In § 173.4, quantity limits for Division 6.1 (poisonous liquids), Packing Groups II and III, would be set at 30 milliliters for liquids and 30 grams for solids; and for Packing Group I poisons, 1 gram for both liquids or solids.

Section 173.6 through 173.11. Section 173.6 would be removed and requirements applicable to air shipments would be consolidated in proposed § 173.27. Sections 173.7, 173.9

and 173.10 would be revised editorially. No changes are proposed to § 173.11.

Section 173.12. This section would be revised to consolidate provisions applicable to the packaging of hazardous wastes. Provisions in existing § 171.3 applying to use of open head drums and in § 173.28 applying to reuse of packagings for waste materials would be relocated to § 173.12 and the section would be revised editorially.

2. Subpart B; Preparation of Hazardous Materials for Transportation

Section 173.21. Section 173.21 would be rewritten to improve its clarity. The categories of materials which are forbidden would be expanded to include electrical devices which are likely to create sparks or generate a dangerous quantity of heat, unless the devices are packaged in a manner which precludes such an occurrence. Also forbidden would be the packing of any incompatible material (hazardous or non-hazardous) in the same packaging, freight container, or overpack if the mixing of these materials would be likely to cause a dangerous evolution of heat, flammable or poisonous gases or vapors, or to produce corrosive materials. This is similar to an existing provision in § 173.21(a) which addresses the mixing of two hazardous materials.

Sections 173.22 and 173.22a. No changes are proposed to §§ 173.22 and 173.22a.

Section 173.23. The provision for continued use of packagings marked "ICC" would be relocated from § 171.14 to proposed § 173.23(a). Obsolete provisions in existing § 173.23(a) concerning DOT-34 drums would be removed.

Section 173.24. The standard requirements for all packages which appear in existing § 173.24 would be substantively revised and expanded into three sections. Proposed § 173.24 would address general requirements applicable to all packages. Proposed § 173.24a would address general requirements unique to non-bulk packages and proposed § 173.24b would address those requirements unique to bulk packages. A statement of applicability would be added to § 173.24 to make it clear that the section applies to all packagings used for hazardous materials: specification and non-specification, bulk and non-bulk, and new and reused packagings. General marking requirements for specification packages would be relocated from existing § 173.24 to § 178.0-3. Some requirements applying to workmanship and construction materials would be removed; others would be relocated to

the individual specifications in Part 178. Language in proposed § 173.24 would address what constitutes an "authorized packaging". Compatibility requirements would be restated for clarity, and general provisions applicable to the use of vents on packagings are proposed. A requirement would be included that liquids must not completely fill a receptacle at a temperature of 55 °C. (131 °F.) or less.

Section 173.24a. Proposed § 173.24a contains additional general requirements applicable to non-bulk packagings. Requirements applying to closures, securing and cushioning, use of nails, etc. are essentially a restatement of existing provisions and appear in paragraph (a). Also contained in this paragraph is a requirement that each non-bulk package must be capable of withstanding a vibration test. The absence of a vibration standard was a criticism of the U.N. system that was mentioned in numerous comments to the ANPRM. The test would appear in Appendix C to Part 173. Non-bulk filling limits, based on the U.N. Recommendations, are proposed. Also, requirements applicable to packing different hazardous materials in the same outer packaging are proposed.

Section 173.24b. In proposed § 173.24b, filling limits are standardized for all bulk packagings. A requirement has been added that non-reclosing pressure relief devices not be used for materials that are flammable or poisonous, or both. Several of the special provisions for packaging materials which are toxic by inhalation require stainless steel cargo tanks and portable tanks to be used, but also permit the use of other steels if they are of an "equivalent thickness", as determined from the formula presented in § 173.24b. See the preamble to Subpart F of Part 173 for additional discussion concerning filling limits and equivalent steels.

Section 173.25. In § 173.25, the provisions for overpacks would be revised to require the use of orientation arrows in place of the "This side up" or "This end up" marking, consistent with proposed § 172.312. Also, it is proposed to prohibit the overpacking of Packing Group I corrosives and oxidizers with other materials and to delete existing prohibitions against overpacking nitric acid, perchloric acid, and similar materials.

Section 173.26. Proposed § 173.26 would address quantity limitations on packagings. Existing provisions for metric conversions would be eliminated.

Section 173.27. Proposed § 173.27 would contain standard packaging requirements for transportation by

aircraft. Pressure requirements and requirements for use of absorbent materials for packagings used for liquids, based on the ICAO Technical Instructions, are proposed. It is proposed that Packing Group III materials conform to Packing Group II performance requirements for transportation by aircraft. For combination packagings, quantity limitations for inner packagings would appear in two tables, one for passenger aircraft and the other for cargo aircraft only, primarily based on the ICAO Technical Instructions and on the maximum quantity per package authorized in the § 172.101 Table.

Section 173.28. Many of the present DOT specification packagings are marked "NRC" (non-reuseable container) or "STC" (single trip container) and may only be used one time for hazardous materials service. Existing § 173.28 contains the restrictions on reuse of packagings. It is proposed to remove many of these restrictions and generally align requirements with the U.N. Recommendations. Proposed § 173.28 allows the reuse of packagings for hazardous materials service if the packaging is free from corrosion or other damage, is leakproofness tested, and, in the case of a metal or plastic drum or jerrican, the packaging meets certain thickness requirements. Packagings made of paper, textiles, fiberboard and plastic film would not be authorized for reuse for hazardous materials. This proposal differs from existing provisions in that all packagings used for liquids would have to be leak tested. Only DOT-17 series drums are retested, or "reconditioned", at present. In addition, proposed § 173.28 defines the terms "reconditioning" and "remanufacture." Reconditioning is defined because even though the U.N. Recommendations do not specify reconditioning before reuse, they do acknowledge the practice and provide special markings for reconditioned packagings which would be adopted in this rulemaking. Remanufacturers would be made subject to the HMR to the same extent as manufacturers of new packagings.

Section 173.29. This section would be revised editorially for clarity.

Section 173.30. This section would not be changed.

Section 173.31. Paragraph (a) of this section would be revised to remove effective dates which have already passed, to relocate certain requirements currently in Part 179, and to enhance requirements applicable to the filling of tank cars and use of pressure relief devices. It would be prohibited to load a material into a tank car if the

temperature of the material exceeded the tank's design temperature range. Provisions would be added to relate tank pressure ratings and the associated opening pressures of pressure relief devices to lading pressure at the maximum lading temperatures likely to be reached under normal transportation conditions. (See the preamble to Subpart F of Part 173 for additional discussion concerning proposals related to bulk packagings.) Use of air pressure for the loading or unloading of flammable materials would be restricted as would the use of non-reclosing pressure relief devices on tank car tanks used for Class 3, 4, or 6.1 liquids.

Section 173.32. Equivalency provisions would be added to permit the use of DOT 51 portable tanks where DOT 56, 57, or 60 tanks are authorized, and use of DOT 60 portable tanks where DOT 56 or 57 tanks are authorized. As for tank cars, restrictions would be imposed on lading density and temperature with respect to the lading density and temperature of the tank, on the use of air pressure for loading or unloading flammable materials and on the use of non-reclosing pressure relief devices on tanks used for Class 3, 4, or 6.1 liquids. Tank minimum design pressure requirements, based on lading pressures, would be prescribed. For DOT 60 and marine portable tanks used for multiple hazard liquids, a minimum tank design pressure of 25 p.s.i. is proposed.

Section 173.32c. This section would be editorially revised to implement inclusion of the IM Tank Table in § 172.102.

Section 173.32d. This section would no longer be needed and would be removed.

Section 173.33. Consistent with proposals made under Docket HM-183, it is proposed to amend the general use provisions for cargo tanks to address lading density and temperature, tank design pressure based on lading pressures, use of non-reclosing pressure relief devices and use of air pressure for loading or unloading. Equivalency provisions would be added to permit an MC 331 to be used where an MC 306, 307 or 312 cargo tank is authorized and to permit use of an MC 307 or 312 where an MC 306 is authorized. Also, a minimum design pressure of 25 p.s.i. (172.4 kPa) would be required for MC 307 and 312 cargo tanks used for multiple hazard liquids.

Section 173.40. This section would be added to implement general packagings requirements for use of cylinders for materials which are toxic by inhalation. The requirements are similar to those

applicable to Poison A liquids and gases in present § 173.327.

3. Subpart C; Explosives and Blasting Agents

Subpart C, containing the hazard class definitions and packaging requirements for explosives (i.e., Classes A, B and C explosives and blasting agents), has not been revised in this proposal. Proposals, to align DOT's requirements applicable to explosives with those in the U.N. Recommendations, will be published in a separate rulemaking action at a future date.

4. Subpart D; Hazard Class Definitions

In the present regulations a single hazard class or, in some instances, several classes of similar materials are placed in a single subpart of Part 173, from Subpart D (flammable, combustible and pyrophoric liquids) to Subpart O (ORM-E). Each subpart contains the hazard class definitions, general requirements applicable to specific classes of materials, exceptions, and packaging requirements for both "n.o.s" materials and specifically named materials or articles within the class or classes. In this proposal, this information is organized quite differently. Subpart D would contain definitions, packing group assignments and exceptions for all of the hazard classes, excluding explosives and radioactive materials. For the most part, hazard class definitions are based on the U.N. Recommendations. Subpart E would contain non-bulk packaging sections and Subpart F would contain bulk packaging sections for materials other than Classes 1 and 7.

Section 173.115. Danger from gases can arise from a number of characteristics, which in turn depend on the physical or chemical nature of the gas. One danger is flammability and is possessed by those gases which burn, such as methane, propane, hydrogen, etc. A second danger arises from the energy possessed by the gas in a compressed state. This danger depends on the gas being compressed and the gas under pressure may be in the liquid or gaseous form. Compressed air and dichlorodifluoromethane (Refrigerant 12) are examples of gases presenting only this danger. A third danger is that of toxicity and is possessed by poisonous gases. Phosgene is an example of a gas with this characteristic. A particular gas may exhibit more than one of these dangers. A fourth danger is support of combustion by a gas which is not of itself flammable. Oxygen is an example of a gas with this hazard. Compressed carbon monoxide would be an example of a gas which is flammable, toxic and,

depending on its pressure level, dangerous by compression as well.

The hazard class definitions for Class 2 (gases) in this proposal are not identical to the definitions contained in the U.N. Recommendations for that class. The U.N. classing procedures for gases (Class 2) do not distinguish between the three aforementioned sources of danger and, for that reason, RSPA considers the U.N. Recommendations to be deficient for this hazard class. It is proposed to divide Class 2 into three divisions as follows: Division 2.1 is for flammable gases, Division 2.2 is for compressed gases (non-flammable, non-toxic) and Division 2.3 is for toxic (poisonous) gases. While this is a departure from the U.N. Recommendations, it is consistent with the IMDG Code of IMO which subdivides Class 2 into these same divisions for storage and segregation purposes (see 5.1.2 of the IMDG Code). In addition, Division 2.3 is assigned packing groups. Divisions 2.1 and 2.2 are not.

Division 2.1 (flammable gases) is defined in terms of the material being: (1) a gas under ambient conditions (i.e., 14.7 psia (101.4 kPa) and 68 °F (20 °C)), and (2) flammable. There are no pressure requirements. The flammability criteria, having to do with flammability limits, come from the existing regulations (§ 173.300(b)(1)), but the Bureau of Explosives Flame Projection test, a feature of the present HMR (§ 173.300(b)(2)), would be deleted.

Division 2.2 (non-flammable, compressed gas) is defined strictly in terms of the pressure that it exerts on the container. The pressure levels (40 psia (275.8 kPa) at 70 °F (21.1 °C) or 104 psia (717.1 kPa) at 130 °F (54.4 °C)) are the same as those in the existing regulations at § 173.300(a). The definition applies to both liquefied and non-liquefied compressed gases.

Division 2.3 (poisonous or toxic gas) is defined in terms of these materials being gases at ambient conditions (as in the case of Division 2.1) and by their toxicity. Toxicity is based either on known human experience, or on laboratory tests on unspecified animals. There are no pressure requirements for Division 2.3.

In addition to defining the hazard classes and divisions for gases, proposed § 173.115 defines certain other terms used in the classing of gases. These definitions of terms are similar to those presently found in the regulations at § 173.300 (c) through (j).

Section 173.116. Division 2.3 materials would be placed into packing groups for purposes of this proposal. Packing

Group I (for the most dangerous materials) would be further subdivided into zones A and B with A being for the most lethal gases. So for Division 2.3, there would be four Packing Group levels: I zone A, I zone B, II, and III. The proposed levels are: Packing Group I zone A: LC50 less than or equal to 200 ppm; Packing Group I zone B: LC50 greater than 200 ppm and less than or equal to 1000 ppm; Packing Group II: LC50 greater than 1000 ppm and less than or equal to 3000 ppm; and Packing Group III: LC50 greater than 3000 ppm and less than or equal to 5000 ppm.

While there are no packing groups (or even divisions) for gases (Class 2) in the U.N. Recommendations, the levels of toxicity for Packing Groups I, II, and III for Division 2.3 in this proposal do have their origins in the U.N. system. Division 6.1 materials (poisonous materials, other than gases) are assigned packing groups based on their level of toxicity. For liquids this toxicity may be by the path of inhalation, and the criteria are the level of toxicity, given by the LC50, and the degree of volatility of the liquid. These criteria are presented in a graph found at Section 6.5 of Chapter 6 of the U.N. Recommendations, entitled "Inhalation Toxicity: Packing Group Borderlines". The volatility level in this graph is given in milliliters per cubic meter (mL/m³) or ppm for the liquids. The right hand boundary of this graph is at the volatility value of 1,000,000 mL/m³. This is in fact the boundary where liquids end and gases begin (i.e., the material is all in the gaseous state). The LC50 values in mL/m³ for the packing group thresholds or border lines at this point (the right hand boundary of the graph) are the same as those for Division 2.3 in this proposal: Packing Group I, LC50 less than or equal to 1000 ppm; Packing Group II, LC50 greater than 1000 ppm and less than or equal to 3000 ppm; and Packing Group III, LC50 greater than 3000 ppm and less than or equal to 5000 ppm. In other words, the packing group criteria for Division 2.3 materials in this proposal are an extension of the criteria for inhalation toxicity for highly volatile liquids in Division 6.1 in the U.N. Recommendations. It is logical to treat toxic gases in the same fashion as toxic, volatile liquids, and that is what this notice proposes to do.

Section 173.120. Section 173.120 contains the proposed definitions for Class 3—flammable and combustible liquids. In the present regulations, flammable, combustible, and pyrophoric liquids are defined and regulated in Subpart D of Part 173 beginning at § 173.115. Flammable liquids are defined

as liquids with a flash point below 100 °F (38 °C), combustible liquids as liquids with a flash point at or above 100 °F to 200 °F (93.3 °C), and pyrophoric liquids as those which ignite spontaneously below 130 °F (54.4 °C). In the U.N. system pyrophoric liquids have their own division (4.2) within Class 4 along with other materials which are subject to spontaneous combustion; and flammable liquids (Class 3) are liquids with a flash point of 141 °F (60.5 °C) and below. Combustible liquids (with flash points between 141 °F (60.5 °C) and 200 °F) are not regulated.

In this proposal, pyrophoric liquids are moved to Division 4.2. Flammable liquids are defined as those with a flash point of 141 °F or lower, the same as in the U.N. Recommendations. However, RSPA proposes to continue to regulate materials with flash points between 141 °F and 200 °F as combustible liquids. A domestic shipper of a material with a flash point of 100 °F to 141 °F would have the choice of either shipping the material as a flammable liquid (as would have to be done if it were an international shipment) or could continue to classify the material as a combustible liquid and ship it with the present level of regulation applying to combustible liquids (e.g., no regulation in packagings of 110 gallons or less and, except for carriage by aircraft and vessel, shipping paper, package marking and placarding only for packagings greater than 110 gallons). For liquid material with flash points between 141 °F and 200 °F, a domestic shipper would have to ship his material as a combustible liquid, subject to the same level of regulation which presently exists for combustible liquids.

In addition, RSPA is proposing to regulate materials with flash points at or above 200 °F as combustible liquids when those materials are transported as liquids at or above their flash points. This proposal would apply to such things as asphalt which might even be solid during ambient conditions (especially in winter), but which may be transported heated. When heat is added to melt the material it may be sufficient to raise its temperature to or above the flash point. When the materials are above their flash points, they are easily ignited, and RSPA feels that at least hazard communication warnings should be carried on the transport vehicle to warn emergency responders and others at the scene of an accident of the potential danger of the lading in the tank.

Section 173.120 of the proposal also contains the definition of "flash point" presently found at § 173.115(d).

Section 173.121. Materials in Class 3 are assigned packing groups in the U.N. system based on their volatility and ignitability. Flash points and boiling points are used as the measures of these properties in assigning those packing groups. Proposed § 173.121 assigns packing groups to Class 3 materials using the criteria found in the U.N. Recommendations. Special procedures for classing and assigning packing groups to viscous liquids are also found in the U.N. Recommendations. These procedures are included in this proposal at § 173.121.

Section 173.124. In the U.N. system, Class 4 is made up of three types of materials which are placed in different divisions under that class. Division 4.1 consists of flammable solids, Division 4.2 consists of spontaneously combustible materials, including pyrophoric liquids, and Division 4.3 consists of dangerous when wet materials. In this proposal, § 173.124 contains the definitions for these materials.

In the present regulations, the flammable solid hazard class includes spontaneously combustible materials (except pyrophoric liquids which are found in Subpart D along with flammable and combustible liquids) and water-reactive materials. The definition of flammable solid is a very subjective one and contains no tests or other specific standard by which a material may be measured. The three definitions in the U.N. system for Divisions 4.1, 4.2, and 4.3 are very much the same, i.e., quite subjective.

The definitions in this proposal for Class 4 materials are a combination of the descriptions from both the U.N. Recommendations and the present HMR. Materials are generally placed in one of the three divisions in Class 4 based on experience.

In December of 1986 the U.N. Committee of Experts on the Transport of Dangerous Goods adopted tests and criteria for assignment of hazardous materials to the three divisions of Class 4. These tests and criteria have not been included in this proposal due to lack of time. However, comments are requested concerning the new U.N. criteria and their suitability for inclusion in the HMR as part of this rulemaking project. Copies of the text adopted by the committee may be obtained on request from RSPA.

Section 173.125. Class 4 materials of all three divisions are assigned packing groups. This is addressed in § 173.125 of this proposal. As in the case of the division definitions, the criteria for packing group assignment are not tests.

In fact the U.N. system does not contain any criteria for packing group assignment of Class 4 materials. Packing groups are assigned to Divisions 4.1, 4.2, and 4.3 by experience, and one must consult the § 172.101 Table to obtain the packing group of a given Class 4 material. Prior to December 1986, this proposal follows the U.N. system.

Section 173.128. Section 173.128 of this proposal contains the definitions for Divisions 5.1 (oxidizers) and 5.2 (Organic peroxide) within Class 5. Like the Class 4 definition, the definition for oxidizer (Division 5.1) in both the HMR and the U.N. Recommendations is quite subjective and contains no tests or other scientific criteria. The definition in this proposal uses the language from the HMR as it seems to be more understandable (giving examples) and clearer than that in the U.N. Recommendations, but is consistent with the U.N. definition.

The definitions for Division 5.2 (organic peroxides) in both the HMR and the U.N. are more specific than those for Division 5.1 or Class 4. The definitions in the U.N. and the HMR are consistent with each other, but are not identical. For purposes of this proposal, the language from the HMR is proposed as being clearer than that of the U.N.

Section 173.129. Both Division 5.1 and Division 5.2 materials are assigned packing groups. As in the case of Class 4, this is not done based on criteria (none are given in the U.N. Recommendations), but on experience. The packing groups for Divisions 5.1 and 5.2 materials are found in column 5 of the § 172.101 Table, and § 173.129 references the § 172.101 Table for packing group assignment.

Section 173.132. Class 6 contains two divisions: Division 6.1 for poisonous (toxic materials), and Division 6.2 for infectious substances (etiologic agents). Proposed § 173.132 defines Division 6.1 materials. The U.N. system for the regulation of poisonous materials is quite different from the HMR. The present HMR have three hazard classes for poisons: Poison A's, the most dangerous class, encompass gases and volatile liquids which are classed by experience and not specific criteria; Poison B's encompass liquids and solids and have definite classing criteria for toxicity by the paths of oral ingestion; dermal contact, and inhalation ingestion; Irritating materials are a class of liquids or solids which cause extreme irritation; especially in confined spaces. The DOT class definition for irritating materials does not contain specific criteria; and these materials are simply designated; based on experience. This

class would be eliminated and irritating materials would be classed as Division 6.1 materials.

In the U.N. system, Division 6.1 materials are poisonous materials, other than gases (toxic gases are in Class 2), and the degree of danger is expressed by the packing group assignment. For each of the three packing groups, there are specific criteria, based on animal tests, for each of the three paths of exposure (oral, dermal and inhalation). This proposal adopts the U.N. definitions and accepts the U.N. criteria for exposure by the three paths. Packing groups are assigned in § 173.133, but the threshold criteria from Packing Group III are used in the Division 6.1 definition at § 173.132. In addition to the threshold levels given in the division definition, § 173.132 describes the animal tests which are used to discover the threshold toxicity levels of materials when their toxicity is not known.

Section 173.133. Section 173.133 of this proposal assigns packing groups to Division 6.1 materials based on specific toxicity criteria. In the case of inhalation toxicity, the criteria are given in the form of a graph. The graph is based on section 6.5(c) of Chapter 6 of the U.N. Recommendations. This graph was mentioned previously in the discussion of Division 2.3 toxic gases. The data presented in this graph can be extended beyond the boundary which exists between volatile liquids and gases, and this was done to obtain packing group criteria for toxic gases (see discussion on proposed § 173.115). The criteria in this graph are important because special packaging provisions are specified for liquids which fall into Packing Group I of Division 6.1 because of inhalation toxicity.

Section 173.134. This proposed section contains the definition of the second division of Class 6, Division 6.2, infectious substances. This division is the same as the etiologic agent hazard class in the present HMR. The term "infectious substance" probably conveys a more meaningful message to most people than "etiologic agent". The definitions of these terms in the present HMR and the U.N. Recommendations are similar, with the exception that the HMR mentions the fact that in the U.S. the Department of Health and Human Services has authority to designate materials and specify packagings and labeling requirements for these materials and has promulgated rules to do this in Title 42 of the CFR.

The definition for Division 6.2 in this proposal is similar to that in the present HMR and references the requirements of HHS and their rules at Title 42 of the Code of Federal Regulations.

Section 173.136. In the U.N. Recommendations, corrosive materials are placed in Class 8. There are no divisions in Class 8, but there are three packing groups. Class 8 is comparable to the corrosive material hazard class in the present regulations, with one exception. In the HMR, a corrosive material is one which causes destruction of human skin tissue or which has a severe corrosion rate on steel. A U.N. Class 8 material is one which destroys human skin tissue, or has a severe corrosion rate on steel or aluminum. In the HMR, a material which corrodes aluminum is usually an ORM-B (Other Regulated Materials, category B) material.

Thus, the U.N. Class 8 definition combines the corrosive material definition (see existing § 173.240) and the ORM-B definition (see existing § 173.500) from the HMR. Under this proposal, the ORM-B hazard class would be eliminated and the U.N. definition for corrosive material would be adopted.

The present HMR references a rabbit skin test in the definition of the corrosive material hazard class to demonstrate destructiveness to human skin, and a corrosion test on steel to demonstrate corrosivity to this metal. The Class 8 definition in this proposal contains both of these tests plus a corrosion test for aluminum similar to the steel test. It should be noted that the Class 8 definition in the U.N. Recommendations does not contain any of these tests, but the criteria for packing group assignment do reference the two metal corrosion tests.

Section 173.137. Section 173.137 of this proposal contains the packing group assignments for Class 8 materials. The Packing Group I criterion specifies an animal skin test where necrosis occurs within a period of three minutes or less.

The Packing Group II criterion is a skin test with necrosis appearing in more than three minutes but not more than 60 minutes.

Packing Group III criteria for Class 8 materials contain three elements: a skin test, as in the case of Packing Group I and II materials, but with necrosis appearing in not more than four hours; or a corrosion test on steel with a rate greater than a 6.25 mm (0.246 inches) per year at a temperature of 55 °C (131 °F); or, a corrosion test on aluminum with a rate greater than 6.25 mm per year at 55 °C (131 °F). Materials which are only corrosive to metals and not to skin are assigned to Packing Group III.

Section 173.140. In the U.N. system, Class 9 is reserved for miscellaneous hazardous materials—e.g., materials which experience has shown need to be

regulated but which do not fit any other hazard class definition. The hazard definition for Class 9 in this proposal includes the general wording of the U.N. Class 9 definition and, in addition, includes the definition for ORM-A's from the HMR. ORM-A's are defined in the HMR as materials with irritating or noxious effects that might cause hazardous situations in enclosed spaces, especially in aircraft. In this proposal, some ORM-A's would be regulated as Division 6.1, Packing Group III materials, but others would be regulated in Class 9. The ORM-A hazard class would disappear. Similarly, ORM-C materials, which do not meet a UN hazard class definition, would be regulated under Class 9 in this proposal. The ORM-C class would also disappear.

Section 173.144. Proposed § 173.144 defines the ORM-D and ORM-E hazard classes. These are the only ORM classes that would be retained from the present HMR. The ORM-D hazard class definition, which covers consumer commodities and small arms ammunition, would be essentially unchanged from the present HMR. Similarly, the ORM-E hazard class definition, which covers hazardous substances and hazardous wastes which do not satisfy any other hazard class definition, would be virtually unchanged from the existing HMR. These two hazard classes would be retained from the present system because the U.N. system either does not regulate them and DOT does (because of a statutory requirement or experience), or they may be regulated under the U.N. system but the level of regulation is inappropriate because of the form or quantity of the materials as shipped. In the case of ORM-E's, DOT is obligated to designate hazardous substances and hazardous wastes according to regulations issued by the Environmental Protection Agency pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).

RSPA notes that in its December 1986 meeting, the U.N. Committee of Experts on the Transport of Dangerous Goods adopted shipping descriptions for environmentally hazardous substances (specifically, "Environmentally hazardous substances, solid, n.o.s., Class 9, UN 3077" and "Environmentally hazardous substances, liquid, n.o.s., Class 9, UN 3082"). In light of this, comments are requested concerning elimination of the ORM-E hazard class, and inclusion of hazardous substances and hazardous wastes in Class 9.

Comments are also requested concerning the elimination of the ORM-D hazard class and inclusion of ORM-D materials (i.e., consumer commodities and small-arms ammunition) in Class 9.

Section 173.145. The packing groups for ORM material are found in Column 5 of the § 172.101 Table. Most are assigned to Packing Group III. Proposed § 173.145 references the § 172.101 Table for packing group assignment.

Sections 173.150 through 173.156 would contain exceptions from packaging requirements and other requirements of the regulations for Classes 3, 4.1, 5, 6.1, 8, 9, ORM-D and ORM-E. As is presently the case, exceptions are provided for a specific material only if the entry for that material in the § 172.101 Table (specifically, column 8a) contains a reference to one of the aforementioned sections for exceptions. In general, exceptions would not be provided for Packing Group I materials (excluding flammable liquids).

The proposed exceptions are based on existing provisions in the HMR, but are somewhat more restrictive. For example, for materials packaged under "limited quantity" provisions, there currently are no weight restrictions on outer packagings for many of the materials such as flammable liquids, corrosive materials and poisons. It is proposed to impose a per package limit of 30 kilograms (66.1 pounds) on most materials shipped under limited quantity provisions to minimize their aggregate risk. This parallels existing provisions for "consumer commodity" packages. Existing exceptions from rail and highway modal requirements would be removed to eliminate ambiguities concerning the applicability of incident reporting and training requirements to shipments of limited quantities transported by railroad car or motor vehicle.

Section 173.150. Proposed § 173.150 contains exceptions for flammable and combustible liquids (Class 3). Limited quantity provisions would be essentially unchanged except for the 30 kg package limitation previously mentioned. The limited quantity provision provides an exception from specification packaging requirements, labeling (except for transport by aircraft), placarding and the carrier requirements of Parts 174 and 177 (except those related to shipping papers.)

As in the HMR at present, a material which conforms to the limited quantity provisions and which meets the definition in § 171.8 for a consumer commodity, may be reclassified as an ORM-D material and renamed "Consumer commodity". The consumer

commodity provision provides an exception from shipping paper requirements and certain other minor exceptions in addition to the exceptions provided for limited quantities.

Existing exceptions for alcoholic beverages and aqueous solutions of alcohol would be retained as would existing exceptions for combustible liquids. A provision would be added whereby a flammable liquid with a flash point at or above 38 °C (100 °F) may be reclassified as a combustible liquid, except for transport by aircraft or vessel.

The existing exceptions in § 173.118(b) for high flash point (73 °F or 22.8 °C) flammable liquids would be eliminated and these materials would be subject to Packing Group III packaging requirements under this proposal.

Section 173.151. This section would provide limited quantity and consumer commodity exceptions for flammable solids (Division 4.1) in Packing Groups II and III. Outer packagings would be limited to 30 kg gross weight. Inner packagings would be limited to 1 kilogram (2.2 pounds) net capacity each for Packing Group II materials and 5 kg (11.02 pounds) for Packing Group III. The relief provided would be the same as for flammable liquids (i.e., packaging, labeling, placarding, etc.)

Section 173.152. This section would provide limited quantity and consumer commodity exceptions for oxidizers (Division 5.1) and organic peroxides (Division 5.2) in Packing Groups II and III. The exceptions are generally the same as those now provided in the HMR.

Section 173.153. This section would provide limited quantity and consumer commodity exceptions for poisonous materials (Division 6.1). Limited quantity provisions would be limited to Packing Group III materials and would not include a labeling exception. Consumer commodity provisions would be provided for limited quantities and for drugs and medicines, irrespective of packing group.

Section 173.154. This section would provide limited quantity and consumer commodity exceptions for corrosive materials in Packing Groups II and III. The exceptions are generally the same as those now provided in the HMR. An additional exception is provided whereby materials, classed as Class 8, Packing Group III, solely because they are corrosive to aluminum, would not be subject to the HMR when transported by motor vehicle or rail.

Section 173.155. This section would provide limited quantity and consumer commodity exceptions for miscellaneous hazardous materials (Class 9). These

materials are generally in Packing Group III. Exceptions from packaging requirements would be provided for outer packagings not exceeding 30 kg (66.1 pounds) gross weight and inner packagings with net capacities not over 4 liters (1.06 gallons) for liquids or 5.0 kilograms (11.02 pounds) for solids.

Section 173.156. This section would contain additional exceptions applicable to ORM-D materials when transported by a private or contract motor carrier from a distribution center to a retail outlet. These exceptions currently appear in § 173.505(b).

Since ORM-E materials would be subject to Packing Group III packaging requirements under this proposal, limited quantity provisions, identical to those for Class 9, are proposed for these materials.

5. Subpart E; Non-Bulk Packagings

A shift to the non-bulk packaging standards of the U.N. Recommendations is one of the original goals of Docket HM-181 and was the principal thrust of the ANPRM under this docket. The advantages of that system are discussed earlier in this proposal and are not repeated here, except to say that two principles from those arguments are used in the development of the non-bulk packaging authorizations. Those principles are: (1) materials of similar hazard are, in general, packaged in the same manner, and (2) any packaging which is suitable for a material because of the chemical and physical properties of the material is authorized for that material. In this notice, packagings are authorized even though they are not economical for use. Also, an attempt is made to avoid the practice of only authorizing those packagings which shippers have petitioned the Department to use. This happened extensively in the past as exemptions were converted into regulations. Exemption packagings often were suitable for other materials not covered by the exemption; but because those materials were not mentioned in the exemption, those packagings were not authorized for them when the exemption later was converted to a regulation.

In keeping with these principles, the majority of materials in the § 172.101 Table, when shipped in non-bulk packagings, are accommodated by eight packaging sections: three for liquids, three for solids, a general non-bulk section for materials not requiring DOT specification or U.N. standard packagings and a packaging section for high hazard liquids, which authorizes only DOT specification gas cylinders. The three proposed general sections for

liquids, include one each for Packing Groups I, II, and III, and the three proposed general sections for solids include one each for Packing Groups I, II, and III. Packing Group II materials (liquid or solid) could be packaged in accordance with either the Packing Group I or II sections, and Packing Group III materials could be packaged in either Packing Group I, II, or III Packagings. (Note that for air shipments Packing Group III materials would have to be placed in packagings that meet Packing Group II performance levels.)

Sections 173.201-203 and 173.211-213. The proposed packaging sections for liquids are §§ 173.201, 173.202, and 173.203 and are, respectively, for Packing Group I, II, and III materials. Similarly, the proposed packaging sections for solids are §§ 173.211, 173.212, and 173.213, respectively, for Packing Group I, II, and III materials. Each section offers a number of combination and single packagings that provide roughly equivalent levels of packaging and that, in general, could be used for packaging a material of the packing group referenced by the section. It should be noted that other restrictions might apply either through the special provisions in the § 172.101 Table or through the general packaging requirements of Subpart B of Part 173. Also, for transportation aboard passenger-carrying aircraft, single packagings would not be authorized for Packing Group I or II materials.

As pointed out, each of the six proposed general sections is targeted for a particular packing group and offers an array of packagings of an equivalent level of packaging integrity. (For example, § 173.201 authorizes packagings for liquid materials in Packing Group I.) The equivalency among the various packagings is established by the performance tests which all of these packagings must meet. Packagings other than specification cylinders authorized in § 173.201 would have to meet the performance tests proposed in Subpart M of Part 178 at the Packing Group I level. For materials with a specific gravity of 1.2 or less, this would consist of a drop test at 1.8 meters (5.91 feet), a stacking test, a leakproofness test, and a hydrostatic pressure test with the pressure determined by the vapor pressure of the material or a specified minimum. In addition, plastic packagings would have to pass a chemical compatibility test. Similarly, in §§ 173.202 and 173.203 equivalency would be established for the authorized array of liquid packagings at the Packing Group II and III levels, respectively, by

the performance tests at those levels. For example, the drop test height for Packing Group II is 1.2 meters (3.94 feet) and for Packing Group III is 0.8 meters (2.62 feet). The same principles would apply to solid materials in §§ 173.211, 173.212, and 173.213.

Not all possible packagings are offered in each section. Proposed §§ 173.201, 173.202, and 173.203 all would authorize the 1A1 drum, for example, as a single unit packaging, but the wooden barrel, 2C2 is authorized for §§ 173.202 and 173.203 only. Similarly, §§ 173.212 and 173.213 authorize both the fiberboard box, 4G, and the fiber drum, 1G, as single unit packagings for solid materials, but neither is authorized by § 173.211. Thus, the system does not rely solely on the performance tests to establish packaging equivalency.

The proposed non-bulk packaging authorizations assigned in Column 8b of the § 172.101 Table usually are to one of the general packaging sections (i.e., § 173.201, 173.202, 173.203, 173.211, 173.212, or 173.213), based on the physical characteristics of the hazardous material and the assigned packing group. These packaging authorizations are not based on the material's hazard class, except to the extent that the hazard class reflects the physical state. For example, Class 3 materials are liquids and are not authorized in those packaging sections (§§ 173.211, 173.212, and 173.213) reserved for solids.

Section 173.204. Proposed § 173.204 is for liquid or solid materials which would not require packaging in conformance to any of the proposed U.N. standards; that is, non-specification or non-standard packaging would be authorized. This provision would apply to certain low hazard materials for which even Packing Group III performance levels are not considered necessary. The packaging restrictions for these materials would be those in Subpart B of Part 173, primarily § 173.24. These restrictions would be similar to those that now apply to use of non-specification packagings, as for limited quantities.

Section 173.205. Proposed § 173.205 is a packaging section which would authorize liquids, such as pentaborane, requiring a high level of package integrity, to be packaged in DOT specification gas cylinders.

Not all hazardous materials are accommodated by use of the general non-bulk packaging sections mentioned above. Because of unique physical, chemical or lethality problems, some materials require special handling. This notice proposes to handle these problem materials in one of two ways: The

preferred system is to use one of the general non-bulk packaging sections and supplement it with special provisions found in Column 7 of the § 172.101 Table. The provisions beginning with the letter "N" apply to non-bulk packagings. For example, special provision "N5" states "Glass materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material." So a Packing Group I liquid that attacks glass (such as hydrofluoric acid solution) is handled by specifying § 173.201 (Packing Group I liquids), and modifying it by specifying special provision "N5" in Column 7 of the § 172.101 Table.

Sections 173.158 through 173.229. The second, and less preferred method of dealing with these "problem" hazardous materials is to write a unique packaging section for the particular material. This notice proposes to do that where the general packaging sections, even modified by special provisions, are not adequate to safely package the material. There are approximately 42 sections between § 173.158 and § 173.229 which would cover the non-bulk packaging authorizations for particular materials or classes of materials or devices. Proposed § 173.158, for example, specified the authorized non-bulk packagings for nitric acid. Because of its special corrosive and oxidizing qualities, nitric acid requires special packaging materials. Stainless steel drums are one of the packagings used for it, and different alloys of stainless steel or different heat treatments of the same alloy are required for different strengths of nitric acid. Proposed § 173.158 lists these different requirements.

Machines and devices containing hazardous materials and the packagings for them are covered by special packaging sections because they usually cannot be packaged in ordinary hazardous material packagings, such as drums and boxes. For example, proposed § 173.174, covers refrigerating machines.

Section 173.225. Another proposed special packaging section, § 173.225, covers the packaging requirements for all organic peroxides (Division 5.2) in the § 172.101 Table. This consists of a table in § 173.225 which gives the ID number, Packing Group, Packaging Method (an alphanumeric code), and whether or not temperature control is required. There are approximately 145 organic peroxides in this list. To use the table, the shipper looks up the ID number for the organic peroxide in which he is interested in the table in § 173.225 and notes the Packing Group,

Packaging Method and whether or not the material is temperature controlled ("TC" in the right hand column). A second table in proposed § 173.225 lists the approved packagings associated with the Packaging Method code. The performance level of the packaging is given by the packing group from the first table. A shipper who is interested in an organic peroxide requiring temperature control (e.g., one requiring refrigeration) is referred to a requirement in § 173.21 (Forbidden materials and packages) which requires that the method of refrigeration be approved by the Director, OHMT, since materials requiring refrigeration for stability pose a significant hazard. Control temperatures would be specified under the conditions of the approval rather than appearing in the HMR. The proposed list of organic peroxides, their packing groups, their authorized packagings, and whether or not they are temperature controlled, is based on Chapter 11 of the U.N. Recommendations.

Sections 173.226 and 173.227. Two proposed sections (§§ 173.226 and 173.227) cover the non-bulk authorized packagings for Division 6.1, Packing Group I, materials that are toxic by inhalation. Proposed § 173.226 covers materials that fall into zone A of the inhalation toxicity Packing Group Borderlines graph (see proposed § 173.133), and proposed § 173.227 would cover materials that fall into zone B of the graph.

Proposed § 173.226 authorizes three distinct types or configurations of high-integrity packagings: a drum-within-a-drum configuration; U.N. standard combination packagings with an "inner packing system"; and gas cylinders.

Proposed § 173.227 adds a fourth configuration: A single drum packaging. In the case of the drum-within-a-drum, both drums would have to be U.N. standard drums that meet Packing Group I performance tests. In addition, minimum thicknesses are specified for the inner and outer drums. The minimum thickness is specified because of the extreme toxicity of those materials. The single drum configuration authorized in proposed § 173.227 also has a minimum thickness requirement. In the case of the combination packagings, proposed § 173.226 would specify that each component (both the inner packaging system consisting of a combination packaging and the outer packaging) would have to withstand the Packing Group I performance tests without the benefit of the other packaging. In other words, each packaging must pass the performance tests alone. Both proposed sections would permit use of DOT specification cylinders in accordance with the provisions of proposed § 173.40.

6. Subpart F of Part 173; Bulk Packagings

The hazardous materials packaging sections in Part 173 of the HMR which authorize bulk packagings have evolved haphazardly throughout the years. Certain of these authorizations for particular materials provide a complete array of bulk packagings (tank cars, cargo tanks and portable tanks). In some sections, materials with similar transportation hazards are not authorized for similar bulk packagings due to oversight or because industry did not petition DOT to authorize them. In these cases safety is not the issue. Other sections, which reflect special permit or exemption experience, are very specific and only allow a limited array of bulk

packagings when other types are just as suitable. Some sections authorize bulk packagings which are inappropriate for certain high hazard materials.

Sections 173.240 through 173.245. These variations and other inconsistencies prompted RSPA to develop for this proposal a method whereby a particular hazardous material can be matched with a group of bulk packagings which provide roughly equivalent levels of packaging integrity (referred to as "equivalent packagings" in this proposal). The matching of material and packaging is based on physical and chemical properties, hazard classification, secondary hazard assignment, and packing group. In order to understand this methodology, it is important to realize what is meant by equivalent bulk packagings and how this concept provides a means of easily matching a hazardous material with a package designed to safely contain the material in transportation. RSPA proposes to arrange the currently authorized specification bulk packagings (including Association of American Railroads (AAR) tank cars and marine portable tanks (MPT)) into new regulatory sections. While acknowledging that there are inherent differences in the specifications for each packaging, RSPA takes the position that the packagings can nonetheless be grouped into categories that provide equivalent levels of packaging integrity. The new sections begin by authorizing all bulk packagings for relatively low hazard materials and progressively eliminating those which are not suitable for the categories of hazardous materials which pose greater hazards.

The following table is a list of equivalent packagings:

| Proposed sections | Tank cars | Cargo tanks | Portable tanks |
|-------------------|--|---|---|
| § 173.240 | DOT 103, 104, 105, 106, 107A, 109, 110, 111, 112, 113, 114, 115; AAR 203W, 206W, 207W, 211W; metal non-DOT spec. silt-proof tank cars and closed cars. | MC 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 330, 331, 338; non-DOT spec. silt-proof cargo tanks and closed motor vehicles. | DOT 51, 52, 53, 56, 57, 60; marine portable tanks (MPT); non-DOT spec. silt-proof portable tanks and closed bins. |
| § 173.241 | DOT 103, 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, 115; AAR 203W, 206W, 211W. | MC 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 330, 331, 338; metal non-DOT spec. cargo tanks suitable for transport of liquids. | DOT 51, 52, 53, 56, 57, 60; MPT; metal non-DOT spec. portable tanks suitable for transport of liquids. |
| § 173.242 | DOT 103, 104, 105, 106, 107A, 109, 110, 111, 112, 113, 114, 115; AAR 206W. | MC 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 330, 331, 338. | DOT 51, 52, 53, 56, 57, 60; MPT. |
| § 173.243 | DOT 103, 104, 105, 106, 107A, 109, 110, 111, 112, 113, 114, 115; (Gauging devices are required on DOT 103, 104, and 111.) | MC 310, 311 or 312 with design pressure (MAWP or MWP) of at least 25 psig; MC 304, 307, 330, 331, 338. | DOT 51, 60; MPT with design pressure (MAWP) of at least 25 psig. |
| § 173.244 | DOT 105, 106, 107A, 109, 110, 112, 113, 114 | MC 330, 331, 338 | DOT 51. |
| § 173.245 | DOT 105SS00W, 112SS00W (legged); 105J500W, 106, 110, 112J500W; (Bottom outlets prohibited). | By approval only | By approval only. |

While there are inherent differences in the individual specifications, RSPA believes that the level of integrity of packagings outlined above is equivalent, and that if a hazardous material can safely be carried in one type of cargo tank by highway, for instance, the

authorization should be extended to all cargo tanks of similar or greater packaging integrity. A result of this type of packaging authorization is a general increase in the number of available authorized bulk packagings for a given material. RSPA has purposely ignored

certain economic considerations in authorizing bulk packagings. For example, a shipper should be allowed to transport a flammable liquid with a subsidiary hazard in an MC 330 cargo tank rather than in an MC 307 cargo

tank even though this may not be economical.

Equivalent packagings are assigned to a hazardous material based on the material's hazard class, secondary hazard and packing group. These assignments reflect what is allowed in the regulations, as well as up-to-date toxicity, compatibility and other material-specific information. The following table represents the general method whereby hazardous materials are assigned bulk packaging sections:

| Category of hazardous material (class or division number, packing group) | Proposed sections |
|--|----------------------------|
| Organic peroxides (Division 5.2) | No bulk packaging allowed. |
| Other high hazard materials, specifically identified. | |
| Poison A-type materials (Classes 2 and 6) | § 173.245 |
| Pyrophoric liquids (Division 4.2, PGI and 4.3, PGI) | § 173.244 |
| Compressed gases (Class 2) | |
| Poison B liquids (Division 6.1, PGI (inhalation)) | |
| Flammable liquids (Class 3, PGI) | § 173.243 |
| Poison B liquids (Division 6.1, PGI and II, (oral) and (dermal)) | |
| Pyrophoric liquids (Division 4.2, PGI and III; 4.3, PGI and III) | |
| Liquids with dual hazards (Classes 3, 4.2 PGI and III, 6.1) | |
| Liquid oxidizers (Division 5.1, PGI) | § 173.242 |
| Flammable liquids (Class 3, PGI and III) | |
| Corrosive liquids (Class 8, PGI and II) | |
| Poison solids (Division 6.1, PGI and II) | |
| Flammable solids (Divisions 4.2, PGI and 4.3, PGI) | |
| Flammable solids and poisonous materials (Divisions 4.1 and 6.1) | |
| Poison B liquids (Division 6.1, PGI) | § 173.241 |
| Corrosive liquids (Class 8, PGI) | |
| Flammable solids (Divisions 4.2, PGI and III, and 4.3, PGI and III) | |
| Oxidizers, solids in solution (Division 5.1, PGI, II and III) | |
| Oxidizers, liquid (Division 5.1, PGI and III) | |
| Combustible liquids (Class 3) | |
| ORM liquids | |
| Corrosive solids (Class 8, PGI, II and III) | § 173.240 |
| Poison solids (Division 6.1, PGI) | |
| Oxidizers, solids (Division 5.1, PGI, II and III) | |
| Flammable solids (Division 4.1, PGI, II and III) | |
| ORM solids | |

The equivalent packaging sections detailed above "fit" most hazardous materials listed in the § 172.101 Table. The result is that there are very few special sections devoted to bulk packagings for specific hazardous materials remaining in the regulations. Virtually all hazardous material entries are accommodated by the bulk packaging authorized in § 173.240 through § 173.245. Additional material-specific tailoring of packaging authorizations is made through special bulk packaging notes ("B" notes) in Column 7 of the § 172.101 Table. These notes are used to modify a particular packaging authorization based on material-specific needs.

Examples of bulk notes are as follows:

"B6 Packagings shall be made of steel", "B16 The lading shall be completely covered with an inert gas", and "B2 MC 306 cargo tanks, DOT 57 portable tanks, and riveted tank cars are not authorized". Through the use of these notes, RSPA is able to eliminate numerous pages of repetitive regulatory text and standardize requirements.

Another type of note proposed in Column 7 of the § 172.101 Table is a "T" note. These notes apply to hazardous materials packaged in IM 101 and IM 102 portable tanks. The effect of the use of "T" notes is the elimination of the present IM Tank Table and associated interim authorizations issued by RSPA. If no "T" note appears, then use of IM portable tanks is not authorized for that material. If a "T" note is listed, it will prescribe a particular tank configuration, e.g., "IM 101, Test pressure—2.65 bars, bottom outlets prohibited, etc.". The proposed "T" notes and associated tank

configurations are extracted directly from the U.N. tank container table.

Deviations from the U.N. Recommendations for IM portable tanks occurs only for those hazardous materials which have been identified as being toxic by inhalation. These materials may not be transported in IM portable tanks. For consistency with the U.N., the pressure rating of the tank is noted in bars and is based on tank test pressure, not design pressure (MAWP). In the present IM Tank Table, the pressure referenced is the design pressure. The integrity of the tank is, nonetheless, the same since test pressure is equal to 150% of MAWP and this is taken into account in the "T" notes. Since test pressure is presently marked on IM tanks, this proposed change should present no problem.

In order to better understand the proposed bulk packaging authorizations outlined above, the following examples are provided:

| Proper shipping name | Hazard class | UN ID# | Pkg. | Labels | Special provisions | Bulk pkg. auth. |
|---------------------------|--------------|---------|------|-----------|--------------------|-----------------|
| Corrosive liquids, n.o.s. | 8 | UN 1760 | I | CORROSIVE | B4, T42 | 242 |
| | | | II | CORROSIVE | B2, T14 | 242 |
| | | | III | CORROSIVE | T7 | 240 |

This is a single-hazard material which, in bulk, may be transported in any packaging listed in proposed § 173.242 or § 178.240, as appropriate. However, "B4" prohibits riveted tank cars, AAR 208 tank cars, MC 306 cargo tanks and DOT 57 portable tanks for Packing Group II materials. For the less corrosive Packing Group II materials, "B2" prohibits MC 306 cargo tanks and DOT 57 portable tanks, and riveted tank cars only. For Packing Group III

materials, there are no "B" notes, and the entire packaging section, § 173.240, is authorized. Furthermore, since "T" notes are shown, IM portable tank carriage is allowed. "T42" permits use of IM portable tanks subject to approval by the Director, OHMT. Packing Groups II and III materials may be transported in IM tanks according to the exact tank configuration outlined in "T14" or "T7", as appropriate.

| Proper shipping name | Hazard class | UN ID# | Pkg. | Labels | Special provisions | Bulk pkg. auth. |
|--------------------------------------|--------------|---------|------|------------------------|--------------------|-----------------|
| Corrosive liquids, poisonous, n.o.s. | 8 | UN 2822 | I | CORROSIVE POISONOUS | | 243 |
| | | | II | CORROSIVE POISONOUS | | 243 |
| | | | III | CORROSIVE | | 240 |

This material is a dual hazard liquid. There are no bulk notes qualifying § 173.243, and each of the packagings listed may be used for Packing Groups I and II materials. Since no "T" notes are listed, IM portable tank movement

would not be allowed for the material at any packing group level. Packing Group III materials may be transported according to the less restrictive § 173.241.

| Proper shipping name | Hazard class | UN ID# | Pkg. | Labels | Special provisions | Bulk pkg. auth. |
|----------------------|--------------|--------------|----------|-------------------|--------------------|-----------------|
| Cyclohexanone. | 3 | UN 1915..... | III..... | FLAMMABLE LIQUID. | B1, T1..... | 242 |

This single-hazard material may have a flash point above 100°F. The "Special Provisions" entry appropriately shows "B1", a domestic exception for combustible liquids in bulk which allows them to be packaged under the less restrictive § 173.241, rather than

§ 173.242. In this situation the shipper must ascertain the flash point of the material and use either § 173.242 or § 173.241 (as provided for in "B1") accordingly. "T1" allows an IM 102 tank configuration.

| Proper shipping name | Hazard class | UN ID# | Pkg. | Labels | Special provisions | Bulk pkg. auth. |
|----------------------|--------------|--------------|--------|----------------------------|--------------------------|-----------------|
| Dimethylzinc..... | 4.2 | UN 1370..... | I..... | SPONTANEOUSLY COMBUSTIBLE. | B11, B16, T28, T29, T40. | 244 |

This spontaneously combustible material may be transported in accordance with § 173.244 with a mandatory nitrogen or other inert gas blanket ("B16" and "T29"). Special provision "B11" imposes pressure

requirements on tanks used for this material. Transportation is authorized in IM 101 portable tanks with "T28" configuration and 10mm shell and head thickness ("T40").

| Proper shipping name | Hazard class | UN ID# | Pkg. | Labels | Special provisions | Bulk pkg. auth. |
|----------------------|--------------|--------------|--------|---------------------------------------|--------------------|-----------------|
| Ethyl chloroformate. | 3 | UN 1182..... | I..... | FLAMMABLE LIQUID, POISON & CORROSIVE. | 10, B32..... | 244 |

This flammable and corrosive liquid demonstrates a third hazard—toxic by inhalation. Recommendations will be made to the UN to change the hazard class of this and other underclassified materials to Division 6.1. This material must be packaged in conformance with the "10" note, which provides for inhalation hazard marking, and the "B32" note, which puts further restrictions on the cargo tanks and portable tanks authorized in § 173.244. The absence of a "T" note indicates that no importable tanks may be used.

While the majority of "B" notes are general in nature, "B30" through "B34" provide packaging criteria for liquids (Docket HM-196) and gases that are toxic by inhalation. Other hazardous materials that are toxic by inhalation but not originally listed in Docket HM-196 have been identified. Although there is no attempt to reclassify these materials in this notice, the proposed table reflects a change in packing group. All identified liquid materials are assigned to Packing Group I of the hazard class they are assigned in the U.N. Recommendations.

As indicated, "B30" through "B34" incorporate bulk packaging requirements for liquid materials and

gases which demonstrate inhalation toxicity. The inhalation toxicity criteria for liquids are extracted from the U.N. Recommendations and parallel Division 6.1(i), Packing Groups I and II. In this notice, Packing Group I is further subdivided into Zones A and B to accommodate stricter packaging standards for the most toxic materials. See §§ 173.115, 173.116, 173.132, 173.133, 173.226 and 173.227 and the preamble of these sections for further discussions of classing, packing group assignments, and non-bulk packaging of Classes 2 and 6. Depending on the toxicity data for a particular liquid or gas, its new bulk packaging section is either § 173.245 or § 173.244 with appropriate "B" notes. More specifically, the following packaging criteria are proposed for these materials:

Liquids (Division 6.1(i))

(a) *Packing Group I, Zone B:* § 173.244 and notes "B14" and "B32" authorize DOT 105J300W, 112J340W and 114J340W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT-51 portable tanks. Design pressure must be the greater of 1.3 times the vapor pressure at 115 °F. (46.1 °C.) or 100 psig (689.5 kPa). Minimum thickness for cargo tanks and portable tanks is 0.25

inch (6.35 mm) stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

(b) *Packing Group I, Zone A:* § 173.244 and notes "B14" and "B30" authorize DOT 105J500W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 1.5 times the vapor pressure at 115 °F or 100 psig. Minimum thickness for cargo tanks and portable tanks is 0.30 inch (7.62 mm) stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

2. Toxic Gases (Division 2.3)

(a) *Packing Group III:* § 173.244 and note "B34" authorize DOT Class 105, 109, 112 and 114 tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 100 psig or 1.1 times the vapor pressure at 115 °F.

(b) *Packing Group II:* § 173.244 and notes "B14" and "B33" authorize DOT 105J300W, 112J340W and 114J340W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 1.2 time vapor pressure at 115 °F or 100 psig. Minimum thickness 0.25 inch stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

(c) *Packing Group I, Zone B:* § 173.244 and note "B14" and "B31" authorize DOT 105J300W, 112J340W and 114J340W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 1.3 times the vapor pressure at 115 °F or 100 psig. Minimum thickness for cargo tanks and portable tanks 0.30 inch stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

(d) *Packing Group I, Zone A:* § 173.245 authorizes DOT 105S500W, 112S500W, 105J500W and 112J500W tank cars and DOT 106 and 110 tank car tanks. Bottom outlets are prohibited and tanks must be insulated. Cargo tanks and portable tanks are authorized only as approved by the Director, OHMT.

Where the "B" note requires stainless steel but permits other steels, the minimum thickness of the shell and heads of each tank and portable tank constructed of a steel other than the reference stainless steel, would be obtained from the formula found in § 173.24b(c) as follows:

Formula for metric units:

$$e_1 = (10e_0/Rm_1 A_1)^{1/3}$$

Formula for nonmetric units:

$$e_1 = (112.3e_0/Rm_1 A_1)^{1/3}$$

where:

e_0 = Required thickness of the reference stainless steel (from the "B" note) in millimeters or inches, as appropriate;

e_1 = Equivalent thickness of the steel used in millimeters or inches, as appropriate;

Rm_1 = Specified minimum tensile strength of the steel used (as specified in the appropriate specification in Part 178 of this subchapter in deka-newtons per square millimeter or pounds per square inch, as appropriate);

A_1 = Specified minimum percentage elongation of the steel used (as specified in § 178.270-3) multiplied by 100 (e.g., if 20% use 20.0).

Where the "B" note requires insulation (e.g., "B14"), each cargo tank and portable tank would have to be insulated with a suitable insulation material of such thickness that the overall thermal conductance is not more than 0.08 B.t.u. per square foot per degree F. differential in temperature per hour. The conductance would be determined at 60 °F. Insulation material would have to be corkboard or self-extinguishing polyurethane foam with minimum thickness of 4 inches.

Other noteworthy features applicable to bulk packaging are as follows:

(1) Bulk transportation of most organic peroxides would still be prohibited. Highly toxic gases (present Poison A materials) would still be prohibited in cargo tanks and portable tanks, except under the terms of approvals and exemptions.

(2) Bulk transportation of hydrogen peroxide in strengths of 52% or less but not less than 8% would become subject to the HMR, to correct a safety deficiency in the existing regulations.

(3) Section 173.24b would be added to add or clarify general requirements that would apply to bulk tank filling limits. The proposed changes standardize the minimum outage (ullage) in a bulk tank packaging and require the outage to be the largest of the following:

(a) For nonflammable liquids, one percent outage at the reference temperature (115 °F (46.1 °C) for uninsulated tanks, 105 °F (40.6 °C) for insulated tanks).

(b) For flammable liquids or poisonous liquids (not toxic by inhalation), two percent outage at the reference temperature (115 °F (46.1 °C) for uninsulated tanks, 105 °F (40.6 °C) for insulated tanks).

(c) For liquid materials that are toxic by inhalation, five percent outage at the

reference temperature (115 °F (46.1 °C) for uninsulated tanks, 105 °F (40.6 °C) for insulated tanks).

(d) Tank must not be liquid full at 55 °C (131 °F).

The ullage for tanks in cryogenic liquid service is included in the filling density limits given in §§ 173.318 and 173.319.

(4) Sections 173.31 through 173.33 would be revised to assure that during normal transport conditions, no lading would be released due to an increase in vapor pressure caused by a rise in temperature of the lading. This is accomplished by relating tank pressure ratings and the associated opening pressures of pressure relief devices to lading pressure at maximum lading temperatures likely to be reached under "normal" transport conditions. These reference temperatures are 115 °F (46.1 °C) for insulated tanks and 105 °F (40.6 °C) for uninsulated tanks. The tank pressure rating for cargo tanks and DOT specification portable tanks (except IM 101 and IM 102) would remain the tank design pressure. The pressure rating for tank cars and U.N. multimodal tank container tanks (IM 101 and IM 102 - portable tanks) would be the tank test pressure.

(5) Section 173.315 would be revised to provide additional integrity for tanks loaded with multiple-hazard loadings.

7. Subpart G; Gases, Preparation and Packagings

Section 173.300. This section would be removed since the definitions for gases would appear in proposed § 173.115.

Sections 173.300a through 173.305. These sections would not be changed.

Section 173.306. § 173.306 would be revised editorially and a new paragraph (h) would be added containing consumer commodity provisions which are currently located in §§ 173.505 and 173.1200. The latter sections would be deleted.

Section 173.307. This section would not be changed.

Section 173.308. The section reference in paragraph (a) would be changed from "§ 173.21(e)" to "§ 173.21(i)".

Section 173.314. Paragraph (a) would be revised to correct the section reference for definitions of gases. The introductory text of paragraph (f) would be revised for clarity and entries in the filling table which appear in paragraph (f) would be corrected.

Section 173.315. Subparagraph (a)(2) would be added to provide for the shipment of gases, other than those listed in the table in subparagraph (a)(1), in cargo tanks and portable tanks meeting the specified minimum design pressure requirements.

Sections 173.316 through 173.320. These sections would not be changed.

Sections 173.321 through 173.340. Subpart C would be extended beyond § 173.320 with the addition of ten proposed new sections. These sections would prescribe the authorized non-bulk packagings for specific gases, or categories of gases, as follows: § 173.321, ethylamine; § 173.324, ethyl methyl ether; § 173.334, organic phosphates mixed with compressed gas; § 173.335, gas generator assemblies; § 173.336, nitrogen dioxide, nitrogen peroxide, and nitrogen tetroxide liquids; § 173.337, nitric oxide; § 173.338, tungsten hexafluoride; and § 173.340, tear gas devices.

8. Subpart H

This subpart, which currently contains the definitions and packagings for poisonous materials and etiologic agents, would be rendered obsolete by previously discussed changes and, therefore, would be deleted.

9. Subpart I; Radioactive Materials

Requirements for radioactive materials remain essentially unchanged. As discussed in the preamble to Subpart C of Part 172, description requirements would change to reflect the numerical hazard class, Class 7. Definitions and packagings would not change, except as mentioned in the proposed change to § 173.417. Within Subpart I, only §§ 173.416 and 173.417 would be revised.

Section 173.416. This section would be revised to correct section references to packaging specifications for radioactive materials which would be redesignated. See the preamble to Part 178 for discussion concerning redesignation of specifications.

Section 173.417. This section would be revised to correct section references to redesignated packagings. Also, in subparagraph (a)(6) the reference to a specification 6J or 17H drum would be changed to a 1A2 steel drum.

10. Subparts J, K, L, M, N, and O

These subparts, which address the definitions, preparation and packagings for ORM materials, would be rendered obsolete and, therefore, would be deleted.

11. Appendices to Part 173

Appendix A. Appendix A would not be changed.

Appendix B. Appendix B would be revised editorially to correct section references and to change the word "polyethylene" to "plastic" wherever it appears in the appendix.

Appendix C. A base level vibration test, which would appear as new Appendix C, is proposed. The test is essentially the same test which appears in the HMR in §§ 178.16 and 178.19 for Specifications 35 and 34, respectively. As discussed in the preamble to § 173.24, this basic vibration test would be made applicable to all non-bulk packagings used for hazardous materials. The test is neither sophisticated nor rigorous and is intended only to point out gross packaging deficiencies.

D. Parts 174 through 177; Carriers' Requirements

Although changes to the regulatory text in Parts 174, 175, 176 and 177 are needed to implement the proposals of this notice, they have not been included due to time constraints. Various sections in these parts would have to be revised editorially to correct section references and to conform to aforementioned changes in hazard class terminology and to placarding. In addition, loading and storage provisions would have to be revised to accommodate the new classification system.

Part 176. Although they do not represent all the changes necessary to implement the proposals of this notice, several proposed changes to Part 176 are included in this notice, as follows.

Section 176.5. This section would be revised to differentiate between "bulk packagings", as defined in § 171.8, and bulk carriage by vessel as addressed in Subchapters D, I, O, and N of Title 46.

Section 176.83. This section would be revised to add a definition for the term "clear of living quarters".

Section 176.84. This new section would contain the meaning and requirements of the stowage provisions, or codes, which appear in column 10c of the § 172.101 Table. There are approximately 100 different stowage provisions listed. The intent of these provisions is to align the § 172.101 Table stowage provisions with those in the IMDG Code. Some of these provisions use terms which are further defined in § 173.83. For example, code "37" is "Stow away from hydrazine." The term "away from" is defined in § 178.83.

E. Part 178; Specifications for Packagings

1. Part 178, General

The changes proposed to Part 178 are essentially those which were proposed in the ANPRM, except for certain changes made in response to comments received and those made on RSPA's own initiative. One hundred specifications for non-bulk packagings

would be eliminated and twenty packaging standards based on the U.N. Recommendations would be added. Performance tests generally based on the U.N. Recommendations would also be added. The title to Part 178 would be changed to reference "packagings" rather than "shipping containers". A number of subparts have been removed and reserved. RSPA will consider consolidation and recodification of Part 178 in the final rule.

Since issuance of the ANPRM, two issues that related to the performance testing of packagings have been resolved in separate rulemaking actions. Compatibility and permeation criteria, for hazardous materials packaged in polyethylene packagings, were established under Docket HM-185 (final rule published June 14, 1984; 49 FR 24684) and appear in 49 CFR at § 173.24(d) and Appendix B to Part 173, entitled "PROCEDURE FOR TESTING CHEMICAL COMPATIBILITY AND RATE OF PERMEATION IN POLYETHYLENE PACKAGINGS AND RECEPTACLES". These criteria would be retained, but would be applied to all plastics which might be used as packaging materials, rather than solely to polyethylene.

Under Docket HM-194 (final rule published March 13, 1985; 50 FR 10060), RSPA revised Subpart E of Part 107 to adopt procedures by which the Director, OHMT could designate third-party packaging testing agencies, for the purpose of certifying conformance of packaging designs with U.N. standards. Use of these independent testing agencies was left to the discretion of shippers and manufacturers. No changes to these provisions are proposed in this notice.

Section 178.0. Section 178.0-2 would be revised for clarity and to require that manufacturers notify, in writing, persons to whom packagings are transferred of any specification requirements which have not been met at time of transfer and of any actions which need to be taken to comply with specification requirements. Copies of the notifications must be retained by the manufacturer for at least one year.

RSPA considers this notice especially important in this proposal where performance-oriented packagings standards would replace specification packagings. Shippers will be performing many functions normally considered as part of manufacturing (e.g., assembling boxes or closing drums) should an incident occur, or an enforcement investigation, which revealed a packaging deficiency, it is important to be able to establish who was responsible for that deficiency.

Specification marking requirements currently in § 173.24 are relocated to § 178.0-3 and this latter section is revised to address all specification markings. Whereas § 173.24 currently specifies a minimum size for specification markings of one half inch in height (except as otherwise provided in Part 178), proposed § 178.0-3 specifies a letter height of at least 6 millimeters (0.24 inches) for packagings having a capacity of less than or equal to 30 liters (7.9 gallons) for liquids or 30 kilograms (66.1 pounds) for solids and a letter height of at least 12 millimeters (0.47 inches) for other packagings.

2. Subparts A Through K; Non-Bulk Specification Packagings

Subpart A of Part 178. Subpart A contains seven specifications for carboys and two specifications for polyethylene drums. These specifications would be removed and Subpart A would be reserved.

Subpart B. Subpart B contains 18 specifications for inner receptacles and liners. Specifications 2P and 2Q are inner receptacles for compressed gases and would be retained. Specification 2R is an inner packaging for radioactive materials. It would be relocated to Subpart K and be redesignated as § 178.360. The remaining specifications would be removed.

Subpart C. Subpart C contains specifications for cylinders and is not affected by this notice.

Subpart D. Subpart D contains 36 specifications for metal drums, kegs, overpacks and boxes and for Spec. 33A polystyrene cases. Four of the specifications (Specs. 6L, 6M, 20PF and 21PF) are packagings for radioactive materials. They would be moved to Subpart K and redesignated as §§ 178.352, 178.354, 178.356 and 178.358, respectively. The remaining specifications would be removed and the subpart would be removed and reserved.

Subpart E. Subpart E contains 22 specifications for wooden drums, barrels, boxes and overpacks. Two, Spec. 20WC and 21WC, are used for radioactive materials and would be redesignated and moved to Subpart K. The remaining specifications would be removed and Subpart E would be removed and reserved.

Subpart F. Subpart F contains 14 specifications for fiberboard boxes, drums and mailing tubes. The subpart would be removed and reserved.

Subpart G. Subpart G contains 9 specifications for paper, plastic and textile bags. The subpart would be removed and reserved.

Subpart H. In § 178.270-11, pressure relief device requirements for IM101 and IM102 intermodal tanks would be revised editorially to address pressure relief settings in terms of tank test pressure instead of mean average working pressure (MAWP).

Subpart K. Radioactive materials packagings from the aforementioned subparts would be relocated to Subpart K. No other changes are proposed in the subpart.

3. Subpart L; Non-Bulk Performance-Oriented Packaging Standards

A new Subpart L would be added to Part 178 containing marking requirements and packaging standards for non-bulk packagings based on Chapter 9 of the U.N. Recommendations.

Section 178.500. Proposed § 178.500 contains a general statement of scope and purpose and refers the user to § 171.8 for definitions of packaging terms.

Section 178.502. Proposed § 178.502 sets forth the identification codes for packagings as used in the U.N. Recommendations. For example, "4" designates a box and "G" designates fiberboard. Therefore, "4G" is the identification code for a fiberboard box.

Section 178.503. Proposed § 178.503 sets forth requirements for marking packages. In general, markings for the U.N. standards consist of the following nine elements:

- (1) The U.N. symbol.
- (2) The package identification code.
- (3) A letter designating the packing group or groups for which the packaging has been performance tested.
- (4) The specific gravity for liquids or the maximum gross mass for solids.
- (5) The letter "S" to indicate that a packaging is intended for solids or the hydrostatic test pressure at which the packaging is rated.
- (6) The last two digits of the year of manufacture.
- (7) The letters "USA".
- (8) The name and address or symbol of the manufacturer.
- (9) For metal or plastic drums and jerricans intended for reuse, the thickness (in millimeters) of the packaging material.

In addition, reconditioned packagings would be marked with the following:

- (1) The name of the country in which the reconditioning is performed.
- (2) The name and address or symbol of the reconditioner.
- (3) The month and last two digits of the year of reconditioning.
- (4) The letter "R".
- (5) If leakproofness tested, the letter "L".

In general, the proposed markings require more information on a packaging than is required currently. This additional information, such as packing group designation and hydrostatic test pressure rating, is believed necessary under this proposal for the shipper to be able to select a packaging appropriate for a specific hazardous material based on the characteristics of that material.

Sections 178.504 through 178.523. Sections 178.504 through 178.523 contain the standards for the 20 performance packagings, which are proposed for adoption.

These standards specify the general requirements for materials, construction and capacity of packagings. As previously mentioned, they are more general than the existing specifications and give manufacturers wide latitude in designing and constructing packagings.

4. Subpart M; Testing of Nonbulk Packagings

There are presently wide differences in the application of test requirements in the various non-bulk packaging specifications in Part 178. Some specifications have no test criteria. Several have test criteria but no requirement to perform testing. Most have test requirements that must be performed at the start of production or upon change in design, materials or construction method and which must be repeated at intervals set forth in the individual specifications. For example, most of the metal drum specifications require testing to be repeated every four months. Some of the specifications call for production-oriented testing such as testing one packaging for every 1000 produced. Specific tests vary by type of packagings and, for similar types, from one specification to another.

Requirements for proof of testing also vary considerably. Proof of testing is not required for some specifications. Proof in the form of retained test samples is required for many specifications, including most of the metal and fiber drum specifications. Some specifications require filing of test reports with the Director, OHMT. Others require retention of test records at the manufacturer's location for periods ranging from four months to three years.

Section 178.601. In place of the existing hodgepodge of package testing and record retention requirements, proposed Subpart M standardizes requirements for all of the performance-oriented non-bulk packagings added in proposed Subpart L. In proposed § 178.601, general requirements for testing and test record retention are prescribed. Design qualification tests would be required at the start of

production for each different packaging and "at intervals established by the manufacturer of sufficient frequency to ensure that all packagings are capable of passing the prescribed tests", except that tests would have to be repeated at least once each year that the packaging is produced. This would give the manufacturer the opportunity to determine effective test schedules for a particular manufacturing operation. Tests could be performed by the manufacturer or by an independent testing agency.

Retention of samples no longer would be required for any of the specifications. Manufacturers would be required to keep records of test results for one year. The format of these records would be left to the discretion of the individual manufacturers. Samples of each different packaging would have to be tested, with certain exceptions such as for packagings which differ only in surface treatment or in reduced height.

Proposed § 178.601 contains an approval provision whereby the Director, OHMT, may approve the selective testing of packagings that differ only in minor respects from the tested type, such as packagings which are produced with small reductions in dimensions. Another provision would permit the Director to require proof through testing that packagings meet specified requirements. It is envisioned that this testing would be performed by the manufacturer (with OHMT personnel or an independent inspector witnessing tests), by an independent testing agency, or by OHMT personnel.

Sections 178.602 through 178.608. Proposed § 178.602 contains general requirements for filling and conditioning packages in preparation for testing. Proposed §§ 178.603 through 178.606 contain requirements for the drop test, leakproofness test, hydrostatic pressure test and stacking test. These tests, based on the U.N. Recommendations, would apply to all of the performance-oriented packagings in proposed Subpart L. The leakproofness test would be performed on all packagings intended to contain liquids, except for the inner packagings of combination packagings. The drop test, hydrostatic pressure test and stacking test would be performed on representative samples of packagings, in accordance with the provisions of the specific test and the general test requirements of §§ 178.601 and 178.602. Proposed §§ 178.607 and 178.608 contain a cooperage test for bung-type wooden barrels and a chemical compatibility test for plastic receptacles.

It is believed that the proposed tests, in conjunction with the "beefed-up"

provisions in §§ 173.24 and 173.24a (including the vibration standard in § 173.24a(a)(5)) will ensure a level of packaging integrity equivalent or better than that provided by the existing DOT specification for non-bulk packagings. However, comments are solicited on whether these proposed tests are adequate or unnecessarily rigorous.

F. Part 179; Specifications for Tank Cars

Section 179.14. This section would be revised to update the list of approved couplers and to relocate performance requirements for coupler vertical restraint systems which currently appear in § 179.105-6.

Section 179.101-1. In the individual specification requirements table, the column for the DOT 112A400F tank car would be deleted and footnote 11 would be added to the "112A400W" column to accommodate these cars. The "Insulation" entries for DOT 112A200W, 112A340W, 112A400W, 112A500W, 114A340W, and 114A400W would be changed from "4 None" to "4, 13 Optional" to clarify that insulation is permitted on these cars. A footnote 13 would be added to permit cars to be stencilled to indicate conformance to the insulation provisions of § 179.100-18.

Section 179.102. This section, which specifies special commodity requirements for pressure tank cars, would be deleted. For bulk packagings, commodity-specific requirements would be accommodated through the special provisions in column 7 of the § 172.101 Table, and the packaging authorizations of Subpart F of Part 173.

Section 179.105. The provisions of § 179.105 would be revised to include DOT 105S, 105J and 111J tank cars. Section 179.105-1 would be editorially revised to address these tank cars and to delete references to implementation dates for coupler vertical restraint systems. Sections 179.105-2 and 179.105-3 contain obsolete implementation dates for coupler restraint systems and tank head puncture resistance systems, and would be removed. Section 179.105-4 would be revised to address DOT 105J and 111J tank cars. The requirements of § 179.105-6 would be relocated to § 179.14 and the section would be removed. Section 179.105-8 would be revised to add stencilling requirements for DOT 105S and 105J cars.

Section 179.106. The requirements of this section would be relocated to § 179.105, and the section would be deleted.

Section 179.202. This section, which specifies special commodity requirements for non-pressure tank cars, would be deleted. Commodity-specific requirements, where necessary, would

be implemented through the special provisions in the § 172.101 Table and the bulk packaging authorizations in Subpart F of Part 173.

Section 179.203. In § 179.203-1, the requirements of paragraphs (c) and (d) would be relocated to § 171.12a and the paragraphs would be removed. In § 179.203-2, an obsolete reference in subparagraph (a)(1) would be removed.

Section 179.302. This section, which specifies special commodity requirements for multi-unit tank car tanks, would be deleted for the same reasons given for § 179.202.

VI. Enforcement of Performance-Oriented Packaging Standards

Inspection and enforcement of the regulations in Part 178 applicable to the manufacture of non-bulk packagings is a relatively uncomplicated process at the present time. Each individual specification provides the basis for the OHMT inspector to observe and compare a packaging with the requirements of the particular specification under which it was manufactured. If the manufacturer (or shipper or other person performing a manufacturing function) is not complying with the requirements of a specification, the inspector can determine this at the manufacturer's plant or at any point in the transportation process.

Under the proposed system of performance-oriented packaging standards, enforcement would become more complex. An inspector could no longer look to detailed specifications as the basis for inspecting a packaging facility. Although the manufacturer would still have to mark its packagings to indicate the type of service for which they are qualified, the most important determinant of qualification would be how well the packagings perform under test conditions. Thus, testing would become a critical factor in determining compliance under the proposed performance-oriented standards.

Under the proposed regulations, testing would increase in relative importance with random in-depth inspections of packagings by OHMT inspectors at freight terminals, intermodal transfer facilities, airports and other transportation facilities continuing to play an important role. However, while inspectors at such locations could continue to discover certain types of violations (e.g., improper markings, failure to use proper packagings for specific hazardous materials, etc.), in most instances they would be able to determine whether a specific package meets the required performance standards only by testing.

It should be noted that under the proposed regulations a shipper would have greater flexibility in selecting and combining packagings so long as required performance standards were met. This flexibility would be accompanied by a greater responsibility for the ultimate conformance of packaging with applicable requirements; thus, to the extent that the shipper would be performing manufacturer-type responsibilities, the shipper would be treated as a manufacturer and subject to enforcement as such. These proposed increased shipper responsibilities are described in proposed §§ 173.24, 173.24a, 173.24b and supplement the shipper responsibilities in § 173.22, which would not be changed. A balancing of manufacturer and shipper responsibilities would be provided by § 178.0-2(d), which proposes that manufacturers be required to notify recipients of their packagings of any actions which need to be taken in order for their packagings to conform to the regulations. The presence or absence of such a notice, as well as the thoroughness and accuracy of same, would be a major factor in determining whether and against whom to take enforcement action if nonconforming packages are found in commerce.

In light of the foregoing, if the performance standards proposed herein are adopted, it is likely that RSPA will focus its inspection efforts on packaging manufacturers' facilities (including shippers' facilities where they perform manufacturing functions) and testing-related activities. These activities would include review of packaging manufacturers' test records, observation of manufacturers' tests, and supervision of OHMT and OHMT-funded tests. Comments are solicited on these proposed changes to enforcement procedures.

Any testing program to determine compliance must have as its foundation a set of standard procedures by which to measure performance. For most existing DOT non-bulk specification packagings, OHMT's Enforcement Division has developed published test procedures and standards, in coordination with Wyle Laboratories, Huntsville, Alabama. These include test procedures and standards for DOT specification glass carboys, polyethylene bottles and containers, steel barrels and drums, fiberboard and wooden boxes, fiber drums, multiwall paper bags and several other types of packagings. These test procedures and standards are public information and are available from the National

Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

If the proposed rules are adopted, these previously developed test procedures and standards would be modified to reflect the specific performance standards promulgated in the final rule. As modified, these test procedures and standards would be used by OHMT's Enforcement Division as the basis for its monitoring, testing, and inspection program.

As noted above, if performance standards are adopted, testing for compliance would be the cornerstone of OHMT's enforcement effort relating to non-bulk packagings falling within the scope of the proposed regulations. There are, however, several alternative means of implementing a compliance testing program. These might include mandatory testing performed by manufacturers, shippers, independent testing agencies, or under the auspices of OHMT.

Suggestions concerning the means of carrying out such a testing program would be welcome. Commenters should be as specific as possible, indicate which approaches they believe would be more efficient, cost-effective, and fair to all concerned, and explain their conclusions. Specific comments might address such issues as government vs. contract laboratories, use of third-party testing or inspection agencies, test record retention requirements, the number of tests, and the appropriateness of OHMT or private parties bearing the costs of samples and testing.

In light of the proposed movement away from specific design criteria to more general performance standards, OHMT is committed to establishing enforcement procedures and policies which will encourage and ensure compliance with such standards. Since failure of a test may in any given case constitute *prima facie* evidence of noncompliance, enforcement action could be taken upon receipt of test results from a testing facility or after testing conducted at a manufacturing or shipping location. Such actions, of course, would be preceded by thorough investigation (possibly, by additional testing) to determine what caused the failure, whether a violation occurred, who committed it, and what the appropriate sanction should be.

Commenters should be aware that enforcement policies generally reflect internal agency decisions concerning the most effective and efficient means of enforcing the regulations. Obviously, the nature of the regulations themselves affects the determination of what types of enforcement approaches are most effective and efficient. Because of this

relationship between the rules and enforcement policies, commenters should consider enforcement issues as part of this rulemaking. OHMT will consider all enforcement-related comments in determining to what extent the proposed regulations should be issued as final rules and in establishing policies for enforcing them.

If the regulations are issued substantially as proposed, OHMT may find it necessary to modify its enforcement policies in order to take into account experience it will have gained under those regulations.

VII. Transition Period

If the proposals contained in this notice lead to publication of a final rule, it is RSPA's intention to delay the effective date of that final rule, for most of the regulatory provisions contained therein, for five years from the date of publication. Voluntary compliance with the new requirements would be authorized immediately upon publication or as soon thereafter as is practicable. The five year period should facilitate the changeover from the present DOT specification system to the U.N. performance-oriented system for non-bulk packagings and mitigate the burden of complying with new or changed regulatory requirements, particularly with regard to hazard communication requirements. Assuming that a final rule would be published within two years of issuance of this notice, the voluntary compliance provision would permit shippers to change to the U.N. system prior to January 1, 1990, when existing grandfather provisions in international regulations terminate and DOT specification non-bulk packagings become virtually unacceptable in international commerce. It is anticipated that certain provisions of the final rule such as the conversion into general regulations of approval provisions for packagings for liquids which are toxic by inhalation, would be implemented over a transition period of less than five years.

VIII. Administrative Notices

A. Executive Order 12291

The effect of this rule, as proposed, does not meet criteria specified in section 1(b) of Executive Order 12291 and is, therefore, not a major rule, but is a significant rule under the regulatory procedures of the Department of Transportation [44 FR 11034]. This proposed rule does not require a Regulatory Impact Analysis, or an environmental impact statement under the National Environmental Policy Act

[42 U.S.C. 4321 et seq.] A regulatory evaluation and flexibility analysis is available for review in the Docket.

B. Impact on Small Entities

Based on limited information concerning size and nature of entities likely affected by this proposed rule, I certify this proposal will not, if promulgated, have a significant economic impact on a substantial number of small entities. This certification is subject to modification as a result of a review of comments received in response to this proposal. A preliminary regulatory flexibility analysis is available for review in the docket.

C. Paperwork Reduction Act

Information collection requirements contained in this proposal are being submitted for approval to the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Public Law 96-511).

D. Request for Comments

Comments are encouraged on all proposals contained in this notice. It is requested that interested persons submit comments concerning obvious errors and omissions as soon as possible so that a supplementary notice can be issued, if necessary, in a timely manner to address these errors and omissions. Substantive comments concerning specific proposals may be submitted at any time during the comment period.

RSPA is interested in receiving comments on incremental costs and benefits associated with specific proposals contained in this notice. Of particular interest are comments addressed to costs, benefits and burden hours associated with proposals related to information collection.

List of Subjects

49 CFR Part 171

Hazardous materials transportation, Definitions.

49 CFR Part 172

Hazardous materials transportation, Markings, Labels, Placards, Packaging.

49 CFR Part 173

Hazardous materials transportation, Packaging.

49 CFR Part 174

Hazardous materials transportation, Rail carriers.

49 CFR Part 175

Hazardous materials transportation, Air carriers.

49 CFR Part 176

Hazardous materials transportation, Maritime carriers.

49 CFR Part 177

Hazardous materials transportation, Motor carriers.

49 CFR Part 178

Hazardous materials transportation, Packaging specifications and standards.

49 CFR Part 179

Hazardous materials transportation, Tank cars.

In consideration of the foregoing, 49 CFR Parts 171 through 179 would be amended as follows:

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

The authority citation for Part 171 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR Part 1.

§ 171.3 [Amended]

In § 171.3, paragraph (e) preceding Note 1 would be removed.

Section 171.7 would be amended as follows:

In § 171.7, paragraph (d) would be removed and paragraph (c) would be revised to read as follows:

§ 171.7 Matter incorporated by reference.

(c) Table of material incorporated by reference. The following Table sets forth material incorporated by reference. It gives the name and address of the organization from which the material is available, the name of the material, and the section(s) of this subchapter, other than § 171.7, in which the matter is referenced.

| Source and name of material | 49 CFR reference |
|---|--|
| The Aluminum Association, 420 Lexington Avenue, New York, NY 10017: | |
| Aluminum Standards and Data, 1970-71, December 1969..... | 178.65-5. |
| Aluminum Standards and Data, Sixth Edition, 1979..... | |
| Aluminum Standards and Data, Seventh Edition, June 1982..... | |
| American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018: | |
| ANSI B9.1-64, Safety Code for Mechanical Refrigeration, 1964 Edition..... | 173.306. |
| ANSI B16.5-77 Steel Pipe Flanges, Flanged Fittings..... | 178.360. |
| ANSI N14.1-71 Packaging of Uranium Hexafluoride for Transport, 1982 Edition..... | 173.417. |
| American Society of Mechanical Engineers, United Engineering Center, 354 47th Street, New York, NY 10017: | |
| ASME Code, section VIII (Division 1) and IX of 1977 Edition of American Society of Mechanical Engineers Boiler and Pressure Code Addenda through December 31, 1978..... | 173.32; 173.33; 173.306; 173.315; 177.814; 178.245; 178.251; 178.255; 178.337; 178.340; 178.342; 178.343; and 179.400. |
| ASME Code, section V (FR Nondestructive Examination, 1977..... | 173.33. |
| ASME Code, section IX (FR Welding and Brazing Qualification 77 and Addendum 79)..... | 178.245; 178.340. |
| American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103: | |
| Noncurrent ASTM Standards are available from: Engineering Societies Library, 354 E. 47th Street, New York, NY 10017: | |
| ASTM A 20-81 Standard Specification for General Requirements for Steel Plates for Pressure Vessels, Revision C, 1982..... | 178.337. |
| ASTM A 47-88 Malleable Iron Castings..... | 179.200. |
| ASTM A 53-68a Welded and Seamless Steel Pipe..... | 179.12-2. |
| ASTM A 178-70 Electric Resistance Welded Carbon Steel Boiler Tubes..... | 179.12. |
| ASTM A 192-69 Seamless Carbon Steel Boiler Tubes for High Pressure Service..... | 179.12. |
| ASTM A 211-75 Standard Specification for Spiral-Welded Steel or Iron Pipe App. B..... | 192.113; Part 192; 195.106. |
| ASTM A 240-82 Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Fusion-Welded Unfired Pressure Vessels, Revision A..... | 173.57; 179.100; 179.200; 179.201; 179.220; 179.400. |
| ASTM A 242-81 Standard Specification for High-Strength Low-Alloy Structural Steel, 1982..... | 179.100. |
| ASTM A 262-68 Recommended Practices for Detecting Susceptibility to Intergranular Attack in Stainless Steels..... | 179.200. |
| ASTM A 269-69 Seamless and Welded Austenitic Stainless Steel Tubing for General Service..... | 179.12. |
| ASTM A 285-78 Pressure Vessel Plates, Carbon Steel, Low and Intermediate-Tensile Strength..... | 179.100; 179.200; 179.220; 179.300. |
| ASTM A 300-58 Steel Plates for Pressure Vessels for Service at Low Temperatures..... | 178.337. |
| ASTM A 300-68 Notch Toughness Requirements for Normalized Steel Pressure Plates for Pressure Vessels..... | 179.102. |
| ASTM A 302-78 Pressure Vessel Plates, Alloy Steel, Manganese-Molybdenum and Manganese-Molybdenum Nickel..... | 179.100; 179.200; 179.200. |
| ASTM A 312-70a Seamless and Welded Austenitic Stainless Steel Pipe..... | 179.12. |
| ASTM A 333-67 Seamless and Welded Steel Pipe for Low-Temperature Service..... | 178.45. |
| ASTM A 370-77 Standard Methods and Definition for Mechanical Testing of Steel Products, 1982..... | 179.102. |
| ASTM A 388-67 Ultrasonic Testing and Inspection of Heavy Steel Forging..... | 178.45. |
| ASTM A 441-81 Standard Specification for High-Strength Low-Alloy Structural Manganese Vanadium Steel..... | 178.338. |
| ASTM A 514-81 Standard Specification for High-Yield Strength Quenched and Tempered Alloy Steel Plate, Suitable for Welding..... | 178.338. |
| ASTM A 515-69 Carbon Steel Plates for Pressure Vessels for Intermediate and Higher Temperature Service..... | 179.100; 179.200; 179.220; 179.300. |
| ASTM A 518-79b Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate and Lower-Temperature Service, 1982 Edition..... | 178.337; 179.100; 179.102; 179.200; 179.220. |
| ASTM A 537-80 Standard Specification for Pressure Vessel Plates, Heat-Treated, Carbon-Manganese-Silicon Steel, 1982 Edition..... | 179.100. |
| ASTM A 572-82 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality, 1982 Edition..... | 178.338; 179.100. |
| ASTM A 588-81 Standard Specification for High-Strength Low-Alloy Structural Steel with 50 Ksi Minimum Yield Point to 4 in. Thick..... | 179.100; 178.338. |
| ASTM A 608-75 Standards Specification for Steel Sheet and Strip Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Atmospheric Corrosion Resistance, 1975 (Reapproved 1981)..... | 178.338. |
| ASTM A 612-7a High Strength Steel Plates for Pressure Vessels for Moderate and Lower Temperature Service..... | 178.337. |
| ASTM A 633-78a Standard Specification for Normalized High-Strength Low-Alloy Structural Steel, 1979 Edition..... | 178.338. |
| ASTM A 715-81 Standard Specification for Steel Sheet and Strip, Hot-Rolled, High-Strength, Low-Alloy, with Improved Formability, 1981..... | 178.338. |
| ASTM B 90-69 Magnesium Alloy Sheet and Plate..... | 178.251. |
| ASTM B 181-70 Nickel Seamless Pipe and Tube, 1970..... | 179.12. |
| ASTM B 182-69 Nickel Plate, Sheet, and Strip..... | 179.200. |
| ASTM B 209-69 Aluminum Alloy Sheet and Plate..... | 178.340; 179.100; 179.200; 179.220. |
| ASTM B 210-70 Aluminum Alloy Drawn Stainless Tables (FR B210-68(78))..... | 179.12. |
| ASTM B 221-76 Aluminum Alloy Extruded Bars, Rods, Shapes and Tubes..... | 179.12. |
| ASTM B 241-69 Standard Specification for Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube..... | 179.12. |
| ASTM B 557-81 Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products, 1979..... | 178.251. |
| ASTM B 580-79 Standard Specification for Anodic Oxide Coatings on Aluminum, 1979..... | 173.316; 173.318. |
| ASTM C 148-77 Standard Methods of Polariscopic Examination of Glass Containers, 1977..... | 178.17. |
| ASTM D 56-79 Standard Method of Test for Flash point by Tag Closed Tester..... | 173.120. |
| ASTM D 88-66 (Reapproved 80) Standard Method for Test of Saybolt Viscosity..... | 173.120. |
| ASTM D 93-80 Standard Method of Test for Flash point by Pensky Martens Closed Tester..... | 173.120. |
| ASTM D 323-58, 68 Vapor Pressure of Petroleum Products (Reid Methods)..... | 173.119; 173.300. |
| ASTM D 1838-64 Copper Strip Corrosion by Liquefied Petroleum (LP) Gases..... | 173.315. |
| ASTM D 2161-79 Conversion of Kinematic Viscosity to Saybolt Universal Viscosity or to Saybolt Furol Viscosity..... | 173.120. |
| ASTM D 3243-73T Flash Point of Aviation Turbine Fuels by Setflash Closed Tester..... | 173.120. |
| ASTM D 3278-78 Flash Point of Liquids by Setflash Closed Tester..... | 173.120. |
| ASTM E 8-69 Tension Testing of Metallic Materials..... | 178.45. |

| Source and name of material | 49 CFR reference |
|---|--|
| ASTM E 8-81 Tension Testing of Metallic Materials | 178.36; 178.37; 178.38; 178.39; 178.40; 178.41; 178.43; 178.44; 178.48; 178.49; 178.50; 178.51; 178.52; 178.53; 178.54; 178.55; 178.56; 178.57; 178.58; 178.59; 178.60; 178.61; 178.68; 178.251. |
| ASTM E 23-60 Notched Bar Impact Testing of Metallic Materials | 178.57; 179.400. |
| ASTM E 112-63 Estimating the Average Grain Size of Metals | Part 178, App. A. |
| ASTM E 290-77 Semi-Guided Bend Test for Ductility of Metallic Materials | 173.21. |
| ASTM E 487-74 Constant Temperature Stability of Chemical Materials | 173.115. |
| ASTM E 681-79 Standard Test Method for Limits of Flammability of Chemicals | 172.407; 172.519. |
| ASTM G 26-70 Standard Recommended Practice for Operating Light-and-Water Exposure Apparatus (Xenon-Arc-Type) for Exposure of Nonmetallic Materials, 1970. | |
| Association of American Railroads, 59 East Van Buren Street, Chicago, IL 60605: | |
| AAR Catalog Nos. F70BHT; F71BHT; F72BHT; F73BHT; F79BHT | 179.14. |
| AAR Catalog Nos. SE60CHT; SE60CHTE; SE70CHT; SE70CHTE | 179.14. |
| AAR Catalog Nos. F70CHT; F70CHTE; F73AHT; F73AHTe; F79CHT; F79CHTE | 179.14. |
| AAR Catalog Nos. SE67BTH; SE67BTHE; SE68BTH; SE68BTHE; SF79CHT; SF79CHTE | 179.14. |
| AAR Catalog Nos. SE60CHT; SE60CHTE; SE67BHT; SE67BHTE; SE68BHT; SE68BHTE | 179.50. |
| AAR Catalog Nos. SE70CHT; SE70CHTE; SE79CHT; SE70CHTE | 179.105. |
| AAR Specification for Design Fabrication and Construction of Freight Cars; September 1, 1964 | 179.100. |
| AAR Specification for Tank Cars, Specification M-1002, 1981 | 173.31. |
| AAR Specification for Tank Cars, September 1985, Exclusive of (1) pp. 28-80; AAR, Part 179, changes to DOT regulations proposed by AAR Committee on Tank Cars, and (2) DOT Regulations in Effect, October 1985. | 179.8; 179.12; 179.100; 179.101; 179.102; 179.103; 179.105; 179.200; 179.201; 179.220; 179.300; 179.400. |
| American Water Works Association, 1010 Vermont Avenue, NW., Suite 810, Washington, DC 20005: | |
| AWWA Standard C207-55, Steel Pipe Flanges, 1955 | 173.360. |
| Bureau of Explosives, 1920 L Street NW., Washington, DC 20036: | |
| Closed Drum Apparatus (Test) | 173.300. |
| Impact Apparatus (Test), January 24, 1961 | 173.53; 173.64; 173.65; 173.114. |
| Open Drum Apparatus (Test) | 173.300. |
| Fetterley's Formula (The Determination of the Relief Dimensions for Safety Valves on Containers in which Liquefied gas is charged and when the exterior surface of the container is exposed to a temperature of 1,200 °F.) | 173.315. |
| Flame Projection Test, 1958 | 173.300. |
| Pamphlet No. 6, Illustrating Methods for Loading and Bracing Carload and Less Than Carload Shipments of Explosives and Other Dangerous Articles, 1962. | 174.101; 174.290; 174.112; 174.115. |
| Pamphlet 6A (Includes Appendix No. 1, October 1944 and Appendix 2, December 1945), Illustrating Methods for Loading and Bracing Carload and Less Than Carload Shipments of Loaded Projectiles, Loaded Bombs, etc., 1943. | 174.101; 174.290. |
| Pamphlet 6C, Illustrating Methods for Loading and Bracing Trailers and Less-Than Trailer Shipments of Explosives and Other Dangerous Articles Via Trailer-on-Flatcar (TOFC) or Container-on-Flat (COFC), September 1968. | 174.55; 174.63; 174.101; 174.112; 174.115. |
| Pamphlets 1 & 2, Emergency Handling of Hazardous Materials in Surface Transportation; June 1973 | 177.861. |
| Canadian Transport Commission, 275 Slater Street, Ottawa, Ontario K1A 0N9: | |
| Canadian Transport Commission Regulations, 1974 | 171.12a; 172.401; 172.502; 174.11. |
| Chlorine Institute, Inc., 342 Madison Avenue, New York, New York 10017: | |
| Type 1 1/2 JQ 225, Dwg. H5-1970, October 7, 1968; or Type 1 1/2 JQ 225, Dwg. H50155, Revision A, April 28, 1969 | 173.315. |
| Standards for Angle Valves, and Dwg. 104-4, May 5, 1959 or Dwg. 104-5, September 1, 1972 | 173.33. |
| Standards for Excess Flow Valves, Dwg. 101-4, and 106-3, May 16, 1969, Dwg. 101-6, and 106-5, September 1, 1973 | 173.33. |
| Standards for Housing and Manway Covers for Steel Cargo Tanks Manufactured on or before December 31, 1974, Dwg. 177-1, November 7, 1962 or Dwg. 173-2, September 11, 1971; Tanks manufactured after January 1, 1975, Dwg. 137-2 (9/1/71). | 173.337. |
| Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, Virginia 22202: | |
| CGA Pamphlet C-3, Standards for Welding and Brazing on Thin Walled Containers, 1975 | 178.47; 178.51; 178.54; 178.58; 178.57; 178.58; 178.60; 178.81; 178.68. |
| CGA Pamphlet C-6, Standards for Visual Inspection of Compressed Gas Cylinders, 1975 | 173.31; 173.34; 173.126. |
| CGA Pamphlet C-7, A Guide for the Preparation of Precautionary Markings for Compressed Gas Containers, Appendix A, May 15, 1972, and Addenda January 1976. | 172.400. |
| CGA Pamphlet C-8, Standard for Requalification of DOT-3HT Cylinder Design, 1979 | 173.34. |
| CGA Pamphlet C-12, Qualification Procedure for Acetylene Cylinder Design, 1979 | 173.34; 173.303. |
| CGA Pamphlet C-14, Procedures for Fire Testing of DOT Cylinder Pressure Relief Device Systems, 1979 | 173.34. |
| CGA Pamphlet G-2.2, Tentative Standard Method for Determining Minimum of 0.2% Water in Anhydrous Ammonia, 1975 | 173.315. |
| CGA Pamphlet G-4.1, Cleaning Equipment for Oxygen Service, 1977 | |
| CGA Pamphlet S-1.1, Pressure Relief Device Standards Part 1—Cylinders for Compressed Gases, 1979 | 173.34. |
| CGA Pamphlets S-1.2, Safety Relief Device Standards Part 2—Cylinders and Portable Tanks for Compressed Gases, 1980 | 173.315; 173.318. |
| CGA Technical Bulletin TB-2, Guidelines for Inspection and Repair of MC-330 and MC-331 Cargo Tanks, 1975 | 173.33. |
| Department of Defense (DOD), 2461 Eisenhower Avenue, Alexandria, VA: | |
| DOD TB 700-2, Explosives Hazard Classification Procedures | 173.66. |
| Department of Energy (USDOE), 1000 Independence Avenue SW., Washington, DC 20545: | |
| USDOE publications available from: Superintendent of Documents, Government Printing Office (GPO) or The National Technical Information Service (NTIS): | |
| USDC, USDOE Materials and Equipment Specification No. SP, Revision 1 and Supplement Fire Resistant Phenolic Foam | 178.120. |
| USAEC, ORO 651—Uranium Hexafluoride Handling Procedures and Container Criteria, Revision 3, 1972 | 173.417; 178.120; 178.121. |
| Department of Health and Human Services (DHHS), Public Health Service Center for Disease Control, National Institute for Occupational Safety and Health (NIOSH), Cincinnati, Ohio 45226: | |
| NIOSH Registry—of Toxic Effects of Chemical Substances, 1976 (Available from the Superintendent of Documents (GPO))S | 172.203. |
| Department of Transportation (USDOT), 400 Seventh St., SW., Washington, DC 20590: | |
| Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials [51 FR 5968 February 18, 1986] Effective March 20, 1986, HMT-166T. | 177.825. |
| Fertilizer Institute, 1015 18th Street, Washington, DC 10036: | |
| Definitions and Test Procedures for Ammonium Nitrate Fertilizer (Revised May 7, 1971) January 16, 1973 | 174.510. |
| General Services Administration, Specification Office, Rm. 6662, 7th and D Street, SW., Washington, DC 20407: | |
| Federal Specification RR-C-901b, General 1-3 | 173.304. |
| Institute of Makers of Explosives, 420 Lexington Avenue, New York, NY 10017: | |
| IME Safety Library Publication No. 22 (IME Standard 22), Recommendation for the Safe Transportation of Detonators in a Vehicle with Certain Other Explosive Materials, January 1, 1985. | 177.835. |
| International Atomic Energy Agency (IAEA), Wagramerstrasse 5, P.O. Box 100, A-1400, Vienna, Austria: | |
| Also available from: Unipub Incorporated, P.O. Box 433, New York, NY 10016. | |
| IAEA, Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6, 1973, Revised Edition (as amended) | 171.12; 173.417. |
| International Civil Aviation Organization (ICAO), P.O. Box 400, Place de l'Aviation Internationale, 1000 Sherbrooke Street West, Montreal, Quebec, Canada H3A 2R2: | |
| ICAO Technical Instructions available from: INTERREG, International Regulations, Publishing and Distribution Organization, P.O. Box 60105, Chicago, IL 60660. | |
| Technical Instructions for the Safe Transport of Dangerous Goods by Air; DOC 9284-AN/905 (1966) [50 FR 48394, December 2, 1985] | 171.11; 172.401. |
| International Maritime Organization (IMO), 4 Albert Embankment, London; SE17SR, United Kingdom; | |
| or New York Nautical Instrument & Service Corporation, 140 W. Broadway, New York, NY 10013: | |
| International Maritime Dangerous Goods Codex, Volumes I, II, III, IV, 1977, and Amendments 14-76; 15-77, and 16-78; 17-79; 18-80; 20-82; 21-83 and 22-84 thereto. | 171.12; 172.102; 172.401; 172.402; 176.5; 178.11; 178.27; 178.30. |

| Source and name of material | 49 CFR reference |
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| International Organization for Standardization, Case Postale 56, CH-1211, Geneva 20, Switzerland: Also available from: ANSI, 1430 Broadway, New York, NY 10018: ISO 82-197(e) Steel Tensile Testing, 1974..... | 178.270-3. 173.121. |
| ISO-2431-72..... | 172.312. |
| ISO R780-1968..... | |
| National Association of Corrosion Engineers, 1440 South Creek, Houston, Texas 77084: NACE Standard TM-01-89, Test Method Laboratory Corrosion Testing of Metals for the Process Industries, 1969..... | 173.500. |
| National Bureau of Standards, Department of Commerce, 5285 Port Royal Road, Springfield, VA 22151: USDC, NBS Handbook H-28 (1957), 1957 Handbook of Screw-Thread Standards for Federal Services, Part II, December 1966 Edition..... | 178.45. 178.120; 178.121. |
| USDC, CAPE 1662, Civilian Applications Program Engineering Drawings (a package of information which includes drawings and bills of material, describing insulated, protective overpacks). | |
| National Fire Protection Association, Batterymarch Park, Quincy, MA 02269: NFPA Pamphlet No. 58—Standard for the Storage and Handling of Liquefied Petroleum Gases, 1979..... | 173.315. |
| National Motor Freight Traffic Association, Inc., Agent 1616 P Street, NW., Washington, DC 20036: National Motor Freight Classification NMF 100-1, 1982..... | 177.841. |
| Nuclear Regulatory Commission, 1717 H Street, NW., Washington, DC 20555: (USNRC). 10 CFR Part 71, Packaging of Radioactive Material for Transport and Transportation of Radioactive Materials Under Certain Conditions. | 173.417. |
| Society of Plastics Industries, Inc., Organic Peroxide Producers Safety Division, 355 Lexington Avenue, New York, NY 10017: Self Accelerating Decomposition Temperature Test, 1972..... | 173.21. |
| Transport Canada, TDG Canadian Government Publishing Center, Supply and Services, Canada, Ottawa K1A 0S9: Transport of Dangerous Goods Regulations, as of July 1, 1985, incorporating Registration Numbers SOR/85-77, SOR85/585 and SOR/85-609. | 171.12a; 172.401; 172.502. |
| Uniform Classification Committee, 222 South Riverside Plaza, Chicago, IL 60606: Uniform Freight Classification, (UFC), Rule 40, Section 5..... | 173.620. 173.620. |
| Uniform Freight Classification (UFC), Rule 41, Sections 2 and 3..... | |
| United Nations, United Nations Sales Section, New York, NY 10017: UN Recommendations for the Transport of Dangerous Goods, Forth Revised Edition (1986)..... | 172.401; 172.407; 172.518. |

In § 171.8, the following definitions and abbreviations would be added, revised, or removed as indicated, in appropriate alphabetical order:

§ 171.8 Definitions and abbreviations.

Add:

"Bag" means a flexible packaging made of paper, plastic film, textiles, woven material or other similar materials.

"Box" means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material.

"Bulk packaging" means a packaging, including a transport vehicle, (1) having an internal volume greater than 450 liters (118.9 gallons) as a receptacle for a liquid, (2) having a capacity greater than 400 kilograms (881.8 pounds) as a receptacle for a solid, or (3) having a water capacity greater than 453.6 kilograms (1000.0 pounds) as a receptacle for a gas.

"Class" means hazard class. See "hazard class".

"Class 1" See § 173.50.

"Class 2" See § 173.115.

"Class 3" See § 173.120.

"Class 4" See § 173.124.

"Class 5" See § 173.128.

"Class 6" See § 173.132.

"Class 7" See § 173.403.

"Class 8" See § 173.136.

"Class 9" See § 173.140.

"Closure" means a device which closes an opening in a receptacle.

"Combination packaging" means a combination of packagings consisting of one or more inner packagings secured in

a non-bulk outer packaging. It does not include a composite packaging.

"Composite packaging" means a packaging consisting of an outer packaging and an inner receptacle, so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains there after an integrated single unit; it is filled, stored, shipped and emptied as such.

"Crate" means an outer packaging with incomplete surfaces.

"Domestic transportation" means transportation between places within the United States other than through a foreign country.

"Dangerous when wet material" See § 173.124.

"Division" means a subdivision of a hazard class.

"Drum" means a flat-ended or convex-ended cylindrical packaging made of metal, fiberboard, plastic, plywood, or other suitable materials. This definition also includes packagings of other shapes made of metal or plastic (e.g., round taper-necked packagings or pail-shaped packagings) but does not include cylinders, jerricans, wooden barrels or bulk packagings.

"Hazard class" means the category of hazard assigned to a hazardous material under the defining criteria of Part 173 of this subchapter and the provisions of the § 172.101 Table.

"Infectious substance" See § 173.134.

"Inner packaging" means a receptacle which requires an outer packaging in order to perform its containment function.

"Inner receptacle" means a receptacle which requires an outer packaging in order to perform its containment function.

"International transportation" means transportation—

(1) Between any place in the United States and any place in a foreign country;

(2) Between places in the United States through a foreign country; or

(3) Between places in one or more foreign countries through the United States.

"Jerrican" means a metal or plastic packaging of rectangular or polygonal cross-section.

"kg" means kilogram.

"kPa" means kilopascal.

"L" means liter.

"Manufacturer" means a person who applies to a packaging a DOT specification marking or a United Nations mark (see § 178.503).

"Maximum capacity" means the maximum inner volume of receptacles or packagings.

"Maximum net mass" means the maximum net mass of contents in a single packaging or, as used in Subpart M of Part 178, the maximum combined mass of inner packagings and the contents thereof.

"mL" means milliliter.

"Non-bulk packaging" means a packaging (1) having an internal volume of 450 liters (118.9 gallons) or less as a receptacle for a liquid, (2) having a capacity of 400 kilograms (881.8 pounds) or less as a receptacle for a solid, or (3) having a water capacity of 453.6 kilograms (1000.0 pounds) or less as a receptacle for a gas.

"n.o.s. entry" means a shipping description from the § 172.101 Table which includes the abbreviation "n.o.s."

"Outer packaging" means the outermost enclosure of a composite or

combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings.

"Pa" means pascal.

"Packing group" means a grouping according to the degree of danger presented by hazardous materials. Packing Group I indicates great danger; Packing Group II, medium danger; Packing Group III, minor danger. See § 172.101(f).

"Poisonous materials" See § 173.132

"Primary hazard" means the hazard class of a material, as assigned in the § 172.101 Table.

"Receptacle" means a containment vessel for receiving and holding materials, including any means of closing.

"Specification packaging" means a packaging conforming to one of the specifications or standards for packagings in Part 178 or Part 179 of this subchapter.

"Strong outer (or outside) packaging" means a packaging which meets or exceeds the performance requirements of § 173.24 of this subchapter applicable to non-specification packagings, either as a single packaging or as the outer packaging of a combination packaging.

"Subsidiary hazard" means a hazard of a material other than the primary hazard. See "primary hazard".

"Table in § 172.101" or "§ 172.101 Table" means the Hazardous Materials Table in § 172.101 of this subchapter.

"UN" means United Nations.

"Wooden barrel" means a packaging made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

"UN standard packaging" means a specification packaging conforming to the requirements in Subparts L and M of Part 178.

Revise

"Bottle" means a receptacle having a neck of relatively smaller cross section than the body and an opening capable of holding a closure for retention of the contents.

"Cargo aircraft only" means an aircraft that is used to transport cargo and is not engaged in carrying passengers. For purposes of this subchapter, the terms "cargo aircraft only", "cargo-only aircraft" and "cargo aircraft" have the same meaning.

"Combustible liquid" See § 173.120.

"Compressed gas" See § 173.115.

"Corrosive material" See § 173.136.

"Etiologic agent" See § 173.134.

"Flammable gas" See § 173.115

"Flammable liquid" See § 173.120.

"Flammable solid" See § 173.124.

"Flash point" means the minimum temperature at which a substance gives off flammable vapors which, in contact with sparks or flame, will ignite. (For criteria, see § 173.121.)

"Gross weight" or "Gross mass" means the weight of a packaging plus the weight of its contents.

"Limited quantity" when specified as such in a section applicable to a particular material, means the maximum amount of a hazardous material for which there is a specific labeling and packaging exception.

"Magnetic material" See § 173.21(d).

"Marking" means descriptive name, identification number, instructions, cautions, weight, specification, or UN marks, or combinations thereof, required by this subchapter on outer packagings of hazardous materials.

"Name of contents" means the proper shipping name as specified in § 172.101.

"Net weight", "Net mass", or "Net quantity" means the mass or volume of hazardous material contained in a package, excluding the weight or volume of any packaging material, except in the case of explosive devices where the net weight is the weight of the finished device excluding packagings. See also "maximum net mass".

"Organic peroxide" See § 173.128.

"ORM" means other regulated material. See § 173.144.

"Oxidizer" See § 173.128.

"Package" means the complete product of the packing operation, consisting of the packaging and its contents as prepared for transport. For radioactive materials, see § 173.403 of this subchapter.

"Packaging" means a receptacle and any other components or materials necessary for the receptacle to perform its containment function and to ensure compliance with the minimum packing requirements of this subchapter. For radioactive materials, see § 173.403 of this subchapter.

"Pyrophoric liquid" See § 173.124(b).

"Spontaneously combustible material" See § 173.124(b).

"Water reactive material" see "Dangerous when wet material."

Remove

NRC

Outside container

Poison A

Poison B

Pyrophoric solid

STC

The title and text of § 171.10 would be revised to read as follows:

§ 171.10 Hazardous materials in bulk on board vessels or barges.

Except for transportation in bulk packagings (as defined in § 171.8 of this Part), the requirements of this subchapter do not apply to the bulk carriage of hazardous materials by vessel or barge. See 46 CFR Subchapters D, I, O and N for requirements applicable to bulk carriage by vessel or barge.

§ 171.11 [Amended]

In § 171.11, paragraphs (d)(4)(i) and (d)(4)(ii) would be removed, and paragraphs (d)(4)(iii) and (d)(4)(iv) would be redesignated as (d)(4)(i) and (d)(4)(ii), respectively.

In § 171.12, paragraphs (c), (d) and (f) would be removed, paragraph (e) would be redesignated as paragraph (c) and paragraph (b) would be revised to read as follows:

§ 171.12 Import and export shipments.

(b) Except for radioactive materials and explosives other than Class 1.4, a material which is packaged, marked, classed, labeled and described in accordance with the IMDG Code when being imported into or exported from the United States, or passing through the United States in the course of being shipped between places outside the United States, may be offered and accepted for transportation and transported within the United States if it is otherwise offered, accepted and transported in accordance with this subchapter, including the placarding requirements of Subpart F of Part 172. The provisions of this paragraph also apply to transportation, a portion of which includes transportation by vessel, between points in a State or between States.

§ 171.12a [Amended]

Section 171.12a would be amended as follows:

1. In paragraph (a) introductory text, the reference to "paragraph (b)" is changed to paragraphs (b) and (g)";

2. In paragraph (d), the introductory phrase preceding the word "specification" is changed to read "Except as specified in paragraph (g) of this section and § 173.301(i) of this subchapter,"

3. In paragraph (e), the reference to "paragraph (a)" is changed to read "paragraphs (a) and (g)".

In § 171.12a, the introductory text of paragraph (b)(2) would be revised and paragraph (g) would be added, as follows:

§ 171.12a Canadian shipments and packagings.

(b)

(2) A material or article meeting the definition for Class 1 (explosives) according to this subchapter, except that, notwithstanding the requirements of Part 172 of this subchapter—

(g) Tank cars used under the provisions of this section must conform to the following requirements:

(1) Each class CTC-105, 112, and 114 tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

(2) After December 31, 1987, each tank car which does not conform to a DOT specification shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

§ 171.14 [Removed]

Section 171.14 would be removed.

PART 172—HAZARDOUS MATERIALS TABLE, SPECIAL PROVISIONS AND HAZARDOUS MATERIALS COMMUNICATIONS REGULATIONS

The authority citation for Part 172 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR Part 1, unless otherwise noted.

The index to Part 172 would be revised to read as follows:

Subpart A—General

Sec.

172.1 Purpose and scope.

172.3 Applicability

Subpart B—Table of Hazardous Materials and Special Provisions

172.101 Purpose and use of hazardous materials table.

172.102 Special provisions.

Appendix A to Subpart B—Identification Number Cross Reference to Proper Shipping Names in the § 172.101 Table

Subpart C—Shipping Papers

172.200 Applicability.

172.201 General entries.

172.202 Description of hazardous material on shipping papers.

172.203 Additional description requirements.

172.204 Shipper's certification.

172.205 Hazardous waste manifest.

Subpart D—Marking

172.300 Applicability

172.301 General marking requirements for non-bulk packagings.

172.302 General marking requirements for bulk packagings.

172.303 Prohibited marking.

172.304 Marking requirements.

172.306 Consignee's or consignor's name and address.

172.308 Authorized abbreviations.

172.310 Radioactive materials.

172.312 Liquid hazardous materials in non-bulk packagings.

172.313 Poisonous hazardous materials.

172.316 Packagings containing material classed as ORM-D or ORM-E.

172.324 Hazardous substances in non-bulk packagings.

172.326 Portable tanks.

172.328 Cargo tanks.

172.330 Tank cars and multi-unit tank car tanks.

172.332 Identification number markings.

172.334 Identification numbers; special provisions and exceptions.

172.338 Replacement of identification numbers.

Subpart E—Labeling

172.400 General labeling requirements.

172.400a Exceptions from labeling.

172.401 Prohibited labeling.

172.402 Additional labeling requirements.

172.403 Radioactive material.

172.404 Labels for mixed and consolidated packagings.

172.405 Authorized label modifications.

172.406 Placement of labels.

172.407 Label specifications.

172.411 EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 labels.

172.415 NON-FLAMMABLE GAS label.

172.416 POISON GAS label.

172.417 FLAMMABLE GAS label.

172.419 FLAMMABLE LIQUID label.

172.420 FLAMMABLE SOLID label.

172.422 SPONTANEOUSLY COMBUSTIBLE label.

172.423 DANGEROUS WHEN WET label.

172.426 OXIDIZER label.

172.427 ORGANIC PEROXIDE label.

172.430 POISON label.

172.431 KEEP AWAY FROM FOOD label.

172.432 INFECTIOUS SUBSTANCE label.

172.436 RADIOACTIVE WHITE-I label.

172.438 RADIOACTIVE YELLOW-II label.

172.440 RADIOACTIVE YELLOW-III label.

172.442 CORROSIVE label.

172.448 CARGO AIRCRAFT ONLY label.

Subpart F—Placarding

172.500 Applicability of placarding requirements.

172.502 Prohibited and permissive placarding.

172.503 Identification number display on placards.

172.504 General placarding requirements.

172.505 Multiple placarding.

172.506 Providing and affixing placards: Highway.

172.507 Special placarding provisions: Highway.

172.508 Placarding and affixing placards: Rail.

172.510 Special placarding provisions: Rail.

172.512 Freight containers and aircraft unit load devices.

172.514 Bulk packagings other than tank cars.

172.516 Visibility and display of placards.

172.519 General specifications for placards.

172.521 DANGEROUS placard.

172.522 EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards.

172.523 EXPLOSIVES 1.4 placard.

172.524 EXPLOSIVES 1.5 placard.

172.525 Standard requirements for the RESIDUE placard.

172.527 Background requirements for certain placards.

172.528 NON-FLAMMABLE GAS placard.

172.532 FLAMMABLE GAS placard.

172.540 POISON GAS placard.

172.542 FLAMMABLE placard.

172.544 COMBUSTIBLE placard.

172.546 FLAMMABLE SOLID placard.

172.547 SPONTANEOUSLY COMBUSTIBLE placard.

172.548 DANGEROUS WHEN WET placard.

172.550 OXIDIZER placard.

172.552 ORGANIC PEROXIDE placard.

172.553 KEEP AWAY FROM FOOD placard.

172.554 POISON placard.

172.556 RADIOACTIVE placard.

172.558 CORROSIVE placard.

Appendix A to Part 172—Office of Hazardous Materials Transportation Color Tolerance Charts and Tables

Appendix B to Part 172—[Reserved]

Appendix C to Part 172—Dimensional Specifications for Recommended Placard Holder

In Part 172, §§ 172.101 and 172.102 would be revised, as follows:

Subpart B—Table of Hazardous Materials and Special Provisions

§ 172.101 Purpose and use of hazardous materials table.

(a) The Hazardous Materials Table (Table) in this section designates the materials listed therein as hazardous materials for the purpose of transportation of those materials. For each listed material, the Table identifies the hazard class or specifies that the material is forbidden in transportation, and gives the proper shipping name or directs the user to the preferred proper shipping name. In addition, the Table specifies or references requirements in this subchapter pertaining to labeling, packaging, quantity limits aboard aircraft and stowage of hazardous materials aboard vessels.

(b) *Column 1: Symbols.* Column 1 of the Table contains six symbols as appropriate: Plus (+) and the letters "A", "D", "E", "I" and "W".

(1) The plus (+) fixes the proper shipping name and the hazard class for that entry without regard to whether the material meets the definition of that class. An alternate proper shipping name and hazard class may be authorized by the Director, OHMT.

(2) The letter "A" restricts the application of requirements of this subchapter to materials offered or intended for transportation by aircraft unless—

(i) The letter "E" also appears with it and the material is a hazardous substance; or

(ii) The material is a hazardous waste.

(3) The letter "D" identifies proper shipping names which are appropriate for describing materials for domestic transportation but may be inappropriate for international transportation under the provisions of international regulations (e.g., IMO, ICAO). Except for hazardous substances or hazardous wastes classed as ORM-E materials, an alternate proper shipping name may be selected when international transportation is involved.

(4) The letter "E" identifies a material which is subject to the requirements of this subchapter, regardless of the mode of transportation or hazard class, if it is a hazardous substance (as defined in § 171.8 of this subchapter). A hazardous substance which does not meet the defining criteria for another hazard class remains subject to certain requirements of this subchapter as an ORM-E.

(5) The letter "I" identifies proper shipping names which are appropriate for describing materials in international transportation. An alternate proper shipping name may be selected when only domestic transportation is involved.

(6) The letter "W" restricts the application of requirements of this subchapter to materials offered or intended for transportation by vessel unless—

(i) The letter "E" also appears with it and the material is a hazardous substance; or

(ii) The material is a hazardous waste.

(c) *Column 2: Hazardous materials descriptions and proper shipping names.* Column 2 lists the hazardous materials descriptions and proper shipping names of materials designated as hazardous materials. Modification of a proper shipping name may otherwise be required or authorized by this section. Proper shipping names are limited to those shown in Roman type (not italics).

(1) Proper shipping names may be used in the singular or plural and in either capital or lower case letters.

(2) The words in italics are not part of the proper shipping name but may be used in addition to the proper shipping name. The word "or" in italics indicates that any terms in the sequence may be used as the proper shipping name as appropriate.

(3) The abbreviation "n.o.i." or "n.o.i.b.n." may be used interchangeably with "n.o.s."

(4) Except for hazardous wastes, when qualifying words are used as part of the proper shipping name, their sequence in the package markings and

shipping paper description is optional. However, the entry in the Table reflects the preferred sequence.

(5) Except for a material classed as an organic peroxide, when one entry references another entry by use of the word "see", if both names are in Roman type, either name may be used as the proper shipping name (e.g., Ethyl alcohol. *See* Ethanol). However, the referenced entry is preferred. For a material classed as an organic peroxide, the technical name shall be used as the proper shipping name. An organic peroxide formulation that is not listed by its technical name, shall be described as "organic peroxide, mixture", "Organic peroxide, sample, n.o.s.", or "organic peroxide, trial quantities, n.o.s.", as appropriate.

(6) When a proper shipping name includes a concentration range as part of the shipping description, the actual concentration, if it is within the range stated, may be used in place of the concentration range. For example, an aqueous solution of hydrogen peroxide containing 30 percent peroxide may be described as "Hydrogen peroxide, aqueous solution with not less than 20 percent but not more than 40 percent hydrogen peroxide" or "Hydrogen peroxide, aqueous solution with 30 percent hydrogen peroxide".

(7) Use of the prefix "mono" is optional in any shipping name when appropriate. Thus, Iodine monochloride may be used interchangeably with Iodine chloride. In "Glycerol alpha-monochlorohydrin" the term "mono" is considered a prefix to the term "chlorohydrin" and may be deleted.

(8) The numbers in italics following a proper shipping name of a material identified by the letter "E" in Column 1 specify, in pounds and kilograms, the minimum quantity of that material, excluding water and other formulating materials, which constitutes a reportable quantity, for purposes of determining whether the material is a hazardous substance as defined in § 171.8 of this subchapter. For example: Ammonia solution (*RQ-1000/454*) means that the reportable quantity for the ammonia is 1,000 pounds or 454 kilograms. Any formulating material identified by the letter "E" in Column 1 of the Table and used in a mixture or solution shall be evaluated independently for the RQ determination. For example, if Mevinphos (*RQ-1/0.454*) is mixed with Xylene (*RQ-1000/454*) and is in a 10-pound package described as "Organophosphorus pesticide, liquid, flammable, toxic, n.o.s." Mevinphos could be in that package in a reportable quantity, but there could not be a reportable quantity of the Xylene

present in that package. Except as otherwise provided, a material in a hazard class other than ORM-E is subject to the requirements of this subchapter even if not packaged in a reportable quantity. A material in the ORM-E class that is neither a hazardous substance nor a hazardous waste (see § 171.8 of this subchapter) is not subject to the requirements of this subchapter.

(9) If the word "waste" is not included in the hazardous material description in Column 2 of the Table, the proper shipping name for a hazardous waste (as defined in § 171.8 of this subchapter) shall include the word "Waste" preceding the proper shipping name of the material. For example: Waste acetone.

(10) A mixture or solution comprised of a hazardous material identified in the Table by technical name and nonhazardous material may be described using the proper shipping name of the hazardous material, if—

(i) The mixture or solution is not specifically identified in the Table;

(ii) The hazard class of the mixture or solution is the same as that of the hazardous material; and

(iii) The qualifying word "mixture" or "solution", as appropriate, is added as part of the proper shipping name.

Example: A solution of Acetone, mineral oil, and water, meeting the definition of a flammable liquid, may be described under this optional provision as "Acetone solution, 3, UN 1090, PG II."

(11) Except for a material subject to or prohibited by §§ 173.21, 173.51, 173.86(d), 173.86(e)(1) or 173.114a(g)(2) of this subchapter, a material for which the hazard class is uncertain and must be determined by testing or a material that is a hazardous waste may be assigned a tentative shipping name, hazard class and identification number, based on the shipper's tentative determination, according to—

(i) Defining criteria in this subchapter;

(ii) The hazard precedence prescribed in § 173.2a of this subchapter; and

(iii) The shipper's knowledge of the material.

(12) Except when the proper shipping name in the Table is preceded by a plus (+)—

(i) If it is specifically determined that a material meets the definition of a hazard class other than the class shown in association with the proper shipping name, the material shall be described by an appropriate proper shipping name listed in association with the correct class for the material.

(ii) If an appropriate technical name is not shown in the Table, selection of a proper shipping name shall be made

from the generic descriptions or "n.o.s." entries corresponding to the specific hazard class of the material. The name that most appropriately describes the material shall be used; e.g., an alcohol not listed by its technical name in the Table shall be described as "Alcohol, n.o.s." rather than "Flammable liquid, n.o.s.". Some mixtures may be more appropriately described according to their application, such as "Coating solution" or "Extract, flavoring, liquid", rather than by an "n.o.s." entry, such as "Flammable liquid, n.o.s.". It should be noted, however, that an n.o.s. entry as a proper shipping name may not provide sufficient information for shipping papers and package markings. Under the provisions of Subparts C and D of this part, the technical name of the constituent which makes the product a hazardous material may be required in association with the proper shipping name.

(iii) If a material meets the definition of more than one hazard class, and is not identified in the Table by a specific description or a dual hazard "n.o.s." entry (e.g., "Flammable liquid, corrosive, n.o.s."), the hazard class of the material shall be determined by using the precedence specified in § 173.2a of this subchapter, and an appropriate shipping description shall be selected as described in paragraph (c)(12)(ii) of this section.

(iv) If it is specifically determined that a material is not a forbidden material and does not meet the definition of any hazard class, the material is not a hazardous material.

(13) When the proper shipping name in the Table is preceded by the letter "D", the hazardous material may be described by an "n.o.s." entry or generic proper shipping name in place of the more specific technical name. However, the technical name of the hazardous material shall be entered in association with the proper shipping name, when appropriate, as for a hazardous substance.

(d) *Column 3: Hazard class.* Column 3 contains a designation of the hazard class or division corresponding to each proper shipping name, or the word "Forbidden".

(1) A material for which the entry in this column is "Forbidden" may not be offered for transportation or transported. This prohibition does not apply if the material is diluted, stabilized or incorporated in a device and it is classed in accordance with the definitions of hazardous materials contained in Part 173 of this subchapter.

(2) When a reevaluation of test data or new data indicates a need to modify the "Forbidden" designation or the

hazard class specified for a material specifically identified in the Table, this data should be submitted to the Director, OHMT.

(3) A basic description of each hazard class and the section reference for class definitions appear in § 173.2 of this subchapter.

(e) *Column 4: Identification number.* Column 4 lists the identification number assigned to each proper shipping name. Those preceded by the letters "UN" are associated with proper shipping names considered appropriate for international transportation as well as domestic transportation. Those preceded by the letters "NA" are associated with proper shipping names not recognized for international transportation, except to and from Canada. Identification numbers in the "NA9000" series are associated with proper shipping names not appropriately covered by international hazardous materials (dangerous goods) transportation standards, or not appropriately addressed by international transportation standards for emergency response information purposes, except for transportation between the United States and Canada.

(f) *Column 5: Packing group.* Column 5 specifies the packing group(s) assignment for a material conforming to the associated hazard class and proper shipping name. Classes 1 and 2 and Divisions 2.1 and 2.2 of Class 2 do not have packing groups. Packing groups I, II and III indicate the degree of danger presented by the material is either great, medium or minor, respectively. If more than one packing group is indicated for an entry, the packing group for the hazardous material is determined using the criteria for assignment of packing groups specified in Subpart D of Part 173. When a reevaluation of test data or new data indicates a need to modify the specified packing group(s), the data should be submitted to the Director, OHMT.

(g) *Column 6: Labels.* Column 6 specifies the hazard warning label(s) required for a package filled with a material conforming to the associated hazard class and proper shipping name, unless the package is otherwise exempted from labeling by provisions in Subpart D of Part 172, or Part 173 of this subchapter. The first label shown for each entry is indicative of the primary hazard of the material, additional labels are indicative of subsidiary hazards. Provisions in § 172.402 may require that a label other than that specified in Column 6 be affixed to the package in addition to that specified in Column 6.

(h) *Column 7: Special provisions.* Column 7 specifies codes for special

provisions applicable to hazardous materials. When Column 7 refers to a special provision for a hazardous material, the meaning and requirements of that special provision are as set forth in § 172.102.

(i) *Column 8: Packaging authorizations.* Columns 8a, 8b and 8c specify the applicable sections for exceptions, non-bulk packaging requirements and bulk packaging requirements, respectively, in Part 173 of this subchapter. Columns 8a, 8b and 8c are completed in a manner which indicates that "§ 173." precedes the designated numerical entry. For example, the entry "202" in column 8b associated with the proper shipping name "Gasoline" indicates that for this material conformance to non-bulk packaging requirements prescribed in § 173.202 of this subchapter is required. When packaging requirements are specified, they are in addition to the standard requirements for all packagings prescribed in § 173.24 of this subchapter and any other applicable requirements in Subparts A and B of Part 173 of this subchapter.

(1) *Exceptions.* Column 8a contains exceptions from some of the requirements of this subchapter. The referenced exceptions are in addition to those specified in Subpart A of Part 173 and elsewhere in this subchapter. A "None" in this column means no packaging exceptions are authorized, except as may be provided by special provisions in Column 7.

(2) *Non-bulk packaging.* Column 8b references the section in Part 173 of this subchapter which prescribes packaging requirements for non-bulk packagings. A "None" in this column means non-bulk packagings are not authorized, except as may be provided by special provisions in Column 7. Each reference in this column to a material which is a hazardous waste or a hazardous substance, and whose proper shipping name is preceded in column 1 of the Table by the letter "A" or "W", is modified to include "§ 173.204" on those occasions when the material is offered for transportation or transported by a mode in which its transportation is not otherwise subject to requirements of this subchapter.

(3) *Bulk packaging.* Column 8c specifies the section in Part 173 of this subchapter which prescribes packaging requirements for bulk packagings other than IM portable tanks. A "None" in this column means bulk packagings are not authorized, except as may be provided by special provisions in Column 7. Authorizations for use of IM portable tanks are set forth in Column 7.

(j) *Column 9: Quantity limitations.* Columns 9a and 9b specify the maximum quantities that may be offered for transportation in one package by passenger-carrying aircraft or rail car (Column 9a) or by cargo aircraft only (Column 9b), subject to the following:

(1) "Forbidden" means the material may not be offered for transportation or transported in the applicable mode of transport.

(2) The quantity limitation is "net" except where otherwise specified, such as for "Consumer commodity" which specifies "65 lbs. gross."

(3) When articles or devices are specifically listed by name, the net quantity limitation applies to the entire article or device (less packaging and packaging materials) rather than only to its hazardous components.

(4) A package offered or intended for transportation by aircraft and which is filled with a material forbidden on passenger-carrying aircraft but permitted on cargo aircraft only, or which exceeds the maximum net quantity authorized on passenger-carrying aircraft, shall be labelled with the CARGO AIRCRAFT ONLY label specified in § 172.448 of this Part.

(k) *Column 10: Vessel stowage requirements.* Columns 10a (Cargo vessel) and 10b (Passenger vessel) specify the authorized stowage locations on board vessels. Column 10c (Other

stowage provisions) specifies codes for stowage requirements for specific hazardous materials. The meaning of each code in Column 10c is set forth in § 176.84 of this subchapter. Section 176.63 of this subchapter sets forth the physical requirements for each of the authorized locations listed in columns 10a and 10b. (For bulk transportation by vessel, see 46 CFR Parts 30 to 40, 70, 98, 148, 151, 153 and 154.) The authorized stowage locations specified in Columns 10a and 10b are defined as follows:

(1) "1" means the material shall be stowed "on deck."

(2) "2" means the material must be stowed "under deck."

(3) "3" means the material must be stowed "under deck away from heat."

(4) "1,2" means the material may be stowed "on deck" or "under deck." However, "under deck" stowage should be used, if available.

(5) "1,3" means the material may be stowed "on deck" or "under deck away from heat." However, "under deck away from heat" stowage should be used, if available.

(6) "4" means the material may be transported on a passenger vessel in only the quantity specified in column 9a of the Table, and is subject to the stowage requirements specified for a cargo vessel for the same material.

(7) "5" means the material is

forbidden and may not be offered for transportation or transported by vessel.

(8) "6" means the material shall be transported in a magazine subject to the requirements of §§ 176.135 through 176.144 of this subchapter.

(l) *Changes to the Table.* (1) Unless specifically stated otherwise in the amendment or the "Effective date" entry in its preamble, if any entry in this Table is changed by an amendment to this subchapter—

(i) Such a change does not apply to the shipment of any package filled prior to the effective date of the amendment; and

(ii) Stocks of preprinted shipping papers and package markings may be continued in use, in the manner previously authorized, until depleted or for a one-year period, subsequent to the effective date of the amendment, whichever is less.

(2) A shipping description or any associated entry which is listed in the § 172.101 Table may be altered, if the alteration is approved by the Director, OHMT.

(3) A shipping description or any associated entry which is listed in the current edition of the IMDG Code but is not listed in the § 172.101 Table may be used as if it were listed in the Table, if approved by the Director, OHMT.

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel storage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|--|---|---------------------------------------|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack aging | (8C) Bulk pack- aging | (9A) Passenger aircraft or helicar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other storage provisions | |
| D | Accellerene, see p-Nitrosodimethylaniline Accumulators, electric, see Batteries, wet etc. Accumulators pressurized (pneumatic or hydraulic) containing non-flammable gas Acetal | 2.2 3 3 | NA1956 UN1088 UN1089 | II I | NONFLAMMA BLE GAS FLAMMABLE LIQUID FLAMMABLE LIQUID | T7 B16 N1 N15, T20, T26, T29. | 308 150 None | 308 202 201 | None 242 243 | No limit 60 L 30 L | No limit 13 13 | 1,2 5 5 | 1,2 5 5 | 12 12 12 | |
| AE | Acetaldehyde ammonia (RQ-1000/454) Acetaldehyde oxime | 9 3 | UN1841 UN2332 | III II | None FLAMMABLE LIQUID, CORROSIVE | T8 | 155 150 | 204 202 | 241 242 | 200 kg 60 L | 1,2 13 | 1,2 1,3 | 1,2 1,3 | 34 | |
| E | Acetic acid glacial or Acetic acid solution more than 80 per cent acid, by weight (RQ-1000/454) | 8 | UN2789 | II | CORROSIVE | B2 N1, N11 N26 N35 T8 | 154 | 202 | 242 | 30 L | 13 | 1,3 | 1,3 | 21 | |
| DE | Acetic acid solution 10 percent or less (RQ-1000/454) | ORM E | NA2790 | III | None | | 156 | 203 | 241 | 30 L | 12 | 1,2 | 1,2 | | |
| E | Acetic acid solution more than 10 per cent but not more than 80 per cent acid, by weight (RQ-1000/454) | 8 | UN2790 | II | CORROSIVE | B2, N1 N11, N26 N35 T8 | 154 | 202 | 242 | 30 L | 12 | 1,2 | 1,2 | | |
| E | Acetic anhydride (RQ-1000/454) | 8 | UN1715 | II | CORROSIVE | B2 N1 N11 N26 N35 T8 | 154 | 202 | 242 | 30 L | 13 | 1,3 | 1,3 | 21, 40, 77 | |
| E | Acetone | 3 | UN1090 | II | FLAMMABLE LIQUID | T8 | 150 | 202 | 242 | 60 L | 13 | 5 | 5 | | |
| E | Acetone cyanohydrin (RQ-10/454) | 6.1 | UN1541 | I | POISON | B14 B32 N1, N16 N34, 10 | None | 227 | 244 | Forbidden | 1 | 5 | 5 | 25, 26 27 40 95 | |
| E | Acetone oils Acetonitrile, see Methyl cyanide Acetyl acetone peroxide (3,5-Dimethyl-3,5- dihydroxydioxolane-1,2) not more than 40 per cent in solution and not more than 9% by weight active oxygen | 3 5.2 | UN1091 UN2080 | II II | FLAMMABLE LIQUID ORGANIC PEROXIDE | T7 T30 | 150 152 | 202 225 | 242 None | 30 L 10 L | 1,3 1 | 1 | 5 | 12, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---|--|------------------------|---------------------------------------|------------------------------|------------------------------|-----------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Acetyl acetone peroxide, (3,5-dimethyl-3,5-dihydroxydioxane-1,2), not more than 32% as a paste with not less than 44% solvent, not less than 9% water and not less than 11% inert solid. | 5.2 | UN3061 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Acetyl acetone peroxide with more than 9% by weight active oxygen. | Forbidden | | | | | None | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 | |
| | Acetyl benzoyl peroxide, not more than 40 per cent in solution. | Forbidden | UN2081 | II | ORGANIC PEROXIDE. | | None | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 | |
| | Acetyl benzoyl peroxide, solid, or more than 40% in solution. | Forbidden | UN1716 | II | CORROSIVE. | B2, T12, T26. | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 80, 40 | |
| | Acetyl bromide (RQ-5000/2270) | 3 | UN1717 | II | FLAMMABLE LIQUID, CORROSIVE. | N1, N11, N16, N26, N34, T18, T26. | None | 202 | 243 | 1 L | 5 L | 1, 3 | 1 | 40 | |
| | Acetyl chloride (RQ-5000/2270) | 3 | UN1717 | II | FLAMMABLE LIQUID, CORROSIVE. | N1, N11, N16, N26, N34, T18, T26. | None | 202 | 243 | 1 L | 5 L | 1, 3 | 1 | 40 | |
| | Acetyl cyclohexanesulfonyl peroxide, more than 82 per cent wetted with less than 12 per cent water. | Forbidden | | | | | | | | | | | | | |
| | Acetyl cyclohexanesulfonyl peroxide, not more than 82 per cent in solution. | 5.2 | UN2083 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Acetyl cyclohexanesulfonyl peroxide, not more than 82 per cent, wetted with not less than 12 per cent water. | 5.2 | UN2082 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Acetylene, dissolved | 2.1 | UN1001 | I | FLAMMABLE GAS. | | None | 303 | None | Forbidden | 15 kg | 1 | 1 | 25, 40, 57, 93 | |
| Acetylene (liquefied) | Forbidden | | | | | | | | | | | | | | |
| Acetylene silver nitrate | Forbidden | | | | | | | | | | | | | | |
| Acetylene tetrabromide, see Tetrabromoethane. | Forbidden | | | | | | | | | | | | | | |
| Acetyl iodide | 6 | UN1888 | II | CORROSIVE. | B2, T9 | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 80, 40 | | |
| Acetyl methyl carbinol | 3 | UN2621 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1, 3 | 1, 3 | | | |
| Acetyl peroxide, see Diacetyl peroxide, etc. | | | | | | | | | | | | | | | |
| Acid butyl phosphate, see Butyl acid phosphate. | | | | | | | | | | | | | | | |
| Acid, liquid, n.o.s. | 6 | NA1760 | II | CORROSIVE. | B2 | 164 | 202 | 242 | 1 L | 5 L | 1, 2 | 1 | | | |
| Acid, sludge, see Sludge acid. | 4.1 | UN2713 | III | FLAMMABLE SOLID. | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1, 3 | 1, 3 | 40 | | |
| Acridine | 3 | UN2607 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1, 3 | 1, 3 | | | |
| Acrolein dimer, stabilized | 3 | UN1092 | I | FLAMMABLE LIQUID, POISON. | B14, B30, 10. | None | 226 | 244 | Forbidden | Forbidden | 1, 3 | 5 | 12, 40 | | |

| (1) Sym- bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifi- cation numbers | Pack- ing group | Labels | Special provisions | (8) Packaging (§ 173.101) | | | (9) Quantity limitations | | | (10) Vessel storage requirements | | |
|---------------------|---|-----------------|--------------------------------|-----------------------|---------------------------------|----------------------------------|------------------------------|--------------------------------|------------------------|--------------------------|--------|------|----------------------------------|-------|---------------|
| | | | | | | | Excep- tions | Non- bulk pack- aging | Bulk packag- ing | (8A) | (8B) | (8C) | (9A) | (9B) | (9C) |
| | | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (9C) | (10A) | (10B) | (10C) |
| | | | | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 | 202 L | | 1,3 | 1,3 | |
| | Alcohols, n.o.s. | 3 | UN1987 | II | FLAMMABLE LIQUID. | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | | 1,3 | 1 | 12 |
| | | | | III | FLAMMABLE LIQUID. | T7, T30 | 150 | 203 | 242 | 60 L | 220 L | | 1,3 | 1,3 | 12 |
| | Alcohols, toxic, n.o.s. | 3 | UN1986 | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | | 1,3 | 1 | 12, 40 |
| | Aldehydes, n.o.s. | 3 | UN1989 | II | FLAMMABLE LIQUID. | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | | 1,3 | 1 | 12 |
| | | | | III | FLAMMABLE LIQUID. | T7, T30 | 150 | 203 | 242 | 60 L | 220 L | | 1,3 | 1,3 | 12 |
| | Aldehydes, toxic, n.o.s. | 3 | UN1988 | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | | 1,3 | 5 | 12, 40 |
| | Aldol | 6.1 | UN2839 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | | 1,3 | 1,3 | 12, 25, 95 |
| DE | Aldrin (RQ 1/0.454) | 6.1 | NA2761 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | | 1,2 | 1,2 | 95 |
| DE | Aldrin, RQ 1/0.454 | 6.1 | NA2762 | II | POISON | | None | 212 | 243 | 5 L | 60 L | | 1,3 | 1,3 | |
| | Alkali metal alloys, liquid, n.o.s. | 4.3 | UN1421 | I | DANGEROUS WHEN WET. | A2, N1, N15, N34. | None | 201 | 244 | Forbidden | 1 L | | 1 | 5 | |
| | Alkali metal amalgams, liquid. | 4.3 | UN1389 | I | DANGEROUS WHEN WET. | A2, N1, N15, N34. | None | 201 | 244 | Forbidden | 1 L | | 1,3 | 1,3 | |
| | Alkali metal amalgams, solid n.o.s. | 4.3 | UN1389 | I | DANGEROUS WHEN WET. | | None | 211 | 242 | Forbidden | 15 kg | | 1,3 | 1,3 | |
| | Alkali metal amides | 4.3 | UN1390 | II | DANGEROUS WHEN WET. | A19, A20, N2, N11, N26. | None | 212 | 241 | 15 kg | 50 kg | | 1,3 | 5 | 40 |
| | Alkali metal dispersions or Alkali earth metal dispersions. | 4.3 | UN1391 | I | DANGEROUS WHEN WET. | A2, N1, N15, N34. | None | 201 | 244 | Forbidden | 1 L | | 1 | 5 | |
| | Alkaline corrosive liquids, n.o.s., see Caus- tic alkali liquids, n.o.s. | 4.3 | UN1393 | II | DANGEROUS WHEN WET. | A19 | None | 212 | 241 | 15 kg | 50 kg | | 1,3 | 5 | |
| | Alkaline earth metal alloys, n.o.s. | 4.3 | UN1392 | I | DANGEROUS WHEN WET. | A19, N34 | None | 211 | 242 | Forbidden | 15 kg | | 1,3 | 1,3 | |
| | Alkaline earth metal amalgams | 6.1 | UN1544 | I | POISON | | None | 201 | 243 | 1 L | 30 L | | 1,2 | 1,2 | 95 |
| | Alkaloids, n.o.s., or Alkaloid salts, n.o.s., poisonous liquid. | | | II | POISON | | None | 202 | 243 | 5 L | 60 L | | 1,2 | 1,2 | 95 |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | | 1,2 | 1,2 | |
| | Alkaloids, n.o.s., or Alkaloid salts, n.o.s., poisonous solid. | 6.1 | UN1544 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | | 1,2 | 1,2 | |
| | | | | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | | 1,2 | 1,2 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|---|--|--------------------------------|--|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk pack- aging | (9A) Passenger aircraft or raticar | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | | | | | KEEP AWAY FROM FOOD. CORROSIVE, FLAMMABLE LIQUID. | | 153 | 213 | 249 | 160 kg | 200 kg | 1,2 | 1,2 | | |
| | Alkylamines, n.o.s. or Polyalkylamines, n.o.s., corrosive, flammable. | 8 | UN2734 | I | CORROSIVE, FLAMMABLE LIQUID. | N1, N11, N34, T8, T31. | None | 201 | 243 | 5 L | 2.5 L | 1,3 | 1,3 | 22 | |
| | Alkylamines, n.o.s. or Polyalkylamines, n.o.s., flammable, corrosive. | 3 | UN2733 | II | CORROSIVE, FLAMMABLE LIQUID. | T42 | None | 202 | 243 | 1 L | 30 L | 1,3 | 1,3 | 22 | |
| | | | | | FLAMMABLE LIQUID. | | None | 201 | 243 | 5 L | 2.5 L | 1,3 | 1 | 40 | |
| | | | | | CORROSIVE, FLAMMABLE LIQUID. | T8, T31 | None | 202 | 243 | 1 L | 5 L | 1,3 | 1,3 | 40 | |
| | | | | | FLAMMABLE LIQUID. | | None | 203 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Alkylamines, n.o.s.; or Polyalkylamines, n.o.s., corrosive. | 8 | UN2735 | I | CORROSIVE | B1, T6, T31. | None | 201 | 242 | 5 L | 2.5 L | 1,2 | 1 | | |
| | | | | | CORROSIVE | B4, N1, N11, N34, T42. | None | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| | | | | | CORROSIVE | B2, T8 | 154 | 202 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| | Alkyl, Aryl or Toluene sulfonic acid, liquid, with more than 5 per cent free sulfuric acid. | 8 | UN2584 | II | CORROSIVE | T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 9 | |
| | Alkyl, Aryl or Toluene sulfonic acid, liquid, with not more than 5 per cent free sulfuric acid. | 8 | UN2586 | III | CORROSIVE | T8 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1 | 9 | |
| | Alkyl, Aryl or Toluene sulfonic acid, solid, with more than 5 per cent free sulfuric acid. | 8 | UN2583 | II | CORROSIVE | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| | Alkyl, Aryl or Toluene sulfonic acid, solid, with not more than 5 per cent free sulfuric acid. | 8 | UN2585 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Alkyl phenols, n.o.s. (including C2-C8 homologues) liquid. | 6.1 | UN2430 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Alkyl phenols, n.o.s. (including C2-C8 homologues) solid. | 6.1 | UN2430 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Aliphatic, see Pesticides, liquid, toxic, n.o.s. | 3 | UN2333 | II | FLAMMABLE LIQUID, POISON. | T8 | None | 202 | 243 | 1 L | 60 L | 1,3 | 5 | 12, 40, 94 | |
| E | Allyl alcohol (RC-100/45.4) | 3 | UN1098 | I | FLAMMABLE LIQUID, POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40 | |
| | Allylamine | 3 | UN2334 | I | FLAMMABLE LIQUID, POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 12, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------------|--|------------------------|---------------------------------------|------------------------------|--|--|---|--|--------------------------------|---------------------------------------|--------------------------------|--------------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft only | (9B) Cargo aircraft only | (9C) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| E | Allyl bromide | 3 | UN1099 | I | FLAMMABLE LIQUID | T18 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 40 | |
| | Allyl chloride (RG-1000/454) | 3 | UN1100 | I | POISON FLAMMABLE LIQUID | T18, T26 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12 40 | |
| | Allyl chloroformate | 8 | UN1722 | I | CORROSIVE | B4, N1, N34, N41, T18, T26 | None | 201 | 242 | Forbidden | 2.5 L | 1 | 5 | 21, 40 77 | |
| | Allyl ethyl ether | 3 | UN2335 | II | FLAMMABLE LIQUID | T8 | None | 202 | 243 | 1 L | 60 L | 1,3 | 5 | 12 40 | |
| | Allyl formate | 3 | UN2336 | I | POISON FLAMMABLE LIQUID | T18, T26 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12 40 | |
| | Allyl glycidyl ether | 3 | UN2219 | III | POISON FLAMMABLE LIQUID | B1, T7 | 150 | 203 | 242 | 60 L | 230 L | 1,3 | 1,3 | | |
| | Allyl iodide | 3 | UN1723 | I | FLAMMABLE LIQUID, CORROSIVE | N1, N11, N34, T18 | None | 201 | 243 | 5 L | 2.5 L | 1,3 | 5 | 40 | |
| | Allyl isothiocyanate inhibited | 6 | UN1545 | II | POISON | N1, N15, N16, N17, N26, T17 | None | 202 | 243 | Forbidden | 60 L | 1 | 5 | 21, 25, 40, 95 | |
| | Allyltrichlorosilane stabilized | 8 | UN1724 | II | CORROSIVE | B2, B6, N16, N26, N34, T8, T26 | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | 21, 40 77 | |
| | Aluminum alkyl halides | 4 | UN3052 | I | SPONTANE- OUSLY COMBUSTI- BLE | B11, T28, T29, T40 | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | | |
| | Aluminum alkyls | 4 | UN3051 | I | SPONTANE- OUSLY COMBUSTI- BLE | B11, T28, T29, T40 | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | | |
| | Aluminum borohydride or Aluminum boro- hydride in devices | 4 | UN2870 | I | SPONTANE- OUSLY COMBUSTI- BLE | B11 | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | | |
| | Aluminum bromide anhydrous | 8 | UN1725 | II | CORROSIVE | T8 | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 40 | |
| Aluminum bromide solution | 8 | UN2580 | III | CORROSIVE | T8 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | | |
| Aluminum carbide | 4 | UN1394 | II | DANGEROUS WHEN WET | A20, N34, N41 | None | 212 | 242 | 15 kg | 50 kg | 1,3 | 1,3 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion num- bers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (375...) | | | (9) Quantity limitations | | | (10) Vessel storage requirements | | |
|---------------------|---|------------------------|---|------------------------------|-----------------------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raitar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other storage provisions | |
| | Aluminum chloride, anhydrous..... | 8 | UN1726 | II | CORROSIVE..... | | 154 | 212 | 240 | 15 kg..... | 50 kg..... | 1,2..... | 1,2..... | 40 | |
| | Aluminum chloride, solution..... | 8 | UN2581 | III | CORROSIVE..... | T8..... | 154 | 203 | 241 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | | |
| | Aluminum dross, wet or hot..... | Forbidden | | | | | | | | | | | | | |
| | Aluminum ferrosilicon powder..... | 4.3 | UN1395 | II | DANGEROUS WHEN WET, POISON. | A19..... | None | 212 | 242 | 15 kg..... | 50 kg..... | 1,3..... | 1,3..... | 40 | |
| | Aluminiun tyhdide..... | 4.3 | UN2463 | I | DANGEROUS WHEN WET. | A19..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 5..... | 5..... | | |
| | Aluminum nitrate..... | 5.1 | UN1438 | III | OXIDIZER..... | A1, A29..... | 152 | 213 | 240 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | | |
| | Aluminum phosphate solution, see Corro- sive liquids, n.o.s. | | | | | | | | | | | | | | |
| | Aluminum phosphide..... | 4.3 | UN1397 | I | DANGEROUS WHEN WET, POISON. | A19, N2..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 5..... | 5..... | 40, 85 | |
| | Aluminum phosphide pesticides..... | 6.1 | UN3048 | I | POISON..... | N2..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 1,2..... | 1,2..... | 95 | |
| | Aluminum powder, coated, not less than 20 per cent aluminum powder, particle size less than 250 microns. | 4.1 | UN1309 | II | FLAMMABLE SOLID. | | 151 | 212 | 240 | 15 kg..... | 50 kg..... | 1,3..... | 1,3..... | 13, 39 | |
| | Aluminum powder, uncoated..... | 4.3 | UN1396 | II | DANGEROUS WHEN WET. | A19, A20..... | None | 212 | 240 | 15 kg..... | 50 kg..... | 1,3..... | 1,3..... | 99 | |
| | Aluminum resinate..... | 4.1 | UN2715 | III | FLAMMABLE SOLID. | | 151 | 213 | 240 | 25 kg..... | 100 kg..... | 1,3..... | 1,3..... | | |
| | Aluminum silicon powder, uncoated..... | 4.3 | UN1398 | III | DANGEROUS WHEN WET. | A1, A19..... | None | 213 | 241 | 25 kg..... | 100 kg..... | 1,3..... | 1,3..... | 40 | |
| DE | Aluminum sulfate, solid (RC-5000/2270) | ORM-E | NA9078 | III | None..... | | 156 | 213 | 240 | No limit..... | No limit..... | 1,2..... | 1,2..... | | |
| DE | Aluminum sulfate solution (RC-5000/2270) Amatols, see Explosives, blasting, type B. | 8 | NA1760 | III | CORROSIVE..... | | 154 | 203 | 241 | 15 kg..... | 50 kg..... | 1,2..... | 1,2..... | | |
| | 2-Amino-4-chlorophenol..... | 6.1 | UN2673 | II | POISON..... | T1..... | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 95 | |
| | 2-Amino-5-diethylaminopentane..... | 6.1 | UN2946 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 240 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 34 | |
| | 2-(2-Aminoethoxy) ethanol..... | 8 | UN3055 | III | CORROSIVE..... | T2..... | 154 | 203 | 241 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | | |
| | N-Aminoethylpiperazine..... | 8 | UN2815 | III | CORROSIVE..... | T7..... | 154 | 203 | 241 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 12 | |
| | Amthophenols (o,m,p.)..... | 6.1 | UN2512 | III | KEEP AWAY FROM FOOD. | T1..... | 153 | 213 | 240 | 100 kg..... | 200 kg..... | 1,2..... | 1,2..... | 34 | |
| | Aminopropylidethanolamine, see Alkyl- amines, n.o.s. | | | | | | | | | | | | | | |
| | n-Aminopropylimidophtidine, see Alkyl- amines, n.o.s. | | | | | | | | | | | | | | |
| | Aminopyridines (o,m,p.)..... | 6.1 | UN2671 | II | POISON..... | T7..... | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,3..... | 1..... | 12, 40, 95 | |
| E | Ammonia, anhydrous, liquefied..... | 2.3 | UN1005 | III | POISON GAS..... | 19..... | None | 304 | 314, 315 | Forbidden..... | Forbidden..... | 1,2..... | 5..... | 40, 57 | |
| | Ammonia solutions, density (specific gravi- ty) between 0.880 and 0.957 at 15 de- grees C in water, with more than 10 per cent but not more than 35 percent ammonia(RC-1000/454). | 8 | UN2672 | III | CORROSIVE..... | T14..... | 154 | 203 | 241 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | 40, 85 | |

| Sym- bols | Hazardous materials descriptions and proper shipping names | Hazard Class | Identification numbers | Pack- ing group | Labels | Special provisions | Packaging authorizations (§ 173.111) | | | Quantity limitations (9) | | | Vessel stowage requirements (10) | | |
|--------------|---|------------------|------------------------|--------------------|----------------------|--------------------|--------------------------------------|-----------------------------|---------------------|-------------------------------|---------------------|--------------|----------------------------------|--------------------------|--|
| | | | | | | | Excep- tions | Non- bulk pack- aging | Bulk packag- ing | Passenger aircraft or railcar | Cargo aircraft only | Cargo vessel | Pass- enger vessel | Other stowage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| E | Ammonia solutions, density (specific gravity) less than 0.860 at 15 degrees C in water, with more than 50 percent ammonia (RQ-1000/454). | 2.2 | UN1005 | | NONFLAMMABLE GAS. | B13 | 306 | 304 | 314, 315 | Forbidden | 25 kg | 1,3 | 5 | 40, 57, 85, 95 | |
| E | Ammonia solutions, density (specific gravity) less than 0.860 at 15 degrees C in water, with more than 35 percent but not more than 50 percent ammonia (RQ-1000/454). | 2.2 | UN2073 | | NONFLAMMABLE GAS. | | 306 | 304 | 314, 315 | 5 L | 60 L | 1,3 | 5 | 40, 57, 85 | |
| DE | Ammonia solutions with 10 per cent or less ammonia (RQ-1000/454). | ORM-E | NA2672 | III | None | | 156 | 203 | 241 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium acetate (RQ-5000/2270). | ORM-E | NA9079 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium arsenate | 6.1 Forbidden | UN1546 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 27, 95 | |
| DE | Ammonium azide | Forbidden | | | | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium benzoate (RQ-5000/2270) | ORM-E | NA9080 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium bicarbonate (RQ-5000/2270) | ORM-E | NA9081 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium bifluoride, solid, see Ammonium hydrogen fluoride, solid. | | | | | | | | | | | | | | |
| DE | Ammonium bifluoride solution, see Ammonium hydrogen fluoride, solution. | | | | | | | | | | | | | | |
| DE | Ammonium bisulfite, solid solution (RQ-5000/2270). | 8 | NA2683 | III | CORROSIVE | | 154 | 213 | 240 | 5 L | 60 L | 1,2 | 1,2 | | |
| D | Ammonium bisulfite, solution (RQ-5000/2270). | 8 | NA2683 | III | CORROSIVE | | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| DE | Ammonium bromate | Forbidden | | | | | | | | | | | | | |
| DE | Ammonium carbamate (RQ-5000/2270) | ORM-E | NA9083 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium carbonate (RQ-5000/2270) | ORM-E | NA9084 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium chlorate | Forbidden | | | | | | | | | | | | | |
| DE | Ammonium chloride (RQ-5000/2270) | ORM-E | NA9085 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium chromate (RQ-1000/454) | ORM-E | NA9086 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ammonium citrate, dibasic (RQ-5000/2270). | ORM-E | NA9087 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| E | Ammonium dichromate (ammonium bichromate) (RQ-1000/454) solid. | 5.1 | UN1439 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 34 | |
| D | Ammonium dichromate (ammonium bichromate) solution (RQ-1000/454). | 5.1 | UN1439 | II | OXIDIZER | | 152 | 202 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| E | Ammonium dinitro-o-cresolate | 6.1 | UN1843 | II | POISON | T8 | None | 212 | 242 | Forbidden | 100 kg | 1,2 | 1 | 36, 65, 66, 77 | |
| DE | Ammonium fluoride (RQ-5000/2270) | 8 | NA9088 | III | CORROSIVE | | 154 | 213 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| E | Ammonium fluoride (RQ-5000/2270) | 6.1 | UN2505 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26, 34 | |
| E | Ammonium fluosilicate (RQ-1000/454) | 6.1 | UN2854 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26, 34 | |
| E | Ammonium fulminate | Forbidden | | | | | | | | | | | | | |
| E | Ammonium hydrogen fluoride, solid (RQ-5000/2270). | 8 | UN1727 | II | CORROSIVE | N34 | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 26, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (8A) Passenger aircraft or raillar | (8B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| E | Ammonium hydrogen fluoride solution (RQ-5000/2270) | 8 | UN2817 | II | CORROSIVE, POISON | N34, T15 | None | 202 | 243 | 1 L | 30 L | 1,2 | 1,2 | 40 |
| AW | Ammonium hydrogen sulfate <i>Ammonium hydrosulfide, solution, see Am- monium sulfide solution.</i> | 8 | UN2506 | II | CORROSIVE | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 27 40 |
| D | Ammonium hydroxide, see Ammonia solu- tions, etc. | | | | | | | | | | | | | |
| | Ammonium metavanadate | 61 | UN2859 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 |
| | Ammonium nitrate fertilizers, n.o.s. | 51 | UN2072 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,3 | 1,3 | 31, 48, 59, 60 |
| | Ammonium nitrate fertilizers: <i>uniform non- segregating mixtures of ammonium ni- trate/ ammonium sulfate, with more than 45 per cent but not more than 70 per cent ammonium nitrate and not more than 0.4 per cent of total combustible material</i> | 51 | UN2069 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 31, 48, 59 60 |
| | Ammonium nitrate fertilizers: <i>uniform non- segregating mixtures of ammonium ni- trate with added matter which is inorgan- ic and chemically inert towards ammoni- um nitrate, with not less than 90 per cent ammonium nitrate and not more than 0.2 per cent combustible material (including organic material calculated as carbon) or with more than 70 per cent but less than 90 per cent ammonium nitrate and not more than 0.4 per cent total combus- tible material</i> | 51 | UN2067 | III | OXIDIZER | A1 A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 31, 48, 59, 60 |
| | Ammonium nitrate fertilizers: <i>uniform non- segregating mixtures of ammonium ni- trate with calcium carbonate and/or do- lomite, with more than 80 per cent but less than 90 per cent ammonium nitrate and not more than 0.4 per cent total combustible material</i> | 51 | UN2068 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 31, 48, 59, 60 |
| | Ammonium nitrate fertilizers: <i>uniform non segregating mixtures of nitrogen/phos- phate or nitrogen/potash types or coin- plete fertilizers of nitrogen/phosphate/ potash type, with more than 70 per cent but less than 90 per cent ammonium nitrate and not more than 0.4 per cent total combustible material</i> | 51 | UN2070 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 31, 48, 59 60 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.24) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk packag- ing (8B) | Bulk packag- ing (8C) | Passenger aircraft or rafts (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| AW | Ammonium nitrate fertilizers: uniform non-segregating mixtures of nitrogen/phosphate or nitrogen/potash types or complete fertilizers of nitrogen/ phosphate/potash type, with not more than 70 per cent ammonium nitrate and not more than 0.4 per cent total added combustible material or with not more than 45 per cent ammonium nitrate with unrestricted combustible material. | 9 | UN2071 | III | None | | 155 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| D | Ammonium nitrate fertilizers with not more than 0.2 percent carbon, which meet the definition in the Fertilizer Institute publication 'Definition and Test Procedures for Ammonium Nitrate Fertilizer', dated May 8, 1971. | 5.1 | NA1942 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 31, 48, 60 | |
| | Ammonium nitrate fertilizer, which is more liable to explode than ammonium nitrate with 0.2 per cent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance. | 1.1D | UN0223 | | | | | | | | | | | | |
| | Ammonium nitrate, liquid (hot concentrated solution). | 5.1 | UN2426 | II | OXIDIZER | B5, B17, T25. | None | None | 243 | Forbidden | Forbidden | 5 | 5 | | |
| | Ammonium nitrate, with more than 0.2 per cent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance. | 1.1D | UN0222 | | | | | | | | | | | | |
| | Ammonium nitrate, with not more than 0.2 per cent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance. | 5.1 | UN1942 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 31, 48, 59, 60 | |
| DE | Ammonium nitrite | Forbidden | | | | | | | | | | | | | |
| | Ammonium oxalate (RQ-5000/2270). | 6.1 | NA2449 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | |
| | Ammonium perchlorate | 5.1 | UN1442 | II | OXIDIZER | N13, N34 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 5 | 46 | |
| | Ammonium perchlorate, average particle size less than 45 microns. | 1.1D | UN0402 | | | | | | | | | | | | |
| | Ammonium permanganate, see Permannates, inorganic, n.o.s. | | | | | | | | | | | | | | |
| | Ammonium persulfate | 5.1 | UN1444 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Ammonium picrate, dry or wetted with less than 10 per cent water, by weight. | 1.1D | UN0004 | | | | | | | | | | | | |
| | Ammonium picrate, wetted with not less than 10 per cent water, by weight. | 4.1 | UN1310 | I | FLAMMABLE SOLID. | A2, N15, N34, N41. | None | 211 | None | 0.5 kg | 0.5 kg | 1 | 5 | 36 | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | (10) Vessel stowage requirements | | |
|-----------------|--|---------------------|--|-----------------------|---------------|---------------------------|--|--------------------------|----------------------|------------------------------------|--------------------------|-------------------------------------|------------------------|--------------------------------|
| | | | | | | | Excep-tions (8A) | Non-bulk pack-aging (8B) | Bulk packag-ing (8C) | Passenger aircraft or railcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Passenger vessel (10B) | Other stowage provisions (10C) |
| | 1 3H Ammunition, incendiary white phosphorus with burster, expelling charge or propelling charge 1 4G Ammunition, practice 1 4G Ammunition proof Ammunition, rocket, see Warheads rocket etc. Ammunition, SA (small arms) see Cartridges for weapons etc. Ammunition smoke (other than water-activated ammunition), without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge 1 3G Ammunition, SA (small arms) see Cartridges for weapons etc. 1 4G Ammunition smoke (other than water-activated ammunition), without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge 1 2G Ammunition smoke (other than water-activated ammunition) without white phosphorus or phosphides with or without burster, expelling charge or propelling charge Ammunition, smoke (water-activated contrivances) white phosphorus, with burster, expelling charge or propelling charge, see Contrivances, water-activated etc. (UN 0248) Ammunition, smoke (water-activated contrivances), without white phosphorus or phosphides, with burster, expelling charge or propelling charge, see Contrivances water-activated, etc. (UN 0249) Ammunition smoke white phosphorus (other than water-activated ammunition), with burster, expelling charge or propelling charge Ammunition smoke white phosphorus (other than water-activated ammunition), with burster, expelling charge or propelling charge Ammunition, sporting, see Cartridges for weapons etc. (UN 0012; 0328; 0339) Ammunition tear-producing non-explosive without burster or expelling charge, non-fuzed Ammunition, tear-producing with burster, expelling charge or propelling charge. | | UN0244 UN0362 UN0363 UN0016 UN0303 UN0015 UN0246 UN0245 UN2017 UN0018 | | | | (8A) (8B) (8C) | (9A) (9B) | (10A) (10B) | | | | | |

13 20
40; 86

5

12

50 kg

None

212

None

POISON
CORROSIVE

II

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.175) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | |
|--|---|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|--|---|------------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger aircraft | (10C) Other inflight provisions | | |
| E | Ammunition, tear-producing with burster, expelling charge or propelling charge. | 1.3G | UN0019 | | | | | | | | | | | | | |
| | Ammunition, tear-producing with burster, expelling charge or propelling charge. | 1.4G | UN0301 | | | | | | | | | | | | | |
| | Ammunition, toxic, nonexplosive, without burster or expelling charge, non-fuzed. | 6.1 | UN2016 | | II | POISON | | None | 212 | None | Forbidden | 100 kg | Forbidden | 1,2 | 5 | 13, 40, 95 |
| | Ammunition, toxic (other than water-acti- vated ammunition), with burster, expel- ling charge or propelling charge. | 1.2K | UN0020 | | | | | | | | | | | | | |
| | Ammunition, toxic (other than water-acti- vated ammunition), with burster, expel- ling charge or propelling charge. | 1.3K | UN0021 | | | | | | | | | | | | | |
| | Ammunition, toxic (water-activated contri- vances), with burster, expelling charge or propelling charge, see Contrivances, water-activated, etc. | | | | | | | | | | | | | | | |
| | Ammunition, see Caps, toy | | | | | | | | | | | | | | | |
| | Amyl acetates (FC-1000/454) | | 3 | UN1104 | III | FLAMMABLE LIQUID. | T1 | 150 | 203 | 241 | 5 L | 60 L | 1,3 | 1 | | |
| | Amyl acid phosphate | | 8 | UN2819 | III | CORROSIVE | T7 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| | Amyl alcohols | | 3 | UN1105 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Amylamine | | 3 | UN1106 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Amyl butyrates | | 3 | UN2620 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Amyl chloride | | 3 | UN1107 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| n-Amylene | | 3 | UN1108 | I | FLAMMABLE LIQUID. | T14 | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | 12 | | |
| Amyl formates | | 3 | UN1109 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | |
| Tert - Amyl hydroperoxide not more than 88% in solution with not less than 6% water. | | 5.2 | UN3067 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | Forbidden | Forbidden | 1 | 5 | | | |
| Amyl mercaptan, | | 3 | UN1111 | II | FLAMMABLE LIQUID. | N1, N15, T8 | None | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | |
| Amyl methyl ketone | | 3 | UN1110 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |
| Amyl nitrate | | 3 | UN1112 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | |
| Amyl nitrite | | 3 | UN1113 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12, 40 | | |
| tert-Amylperoxybenzoate, not more than 92 per cent in solution. | | 5.2 | UN3044 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--|--|------------------------|---------------------------------------|------------------------------|-------------------------|---|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | tert-Amyl peroxy-2-ethylhexanoate, techni- cally pure. | 5.2 | UN2898 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | tert-Amyl peroxydecanoate, not more than 75 per cent with phlegmatizer. | 5.2 | UN2891 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | tert-Amyl peroxyvalerate, not more than 77 per cent in solution. | 5.2 | UN2857 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Amyltrichlorosilane | 8 | UN1728 | II | CORROSIVE | B2, B6, N16, N26, N34, T8, T26. | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | 77, 40 | |
| | Anhydrous hydrofluoric acid, see Hydrogen fluoride, anhydrous. | | | | | | | | | | | | | | |
| | Aniline (RC-1000/454) | 6.1 | UN1547 | II | POISON | T8 | None | 202 | 243 | Forbidden | 60 L | 1,2 | 1,2 | 26, 40, 44, 95 | |
| | Aniline hydrochloride | 6.1 | UN1548 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 27, 34 | |
| | Aniline oil, see Aniline | | | | | | | | | | | | | | |
| | Anisidines liquid | 6.1 | UN2431 | III | KEEP AWAY FROM FOOD. | T1 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Anisidines solid | 6.1 | UN2431 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Anisole | 3 | UN2222 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | | |
| | Anisoyl chloride | 8 | UN1728 | II | CORROSIVE | B2, T8 | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 80, 13, 40 | |
| Anti-freeze liquid, see Flammable liquids, n.o.s. | | | | | | | | | | | | | | | |
| Antimonoous chloride, see Antimony trichlo- ride. | | | | | | | | | | | | | | | |
| Antimony compounds, inorganic, n.o.s. pot- sonous liquid. | 6.1 | UN1549 | I | POISON | | None | 201 | 243 | 1 L | 30 L | 1,2 | 1,2 | 95 | | |
| Antimony compounds, inorganic, n.o.s. pot- sonous solid. | 6.1 | UN1549 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 95 | | |
| Antimony lactate | 6.1 | UN1550 | III | KEEP AWAY FROM FOOD. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | | |
| Antimony pentachloride, liquid (RC-1000/ 454). | 8 | UN1730 | II | CORROSIVE | B2, T8, T26. | None | 202 | 242 | 1 L | 30 L | 1 | 1 | 80, 13, 40 | | |
| Antimony pentachloride, solution (RC- 1000/454). | 8 | UN1731 | II | CORROSIVE | B2, T8, T27. | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 80, 40 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.34) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|--|---|---|---------------------------------------|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Not bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raider | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage requirements | |
| (1) | Antimony pentafluoride | 8 | UN1792 | II | CORROSIVE, POISON. | N1, N3, N11, N16, N26, N35, T12, T26. | None | 202 | 243 | Forbidden | 30 L | 1 | 5 | 40 | |
| E | Antimony potassium tartrate (RQ-1000/ 45A). Antimony powder | 6.1 | UN1551 UN2871 | III | KEEP AWAY FROM FOOD, KEEP AWAY FROM FOOD, | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Antimony sulfide and a chlorate, mixtures of. Antimony sulfide, solid, see Antimony com- pounds, inorganic, n.o.s. | Forbidden | | | | | | | | | | | | | |
| DE | Antimony tribromide, solid (RQ-1000/45A) | 8 | NA1549 | II | CORROSIVE | B2 | 154 | 212 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 40 | |
| D | Antimony triphosphide, solution (RQ-1000/ 45A). | 8 | NA1549 | II | CORROSIVE | B2 | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | | |
| DE | Antimony trichloride, solid (RQ-1000/45A) | 8 | UN1793 | II | CORROSIVE | | 154 | 212 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 40 | |
| DE | Antimony trichloride solution (RQ-1000/ 45A). | 8 | NA1549 | II | CORROSIVE | | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | | |
| DE | Antimony trifluoride, solid (RQ-1000/45A) | 8 | NA1549 | II | CORROSIVE | | 154 | 212 | 240 | 25 kg | 25 kg | 1,2 | 1,2 | | |
| DE | Antimony trifluoride solution (RQ-1000/ 45A). | 8 | NA1549 | II | CORROSIVE | | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | | |
| DE | Antimony trioxide (RQ-5000/2270) | ORM-E | NA9201 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Aque ammonia, see Ammonia solution, etc. Argon, compressed | 2.2 | UN1006 | | NONFLAMMA- BLE GAS. | | 306 | 302 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Argon, refrigerated liquid (cryogenic liquid) | 2.2 | UN1951 | | NONFLAMMA- BLE GAS. | | 320 | 316 | 318 | 50 kg | 500 kg | 1,3 | 1 | 85 | |
| | Arsenic acid, liquid | 6.1 | UN1553 | I | POISON | T18, T27 | None | 201 | 243 | 1 L | 30 L | 1,2 | 1,2 | 95 | |
| | Arsenic acid, solid | 6.1 | UN1554 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Arsenical dust | 6.1 | UN1562 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Arsenical pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2760 | I | FLAMMABLE LIQUID, POISON, POISON, FLAMMABLE LIQUID. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| | Arsenical pesticides, liquid, toxic, flamma- ble, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN2993 | I | POISON, FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 21, 95 | |
| | Arsenical pesticides, liquid, toxic, n.o.s. | 6.1 | UN2994 | III | POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 21, 95 | |
| | Arsenical pesticides, liquid, toxic, n.o.s. | 6.1 | UN2994 | I | KEEP AWAY FROM FOOD, POISON | B1, T14 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 21, 34 | |
| | Arsenical pesticides, liquid, toxic, n.o.s. | 6.1 | UN2994 | II | POISON | T42 | None | 202 | 243 | 1 L | 30 L | 1 | 1 | 95 | |
| | Arsenical pesticides, liquid, toxic, n.o.s. | 6.1 | UN2994 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | (9) Quantity limitations | | (10) Vessel stowage requirements | | |
|---------------------|--|---|--|---|---|------------------------------|--|--|---|---|--|--|--|
| | | | | | | | (8A) Escap- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raticar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel |
| | Articles, pyrotechnic for technical purposes .. Articles, pyrotechnic for technical purposes .. Articles, pyrotechnic for technical purposes .. Articles, pyrotechnic for technical purposes .. Articles, pyrotechnic for technical purposes .. Asbestos, blue .. Asbestos, white (chrysotile, actinolite, anthophyllite, tremolite). Ascaridole (organic peroxide) .. | 1.1G 1.2G 1.3G 1.4G 1.4S 9 9 | UN0428 UN0429 UN0430 UN0431 UN0432 UN2212 UN2590 | II III | None None | | 155 155 | 216 216 | 240 240 | Forbidden 200 kg | 1.2 1.2 | 1.2 1.2 | |
| DW D | Asphalt, at or above its flashpoint .. Asphalt, cut back, see Tars, liquid, etc. Auto alarms, see Alarm devices, explosive .. Automobile, motorcycle, tractor, or other self-propelled vehicle, engine, or other mechanical apparatus. See Vehicles, self-propelled. Azauric acid (salt of) (dry) .. | Forbidden 9 | NA1989 | III | None | | 155 | None | 242 | Forbidden | 1 | 5 | |
| | Azodithiocarbonic acid .. Azidoethyl nitrate .. Azido guanidine picrate (dry) .. 5-Azido-1-hydroxy tetrazole .. Azido hydroxy tetrazole (mercury and silver salts). 3-Azido-1,2-Propylene glycol dinitrate .. | Forbidden Forbidden Forbidden Forbidden Forbidden Forbidden Forbidden | | | | | | | | | | | |
| DE DE | Azinhos methyl (RQ-1/0.45A) solid .. Azinhos methyl liquid (RQ-1/0.45A) .. 1-Aziridinyl phosphine oxide-(tris), see Tri- (1-aziridinyl) phosphine oxide, solution. 2,2'-Azodi-(2,4-dimethyl-4- methoxyvaleronitrile). 2,2'-Azodi-(2,4-dimethylvaleronitrile) .. 1,1'-Azodi-(hexahydrobenzoxonitrile) .. Azodisobutyronitrile .. 2,2'-Azodi (2-methyl-butyronitrile) .. Azotetrazole (dry) .. Bags, having contained sodium nitrate, empty, unwashed. | 6.1 6.1 4.1 4.1 4.1 4.1 4.1 Forbidden 4.1 | NA2783 NA2783 UN2955 UN2953 UN2954 UN2952 UN3030 UN1359 | II II II II II II III | POISON POISON FLAMMABLE SOLID. FLAMMABLE SOLID. FLAMMABLE SOLID. FLAMMABLE SOLID. FLAMMABLE SOLID. | | None None None None None None None None None None | 212 202 214 214 214 214 214 204 | 242 243 None None None None None 246 | 100 kg 30 L Forbidden Forbidden 50 kg Forbidden Forbidden 100 kg | 1.2 1.2 1 1 1.3 1 1 1.3 | 1.2 1.2 5 5 5 5 5 5 | 85 2 2 25 2 23, 52, 53 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | Labels | Special provisions | (6) Packaging authorizations (§179.17) | | | (7) Quantity limitations | | (8) Vessel stowage requirements | | | |
|---|--|------------------------|---------------------------------------|------------------------------|---|-----------------------|--|--|--------------------------------|---|--------------------------------|------------------------------------|-----------------------------------|---|--|
| | | | | | | | (9A) Excep- tions | (9B) Non- bulk pack- aging | (9C) Bulk pack- aging | (9A) Passenger aircraft or cargo aircraft only | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other storage provisions | |
| E | Barium..... | 4.3 | UN1400 | II | DANGEROUS WHEN WET. | A19..... | None | 212 | 241 | 15 kg..... | 50 kg..... | 1, 3 | 6 | | |
| | Barium alloys, pyrophoric..... | 4.2 | UN1854 | II | SPONTANE- OUSLY COMBUSTI- BLE. | | None | 181 | None | Forbidden..... | Forbidden..... | 1 | 5 | | |
| | Barium azide, dry or wetted with less than 50 per cent water, by weight. | 1.1A | UN0224 | I | FLAMMABLE SOLID, POISON. | A2..... | None | 182 | None | Forbidden..... | Forbidden..... | 1 | 5 | 36 | |
| | Barium azide, wetted with not less than 50 per cent water, by weight. | 4.1 | UN1571 | I | FLAMMABLE SOLID, POISON. | | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 34, 46, 56 | |
| | Barium bromate..... | 5.1 | UN2719 | II | OXIDIZER, POISON. | | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 46, 56, 95 | |
| | Barium chlorate..... | 5.1 | UN1445 | II | OXIDIZER, POISON. | N13, N34, T8. | None | 212 | 242 | 5 kg..... | 50 kg..... | 1, 2 | 1, 2 | 95 | |
| | Barium compounds, n.o.s., except Barium sulfide. | 6.1 | UN1564 | I | POISON..... | | None | 211 | 242 | 5 kg..... | 50 kg..... | 1, 2 | 1, 2 | 95 | |
| | Barium cyanide (RQ-10/4.54)..... | 6.1 | UN1565 | I | POISON..... | N74, N75 | None | 211 | 242 | 5 kg..... | 50 kg..... | 1, 2 | 1, 2 | 26, 40, 95 | |
| | Barium hypochlorite with more than 22 per cent available chlorine. | 5.1 | UN274 | II | OXIDIZER..... | N13, N26, N34. | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 34 | |
| | Barium nitrate..... | 5.1 | UN1446 | II | OXIDIZER, POISON. | | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 95 | |
| AW | Barium nitrate..... | 5.1 | UN1446 | II | OXIDIZER, POISON. | | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 95 | |
| | Barium-oxide..... | 6.1 | UN1884 | III | KEEP AWAY FROM FOOD. | | None | 213 | 240 | 100 kg..... | 200 kg..... | 1, 2 | 1, 2 | 34 | |
| | Barium perchlorate..... | 5.1 | UN1447 | II | OXIDIZER, POISON. | T8 | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 46, 95 | |
| | Barium permanganate..... | 5.1 | UN1448 | II | Poison. OXIDIZER, POISON. | | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 56, 69, 95 | |
| | Barium peroxide..... | 5.1 | UN1449 | II | OXIDIZER, POISON. | | None | 212 | 242 | 5 kg..... | 25 kg..... | 1, 2 | 1, 2 | 13, 95 | |
| | Barium selenate, see Selenates or Selen- ites. | | | | | | | | | | | | | | |
| | Barium selenite, see Selenates or Selen- ites. | | | | | | | | | | | | | | |
| | Batteries, dry, containing potassium hy- droxide solid, electric storage. | 8 | UN3028 | III | CORROSIVE..... | | 159 | 159 | None | 25 kg gross. | 25 kg gross. | 1, 2 | 1, 2 | | |
| | Batteries, wet, filled with acid, electric stor- age. | 8 | UN2794 | II | CORROSIVE..... | | 159 | 159 | None | 25 kg gross. | 230 kg gross. | 1, 2 | 1, 2 | | |
| | Batteries, wet, filled with alkali, electric stor- age. | 8 | UN2795 | III | CORROSIVE..... | | 159 | 159 | None | 25 kg gross. | 230 kg gross. | 1, 2 | 1, 2 | | |
| Batteries, wet, non-spillable, electric stor- age. | 8 | UN2800 | III | CORROSIVE..... | | 159 | 159 | None | No Limit..... | No Limit..... | 1, 2 | 1, 2 | | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | (10) Vessel stowage requirements | | |
|-----------------|--|---------------------|--------------------------------|-----------------------|----------------------------------|---|--|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-------------------------------------|----------------------------|-----------------------------------|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other stowage provisions |
| E | Battery fluid, acid..... | 8 | UN2796 | II | CORROSIVE..... | B2, B15, N1, N26, N34, T8, T27, B2, T8..... | 154 | 202 | 242 | 1 L..... | 30 L..... | 1,2..... | 1..... | 33 |
| | Battery fluid, alkali..... | 8 | UN2797 | II | CORROSIVE..... | B2, T8..... | 154 | 202 | 242 | 1 L..... | 30 L..... | 1,2..... | 1,2..... | |
| | Battery lithium type, see Lithium batteries | | | | | | | | | | | | | |
| | Benzene (RQ-1000/454)..... | 3 | UN1114 | II | FLAMMABLE LIQUID..... | T8..... | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1..... | 40 |
| | Benzene diazonium chloride (dry)..... | Forbidden | | | | | | | | | | | | |
| | Benzene diazonium nitrate (dry)..... | Forbidden | | | | | | | | | | | | |
| | Benzene-1,3-disulfonhydrazide, not more than 52 per cent as a paste. | 4.1 | UN2871 | II | FLAMMABLE SOLID..... | | None | 214 | None | 15 kg..... | 50 kg..... | 1,3..... | 1,3..... | 12, 25, 48, 52, 53, 85 |
| | Benzene phosphorus dichloride, see Phenyl phosphorus dichloride. | | | | | | | | | | | | | |
| | Benzene phosphorus thiodichloride, see Phenyl phosphorus thiodichloride. | | | | | | | | | | | | | |
| | Benzene sulfonyl chloride..... | 4.1 | UN2970 | II | FLAMMABLE SOLID..... | | None | 214 | None | 15 kg..... | 50 kg..... | 1,3..... | 1,3..... | 12, 25, 48, 52, 53, 85 |
| | Benzene sulfonyl chloride..... | 8 | UN2225 | III | CORROSIVE..... | T8..... | 154 | 203 | 241 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | 40 |
| | Benzeneethiol, see Phenyl mercaptan | | | | | | | | | | | | | |
| | Benzene triozonide..... | Forbidden | | | | | | | | | | | | |
| | Benzidine..... | 6.1 | UN1885 | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 95 |
| | Benzine..... | 3 | UN1115 | II | FLAMMABLE LIQUID..... | | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 5..... | 12 |
| DE | Benzoic acid (RQ-5000/2270)..... | ORM-E 3 | NA8094 | III | None..... | | 156 | 213 | 240 | No limit..... | No limit..... | 1,2..... | 1,2..... | |
| | Benzoic derivative pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2770 | I | FLAMMABLE LIQUID, POISON..... | | None | 201 | 243 | Forbidden..... | 30 L..... | 1,3..... | 5..... | |
| | Benzoic derivative pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3003 | I | POISON..... | T42..... | None | 202 | 243 | 1 L..... | 60 L..... | 1,3..... | 1..... | 21, 40, 95 |
| | Benzoic derivative pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | | | II | POISON..... | T18..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,2..... | 1..... | 21, 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD, POISON..... | T18..... | 153 | 203 | 241 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 21, 34, 40 |
| | Benzoic derivative pesticides, liquid, toxic, n.o.s. | 6.1 | UN3004 | I | POISON..... | T42..... | None | 201 | 243 | 1 L..... | 30 L..... | 1..... | 1..... | 40, 95 |
| | | | | II | POISON..... | T14..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,2..... | 1..... | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD, POISON..... | T14..... | 153 | 203 | 241 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 40, 34 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|-------------------------|--|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raikcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Benzoic derivative pesticides, solid, toxic, n.o.s. | 6.1 | UN2769 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 40, 95 | |
| | | | | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 | |
| E | Benzol, see Benzene | | | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 26, 40, 95 | |
| | Benzonitrile (RQ-1000/454) | 6.1 | UN2224 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Benzoquinone | 6.1 | UN2587 | II | POISON | B2, T15 | None | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | 40 | |
| | Benzotrithloride | 8 | UN2226 | II | CORROSIVE | T2 | 154 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Benzotrifluoride | 3 | UN2338 | II | FLAMMABLE LIQUID | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Benzoxidiazoles (dry) | Forbidden | | | | | | | | | | | | | |
| | Benzoyl azide | Forbidden | | | | | | | | | | | | | |
| E | Benzoyl chloride (RQ-1000/454) | 8 | UN1736 | II | CORROSIVE | B2, T9, T26 | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 80, 40 | |
| | Benzoyl peroxide, see Dibenzoyl peroxide, etc. | | | | | | | | | | | | | | |
| | Benzyl bromide | 6.1 | UN1737 | II | POISON, CORROSIVE | N1, N26, N33, N34, T12, T26 | None | 202 | 243 | Forbidden | 30 L | 1 | 5 | 40 | |
| E | Benzyl chloride (RQ-100/45.4)stabilized | 6.1 | UN1738 | II | POISON, CORROSIVE | B41, N1, N26, N33, T12, T26 | None | 202 | 243 | Forbidden | 30 L | 1 | 5 | 13, 20, 40, 95 | |
| E | Benzyl chloride unstabilized (RQ-100/45.4) | 6.1 | UN1738 | II | POISON, CORROSIVE | B8, B11, N1, N26, N33, N34, T12, T26 | None | 202 | 243 | Forbidden | 30 L | 1 | 5 | 13, 20 | |
| | Benzyl chloroformate | 8 | UN1739 | I | CORROSIVE | B4, N1, N11, N34, N41, T18, T26 | None | 201 | 242 | Forbidden | 2.5 L | 1 | 5 | 40 | |
| | Benzyl dimethylamine | 8 | UN2619 | II | CORROSIVE | B2, T1 | 154 | 202 | 242 | 1 L | 30 L | 1,3 | 1,3 | 21, 40, 48 | |
| | 4-(Benzyl(ethylamino)-3- ethoxybenzenediazonium zinc chloride. | 4.1 | UN3037 | II | FLAMMABLE SOLID. | | None | 214 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Benzylidene chloride | 6.1 | UN1886 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1 | 5 | 40, 95 | |
| | Benzyl iodide | 6.1 | UN2653 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1 | 12, 40, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging instructions (§ 173.31) | | | (9) Quantity limitations | | | (10) Vessel storage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---------------------------------|------------------------------|--|--|--------------------------------|---------------------------------------|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft only | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other storage provisions |
| | 4-(Benzy(methylamino)3-ethoxybenzenediazonium zinc chloride. | 4.1 | UN3038 | II | FLAMMABLE SOLID. | | None | 214 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| DE | Beryllium chloride (RC-5000/2270) | 6.1 | NA1566 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| DE | Beryllium compounds, n.o.s. | 6.1 | UN1566 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| E | Beryllium fluoride (RC-5000/2270) | 6.1 | NA1566 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Beryllium nitrate (RC-5000/2270) | 5.1 | UN2464 | II | OXIDIZER, POISON. | | None | 212 | 242 | 5 kg | 25 kg | 1,3 | 1,3 | 12, 48, 95 | |
| | Beryllium, powder | 6.1 | UN1567 | II | POISON, FLAMMABLE SOLID. | | None | 212 | 242 | 15 kg | 50 kg | 1,2 | 1,2 | 24, 95 | |
| | Bifluorides, n.o.s. | 8 | UN1740 | II | CORROSIVE | N3, N34 | None | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 25, 26, 40 | |
| | Biphenyl triozonide | Forbidden | | | | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| | Bipyridilium pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2782 | I | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |
| | Bipyridilium pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3015 | I | POISON, FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 21, 40, 95 | |
| | Bipyridilium pesticides, liquid, toxic, n.o.s. | 6.1 | UN3016 | II | POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1 | 21, 40, 95 | |
| | Bipyridilium pesticides, solid, toxic, n.o.s. | 6.1 | UN2781 | III | KEEP AWAY FROM FOOD. | B1, T14 | 153 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 21, 34, 40 | |
| | bis (Aminopropyl) piperazine, see Corrosive liquid, n.o.s. | | | | | | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | Bisulfites, inorganic, aqueous solutions, n.o.s. | | | | | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | Black powder (Gunpowder), compressed or Black powder (Gunpowder), in pellets. | 1.1D | UND028 | III | KEEP AWAY FROM FOOD. | T14 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Black powder (Gunpowder), granular or as a meal. | 1.1D | UND027 | III | KEEP AWAY FROM FOOD. | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 40, 95 | |
| | Blasting agent, n.o.s., see Explosives, blasting. | | | | | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| | Blasting cap assemblies, see Detonator assemblies, non-electric, for blasting. | | | | | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 | |
| | Blasting caps, electric, see Detonators; electric for blasting. | | | | | | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | 89, 40, 49 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.13) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|-----------------------------|---|------------------------------|---|--|--------------------------------|--|--------------------------------|--------------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or resuit | (9B) Cargo aircraft only | (9C) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | Blasting caps, non-electric, see Detonators, non-electric for blasting | | | | | | | | | | | | | | |
| | Bleaching powder, see Calcium hypochlorite mixtures etc. | | | | | | | | | | | | | | |
| | Bombs photo-flash | 11F | UN0037 | | | | | | | | | | | | |
| | Bombs photo-flash | 11D | UN0038 | | | | | | | | | | | | |
| | Bombs photo-flash | 12G | UN0039 | | | | | | | | | | | | |
| | Bombs photo-flash | 13G | UN0299 | | | | | | | | | | | | |
| | Bombs, smoke, non-explosive, with corrosive liquid, without initiating device | 8 | UN2028 | II | CORROSIVE | | | None | 160 | None | Forbidden | 50 kg | Forbidden | 1, 2 | 5, 40 |
| | Bombs, with bursting charge | 11F | UN0033 | | | | | | | | | | | | |
| | Bombs, with bursting charge | 11D | UN0034 | | | | | | | | | | | | |
| | Bombs, with bursting charge | 12D | UN0035 | | | | | | | | | | | | |
| | Bombs, with bursting charge | 12F | UN0291 | | | | | | | | | | | | |
| | Bombs with flammable liquid with bursting charge | 11J | UN0399 | | | | | | | | | | | | |
| | Bombs with flammable liquid with bursting charge | 12J | UN0400 | | | | | | | | | | | | |
| | Boosters, with detonator | 11B | UN0225 | | | | | | | | | | | | |
| | Boosters with detonator | 12B | UN0268 | | | | | | | | | | | | |
| | Boosters without detonator | 11D | UN0042 | | | | | | | | | | | | |
| | Boosters without detonator | 12D | UN0283 | | | | | | | | | | | | |
| | Borate and chlorate mixtures, see Chlorate and borate mixtures. | | | | | | | | | | | | | | |
| | Borneol | 41 | UN1312 | III | FLAMMABLE SOLID | A1 | | None | 213 | 240 | 25 kg | 100 kg | Forbidden | 1, 3 | 1, 3 |
| | Boron tribromide | 8 | UN2892 | I | CORROSIVE AND POISON | N1 N11 N26 N34 T18 T27 | | None | 201 | 243 | Forbidden | 25 L | Forbidden | 1, 1 | 1, 12, 34 |
| | Boron trichloride | 23 | UN1741 | IA | POISON GAS, CORROSIVE | 10 | | None | 304 | 245 | Forbidden | Forbidden | Forbidden | 1, 3 | 25, 34, 40, 85 |
| | Boron trifluoride | 23 | UN1008 | II | POISON GAS | B14, B31, 10 | | None | 302 | 244 | Forbidden | Forbidden | Forbidden | 1, 1 | 5, 40, 85 |
| | Boron trifluoride acetic acid complex | 8 | UN1742 | II | CORROSIVE | B2, B6, T9, T27 | | 154 | 202 | 242 | 1 L | 30 L | 1, 2 | 1, 2 | |
| | Boron trifluoride diethyl etherate | 43 | UN2604 | II | DANGEROUS WHEN WET, CORROSIVE, FLAMMABLE LIQUID | A19, T8, T26 | | None | 202 | 243 | 1 L | 5 L | 1 | 5 | 40 |
| | Boron trifluoride dihydrate | 8 | UN2851 | II | CORROSIVE | T9, T27 | | 154 | 212 | 240 | 15 kg | 50 kg | 1, 3 | 1, 3 | 12, 40 |
| | Boron trifluoride dimethyl etherate | 43 | UN2965 | II | DANGEROUS WHEN WET, CORROSIVE, FLAMMABLE LIQUID | A19, T8, T26 | | None | 202 | 243 | 1 L | 5 L | 1 | 5 | |
| | Boron trifluoride propionic acid complex | 8 | UN1743 | II | CORROSIVE | B2, T9, T27 | | 154 | 202 | 242 | 1 L | 30 L | 1, 2 | 1, 2 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|---|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raibcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | Box toe gum, see Nitrocellulose Brake fluid, hydraulic | 3 | UN1118 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | | | | III | FLAMMABLE LIQUID. | B1, T7, T30 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Bromates, inorganic, n.o.s. Bromine or Bromine solutions | 5.1 8 | UN1450 UN1744 | II I | OXIDIZER CORROSIVE, POISON. | B10 N1, N11, N34, N41, T18, T41, 10. | 152 None | 212 227 | 240 249 | 5 kg Forbidden | 25 kg Forbidden | 1,2 1 | 1,2 5 | 46, 56 12 | |
| | Bromine azide | Forbidden | | | | | | | | | | | | | |
| | Bromine chloride | 2.3 | UN2901 | IB | POISON GAS, CORROSIVE, OXIDIZER. | B12, B14, B31, 10. | None | 304 | 244 | Forbidden | Forbidden | 1 | 5 | 31, 40, 95 | |
| | Bromine pentafluoride | 5.1 | UN1745 | I | OXIDIZER, POISON. | B14, B30, 10. | None | 228 | 244 | Forbidden | Forbidden | 1 | 5 | 13, 25, 40, 95 | |
| | Bromine trifluoride | 5.1 | UN1746 | I | CORROSIVE. OXIDIZER, POISON, CORROSIVE. | B14, B32, 10. | None | 228 | 244 | Forbidden | Forbidden | 1 | 5 | 13, 25, 40, 95 | |
| | Bromoacetic acid, solid | 8 | UN1938 | II | CORROSIVE | N26, N34, T9. | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| | Bromoacetic acid, solution | 8 | UN1938 | II | CORROSIVE | B2, T9 | 154 | 212 | 242 | 1 L | 30 L | 1,2 | 1,2 | 13 | |
| | Bromoacetone | 6.1 | UN1569 | I | POISON | B14, B30, 10. | None | 193 | 244 | Forbidden | Forbidden | 1 | 5 | 21, 40, 95 | |
| | Bromoacetyl bromide | 8 | UN2513 | II | CORROSIVE | B2, T9, T26. | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 8 | |
| | Bromobenzene | 3 | UN2514 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Bromobenzyl cyanides, liquid | 6.1 | UN1694 | I | POISON | T18 | None | 201 | 243 | Forbidden | Forbidden | 1 | 5 | 12, 40, 95 | |
| | Bromobenzyl cyanides, solid | 6.1 | UN1694 | I | POISON | T18 | None | 201 | 241 | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | 2-Bromobutane | 3 | UN2339 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Bromoethane | 6.1 | UN1887 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | 4-Bromo-1,2-dinitrobenzene | Forbidden | | | | | | | | | | | | | |
| | 2-Bromoethyl ethyl ether | 3 | UN2340 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Bromoform | 6.1 | UN2515 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | 12, 34, 40 | |
| | 1-Bromo-3-methylbutane | 3 | UN2341 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Bromomethylpropanes | 3 | UN2342 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|-------------------|-----------------------|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | | | | | (8) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | | | | | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | 1-Bromo-3-nitrobenzene (unstable at 56 °C). | Forbidden 3 | UN2343 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | 2-Bromopentane | 3 | UN2344 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Bromopropanés | | | III | | B1, T3, T7. | 150 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Bromopropánés | 3 | UN2344 | III | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 203 | 242 | 60 L | 220 L | 1,2 | 1 | | |
| | 3-Bromopropyne | 3 | UN2345 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Bromocétane | Forbidden | | | | | | | | | | | | | |
| | Bromotobene-alpha, see Benzyl bromide | 2.1 | UN2419 | | FLAMMABLE GAS. | B13 | None | 304 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 85 | |
| | Bromotrifluoroethylene | 2.1 | UN1009 | | NONFLAMMABLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Bromotrifluoromethane (R-13B1 or H-1301) | 2.1 | UN1570 | I | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Brcucine | 6.1 | UN0043 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Burstels, explosive | 1.1D | UN1010 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Butadiene, inhibited | 2.1 | UN1011 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Butane or Butane mixtures see also Petroleum gases, liquified. | 2.1 | | | | | | | | | | | | | |
| | Butane, butane mixtures and mixtures having similar properties in cartridges each not exceeding 500 grams, see Receptacles, etc. | | | | | | | | | | | | | | |
| | Butanediene | 3 | UN2346 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | 1,2,4-Butanetriol trinitrate | Forbidden 3 | | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Butánols | | UN1120 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | ter-Butoxyacarbonyl azide | Forbidden 3 | | III | FLAMMABLE LIQUID. | T1 | 150 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Butoxyl | 3 | UN2708 | III | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| E | Butyl acetates (RC-5000/2270) | 3 | UN1123 | II | FLAMMABLE LIQUID. | B1, T1 | 150 | 202 | 241 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Butyl acid phosphate | 8 | UN1718 | III | CORROSIVE | T7 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| | Butylacrylate | 3 | UN2348 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging quantities (170...) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | | |
|--|--|------------------------|---------------------------------------|-------------------------------------|----------------------|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|------------|------------------------|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or rafts | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | | | |
| E | Butyl alcohols, see Butanols. | | | | | | | | | | | | | | | | | |
| | n-Butylamine (PG-1000/454) | 3 | UN1125 | II | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 202 | 241 | 60 L | 220 L | 1,3 | 1,3 | | | | | |
| | N-Butylaniline | 6.1 | UN2738 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | 40 | | |
| | Butyl benzenes | 3 | UN2709 | III | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | | | 40, 95 | | |
| | n-Butyl bromide | 3 | UN1126 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | | | |
| | n-Butyl chloride, see Chlorobutanes | | | | | | | | | | | | | | | | | |
| | sec-Butylchloroformate | 6.1 | NA2743 | I | POISON, CORROSIVE. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1,3 | | | 12, 40, 95 | | |
| | n-Butylchloroformate | 6.1 | UN2743 | I | POISON, CORROSIVE. | T18 | None | 201 | 243 | Forbidden | 1 L | 1,3 | 1,3 | 1,3 | | 12, 13, 21, 25, 40, 95 | | |
| | tert-Butyl cumyl peroxide, technically pure | 5.2 | UN2091 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | | | 12, 40 | | |
| | tert-Butylcyclohexylchloroformate | 6.1 | UN2747 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | | | 12, 13, 25, 34 | | |
| | n-Butyl-4,4-di-(tertbutylperoxy) valerate, not more than 52 per cent with inert solid. | 5.2 | UN2141 | II | ORGANIC PEROXIDE. | | None | 225 | None | 5 kg | 10 kg | 1 | 5 | | | 12, 40 | | |
| | n-Butyl-4,4-di-(tertbutylperoxy) valerate, technically pure. | 5.2 | UN2140 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 5 L | 1 | 5 | | | 12, 40 | | |
| | Butylene | 2.1 | UN1012 | | FLAMMABLE GAS. | | None | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | | | 40, 85 | | |
| | 1,2-Butylene oxide, stabilized | 3 | UN3022 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | | | |
| | Butyl ethers, see Dibutyl ethers | | | | | | | | | | | | | | | | | |
| Butyl ethyl ether, see Ethyl butyl ether | | | | | | | | | | | | | | | | | | |
| n-Butyl formate | 3 | UN1128 | II | FLAMMABLE LIQUID. | T1 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | | | |
| tert-Butyl hydroperoxide, more than 90 per cent with water. | Forbidden | | | | | | | | | | | | | | | | | |
| tert-Butyl hydroperoxide, more than 72 per cent but not more than 90 per cent with water. | 5.2 | UN2094 | I | ORGANIC PEROXIDE. | | None | 225 | None | 1 L | 5 L | 1 | 5 | | | 12, 40 | | | |
| tert-Butyl hydroperoxide, not more than 72 per cent with water. | 5.2 | UN2093 | I | ORGANIC PEROXIDE. | T9, T37 | | None | 225 | None | 1 L | 5 L | 1 | 5 | | 12, 40 | | | |
| tert-Butyl hydroperoxide, not more than 80 per cent in di-tert-butyl peroxide, or tert-Butyl hydroperoxide, not more than 80 per cent in di-tert-butyl peroxide and solvent or tert-Butyl hydroperoxide, not more than 80 per cent in solvent. | 5.2 | UN2092 | I | ORGANIC PEROXIDE. FLAMMABLE LIQUID. | | None | 225 | None | 1 L | 5 L | 1 | 5 | | | 12, 40 | | | |
| N,n-Butyl imidazole | 6.1 | UN2690 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | | | 40, 95 | | | |
| tert-Butyl isocyanate | 3 | UN2484 | I | FLAMMABLE LIQUID, POISON. | B14, B32, N26, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | | | 12, 40, 48 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | (9) Quantity limitations | | | (10) Vessel stowage requirements | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---------------------------------|------------------------------|--|--|--|--------------------------------|--------------------------|-------------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk bulk packag- ing | (9A) Passenger aircraft or helicopter | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | Di-Butyl isocyanate | 3 | UN2485 | I | FLAMMABLE LIQUID, POISON. | B13, B32, N26, 10. | None | 227 | Forbidden | Forbidden | 1 | 5 | 12, 40, 48 |
| | Butyl mercaptan | 3 | UN2347 | II | FLAMMABLE LIQUID. | N1, N15, T8. | 150 | 202 | 60 L | 60 L | 1,3 | 1 | |
| | Di-Butyl methacrylate | 3 | UN2227 | II | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 220 L | 220 L | 1,3 | 1,3 | |
| | Butyl methyl ether | 3 | UN2350 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 5 L | 5 L | 1,3 | 1 | |
| | tert-Butyl monoperoxyacetate, not more than 55 per cent as a paste. | 5.2 | UN2101 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 kg | 10 kg | 1 | 5 | 12, 40 |
| | tert-Butyl monoperoxyacetate, not more than 55 per cent in solution. | 5.2 | UN2100 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 L | 10 L | 1 | 5 | 12, 40 |
| | tert-Butyl monoperoxyacetate, technically pure. | 5.2 | UN2099 | II | ORGANIC PEROXIDE. | | None | None | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | tert-Butyl monoperoxyphthalate, technically pure. | 5.2 | UN2105 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 kg | 10 kg | 1 | 5 | 12, 40 |
| | Butyl nitrate | 3 | UN2351 | III | FLAMMABLE LIQUID. | T8 | 150 | 202 | 5 L | 60 L | 1,3 | 1 | 40 |
| | tert-Butyl peroxyacetate, more than 76 per cent in solution. | Forbidden | | | | | | | | | | | |
| | tert-Butyl peroxyacetate, not more than 76 per cent in solution. | 5.2 | UN2095 | II | ORGANIC PEROXIDE. | | 192 | 225 | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | tert-Butyl peroxyacetate, not more than 52 per cent in solution. | 5.2 | UN2096 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 L | 10 L | 1 | 5 | 12, 40 |
| | tert-Butyl peroxybenzoate, not more than 50 per cent with inert inorganic solid. | 5.2 | UN2890 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 kg | 10 kg | 1 | 5 | 12, 40 |
| | tert-Butyl peroxybenzoate, not more than 75 per cent in solution. | 5.2 | UN2098 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 L | 10 L | 1 | 5 | 12, 40 |
| | tert-Butyl peroxybenzoate, technically pure or tert-Butyl peroxybenzoate, more than 75 per cent in solution. | 5.2 | UN2097 | II | ORGANIC PEROXIDE. | | None | None | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | tert-Butyl peroxydionate, not more than 76 per cent in solution. | 5.2 | UN2183 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 L | 10 L | 1 | 5 | 12, 40 |
| | n-Butyl peroxydicarbonate, see Di-n-butyl peroxydicarbonate, etc. | | | | | | | | | | | | |
| | tert-Butyl peroxydiethylacetate, not more than 33 per cent, with tert-Butyl peroxy- benzoate, not more than 33 per cent, and solvent. | 5.2 | UN2651 | II | ORGANIC PEROXIDE. | | 152 | 225 | 5 L | 10 L | 1 | 5 | 12, 40 |
| | tert-Butyl peroxydiethylacetate, technically pure. | 5.2 | UN2144 | II | ORGANIC PEROXIDE. | | None | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butyl peroxy-2-ethylhexanoate, not more than 30 per cent with 2,2-Di(tert- butyl-peroxy) butane, not more than 35 per cent, with not less than 35 per cent p-nitrotoluene. | 5.2 | UN2886 | II | ORGANIC PEROXIDE. | | 152 | 225 | Forbidden | Forbidden | 1 | 5 | 20, 40 |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.101) | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|--|---------------------|--------------------------------|-----------------------|----------------------|---------------------------------|---|-----------------------------|-----------------------------|--------------------------------------|-----------------------------|-------------------------------------|---------------------------|----------------------------------|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk packag-ing | (8C) Bulk packag-ing | (8A) Passenger aircraft or raicar | (8B) Cargo aircraft only | (8C) Cargo vessel | (8D) Pas-senger vessel | (8E) Other stowage provisions |
| | tert-Butyl peroxy-2-ethylhexanoate, not more than 50 per cent with phlegmatizer, not tert-Butyl peroxy-2-ethylhexanoate, not more than 12 per cent with 2,2-Di-(tert-butyl-peroxy) butane, not more than 14 per cent, with not less than 14 per cent phlegmatizer and 60 per cent inert organic solid. | 5.2 | UN2888 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butyl peroxy-2-ethylhexanoate, technically pure. | 5.2 | UN2887 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 10 kg | 10 kg | 1 | 5 | 12, 40 |
| | tert-Butyl peroxy-2-ethylhexanoate, technically pure. | 5.2 | UN2143 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butyl peroxisobutyrate, more than 52 per cent but not more than 77 per cent in solution. | 5.2 | UN2142 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butyl peroxyisobutyrate, more than 77 per cent in solution. | Forbidden | | | | | | | | | | | | |
| | tert-Butyl peroxyisobutyrate, not more than 52 per cent in solution. | 5.2 | UN2562 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butylperoxy isopropyl carbonate, technically pure. | 5.2 | UN2103 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | tert-Butyl peroxyneodecanoate, not more than 77 per cent in solution. | 5.2 | UN2177 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butyl peroxyneodecanoate, technically pure. | 5.2 | UN2594 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | 3-tert-Butylperoxy-3-phenylphthalide, technically pure. | 5.2 | UN2596 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 |
| | tert-Butyl peroxypropionate, not more than 77 per cent in solution. | 5.2 | UN2110 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | tert-Butyl peroxypropionate, not more than 72 per cent in solution. | 5.2 | UN3047 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | tert-Butylperoxy stearyl carbonate, technically pure. | 5.2 | UN3062 | II | ORGANIC PEROXIDE. | | None | 255 | None | Forbidden | Forbidden | 1 | 5 | |
| | tert-Butyl peroxy-3,5,5-trimethylhexanoate, technically pure. | 5.2 | UN2104 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 |
| | Butylphenols, liquid | 6.1 | UN2228 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 |
| | Butylphenols, solid | 6.1 | UN2229 | III | KEEP AWAY FROM FOOD. | T7, T38 | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 |
| | Butyl phosphoric acid, see Butyl acid phosphate. | | | | | | | | | | | | | |
| DE | n-Butyl phthalate (FQ-100/45.4) | ORM-E | NA9095 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | |
| | Butylpropionate | 3 | UN1914 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | Butyl toluenes | 6.1 | UN2667 | III | KEEP AWAY FROM FOOD. | T2 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 22, 25, 34 |
| | Butyltrichlorosilane | 8 | UN1747 | II | CORROSIVE | B2, B6, N16, N26, N34, T8, T26. | None | 202 | 242 | Forbidden | Forbidden | 1 | 1 | 21, 40, 77 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk packag- ing | (8C) Bulk packag- ing | (9A) Passenger aircraft or relicar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | 5-tert-Butyl-2,4,6-trinitro-m-xylene (Musk xylene) | 4.1 | UN2956 | III | FLAMMABLE SOLID | | None | 214 | None | Forbidden | Forbidden | 1 | 5 | 12, 25, 48 | |
| | Butyl vinyl ether, inhibited | 3 | UN2352 | II | FLAMMABLE LIQUID | T7 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | 40 | |
| | 1,4-Butylenediol | 4.1 | UN2716 | III | FLAMMABLE SOLID | A1 | None | 213 | 240 | 25 kg | 100 kg | 1.2 | 1 | 52, 53, 67, 70 | |
| | Butyraldehyde | 3 | UN1129 | II | FLAMMABLE LIQUID | T8 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | | |
| | Butyraldoxime | 3 | UN2840 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1.3 | 1.3 | | |
| | Butyric acid (RC-5000/2270) | 8 | UN2820 | III | CORROSIVE | T1 | 154 | 203 | 241 | 5 L | 60 L | 1.3 | 1.3 | 12 | |
| | Butyric anhydride | 8 | UN2739 | III | CORROSIVE | T2 | 154 | 203 | 241 | 5 L | 60 L | 1.2 | 1.2 | | |
| | Butyronitrile | 3 | UN2411 | II | FLAMMABLE LIQUID | T14 | None | 202 | 243 | 1 L | 60 L | 1.3 | 5 | 12, 40 | |
| | Butyl chloride | 3 | UN2953 | II | POISON | T9, T26 | None | 202 | 243 | 1 L | 5 L | 1 | 1 | 13, 25, 40 | |
| | Carbazide | Forbidden | | | | | | | | | | | | | |
| DE | Cacodylic acid | 6.1 | UN1572 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 5 | 26, 95 | |
| | Cadmium acetate (RC-100/45.4) | 6.1 | NA2570 | III | KEEP AWAY FROM FOOD | | 153 | 213 | 240 | 100 kg | 200 kg | 1.2 | 1.2 | 34 | |
| DE | Cadmium bromide (RC-100/45.4) | 6.1 | NA2570 | III | KEEP AWAY FROM FOOD | | 153 | 213 | 240 | 100 kg | 200 kg | 1.2 | 1.2 | 34 | |
| DE | Cadmium chloride (RC-100/45.4) | 6.1 | NA2570 | III | KEEP AWAY FROM FOOD | | 153 | 213 | 240 | 100 kg | 200 kg | 1.2 | 1.2 | 34, 40 | |
| E | Cadmium compounds, except Cadmium selenide and Cadmium sulfide | 6.1 | UN2570 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1.2 | 1.2 | 95 | |
| | Calcium | 4.3 | UN1401 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1.2 | 95 | |
| | Calcium arsenate (RC-1000/454) | 6.1 | UN1573 | III | KEEP AWAY FROM FOOD | | None | 153 | 213 | 100 kg | 200 kg | 1.2 | 1.2 | 34 | |
| | Calcium arsenate and calcium arsenite mixtures, solid (RC-1000/454) | 6.1 | UN1574 | II | DANGEROUS WHEN WET | | None | 212 | 242 | 15 kg | 50 kg | 1.3 | 5 | | |
| | Calcium arsenite, solid (RC-1000/454) | 6.1 | NA1574 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1.2 | 95 | |
| | Calcium arsenite solution, see Bisulfites, Calcium bisulfite solution, n.o.s. | 6.1 | NA1574 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1.2 | 95 | |
| | Calcium carbide (RC-5000/2270) | 4.3 | UN1402 | II | DANGEROUS WHEN WET | A19, N2, N34 | None | 212 | 241 | 15 kg | 50 kg | 1.3 | 1.3 | 32 | |
| | Calcium chlorate | 5.1 | UN1452 | II | OXIDIZER | B10, N16, N34 | 152 | 212 | 240 | 5 kg | 25 kg | 1.2 | 1.2 | 46, 56 | |
| | Calcium chlorate solution | 5.1 | UN2429 | II | OXIDIZER | A2, N34, N41, T8 | 152 | 202 | 242 | 1 L | 5 L | 1.2 | 1 | 46, 56 | |
| | Calcium chloride | 5.1 | UN1453 | II | OXIDIZER | B10, N13, N34 | 152 | 212 | 240 | 5 kg | 25 kg | 1.2 | 1.2 | 46, 56 | |
| DE | Calcium chromate (RC-1000/454) | ORM-E | NA9096 | III | None | | 156 | 213 | 240 | No limit | No limit | 1.2 | 1.2 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|---------------------------------|--|-----------------------------------|---|--|--|--|--|---|--|--|--|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Calcium cyanamide with more than 0.1 per cent of calcium carbide. Calcium cyanide (RC-10/4.5A) | 4.3 6.1 | UN1403 UN1575 | III I | DANGEROUS WHEN WET. POISON. | A1, A19, N79, N80. | None None | 213 211 | 241 242 | 25 kg 5 kg | 100 kg 50 kg | 1,3 1,2 | 1,3 1,2 | 26, 40, 85 13 | |
| DE | Calcium dithionite or Calcium hydrosulfite Calcium dodecylbenzenesulfonate (RC-1000/45A) Calcium hydride | ORM-E 4.3 | NA9097 UN1404 | III I | None DANGEROUS WHEN WET. | A19 | None 156 | 212 219 | 241 240 | 15 kg No limit | 50 kg No limit | 1,3 1,2 | 1,3 1,2 | | |
| E | Calcium hydrosulfite, see Calcium dithionite. Calcium hypochlorite, dry or Calcium hypochlorite mixtures with more than 39 per cent available chlorine (8.8 per cent available oxygen) (RC-100/45.4). | 5.1 | UN1748 | II | OXIDIZER | N13, N26, N34. | None 152 | 212 212 | 240 None | 5 kg 5 kg | 25 kg 25 kg | 1,2 1,3 | 5 5 | 48, 56 | |
| E | Calcium hypochlorite, hydrated or Calcium hypochlorite, hydrated mixtures, with not less than 5.5 per cent but not more than 10 per cent water (RC-100/45.4). Calcium hypochlorite mixtures, dry, with more than 10 per cent but not more than 39 per cent available chlorine. Calcium manganese silicon | 5.1 4.3 | UN2880 UN2208 UN2844 | II III III | OXIDIZER OXIDIZER DANGEROUS WHEN WET. | B10 A1, A29, N34. A1, A19 | 152 152 None | 212 213 213 | 240 240 241 | 5 kg 25 kg 25 kg | 25 kg 100 kg 100 kg | 1,2 1,2 1,3 | 1,2 1,2 1,3 | 50 | |
| | Calcium nitrate Calcium oxide Calcium perchlorate Calcium permanganate Calcium peroxide Calcium phosphide | 5.1 5.1 5.1 5.1 4.3 | UN1454 UN1910 UN1455 UN1456 UN1457 UN1360 | III III II II II I | OXIDIZER CORROSIVE OXIDIZER OXIDIZER OXIDIZER DANGEROUS WHEN WET. | T2 B10, T8 B10 B10 A19, N2 | 152 154 152 152 152 None | 213 213 212 212 212 211 | 240 240 240 240 240 242 | 25 kg 25 kg 5 kg 5 kg 5 kg Forbidden | 100 kg 100 kg 25 kg 25 kg 25 kg 15 kg | 1,2 1,2 1,2 1,2 1,2 1,2 | 1,2 1,2 1,2 1,2 1,2 5 | 46 56, 69 13 40, 85 | |
| | Calcium, pyrophoric or Calcium alloys, pyrophoric. | 4.2 | UN1855 | II | SPONTANEOUSLY COMBUSTIBLE. | | None | 187 | None | Forbidden | Forbidden | 1 | 5 | | |
| | Calcium resinate Calcium resinate, fused | 4.1 4.1 | UN1313 UN1314 | III III | FLAMMABLE SOLID. FLAMMABLE SOLID. | A1, A19 A1, A19 | | 213 213 | 240 240 | 25 kg 25 kg | 100 kg 100 kg | 1,3 1,3 | 1,3 1,3 | | |
| | Calcium selenate, see Selenates or selenites. Calcium silicide Calcium silicon Camphor oil | 4.3 4.3 3 | UN1405 UN1406 UN1130 | II III III | DANGEROUS WHEN WET. DANGEROUS WHEN WET. FLAMMABLE LIQUID. | A19 A1, A19 B1, T1 | None None 150 | 212 219 203 | 241 241 242 | 15 kg 25 kg 60 L | 50 kg 100 kg 220 L | 1,3 1,3 1,3 | 1,3 1,3 1,3 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | (9) Quantity limitations | | (10) Vessel stowage requirements | | | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|---------------------------------|---|--|--------------------------------|--|-------------------------------------|--------------------------|-----------------------------------|---|-------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| DE | Camphor, synthetic | 4.1 | UN2717 | III | FLAMMABLE SOLID. | A1 | (8A) None | (8B) 213 | (8C) 240 | (9A) 25 kg | (9B) 100 kg | (10A) 1,3 | (10B) 1,3 | (10C) | |
| | Cannon primers, see Primers, tubular | | | | | | | | | | | | | | |
| | Caproic acid | 8 | UN2829 | III | CORROSIVE | T1 | (8A) 154 | (8B) 203 | (8C) 241 | (9A) 5 L | (9B) 60 L | (10A) 1,2 | (10B) 1,2 | (10C) | |
| | Capryloyl peroxide, see n-Octanoyl peroxide. | | | | | | | | | | | | | | |
| | Caps, blasting, see Detonators, etc. | | | | | | | | | | | | | | |
| | Caps, toy (Amorces) | 1.4S | | | | | | | | | | | | | |
| | Captan (RC-10/4.54) | ORM-E 3 | NA9099 UN2758 | I | None FLAMMABLE LIQUID, POISON. | | (8A) None | (8B) 213 201 | (8C) 240 243 | (9A) No limit Forbidden | (9B) No limit 30 L | (10A) 1,2 1,3 | (10B) 1,2 5 | (10C) | |
| | Carbamate pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | | | | II | FLAMMABLE LIQUID, POISON. | | (8A) None | (8B) 202 | (8C) 243 | (9A) 1 L | (9B) 60 L | (10A) 1,3 | (10B) 1 | (10C) |
| | Carbamate pesticides, liquid, toxic, flamma- ble, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN2991 | I | POISON, FLAMMABLE LIQUID. | T42 | (8A) None | (8B) 201 | (8C) 243 | (9A) 1 L | (9B) 30 L | (10A) 1 | (10B) 1 | (10C) 21, 40, 95 | |
| | Carbamate pesticides, liquid, toxic, n.o.s. | 6.1 | UN2992 | III | POISON, KEEP AWAY FROM FOOD. | B1, T14 | (8A) 153 | (8B) 203 | (8C) 242 | (9A) 60 L | (9B) 220 L | (10A) 1,2 | (10B) 1,2 | (10C) 21, 34, 40 | |
| ADE | Carbamate pesticides, solid, toxic, n.o.s. | 6.1 | UN2757 | I | POISON, KEEP AWAY FROM FOOD. | T42 | (8A) None | (8B) 211 | (8C) 242 | (9A) 5 kg | (9B) 50 kg | (10A) 1,2 | (10B) 1,2 | (10C) 40, 95 | |
| | Carbamate pesticides, liquid, toxic, n.o.s. | 6.1 | UN2757 | II | POISON, KEEP AWAY FROM FOOD. | T14 | (8A) None | (8B) 212 | (8C) 242 | (9A) 25 kg | (9B) 100 kg | (10A) 1,2 | (10B) 1,2 | (10C) 40, 95 | |
| | Carbamate pesticides, liquid, toxic, n.o.s. | 6.1 | UN2757 | III | POISON, KEEP AWAY FROM FOOD. | T14 | (8A) 153 | (8B) 213 | (8C) 240 | (9A) 100 kg | (9B) 200 kg | (10A) 1,2 | (10B) 1,2 | (10C) 34, 40 | |
| | Carbamyl (RC-100/45.4) | 6.1 | NA2757 | III | POISON, KEEP AWAY FROM FOOD. | | (8A) None | (8B) 213 | (8C) 240 | (9A) 100 kg | (9B) 200 kg | (10A) 1,2 | (10B) 1,2 | (10C) | |
| DE | Carbafuran (RC-10/4.54) | 6.1 | NA2757 | II | POISON, KEEP AWAY FROM FOOD. | | (8A) None | (8B) 212 | (8C) 242 | (9A) 25 kg | (9B) 100 kg | (10A) 1,2 | (10B) 1,2 | (10C) | |
| | Carbolic acid, see Phenol, solid or Phenol, molten. | | | | | | | | | | | | | | |
| I | Carbolic acid solutions, see Phenol solu- tions. | | | | | | | | | | | | | | |
| | Carbon, activated | 4.2 | UN1362 | III | SPONTANE- OUSLY COMBUSTI- BLE. | | (8A) None | (8B) 213 | (8C) 241 | (9A) Forbidden | (9B) Forbidden | (10A) 1,3 | (10B) 1,3 | (10C) 12 | |
| I | Carbon, animal or vegetable origin | 4.2 | UN1361 | III | SPONTANE- OUSLY COMBUSTI- BLE. | | (8A) None | (8B) 213 | (8C) 241 | (9A) Forbidden | (9B) Forbidden | (10A) 1,3 | (10B) 1,3 | (10C) 12 | |
| | Carbon bisulfide, see Carbon disulfide | | | | | | | | | | | | | | |
| | Carbon dioxide | 2.2 | UN1013 | | NONFLAMMA- BLE GAS. | B13 | (8A) 306 | (8B) 302, 304 | (8C) 244 | (9A) 75 kg | (9B) 150 kg | (10A) 1,3 | (10B) 1,3 | (10C) 85 | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | (B) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|----------|---|--|--|----------------|-----------|--------------------|---|---------------------|-----------------|------------------------------|---------------------|--------------|----------------------------------|--------------------------|-------|
| | | | | | | | Excep-tions | Non-bulk pack-aging | Bulk packag-ing | Passenger aircraft or raicar | Cargo aircraft only | Cargo vessel | Pass-enger vessel | Other stowage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | Cartridges for weapons, blank Cartridges for weapons, blank Cartridges for weapons, blank (Cartridges, safety, blank) Cartridges for weapons (Cartridges, safety), other than blank Cartridges for weapons, inert projectile Cartridges for weapons, inert projectile Cartridges for weapons, inert projectile Cartridges for weapons, with bursting charge Cartridges for weapons, with bursting charge Cartridges for weapons, with bursting charge Cartridges for weapons, with bursting charge Cartridges for weapons, with bursting charge (projectiles with propelling charge) Cartridges for weapons, with bursting charge (projectiles with propelling charge) Cartridges, oil well Cartridges, oil well Cartridges, power device Cartridges, power device Cartridges, power device Cartridges, power device (Cartridges, safety) Cartridges, safety, see Cartridges for weapons, other than blank or Cartridges, power device (UN 0323) Cartridges, safety, blank, see Cartridges for weapons, blank (UN 0074) Cartridges, signal Cartridges, signal Cartridges, signal Cartridges, sporting, see Cartridges for weapons, other than blank Cartridges, starter, jet engine, see Cartridges, power device Cases, cartridge, empty with primer Cases, cartridges, empty with primer Casinghead gasoline see Natural gasoline Castor beans or Castor meal or Castor pomace or Castor flake Caustic alkali liquids, n.o.s. Caustic potash, see Potassium hydroxide etc. | 1.4C 1.2C 1.4S 1.4S 1.2C 1.4C 1.3C 1.1F 1.2F 1.4F 1.4E 1.1E 1.2E 1.3C 1.4C 1.3C 1.4C 1.2C 1.4S | UN0338 UN0413 UN0014 UN0012 UN0328 UN0339 UN0417 UN0005 UN0007 UN0348 UN0412 UN0006 UN0321 UN0277 UN0278 UN0275 UN0276 UN0381 UN0323 | | | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) |
| | | | | II | None | | 155 | 204 | 240 | No limit | No limit | 1,2 | 5 | 34, 40, 44 | |
| AW | | | 8 | II | CORROSIVE | B2, T14 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | |
|---|--|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|--|------------------------|------------|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or relicar | (9B) Cargo aircraft only | (9A) Cargo vessel | (9B) Pas- senger vessel | (9C) Other stowage provisions | | | |
| D | (1.2C) Charges, propelling, for rocket motors, composite mixture. | 1.2C | UN0416 | | | | | | | | | | | | | | |
| | (1.2D) Charges, shaped, commercial without detonator. | 1.2D | UN0439 | | | | | | | | | | | | | | |
| | (1.4D) Charges, shaped, commercial without detonator. | 1.4D | UN0440 | | | | | | | | | | | | | | |
| | (1.4S) Charges, shaped; commercial without detonator. | 1.4S | UN0441 | | | | | | | | | | | | | | |
| | (1.2D) Charges, shaped, commercial without detonator. | 1.2D | UN0439 | | | | | | | | | | | | | | |
| | (1.1D) Charges, shaped, commercial, without detonator. | 1.1D | UN0059 | | | | | | | | | | | | | | |
| | (1.4D) Charges, shaped, flexible, linear, metal clad. | 1.4D | UN0237 | | | | | | | | | | | | | | |
| | (1.1D) Charges, shaped, flexible, linear, metal clad. | 1.1D | UN0288 | | | | | | | | | | | | | | |
| | (1.1D) Charges, supplementary explosive | 1.1D | UN0060 | | | | | | | | | | | | | | |
| | (8) Chemical kit | 8 | NA1760 | | | | | | | | | | | | | | |
| | (6.1) Chloracetophenone (CN) Solid | 6.1 | UN1697 | | II | CORROSIVE | | | 154 | 161 | None | 1 L | 1 L | 1,3 | 1,3 | | |
| | (6.1) Chloral, anhydrous, inhibited. | 6.1 | UN2075 | | II | POISON | N1, N12, N16, N17, N32, N33, N34. | | None | 212 | 242 | Forbidden | 100 kg | 1 | 5 | 12, 40, 95 | |
| | (5.1) Chlorate and borate mixtures | 5.1 | UN1458 | | II | POISON OXIDIZER | T14, B10, N13, N34. | | None | 212 | 240 | 25 kg | 100 kg | 1 | 5 | 40, 95 | |
| | (5.1) Chlorate and magnesium chloride mixtures | 5.1 | UN1459 | | II | OXIDIZER | B10, N13, N34, T8. | | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| (5.1) Chlorate of potash, see Potassium chlorate. | 5.1 | UN1461 | | II | OXIDIZER | B10, N13, N34. | | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | | |
| (6.1) Chlorate of soda, see Sodium chlorate. | 6.1 | NA2762 | | III | KEEP AWAY FROM FOOD. | | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | | |
| (5.1) Chlorate, inorganic, n.o.s. | 5.1 | UN2626 | | I | OXIDIZER | T25 | | None | 229 | 243 | Forbidden | Forbidden | 1 | 5 | 46, 56 | | |
| (6.1) Chloridane (RC-1/0.454) | 6.1 | UN2230 | | II | POISON | | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | | | |
| (2.3) Chloric acid solution, with not more than 10 per cent chloric acid. | 2.3 | UN1017 | | IB | POISON GAS | B14, B31, 10. | | None | 304 | 314, 315 | Forbidden | Forbidden | 1 | 5 | 40, 51, 55, 62, 66, 95 | | |
| (6.1) Chloride of phosphorus, see Phosphorus trichloride. | 6.1 | | | | | | | | | | | | | | | | |
| (6.1) Chloride of sulfur, see Sulfur chloride. | 6.1 | | | | | | | | | | | | | | | | |
| (6.1) Chlorinated anthracene oil | 6.1 | | | | | | | | | | | | | | | | |
| (6.1) Chlorinated lime, see Calcium hypochlorite mixtures, etc. | 6.1 | | | | | | | | | | | | | | | | |
| (2.3) Chlorine (RC-10/4.54) | 2.3 | | | | | | | | | | | | | | | | |

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| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.14) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | |
|-----------------------------|--|------------------------|---------------------------------------|------------------------------|--|---|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|------------------------------|--|--|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or raider (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | | | |
| D | <i>Chlorine azide</i> | Forbidden | | | | | | | | | | | | | | | |
| | Chlorine dioxide hydrate, frozen..... | 5.1 | NA9191 | II | OXIDIZER, POISON. | | None | 229 | None | Forbidden | Forbidden | 5 | 5 | | | | |
| | <i>Chlorine dioxide (not hydrate)</i> | Forbidden | | | | | | | | | | | | | | | |
| | Chlorine pentafluoride..... | 2.3 | UN2548 | IA | POISON GAS, OXIDIZER, CORROSIVE. | 10 | None | 304 | 245 | Forbidden | Forbidden | 1 | 5 | | 31, 40, 95 | | |
| | Chlorine trifluoride..... | 2.3 | UN1749 | IA | POISON GAS, OXIDIZER, CORROSIVE. | 10 | None | 304 | 245 | Forbidden | Forbidden | 1,3 | 5 | | 34, 40, 95 | | |
| | Chlorites, inorganic, n.o.s..... | 5.1 | UN1462 | II | OXIDIZER..... | N26, N34, T8. | 152 | 212 | 240 | 5 kg..... | 25 kg..... | 1,2 | 1,2 | | 46, 56 | | |
| | Chloroacetaldehyde..... | 6.1 | UN2232 | II | POISON..... | T17 | None | 202 | 243 | 5 L..... | 60 L..... | 1 | 5 | | 40, 95 | | |
| | Chloroacetic acid, liquid..... | 8 | UN1750 | I | CORROSIVE, POISON. | B8, B14, B32, N26, N34, N34, N34, T17. | None | 227 | 244 | Forbidden | Forbidden | 1,2 | 1,2 | | 40 | | |
| | Chloroacetic acid, solid..... | 8 | UN1751 | II | CORROSIVE, POISON..... | N1, N26, N34. | None | 212 | 242 | 15 kg..... | 50 kg..... | 1,2 | 1,2 | | 40 | | |
| | Chloroacetone, stabilized..... | 6.1 | UN1695 | II | POISON..... | N12, N32, N34, T17. | None | 202 | 243 | Forbidden | Forbidden | 1 | 5 | | 40, 95 | | |
| | <i>Chloroacetone (unstabilized)</i> | Forbidden | | | | | | | | | | | | | | | |
| | Chloroacetonitrile..... | 6.1 | UN2668 | I | POISON..... | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1,3 | | 12, 21, 25, 26, 40, 95 | | |
| | Chloroacetophenone (CM)Liquid..... | 6.1 | UN1697 | I | POISON..... | B14, B30, N1, N12, N16, N17, N32, N33, N33, 10. | None | 226 | 244 | Forbidden | Forbidden | 1 | 5 | | 12, 40, 95 | | |
| Chloroacetyl chloride..... | 8 | UN1752 | II | CORROSIVE..... | B2, B8, N1, N11, N26, N34, N34, T9, T26. | None | 202 | 242 | Forbidden | Forbidden | 1 | 5 | | 40 | | | |
| Chloroanilines, liquid..... | 6.1 | UN2019 | II | POISON..... | T14 | None | 202 | 243 | 5 L..... | 60 L..... | 1,2 | 1,2 | | 95 | | | |
| Chloroanilines, solid..... | 6.1 | UN2018 | II | POISON..... | T14, T38 | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2 | 1,2 | | 95 | | | |
| Chloroanisidines..... | 6.1 | UN2233 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg..... | 200 kg..... | 1,2 | 1,2 | | 34 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|--|--------------------------------|-------------------------|-------------------------------------|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft | (9B) Cargo aircraft only | (9C) Cargo vessel | (9D) Pass- enger vessel | (9E) Other stowage provisions | |
| E | Chlorobenzene (RC-100/45.4) | 3 | UN1134 | III | FLAMMABLE LIQUID. | T1 | 150 | 203 | 241 | 5 L | 60 L | 1.3 | 1 | | |
| | Chlorobenzol, see Chlorobenzene | | | | | | | | | | | | | | |
| | Chlorobenzotrifluorides | 3 | UN2234 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1.3 | 1,3 | 40 | |
| | p-Chlorobenzoyl peroxide, see Di-4-chloro- benzoyl peroxide, etc. | 6.1 | UN2235 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1.2 | 1,2 | 34 | |
| | Chlorobenzylchlorides | 6.1 | UN2688 | III | KEEP AWAY FROM FOOD. | T2 | 153 | 203 | 241 | 60 L | 220 L | 1.2 | 1,2 | 34 | |
| | 1-Chloro-3-bromopropane | 3 | UN1127 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | | |
| | Chlorobutanes | | | | | | | | | | | | | | |
| | Chlorocresols (liquids) | 6.1 | UN2669 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1.3 | 1,3 | 12, 95 | |
| | Chlorocresols (solid) | 6.1 | UN2669 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1.3 | 1,3 | 12, 40, 95 | |
| | 3-Chloro-4-diethylaminobenzenediazonium zinc chloride. | 4.1 | UN3033 | II | FLAMMABLE SOLID. | | None | 214 | None | 15 kg | 50 kg | 1 | 1 | 25 | |
| | Chlorodifluorobromomethane | 2.2 | UN1974 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 50 kg | 1.3 | 1,3 | 85 | |
| | 1-Chloro-1,1-difluoroethane, see Chlorodi- fluoroethanes. | | | | | | | | | | | | | | |
| | Chlorodifluoroethanes or Difluoroethane | 2.1 | UN2517 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1.3 | 1 | 40, 89 | |
| | Chlorodifluoromethane (R-22) | 2.2 | UN1018 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1.3 | 1,3 | 85 | |
| | Chlorodifluoromethane and chloropenta- fluoroethane mixture with fixed boiling point, with approximately 49 per cent chlorodifluoromethane. | 2.2 | UN1973 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1.3 | 1,3 | 85 | |
| AEW | Chlorodinitrobenzene | 6.1 | UN1577 | II | POISON | T14 | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1,2 | 95 | |
| | Chloroform (RC-5000/2270) | 6.1 | UN1868 | II | POISON | N36, T14 | None | 202 | 243 | 5 L | 60 L | 1.2 | 1,2 | 40, 95 | |
| | Chloroformates, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN2742 | II | POISON, CORROSIVE, FLAMMABLE LIQUID. | | None | 202 | 243 | 1 L | 30 L | 1.3 | 1,3 | 12, 13, 22, 25, 40, 95 | |
| | Chloromethylchloroformate | 6.1 | UN2745 | II | POISON, CORROSIVE. | T18 | None | 202 | 243 | 1 L | 30 L | 1.3 | 1,3 | 12, 13, 23, 25, 40, 95 | |
| | Chloromethyl ethyl ether | 3 | UN2354 | II | FLAMMABLE LIQUID, POISON. | T8 | None | 202 | 243 | 1 L | 60 L | 1.3 | 5 | 12, 40 | |
| | 3-Chloro-4-methylphenylisocyanate | 6.1 | UN2236 | II | POISON. | | None | 202 | 243 | 5 L | 60 L | 1.2 | 1,2 | 25, 40, 95 | |
| | Chloronitroanilines | 6.1 | UN2237 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1.2 | 1,2 | 26, 34 | |
| | Chloronitrobenzene, ortho, liquid | 6.1 | UN1578 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1.2 | 1,2 | 95 | |
| | Chloronitrobenzenes meta or para, solid | 6.1 | UN1578 | II | POISON | T14 | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1,2 | 95 | |
| | Chloronitrotoluenes | 6.1 | UN2433 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1.2 | 1,2 | 34 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---------------------------------|---|---|--|--------------------------------|---|--------------------------------|--------------------------|---|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raftcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pass- enger vessel | (10C) Other stowage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | Chloropentafluoroethane (R-115)..... | 2.2 | UN1020 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | 3-Chloroperoxybenzoic acid, not more than 86 per cent with 3-chlorobenzoic acid. | 5.2 | UN2755 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | 3-Chloroperoxybenzoic acid, not more than 57 per cent with water and 3-Chloroben- zoic acid. | 5.2 | UN3081 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Chlorophenates, liquid..... | 8 | UN2904 | III | CORROSIVE..... | | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| | Chlorophenates, solid..... | 8 | UN2905 | III | CORROSIVE..... | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Chlorophenols, liquid..... | 6.1 | UN2021 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Chlorophenols, solid..... | 6.1 | UN2020 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Chlorophenyl trichlorosilane..... | 8 | UN1753 | II | CORROSIVE..... | B2, B6, N16, N28, N34, T8, T26. | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | 40 | |
| | Chloropicrin..... | 6.1 | UN1580 | I | POISON..... | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Chloropicrin and methyl bromide mixtures..... | 2.3 | UN1581 | IB | POISON GAS..... | B13, B14, B31, 10. | None | 193 | 244 | Forbidden | Forbidden | 1 | 5 | 25, 40, 95 | |
| | Chloropicrin and methyl chloride mixtures..... | 2.3 | UN1582 | IB | POISON GAS..... | B13, B14, B31, 10. | None | 193 | 244 | Forbidden | Forbidden | 1 | 5 | 25, 40, 95 | |
| | Chloropicrin mixture, flammable (pressure not exceeding 14.7 psia at 115 degrees F flash point below 100 deg F) see Poisonous liquids, flammable, n.o.s.. | | | | | | | | | | | | | | |
| | Chloropicrin mixtures, n.o.s..... | 6.1 | UN1583 | I | POISON..... | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1 | 40, 95 | |
| | Chloropivaloyl chloride..... | 6.1 | NA2810 | II | POISON..... | B14, B32, 10. | None | 201 | 243 | 5 L | 2.5 L | 1 | 1 | 40, 95 | |
| | Chloroplatinic acid, solid..... | 8 | UN2507 | III | CORROSIVE..... | T15..... | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 12, 40 | |
| | Chloroprene, inhibited..... | 3 | UN1991 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 1 | | |
| | Chloroprene, uninhibited..... | Forbidden | | | | | | | | | | | | | |
| | 2-Chloropropane..... | 3 | UN2356 | I | FLAMMABLE LIQUID. | N15, N36, T14. | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | 12 | |
| | 3-Chloropropanol-1..... | 6.1 | UN2849 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | 2-Chloropropene..... | 3 | UN2456 | I | FLAMMABLE LIQUID. | N1, N15, N36, T14. | 150 | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12 | |
| | alpha-Chloropropionic acid..... | 8 | UN2511 | III | CORROSIVE..... | T8 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | 8 | |
| | 2-Chloropyridine..... | 6.1 | UN2822 | II | POISON..... | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 | |
| | Chlorosilanes, n.o.s..... | 8 | UN2987 | II | CORROSIVE..... | B2 | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 40, 77 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk pack- aging | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Chlorosilanes, n.o.s., flash point less than 23 degrees C. | 3 | UN2985 | I | FLAMMABLE LIQUID, CORROSIVE, CORROSIVE, FLAMMABLE LIQUID. | | None | 201 | 243 | 0.5 L | 2.5 L | 1,3 | 5 | 40 | |
| | Chlorosilanes, n.o.s., flash point not less than 23 degrees C. | 8 | UN2986 | II | CORROSIVE, FLAMMABLE LIQUID. | | None | 202 | 243 | 1 L | 30 L | 1 | 1 | 23, 40 | |
| | Chlorosilanes, n.o.s., which in contact with water emit flammable gas. | 4.3 | UN2988 | I | DANGEROUS WHEN WET, FLAMMABLE LIQUID. | A2 | None | 201 | 244 | Forbidden | 1 L | 1 | 5 | 40 | |
| | Chlorosulfonic acid (with or without sulfur trioxide) (RQ-1000/454). | 8 | UN1754 | I | CORROSIVE. | B4, N1, N11, N35, T12, T27. | None | 201 | 242 | .5 L | 2.5 L | 1 | 1 | 80, 33, 40 | |
| | Chlorotetrafluoroethane (R-124) | 2.2 | UN1021 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Chlorotoluenes | 3 | UN2238 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 34 | |
| | 4-Chloro-o-toluidine hydrochloride | 6.1 | UN1579 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 241 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Chlorotoluidines liquid | 6.1 | UN2239 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Chlorotoluidines solid | 6.1 | UN2239 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 260 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Chlorotrifluoroethane | 2.2 | UN1983 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| ADE | Chlorotrifluoromethane (R-13) | 2.2 | UN1022 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Chlorotrifluoromethane and trifluorometh- ane azeotropic mixture with approximate- ly 60 per cent chlorotrifluoromethane. | 2.2 | UN2599 | | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| DE | Chlorpyrifos (RQ-1/0.454) | 6.1 | NA2783 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 40 | |
| | Chromic acetate (RQ-1000/454) | ORM-E | NA9101 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Chromic acid, solid (RQ-1000/454) | 5.1 | NA1463 | II | OXIDIZER, CORROSIVE. | B10 | None | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | | |
| E | Chromic acid solution (RQ-1000/454) | 8 | UN1755 | II | CORROSIVE. | B2, T9, T27. | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 40 | |
| | Chromic anhydride, see Chromium trioxide, anhydrous. | | | | | | | | | | | | | | |
| | Chromic fluoride, solid | 8 | UN1756 | II | CORROSIVE. | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| | Chromic fluoride, solution | 8 | UN1757 | III | CORROSIVE | B2, T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| DE | Chromic sulfate (RQ-1000/454) | ORM-E | NA9100 | III | None. | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Chromium nitrate | 5.1 | UN2720 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |

| (1) Sym- bol | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--------------------|--|------------------------|---------------------------------------|------------------------------|----------------------------------|--------------------------------------|--|--|--------------------------------|--|--------------------------------|--------------------------|---|---|-----------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Chromium oxychloride | 8 | UN1758 | I | CORROSIVE | B4, N1, N11, N26, N34, T12, T26, B10 | None | 201 | 242 | Forbidden | 2.5 L | Forbidden | 1 | 1 | 80, 40 |
| E | Chromium trioxide, anhydrous (RC-1000/454) | 5.1 | UN1463 | II | OXIDIZER, CORROSIVE | | None | 212 | 240 | 5 kg | 25 kg | 1.2 | 1.2 | 1.2 | 34, 65 |
| E | Chromosulfuric acid | 8 | UN2240 | I | CORROSIVE | B4, B6, N1, N11, N26, N34, T12, T27 | None | 201 | 242 | 5 L | 2.5 L | 1.2 | 1 | 1 | 80, 9, 40 |
| DE | Chromous chloride (FC-1000/454) Chromyl chloride, see Chromium oxychloride. Cigar and cigarette lighter fluid, see Lighter fluids. Cigar and cigarette lighters, charged with fuel, see Lighters for cigars, cigarettes, etc. | ORM-E | NA9102 | III | None | | 156 | 213 | 240 | No limit | No limit | 1.2 | 1.2 | 1.2 | |
| DE | Cigarettes, self-lighting | 4.1 | UN1867 | III | FLAMMABLE SOLID. | | None | 213 | None | Forbidden | Forbidden | 1.3 | 1.3 | 1.3 | 13 |
| DE | Coal briquettes, hot | Forbidden | | | | | | | | | | | | | |
| DE | Coal gas | 2.3 | UN1023 | II | POISON GAS, FLAMMABLE GAS. | B38, 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 5 | 40, 95 |
| DE | Coal tar distillates, flammable | 3 | UN1136 | I | FLAMMABLE LIQUID. | T9 | 150 | 201 | 243 | 1 L | 30 L | 1.3 | 1.3 | 5 | |
| DE | Coal tar dye, corrosive, liquid, n.o.s. see Dyes, n.o.s. or Dye intermediates, n.o.s., corrosive. Coating solution | | | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | 1 | |
| DE | Coal tar dye, corrosive, liquid, n.o.s. see Dyes, n.o.s. or Dye intermediates, n.o.s., corrosive. Coating solution | | | III | FLAMMABLE LIQUID. | B1, T7, T30 | 150 | 203 | 242 | 60 L | 220 L | 1.3 | 1.3 | 1.3 | |
| DE | Cobalt naphthenates, powder | 4.1 | UN2001 | III | FLAMMABLE SOLID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | 1 | |
| DE | Cobaltous bromide (RC-1000/454) | ORM-E | NA9103 | III | None | | 156 | 213 | 240 | No limit | No limit | 1.2 | 1.2 | 1.2 | |
| DE | Cobaltous formate (FC-1000/454) | ORM-E | NA9104 | III | None | | 156 | 213 | 240 | No limit | No limit | 1.2 | 1.2 | 1.2 | |
| DE | Cobaltous sulfamate (FC-1000/454) | ORM-E | NA9105 | III | None | | 156 | 213 | 240 | No limit | No limit | 1.2 | 1.2 | 1.2 | |
| DE | Cobalt resinate, precipitated | 4.1 | UN1318 | III | FLAMMABLE SOLID. | A1, A19 | 151 | 213 | 240 | 25 kg | 100 kg | 1.3 | 1.3 | 1.3 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | (9) Quantity limitations | | (10) Vessel stowage requirements | | | | |
|---|---|------------------------|---------------------------------------|------------------------------|--|------------------------------|---|--|---|--------------------------------|-------------------------------------|-----------------------------------|---|--------|----|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Passenger aircraft or raftcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | | |
| D | Cocculus..... | 6.1 Forbid- den | UN1584 | II | POISON..... | (7) | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 95 | |
| | Coke, hot..... | | | | | | | | | | | | | | |
| | Celluloid, see Nitrocellulose etc. | | | | | | | | | | | | | | |
| | Combustible liquid, n.o.s..... | 3 | NA1993 | | | None | 150 | 203 | 241 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | | |
| | Components, explosive train, n.o.s..... | 1.2B | UN0382 | | | | | | | | | | | | |
| | Components, explosive train, n.o.s..... | 1.4B | UN0383 | | | | | | | | | | | | |
| | Components, explosive train, n.o.s..... | 1.4S | UN0384 | | | | | | | | | | | | |
| | Composition B, see Hexollia, etc. | | | | | | | | | | | | | | |
| | Compounds, cleaning liquid, corrosive, see Corrosive liquids, n.o.s..... | | | | | | | | | | | | | | |
| | Compounds, cleaning liquid, flammable, see Flammable liquid preparations, etc., Compressed or Liquefied gases, flamma- ble, n.o.s..... | 2.1 | UN1954 | | | FLAMMABLE GAS. | B13..... | 306 | 302, 304, 305 | 244 | Forbidden..... | 150 kg..... | 1..... | 5..... | 40 |
| Compressed or Liquefied gases, flamma- ble, toxic, n.o.s. LC50 less than or equal to 1000 ppm. | 2.3 | UN1953 | | IB | POISON GAS, FLAMMABLE GAS. | 10..... | None | 302, 304, 305 | 245 | Forbidden..... | Forbidden..... | 1..... | 5..... | 40, 95 | |
| Compressed or Liquefied gases, n.o.s..... | 2.2 | UN1956 | | | NONFLAMMA- BLE GAS. | B13..... | 306, 307 | 302, 304, 305 | 244 | 75 kg..... | 150 kg..... | 1,3..... | 1,3..... | 95 | |
| Compressed or Liquefied gases, toxic, n.o.s. LC50 less than or equal to 200 ppm. | 2.3 | UN1955 | | IA | POISON GAS | 10..... | None | 302, 304, 305 | 245 | Forbidden..... | Forbidden..... | 1..... | 5..... | 40, 95 | |
| Compressed or liquefied gases, flammable, toxic, n.o.s. LC50 over 1000 up to 5000 ppm. | 2.3 | UN1953 | | II | POISON GAS, FLAMMABLE GAS. | B14, B38, 10..... | None | 302, 304, 305 | 244 | Forbidden..... | Forbidden..... | 1..... | 5..... | 40 | |
| Compressed or liquefied gases, toxic, n.o.s. LC50 over 200 up to 5000 ppm. | 2.3 | UN1955 | | II | POISON GAS | B14, B35, 10..... | None | 302, 304, 305 | 244 | Forbidden..... | Forbidden..... | 1..... | 5..... | 40 | |
| Consumer commodity..... | ORM-D | | None | III | None | | 156, 306 | 156, 306 | None | 65 lb gross..... | 65 lb gross..... | 1,2..... | 1,2..... | | |
| Continuances, water-activated, with burster, expelling charge or propelling charge. | 1.2L | UN0248 | | | | | | | | | | | | | |
| Continuances, water-activated, with burster, expelling charge or propelling charge. | 1.3L | UN0249 | | | | | | | | | | | | | |
| Copper acetoarsenite (RC-100/45.4) | 6.1 Forbid- den | | UN1585 | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 95 | |
| Copper acetylde..... | Forbid- den | | | | | | | | | | | | | | |
| Copper amine azide..... | Forbid- den | | | | | | | | | | | | | | |
| Copper arsenite..... | 6.1 | UN1586 | | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 95 | |
| Copper based pesticides, liquid, flammable, toxic n.o.s., flash point less than 23 de- grees C. | 3 | UN2776 | | I | FLAMMABLE LIQUID, POISON, FLAMMABLE LIQUID, POISON. | | None | 201, 202 | 243 | Forbidden..... | 30 L..... | 1,3..... | 1..... | | |
| | | | | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L..... | 60 L..... | 1,3..... | 1..... | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (173.22) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--------------------------------------|--|---------------------|--------------------------------|-----------------------|------------------------------|----------------------------|--|----------------------------|------------------------|---------------------------------------|-----------------------------|-----------------------------------|-------------------------------------|----------------------------|-----------------------------------|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk packaging | (8C) Bulk packaging | (9A) Passenger aircraft or raifcar | (9B) Cargo aircraft only | (9C) Cargo aircraft or raifcar | (10A) Cargo aircraft vessel | (10B) Pas-senger vessel | (10C) Other storage provisions |
| AEW | Copper based pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3009 | I | POISON, FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 21, 40, 95 | |
| | Copper based pesticides, liquid, toxic, n.o.s. | 6.1 | UN3010 | II | POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 243 | 5 L | 60 L | 1, 2 | 1 | 21, 40, 95 | |
| | Copper chlorate | 5.1 | UN2721 | II | POISON | T14 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | Copper chloride (RQ-10/4.54) | 6.1 | UN2775 | III | KEEP AWAY FROM FOOD. | T14 | None | 202 | 243 | 5 L | 60 L | 1, 2 | 1, 2 | 40, 95 | |
| | Copper cyanide | 6.1 | UN2802 | III | KEEP AWAY FROM FOOD. | T14 | None | 203 | 241 | 60 L | 220 L | 1, 2 | 1, 2 | 34, 40 | |
| | Copper selenate, see Selenates or Selenites. | | | | | | None | 211 | 242 | 5 kg | 50 kg | 1, 2 | 1, 2 | 40, 95 | |
| | Copper selenite, see Selenates or Selenites. | | | | | | None | 212 | 242 | 25 kg | 100 kg | 1, 2 | 1, 2 | 40, 95 | |
| | Copper tetramine nitrate | | | | | | None | 213 | 240 | 100 kg | 200 kg | 1, 2 | 1, 2 | 34, 40 | |
| | Copra | | | | | | | 152 | 240 | 5 kg | 25 kg | 1, 2 | 1, 2 | 46, 56 | |
| | Cord, detonating, flexible | | | | | | | 154 | 240 | 25 kg | 100 kg | 1, 2 | 1, 2 | 26, 95 | |
| | Cord, detonating, flexible | | | | | | | None | 204 | 242 | 25 kg | 100 kg | 1, 2 | 1, 2 | |
| | Cord (Fuse), detonating, metal clad | | | | | | | | | | | | | | |
| | Cord (Fuse), detonating, mild effect metal clad | | | | | | | | | | | | | | |
| Cord, igniter | | | | | | | | | | | | | | | |
| Cordite, see Powder, smokeless | | | | | | | | | | | | | | | |
| Corrosive liquids, flammable, n.o.s. | | | | | | | | | | | | | | | |
| AW | Corrosive liquids, n.o.s. | 8 | UN2920 | I | CORROSIVE, FLAMMABLE LIQUID. | B4, N1, N11, N34, T42 | None | 201 | 243 | 0.5 L | 2.5 L | 1 | 1 | 12, 21, 25 | |
| | Corrosive liquids, n.o.s. | 8 | UN1760 | II | CORROSIVE, FLAMMABLE LIQUID. | B2, T15, T26 | None | 202 | 243 | 1 L | 30 L | 1 | 1 | 12, 21, 25 | |
| | Corrosive liquids, n.o.s. | 8 | UN1760 | I | CORROSIVE | B4, N1, N11, N26, N34, T42 | None | 201 | 242 | 0.5 L | 2.5 L | 1, 2 | 1 | 40 | |
| | | | | II | CORROSIVE | B2, T14 | 154 | 202 | 1 L | 30 L | 1, 2 | 1 | 1 | 40 | |
| | | | | III | CORROSIVE | T7 | 154 | 203 | 5 L | 60 L | 1, 2 | 1, 2 | 1, 2 | 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| DW | Corrosive liquids, poisonous, n.o.s. | 6 | UN2922 | I | CORROSIVE, POISON, CORROSIVE, POISON, CORROSIVE, CORROSIVE, FLAMMABLE SOLID. | N1, N11, N34. | None | 201 | 243 | 0.5 L | 2.5 L | 1,2 | 1 | 40 | |
| | | | | II | | | None | 202 | 243 | 1 L | 30 L | 1,2 | 1,2 | 40 | |
| | | | | III | | | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | 40 | |
| | Corrosive solids, flammable, n.o.s. | 6 | UN2921 | I | CORROSIVE, FLAMMABLE SOLID. | | None | 211 | 242 | 1 kg | 25 kg | 1,3 | 1 | 12, 25 | |
| | | | | II | | | None | 212 | 242 | 15 kg | 50 kg | 1,3 | 1 | 12, 25 | |
| | | | | I | | | None | 211 | 240 | 1 kg | 25 kg | 1,2 | 1 | | |
| | | | | II | | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| | | | | III | | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | | | | I | | | None | 211 | 240 | 1 kg | 25 kg | 1,2 | 1 | | |
| | | | | II | | | None | 212 | 240 | 15 kg | 50 kg | 1,2 | 1 | | |
| AIW | Corrosive solids, poisonous, n.o.s. | 6 | UN2923 | I | CORROSIVE, OXIDIZER, POISON. | | None | 211 | 242 | 1 kg | 25 kg | 1,2 | 1 | 13, 40 | |
| | | | | II | | | None | 212 | 240 | 15 kg | 50 kg | 1,2 | 1 | 40 | |
| | | | | III | | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1 | 40 | |
| | Cotton | 9 | NA1365 | III | None | | 155 | None | 240 | No limit | No limit | 1,2 | 1,2 | 13, 54, 64 | |
| DE | Cotton waste, oily | 4.2 | UN1364 | III | SPONTANEOU- LY COMBUSTI- BLE. | | None | 213 | None | Forbidden | Forbidden | 1,3 | 1,3 | 13 | |
| | | | | III | | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | 13 | |
| | | | | III | | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | 13 | |
| DE | Coumaphos (RQ-10/4.54) | 6.1 | NA2783 | II | POISON, FLAMMABLE LIQUID. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 21, 40, 95 | |
| | Coumarin derivative pesticides, liquid, flam- mable, toxic, n.o.s., flashpoint less than 23 deg C. | 3 | UN3024 | I | POISON, FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| | | | | II | | | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |
| | | | | I | | | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 21, 40, 95 | |
| DE | Coumarin derivative pesticides, liquid, toxic, flammable, n.o.s. flashpoint not less than 23 deg C. | 6.1 | UN3025 | II | POISON, FLAMMABLE LIQUID. | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 21, 40, 95 | |
| | | | | III | | B1 | 153 | 203 | 60 L | 220 L | 1,2 | 1,2 | 21, 34, 40 | | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | Packaging (173...) | | | Quantity limitations | | | Vessel stowage requirements | | |
|----------|--|--------------|-------------------------|----------------|---------------------------|--------------------|--------------------|---------------------|-----------------|----------------------|-----------|-------|-----------------------------|------------|--|
| | | | | | | | Excep-tions | Non-bulk pack-aging | Bulk packag-ing | (9A) | (9B) | (10A) | (10B) | (10C) | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | Coumarin derivative pesticides, liquid, toxic, n.o.s. | 6.1 | UN3026 | I | POISON | | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | | | | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Coumarin derivative pesticides, solid, toxic, n.o.s. | 6.1 | UN3027 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | | |
| | | | | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | |
| D | Creosote, coal tar | 3 | NA1993 | III | FLAMMABLE LIQUID. | | 150 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | | |
| E | Cresols (o,m,p-) (RQ-100/45.4) | 6.1 | UN2076 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| | Cresylic acid | 6.1 | UN2022 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | | |
| E | Crotonaldehyde, stabilized (RQ-100/45.4) | 3 | UN1143 | I | FLAMMABLE LIQUID, POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1 | | |
| | Crotonic acid | 8 | UN2823 | III | CORROSIVE | T20 | 154 | 203 | 240 | 5 L | 60 L | 1,3 | 1,3 | 12 | |
| | Crotonylene | 3 | UN1144 | I | FLAMMABLE LIQUID. | | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | 12 | |
| | Cumene hydroperoxide, see Cumyl hydroperoxide. | | | | | | | | | | | | | | |
| | Cumyl hydroperoxide (Cumene hydroperoxide), technically pure. | 5.2 | UN2116 | I | ORGANIC PEROXIDE. | B17, B22, T25. | None | 225 | 243 | 1 L | 5 L | 1 | 5 | 12, 40 | |
| | Cumyl peroxyneodecanoate, not more than 77 per cent in solution. | 5.2 | UN2963 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Cumyl peroxyvalerate, not more than 77 per cent in solution. | 5.2 | UN2964 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| DE | Cupric acetate (RQ-100/45.4) | ORM-E | NA9106 | III | None | | 156 | 203 | 240 | No limit | No limit | a,2 | 1,2 | | |
| DE | Cupric nitrate (RQ-100/45.4) | 5.1 | NA1479 | II | OXIDIZER | | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | | |
| DE | Cupric oxalate (RQ-100/45.4) | 6.1 | NA2449 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | |
| | Cupric sulfate (RQ-10/4.54) | ORM-E | NA9109 | III | None | | 156 | 203 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Cupric sulfate, ammoniated (RQ-100/45.4) | ORM-E | NA9110 | III | None | | 156 | 203 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Cupric tartrate (RQ-100/45.4) | ORM-E | NA9111 | III | None | | 156 | 203 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Cupriethylenediamine solution | 8 | UN1761 | II | CORROSIVE, POISON. | T8, T26 | 154 | 202 | 243 | 1 L | 30 L | 1,2 | 1,2 | | |
| | Cutters, cable, explosive | 1.4S | UN0070 | | | | | | | | | | | | |
| | Cyanide or cyanide mixtures dry, see Cyanides, inorganic, n.o.s. | | | | | | | | | | | | | | |
| | Cyanides, inorganic, n.o.s. | 6.1 | UN1588 | I | POISON | N74, N75 | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 26, 95 | |
| | | | | II | POISON | N74, N75 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 26, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | N74, N75 | None | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26 | |
| | Cyanide solutions | 6.1 | UN1935 | I | POISON | B37, T18, T26. | None | 201 | 243 | 1 L | 30 L | 1,2 | 1,2 | 26, 40, 95 | |
| | | | | II | POISON | T18, T26 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 26, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|--------------------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Cyanogen bromide | 6.1 | UN1889 | I | POISON CORROSIVE | B14, B30 N2 N11 10 | None | 211 | 244 | Forbidden | Forbidden | 1 | 5 | 20, 25, 40, 95 | |
| E | Cyanogen chloride (RC-10/4.54) | 2.3 | UN1589 | IA | POISON GAS FLAMMABLE GAS | 10 | None | 192 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 85 | |
| | Cyanogen, liquefied | 2.3 | UN1026 | IB | POISON GAS FLAMMABLE GAS | B14, B31, 10 | None | 192 | 244 | Forbidden | Forbidden | 1 | 5 | 34, 40 | |
| AW | Cyanuric chloride Cyanuric triazide | 8 Forbidden | UN2670 | III | CORROSIVE | | None | 213 | 240 | 25 kg | 100 kg | 1, 3 | 1, 3 | 12, 40 | |
| | Cyclobutane | 2.1 | UN2601 | | FLAMMABLE GAS | T18 | 306 | 304 | 314, 315 | Forbidden | Forbidden | 1, 3 | 1 | 40, 85 | |
| | Cyclobutylchloroformate | 6.1 | UN2744 | II | POISON, CORROSIVE | | None | 202 | 243 | 1 L | 30 L | 1, 3 | 1, 3 | 12, 13, 23, 25 40, 85 | |
| | 1,5,9 Cyclododecatriene | 6.1 | UN2518 | III | KEEP AWAY FROM FOOD | T7 | 153 | 203 | 241 | 60 L | 220 L | 1, 2 | 5 | 34, 40 | |
| | Cycloheptane | 3 | UN2241 | II | FLAMMABLE LIQUID | T1 | None | 202 | 242 | 5 L | 60 L | 1, 3 | 1 | 40 | |
| | Cycloheptatriene | 3 | UN2603 | II | FLAMMABLE LIQUID | T14 | None | 202 | 243 | 1 L | 60 L | 1, 3 | 5 | 12, 40 | |
| | Cycloheptene | 3 | UN2242 | II | POISON FLAMMABLE LIQUID | T7 | 150 | 202 | 241 | 5 L | 60 L | 1, 3 | 1 | | |
| E | Cyclohexane (RC-1000/454) | 3 | UN1145 | II | FLAMMABLE LIQUID | T8 | 150 | 202 | 242 | 5 L | 60 L | 1, 3 | 5 | 12 | |
| | Cyclohexanone | 3 | UN1915 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1, 3 | 1, 3 | | |
| | Cyclohexanone peroxide(s) (1-Hydroxy-1-hydroperoxy dicyclohexyl peroxide, technically pure, or 1-Hydroxy-1-hydroperoxy dicyclohexyl peroxide and Di-(1-hydroxy dicyclohexyl) peroxide mixtures), more than 90 per cent with water with not more than 9 percent available oxygen | 5.2 | UN2117 | I | ORGANIC PEROXIDE | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Cyclohexanone peroxide(s) (1-Hydroxy-1-hydroperoxy dicyclohexyl peroxide, technically pure, or 1-Hydroxy-1-hydroperoxy dicyclohexyl peroxide and Di-(1-hydroxy dicyclohexyl) peroxide mixtures), not more than 90 per cent with water with not more than 9 percent available oxygen | 5.2 | UN2119 | I | ORGANIC PEROXIDE | | None | 225 | None | 1 kg | 5 kg | 1 | 5 | 12, 40 | |
| | Cyclohexanone peroxide(s) not more than 72 per cent as a paste with not more than 9 per cent available oxygen | 5.2 | UN2896 | II | ORGANIC PEROXIDE | | 152 | 225 | None | 1 kg | 5 kg | 1 | 5 | 12, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|----------------------------------|------------------------------|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or rescue | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | |
| | <i>Diazodinitrophenol (dry)</i> | Forbidden 1.1A | UN0074 | | | | | | | | | | | | | |
| | Diazodinitrophenol, wetted with not less than 40 per cent water, by weight, or mixture of alcohol and water. | | | | | | | | | | | | | | | |
| | <i>Diazodiphenylmethane</i> | Forbidden 4.1 | | | | | | | | | | | | | | |
| | 2-Diazo-1-naphthol-4-sulpho-chloride..... | 4.1 | UN3042 | II | FLAMMABLE SOLID. | | None | 212 | None | 15 kg | 50 kg | 1 | 5 | 25 | | |
| | 2-Diazo-1-naphthol-5-sulpho-chloride..... | | UN3043 | II | FLAMMABLE SOLID. | | None | 212 | None | 15 kg | 50 kg | 1 | 5 | 25 | | |
| | <i>Diazonium nitrates (dry)</i> | Forbidden | | | | | | | | | | | | | | |
| | <i>Diazonium perchlorates (dry)</i> | Forbidden | | | | | | | | | | | | | | |
| | <i>1,3-Diazopropane</i> | Forbidden 5.2 | | | | | | | | | | | | | | |
| | Dibenzoyl peroxide (Benzoyl peroxide), more than 77 per cent but less than 85 per cent with water. | 5.2 | UN2088 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | | |
| | Dibenzoyl peroxide (Benzoyl peroxide), not less than 30 per cent but not more than 52 per cent with inert solid. | 5.2 | UN2089 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 10 kg | 25 kg | 1 | 5 | 12, 40 | | |
| | Dibenzoyl peroxide (Benzoyl peroxide), not more than 72 per cent as a paste. | 5.2 | UN2087 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 10 kg | 25 kg | 1 | 5 | 12, 40 | | |
| | Dibenzoyl peroxide (Benzoyl peroxide), not more than 77 per cent with water. | 5.2 | UN2090 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 | | |
| | Dibenzoyl peroxide (Benzoyl peroxide), technically pure, or Dibenzoyl peroxide (Benzoyl peroxide), more than 52 per cent with inert solid. | 5.2 | UN2085 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | | |
| | Dibenzoyl peroxide more than 72 percent but less than 95 percent as a paste. | 5.2 | UN2086 | I | ORGANIC PEROXIDE. | | None | 225 | 246 | Forbidden | Forbidden | 1 | 5 | | | |
| | Dibenzoyldichlorosilane..... | 8 | UN2434 | II | CORROSIVE..... | B2, T8, T28. | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 40 | | |
| | <i>Dibenzyl peroxydicarbonate, more than 87 per cent with water.</i> | Forbidden | | | | | | | | | | | | | | |
| | Dibenzyl peroxydicarbonate, not more than 87 per cent with water. | 5.2 | UN2149 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | | |
| | Diborane..... | 2.3 | UN1911 | IA | POISON GAS, FLAMMABLE GAS. | 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 57, 74, 95 | | |
| D | Diborane mixtures..... | 2.3 | NA1911 | IA | POISON GAS, FLAMMABLE GAS. | B35, 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 57, 74, 95 | | |
| | <i>Dibromoacetylene</i> | Forbidden | | | | | | | | | | | | | | |
| | Dibromobenzene..... | 3 | UN2711 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1.3 | 1.3 | | | |
| | 1,2-Dibromobutane-3-one..... | 6.1 | UN2646 | II | POISON..... | | None | 202 | 243 | 5 L | 60 L | 1.2 | 1 | 40, 95 | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---|---|---------------------|--------------------------------|-----------------------|---|---------------------------|--|-----------------------------|-----------------------------|---------------------------------------|-----------------------------|-------------------------------------|---------------------------|----------------------------------|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (9A) Cargo vessel | (9B) Pas-senger vessel | (9C) Other stowage provisions |
| A | Dibromochloropropane | 6.1 | UN2872 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 |
| | Dibromodifluoromethane | 9 | UN1941 | III | None | T13 | 155 | 203 | 241 | 100 L | 220 L | 1,2 | 1,2 | 25, 34 |
| | 1,2-Dibromoethane, see Ethylene dibromide. | | | | | | | | | | | | | |
| | Dibromomethane | 6.1 | UN2664 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 |
| | Di-(n-butyl)amine | 8 | UN2248 | I | CORROSIVE, POISONOUS, FLAMMABLE LIQUID. | B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,2 | 1,2 | 21, 40, 95 |
| | Dibutylaminoethanol | 6.1 | UN2873 | III | KEEP AWAY FROM FOOD. | T1 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 |
| | Di-(4-tert-butylcyclohexyl) peroxydicarbonate, not more than 42 per cent, stable dispersion, in water. | 5.2 | UN2894 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | Di-(4-tert-butylcyclohexyl) peroxydicarbonate, technically pure. | 5.2 | UN2154 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | Dibutyl ethers | 3 | UN1149 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | Di-tert-butyl peroxide (tert-Butyl-peroxide), technically pure. | 5.2 | UN2102 | II | ORGANIC PEROXIDE, FLAMMABLE LIQUID. | | 152 | 225 | None | 1 L | 5 L | 1 | 5 | 12, 40 |
| | 2,2-Di-(tert-butylperoxy) butane, more than 55 per cent in solution. | Forbidden | | | | | | | | | | | | |
| | 2,2-Di-(tert-butylperoxy) butane, not more than 55 per cent in solution. | 5.2 | UN2111 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 |
| | 1,1-Di-(tert-butylperoxy) cyclohexane, not more than 40 per cent with inert inorganic solid with not less than 13 per cent in phlegmatizer. | 5.2 | UN2885 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 |
| | 1,1-Di-(tert-butylperoxy) cyclohexane, not more than 50 per cent with phlegmatizer. | 5.2 | UN2897 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 |
| | 1,1-Di-(tert-butylperoxy) cyclohexane not more than 27% in solution with not less than 36% diluent type A and not less than 36% diluent type B. | 5.2 | UN3069 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 2 |
| 1,1-Di-(tert-butylperoxy) cyclohexane, not more than 77 per cent in solution. | 5.2 | UN2180 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| 1,1-Di-(tert-butylperoxy) cyclohexane, technically pure. | 5.2 | UN2179 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| Di-n-butyl peroxydicarbonate, more than 52 per cent in solution. | Forbidden | | | | | | | | | | | | | |
| Di-n-butyl peroxydicarbonate, not more than 52 per cent in solution. | 5.2 | UN2169 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| Di-n-butyl peroxydicarbonate, not more than 27 per cent in solution. | 5.2 | UN2170 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| Di-sec-butyl peroxydicarbonate, not more than 52 per cent in solution. | 5.2 | UN2151 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|---|--|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raitar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| D | Dichloroethylene..... | 3 | UN1150 | II | FLAMMABLE LIQUID. | T14..... | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1..... | | |
| | Dichloroethyl ether..... | 6.1 | UN1916 | II | POISON..... | N33, N34, T8. | None | 202 | 243 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | 95 | |
| | <i>Dichloroethyl sulfide</i> | Forbidden | | | | | | | | | | | | | |
| | Dichlorofluoromethane..... | 2.2 | UN1029 | II | NONFLAMMA- BLE GAS. | | 306 | 304 | 314, 315 | 75 kg..... | 150 kg..... | 1,3..... | 1,3..... | 85 | |
| | Dichloroisocyanuric acid, dry or Dichloro- isocyanuric acid salts..... | 5.1 | UN2465 | II | OXIDIZER..... | B10, 28..... | 152 | 212 | 240 | 5 kg..... | 25 kg..... | 1,2..... | 1,2..... | | |
| | Dichloroisopropyl ether..... | 6.1 | UN2490 | II | POISON..... | T8..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,2..... | 1..... | 95 | |
| | Dichloromethane..... | 6.1 | UN1593 | III | KEEP AWAY FROM FOOD. | N36, T13..... | 153 | 203 | 241 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 25, 34 | |
| | Dichloromethane..... | 9 | NA1593 | III | NONE..... | N36, T13..... | 155 | 204 | 241 | No limit..... | No limit..... | 1,2..... | 1,2..... | 25 | |
| | 1,1-Dichloro-1-nitroethane..... | 6.1 | UN2650 | II | POISON..... | T8..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 12, 40, 95 | |
| | Dichloropentanes..... | 3 | UN1152 | III | FLAMMABLE LIQUID. | B1, T1..... | 150 | 202 | 241 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | | |
| DE | 2,4-Dichlorophenoxyacetic acid (RC-100/ 45.4)..... | ORM-E | NA2765 | III | None..... | | 156 | 213 | 240 | No limit..... | No limit..... | 1,2..... | 1,2..... | | |
| | 2,4-Dichlorophenoxyacetic acid ester (RC- 100/45.4)..... | ORM-E | NA2765 | III | None..... | | 156 | 213 | 240 | No limit..... | No limit..... | 1,2..... | 1,2..... | | |
| DE | Dichlorophenyl isocyanates..... | 6.1 | UN2250 | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,3..... | 1,3..... | 25, 40, 95 | |
| | Dichlorophenyltrichlorosilane..... | 8 | UN1766 | II | CORROSIVE..... | B2, B6, N16, N26, N34, T8, T26. | None | 202 | 242 | Forbidden..... | 30 L..... | 1..... | 1..... | 40 | |
| E | Dichloropropane, see Propylene dichloride 1,3-Dichloropropanol-2..... | 6.1 | UN2750 | II | POISON..... | T8..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 12, 40, 95 | |
| | Dichloropropene (RC-5000/2270)..... | 3 | UN2047 | II | FLAMMABLE LIQUID. | T8..... | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | | |
| DE | Dichloropropene and propylene dichloride mixture, see Propylene dichloride. 2,2-Dichloropropionic acid (RC-5000/2270)..... | 8 2.3 | NA1760 UN2189 | II II | CORROSIVE..... POISON GAS, FLAMMABLE GAS. | B2..... B13, B14, B31, 10. | 154 None | 202 304 | 242 244 | 1 L..... Forbidden..... | 30 L..... Forbidden..... | 1,2..... 1..... | 1,2..... 5..... | 40, 95 | |
| | Dichlorosilane..... | 2.2 | UN1958 | I | NONFLAMMA- BLE GAS. | | 308 | 304 | 314, 315 | 75 kg..... | 150 kg..... | 1,3..... | 1,3..... | 85 | |
| DE | Dichlorotetrafluoroethane..... | 6.1 | NA2810 | I | POISON..... | B14, B32, 10. | | 227 | 244 | Forbidden..... | Forbidden..... | 1..... | 1,3..... | 40, 95 | |
| | 3,5-Dichloro-2,4,6-trifluoropyridine..... | Forbidden | | | | | | | | | | | | | |
| DE | Dichlorovinylchloroarsine..... | 6.1 | NA2783 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 241 | 100 kg..... | 200 kg..... | 1,2..... | 1,2..... | | |
| | Dichlorvos (RC-10/4.5A)..... | 6.1 | NA2783 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 241 | 100 kg..... | 200 kg..... | 1,2..... | 1,2..... | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard Class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---|---|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk packag- ing (8B) | Bulk packag- ing (8C) | Passenger aircraft or raftcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| AW | Dicumyl peroxide, technically pure, or Dicumyl peroxide with inert solid. | 5.2 | UN2121 | II | ORGANIC PEROXIDE. | B9, B20 | 152 | 225 | 243 | 10 kg | 25 kg | 1 | 5 | 12, 40 | |
| | Dicycloheptadiene see Norbornadiene | 8 | UN2565 | III | CORROSIVE. | T8 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | 34 | |
| | Dicyclohexylamine | 6.1 | UN2687 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | |
| | Dicyclohexylammonium nitrite | | | | | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Dicyclohexyl peroxydicarbonate, not more than 91 per cent with water. | 5.2 | UN2153 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Dicyclohexyl peroxydicarbonate, technically pure. | 5.2 | UN2152 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Dicyclopentadiene | 3 | UN2048 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Didecanoyl peroxide, technically pure | 5.2 | UN2120 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | 2,2-Di-(4,4-di-tert-butylperoxycyclohexyl) propane, more than 42 per cent with inert solid. | Forbidden | | | | | | | | | | | | | |
| | 2,2-Di-(4,4-di-tert-butylperoxycyclohexyl) propane, not more than 42 per cent with inert solid. | 5.2 | UN2168 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 | |
| Di-2,4-dichlorobenzoyl peroxide, more than 75 per cent with water. | Forbidden | | | | | | | | | | | | | | |
| Di-2,4-dichlorobenzoyl peroxide, not more than 52 per cent as a paste. | 5.2 | UN2138 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 10 kg | 25 kg | 1 | 5 | 12, 40 | | |
| Di-2,4-dichlorobenzoyl peroxide, not more than 52 per cent in solution. | 5.2 | UN2139 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 | | |
| Di-2,4-dichlorobenzoyl peroxide, not more than 75 per cent with water. | 5.2 | UN2137 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 | | |
| 1,2-Di-(dimethylamino) ethane | 3 | UN2372 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | |
| Didymium nitrate | 5.1 | UN1465 | III | OXIDIZER | A1 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | | |
| Dieldrin (RC-1/0.454) | 6.1 | NA2761 | II | POISON | | None | 212 | 242 | 0.5 kg | 5 kg | 1,2 | 1,2 | | | |
| Diesel fuel | 3 | NA1202 | III | None | | 150 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | | | |
| Diethanol nitrosamine dinitrate (dry) | Forbidden | | | | | | | | | | | | | | |
| Diethoxymethane | 3 | UN2373 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 12 | | |
| 2,5-Diethoxy-4-morpholinobenzenediazonium zinc chloride. | 4.1 | UN3036 | II | FLAMMABLE SOLID. | | None | 212 | None | Forbidden | Forbidden | 1 | 5 | 25 | | |
| 3,3-Diethoxypropene | 3 | UN2374 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | |
| Diethylamine (RC-1000/454) | 3 | UN1154 | II | FLAMMABLE LIQUID. | N34, T8 | 150 | 202 | 242 | Forbidden | 60 L | 1,3 | 1,3 | 12, 40 | | |
| Diethylaminoethanol | 3 | UN2686 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |
| Diethylaminopropylamine | 8 | UN2684 | III | CORROSIVE, FLAMMABLE LIQUID. | B1, B2, T8 | 154 | 203 | 243 | 5 L | 60 L | 1,2 | 1,2 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|------------------------------------|--------------------------------------|--|--|--|---|--|-----------------------------------|--|--|--|
| | | | | | | | Excep- tions (8A) (8A) | Non- bulk pack- aging (8B) (8B) | Bulk packag- ing (8C) (8C) | Passenger aircraft or railcar (9A) (9A) | Cargo aircraft only (9B) (9B) | Cargo vessel (10A) (10A) | Pass- enger vessel (10B) (10B) | Other stowage provisions (10C) (10C) | |
| | N,N-Diethyl aniline..... | 6.1 | UN2432 | III | KEEP AWAY FROM FOOD. | T2 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Diethylbenzene..... | 3 | UN2049 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 40 | |
| | Diethyl carbonate..... | 3 | UN2366 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Diethyl cellosolve, see Ethylene glycol diethyl ether. | | | | | | | | | | | | | | |
| | Diethyldichlorosilane..... | 8 | UN1767 | II | CORROSIVE, FLAMMABLE LIQUID. | B6, N16, N26, N34, T8, T26. | None | 202 | 243 | Forbidden | 30 L | 1 | 1 | 21, 40, 77 | |
| | Diethylene glycol dinitrate..... | Forbidden | | | | | | | | | | | | | |
| | Diethylene glycol dinitrate, desensitized with not less than 25 percent non-vola- tile water-insoluble phlegmatizer, by weight. | 1.1D | UN0075 | | | | | | | | | | | | |
| | Diethylenetriamine..... | 8 | UN2079 | II | CORROSIVE | B2, T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | 26, 32, 40, 71 | |
| | Diethyl ether..... | 3 | UN1155 | I | FLAMMABLE LIQUID. | T21 | 150 | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12, 40 | |
| | N,N-Diethylethylene diamine..... | 8 | UN2685 | II | CORROSIVE, FLAMMABLE LIQUID. | T8 | None | 202 | 243 | 1 L | 30 L | 1,3 | 1,3 | 12, 21 | |
| | Diethylgold bromide..... | Forbidden | | | | | | | | | | | | | |
| | Di-2-ethylhexyl peroxydicarbonate, not more than 77 per cent in solution. | 5.2 | UN2123 | II | ORGANIC PEROXIDE | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Di-2-ethylhexyl peroxydicarbonate, not more than 32 per cent, stable dispersion in water. | 5.2 | UN2960 | II | ORGANIC PEROXIDE | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Di-2-ethylhexyl peroxydicarbonate, techni- cally pure. | 5.2 | UN2122 | II | ORGANIC PEROXIDE | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Di-2-ethylhexyl phosphoric acid, see Di- socioyl acid phosphiate. | | | | | | | | | | | | | | |
| | Diethyl ketone..... | 3 | UN1156 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Diethyl peroxydicarbonate, more than 27 per cent in solution. | Forbidden | | | | | | | | | | | | | |
| | Diethyl peroxydicarbonate, not more than 27 per cent in solution. | 5.2 | UN2175 | II | ORGANIC PEROXIDE | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Diethyl sulfate..... | 6.1 | UN1594 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1 | 1 | 95 | |
| | Diethyl sulfide..... | 3 | UN2375 | II | FLAMMABLE LIQUID, POISON | T14 | None | 202 | 243 | 1 L | 60 L | 1,3 | 5 | 12, 13, 95 | |
| | Diethythiophosphoryl chloride..... | 8 | UN2751 | II | CORROSIVE | B2, T8 | None | 202 | 242 | 1 L | 30 L | 1 | 5 | 12, 21, 40 | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | Special provisions | (8) Packaging authorizations (173.***) | | | (9) Quantity limitations | | (10) Vessel stowage requirements | | |
|-----------------|--|---------------------|--------------------------------|-----------------------|---|---|---|-----------------------------|-------------------------|--------------------------------------|-----------------------------|-------------------------------------|----------------------------|-----------------------------------|
| | | | | | | | (8A) Except-ions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or rocket | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pass-enger vessel | (10C) Other stowage provisions |
| (1) | Diethylzinc..... | 4.2 | UN1366 | I | SPONTANE- OUSLY COMBUSTI- BLE. | B11, T28, T40. | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | 18 |
| | Difluorochloroethanes, see Chlorodifluoroethanes. | | | | | | | | | | | | | |
| | Difluoroethane (R-152a)..... | 2.1 | UN1030 | | FLAMMABLE | | 306 | 304 | 314, 315 | Forbidden | Forbidden | 1,3 | 1 | 40, 85 |
| | 1,1-Difluoroethylene..... | 2.1 | UN1959 | | FLAMMABLE GAS. | B13 | 306 | 304 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 85 |
| | Difluorophosphoric acid, anhydrous..... | 8 | UN1766 | II | CORROSIVE..... | B2, N5, N11, N16, N26, N34, T9, T27. | None | 202 | 242 | Forbidden | Forbidden | 1,2 | 1,2 | 40 |
| | 2,2-Dihydroperoxy propane, not more than 25 per cent with inert organic solid. | 5.2 | UN2178 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | 2,3-Dihydropyran..... | 3 | UN2376 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | Di-(1-hydroxycyclohexyl) peroxide, techni-cally pure. | 5.2 | UN2148 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 |
| | 1,8-Dihydroxy-2,4,5,7-tetra-nitroanthraquinone (chrysaminic acid). | Forbidden | | | | | | | | | | | | |
| | Di-(1-hydroxytetrazole) (dry)..... | Forbidden | | | | | | | | | | | | |
| | Diiodoacetylene..... | Forbidden | | | | | | | | | | | | |
| | Diisobutylamine..... | 3 | UN2361 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | |
| | Diisobutylene, isomeric compounds..... | 3 | UN2050 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | Diisobutyl ketone..... | 3 | UN1157 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | Diisobutyl peroxide, not more than 52 per cent in solution. | 5.2 | UN2182 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | Diisooctyl acid phosphate..... | 8 | UN1902 | III | CORROSIVE | T7 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | |
| | Diisopropylamine..... | 3 | UN1158 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | Diisopropylbenzene hydroperoxide, see Isopropylcumyl hydroperoxide, etc.. | | | | | | | | | | | | | |
| | Diisopropyl ether..... | 3 | UN1159 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12, 40 |
| | Diisopropyl peroxycarbonate or isopropyl peroxycarbonate, technically pure. | 5.2 | UN2133 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |
| | Diisopropyl peroxycarbonate or isopropyl peroxycarbonate, not more than 52 per cent in solution. | 5.2 | UN2134 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.31) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---|--|------------------------|---------------------------------------|------------------------------|----------------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| E | Diisotridecyl peroxydicarbonate, technically pure. | 5.2 | UN2889 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Diketene, inhibited. | 3 | UN2521 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Dilauroyl peroxide (Lauroyl peroxide), not more than 42 per cent, stable dispersion, in water. | 5.2 | UN2893 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 10 L | 25 L | 1 | 5 | 12, 40 | |
| | Dilauroyl peroxide (Lauroyl peroxide), technically pure. | 5.2 | UN2124 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 10 kg | 25 kg | 1 | 5 | 12, 40 | |
| | 1,1-Dimethoxyethane. | 3 | UN2377 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 12 | |
| | 1,2-Dimethoxyethane. | 3 | UN2252 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Dimethylamine, anhydrous (FG-1000/454) | 2.3 | UN1032 | II | POISON GAS, FLAMMABLE GAS. | B14, B33, 10. | None | 304 | 314, 315 | Forbidden | Forbidden | 1,3 | 5 | 40, 85 | |
| | Dimethylamine solution (FG-1000/454) | 3 | UN1160 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 12 | |
| | 2-Dimethylaminoacetone | 3 | UN2378 | II | FLAMMABLE LIQUID. | T8 | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | 40 | |
| | 4-Dimethylamino-6-(2-dimethylaminoethoxy) toluene-2-diazonium zinc chloride. | 4.1 | UN3039 | II | FLAMMABLE SOLID. | | None | 212 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Dimethylaminoethyl methacrylate. | 6.1 | UN2522 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | N,N-Dimethylaniline. | 6.1 | UN2253 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 95 | |
| | Di-(2-methylbenzoyl) peroxide, not more than 65 per cent with water. | 5.2 | UN2593 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | 2,3-Dimethylbutane. | 3 | UN2457 | II | FLAMMABLE LIQUID. | T13 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12 | |
| 1,3-Dimethylbutylamine. | 3 | UN2379 | II | FLAMMABLE LIQUID. | T8 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| Dimethylcarbamoyl chloride | 8 | UN2262 | II | CORROSIVE. | B2, T8 | | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | 40 | |
| Dimethyl carbonate | 3 | UN1161 | II | FLAMMABLE LIQUID. | T8 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| Dimethyl chlorophosphate, see Corrosive liquid, poisonous, n.o.s. | | | | | | | | | | | | | | | |
| Dimethylcyclohexanes. | | | | | | | | | | | | | | | |
| Dimethylcyclohexylamine | | | | | | | | | | | | | | | |
| 2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, not more than 82 per cent with inert solid. | 5.2 | UN2173 | II | ORGANIC PEROXIDE. | T1 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| 2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, not more than 82 per cent with water. | 5.2 | UN2959 | II | ORGANIC PEROXIDE. | B2, T8 | | 154 | 202 | 242 | 1 L | 30 L | 1,3 | 1,3 | 12, 21, 40 | |
| 2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, technically pure. | 5.2 | UN2172 | II | ORGANIC PEROXIDE. | | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | Packaging specifications (173...) | | | Quantity limitations | | | Vessel stowage requirements | | |
|----------|--|--------------|-------------------------|----------------|--------------------------------------|-------------------------|-----------------------------------|---------------------|-----------------|------------------------------|---------------------|--------------|-----------------------------|--------------------------|--|
| | | | | | | | Excep-tions | Non-bulk pack-aging | Bulk packag-ing | Passenger aircraft or railet | Cargo aircraft only | Cargo vessel | Passenger vessel | Other stowage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | 2,5-Dimethyl-2,5-di(tert-butylperoxy) hexane, not more than 52 per cent with inert solid. | 5.2 | UN2156 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 | |
| | 2,5-Dimethyl-2,5-di-3 (tert-butylperoxy) hexane, technically pure. | 5.2 | UN2155 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 | |
| | 2,5-Dimethyl-2,5-di(tert-butylperoxy) hexane-3, not more than 52 per cent with inert solid. | 5.2 | UN2159 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 | |
| | 2,5-Dimethyl-2,5-di(tert-butylperoxy) technically pure. | 5.2 | UN2158 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Dimethyldichlorosilane | 3 | UN1162 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1 | 40 | |
| | Dimethyldiethoxysilane | 3 | UN2380 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | 2,5-Dimethyl-2,5-di(2-ethylhexanoylperoxy) hexane, technically pure. | 5.2 | UN2157 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | 2,5-Dimethyl-2,5-dihydroperoxy hexane or Dimethylhexane dihydroperoxide, not more than 82 per cent with water. | 5.2 | UN2174 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | 2,5-Dimethyl-2,5-dihydroperoxy hexane, more than 82 per cent with water. | Forbidden | | | | | | | | | | | | | |
| | Dimethyldioxanes | 3 | UN2707 | II | FLAMMABLE LIQUID. | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Dimethyl disulfide | 3 | UN2381 | III | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | 2,5-Dimethyl-2,5-di-(3,5-trimethyl hexan-oylperoxy)-hexane, or 2,5-Dimethyl-2,5-di(isononylperoxy)-hexane not more than 77% in solution. | 5.2 | UN3060 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | | |
| | Dimethylethanamine | 3 | UN2051 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Dimethyl ether | 2.1 | UN1033 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | N,N-Dimethylformamide | 3 | UN2265 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Dimethylhexane dihydroperoxide, see 2,5-Dimethyl-2,5-dihydroperoxy hexane, etc. | 3 | UN2382 | I | FLAMMABLE LIQUID, POISON. | B14, B32, N15, N26, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 12, 40, 95 | |
| | Dimethylhydrazine, symmetrical | 3 | UN1163 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B14, B32, N15, N26, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 61, 74, 95 | |
| | Dimethylhydrazine, unsymmetrical | 3 | UN1163 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B14, B32, N15, N26, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 61, 74, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|-------------------------|---|--|--|--------------------------------|--|--------------------------------|--------------------------|--|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Di-(beta-nitroxyethyl) ammonium nitrate | Forbidden | | | | | | | | | | | | | |
| | s,s'-Di-(nitroxy) methylether | Forbidden | | | | | | | | | | | | | |
| | 1,9-Dinitroxy pentamethylene-2,4, 6,6-tetra- mine (dry) | Forbidden | | | | | | | | | | | | | |
| | Di-n-nonanoyl peroxide, technically pure | 5.2 | UN2130 | II | ORGANIC- PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Di-n-octanoyl peroxide, technically pure | 5.2 | UN2129 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Dioxane | 3 | UN1165 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Dioxolane | 3 | UN1166 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Dipentene | 3 | UN2052 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Diperoxy azelaic acid not more than 27 per cent with not less than 13 per cent azelaic acid and not less than 53 per cent sodium sulfate. | 5.2 | UN2958 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Diperoxy dodecane diacid, not more than 42% with not less than 56% sodium sulfate. | 5.2 | UN3063 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Di-(2 Phenoxyethyl)-peroxy dicarbonate, not more than 85% with water. | 5.2 | UN3059 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Di-(2 phenoxyethyl)-peroxy dicarbonate, technically pure. | 5.2 | UN3058 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Diphenylamine chloroarsine (DM) | 6.1 | UN1698 | II | POISON. | | None | 212 | None | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Diphenylchloroarsine | 6.1 | UN1699 | I | POISON. | B14, B32, N2, N33, N34, N34, 10. | None | 211 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Diphenyldichlorosilane | 8 | UN1769 | II | CORROSIVE | B2, N16, N26, N34, T8, T26. | None | 202 | 244 | Forbidden | Forbidden | 1 | 1 | 40 | |
| | Diphenylmethane-4,4'diisocyanate | 6.1 | UN2489 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 48 | |
| | Diphenylmethyl bromide | 8 | UN1770 | II | CORROSIVE | | 154 | 212 | 240 | 15 kg | 50 kg | 1 | 5 | 40 | |
| | Diphenyloxide-4,4'disulfohydrazide | 4.1 | UN2951 | II | FLAMMABLE SOLID. | | None | 212 | None | 15 kg | 50 kg | 1,3 | 1 | 12, 25, 48, 52, 53, 85 | |
| | Dipicrylamine, see Hexanitrodiphenylamine | 1.1D | UN0401 | | | | | | | | | | | | |
| | Dipicryl sulfide, dry or wetted with less than 10 per cent water, by weight. | 4.1 | UN2852 | I | FLAMMABLE SOLID. | A2, N15, N34, N41. | None | 211 | None | Forbidden | Forbidden | 1 | 5 | | |
| | Dipicryl sulfide, wetted with not less than 10 per cent water, by weight. | 4.1 | UN2852 | I | FLAMMABLE SOLID. | | None | 211 | None | Forbidden | Forbidden | 1 | 5 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 178.305) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or ratical | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| DE | Dipropionyl peroxide or Propionyl peroxide, not more than 28 per cent in solution. | 5.2 | UN2132 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Dipropionyl peroxide, more than 28 per cent in solution. | Forbidden | | | | | 150 | 202 | 242 | 5 L. | 60 L. | 1,3 | 1 | | |
| | Dipropylamine | 3 | UN2383 | II | FLAMMABLE LIQUID. | T8 | None | 212 | None | Forbidden | Forbidden | 1 | 5 | 25 | |
| | 4-Dipropylamino benzenediazonium zinc chloride. | 4.1 | UN3034 | II | FLAMMABLE SOLID. | T1 | 150 | 202 | 242 | 5 L. | 60 L. | 1,3 | 5 | 12 | |
| | Dipropyl ether | 3 | UN2384 | II | FLAMMABLE LIQUID. | | 150 | 203 | 242 | 60 L. | 220 L. | 1,3 | 1,3 | | |
| | Dipropylketone | 3 | UN2710 | III | FLAMMABLE LIQUID. | B1, T1 | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Di-n-propyl peroxydicarbonate, technically pure. | 5.2 | UN2176 | I | ORGANIC PEROXIDE. | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Diquat (RQ-1000/45-4) | ORM-E | NA2781 | III | None | B2 | 154 | 202 | 242 | 1 L. | 30 L. | 1,2 | 1,2 | | |
| | Disinfectants, corrosive liquid, n.o.s. | 8 | UN1903 | III | CORROSIVE | | 154 | 203 | 241 | 5 L. | 60 L. | 1,2 | 1,2 | | |
| | Disinfectants, n.o.s. poisonous liquid | 6.1 | UN1601 | III | CORROSIVE POISON. | | None | 201 | 243 | 1 L. | 30 L. | 1,2 | 1 | 40, 95 | |
| DE | Disinfectants, n.o.s. poisonous solid. | 6.1 | UN1601 | III | POISON. KEEP AWAY FROM FOOD. | | None | 202 | 243 | 5 L. | 60 L. | 1,2 | 1 | 40, 95 | |
| | Dispersant gas, see Compressed or liquefied gases, etc. | | | | | | 153 | 203 | 241 | 60 L. | 220 L. | 1,2 | 1,2 | 34, 40 | |
| | Di-stearyl peroxydicarbonate, not more than 85 per cent with stearyl alcohol. | 5.2 | UN2592 | II | ORGANIC PEROXIDE. | | None | 211 | 242 | 5 kg. | 50 kg. | 1,2 | 1,2 | 95 | |
| | Disuccinic acid peroxide or Succinic acid peroxide, technically pure. | 5.2 | UN2135 | I | ORGANIC PEROXIDE. | | None | 212 | 242 | 25 kg. | 100 kg. | 1,2 | 1,2 | 95 | |
| | Disuccinic acid peroxide, not more than 72 per cent, wetted with water. | 5.2 | UN2962 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 20, 40 | |
| | Disulfoton (RQ-1/0.45-4) | 6.1 | NA2783 | II | POISON. | | None | 202 | 243 | 5 L. | 60 L. | 1,2 | 1 | | |
| | Dithiocarbamate pesticides, liquid, flamma- ble, toxic, n.o.s., flash point less than 23deg C. | 3 | UN2772 | I | FLAMMABLE LIQUID. POISON. FLAMMABLE LIQUID. | | None | 201 | 243 | Forbidden | Forbidden | 1,3 | 5 | | |
| | Dithiocarbamate pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23deg C. | 6.1 | UN3005 | I | POISON. FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L. | 30 L. | 1 | 1 | 21, 40, 95 | |
| | Dithiocarbamate pesticides, liquid, toxic, n.o.s. | 6.1 | UN3006 | III | POISON. KEEP AWAY FROM FOOD. | T14 | None | 202 | 243 | 5 L. | 60 L. | 1,3 | 1 | 21, 40, 95 | |
| | Dithiocarbamate pesticides, liquid, toxic, n.o.s. | 6.1 | UN3006 | I | POISON. KEEP AWAY FROM FOOD. | T14 | 163 | 203 | 241 | 60 L. | 220 L. | 1,2 | 1 | 21, 34, 40, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation Numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.11) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|-----------------------------------|------------------------------|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|-------------------|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raider | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | | |
| | <i>Electrolyte (acid or alkali) for batteries, see Battery fluid, acid or Battery fluid, alkali.</i> | | | | | | | | | | | | | | | | |
| DE | Endosulfan (RC-1/0.454) | 6.1 | NA2761 | II | POISON | | None | 212 | 242 | 0.5 kg | 5 kg | 1.2 | 1.2 | | | | |
| DE | Endosulfan mixture, liquid (RC-1/0.454) | 6.1 | NA2761 | III | POISON KEEP AWAY FROM FOOD. | | None | 202 203 | 243 241 | 5 L 60 L | 60 L 220 L | 1.2 1.2 | 1.2 1.2 | | | | |
| DE | Endrin (RC-1/0.454) | 6.1 | NA2761 | II | POISON | | None | 212 | 242 | 0.5 kg | 5 kg | 1.2 | 1.2 | | | | |
| DE | Endrin mixture, liquid (RC-1/0.454) | 6.1 | NA2761 | III | POISON KEEP AWAY FROM FOOD. | | None | 202 203 | 243 241 | 5 L 60 L | 60 L 220 L | 1.2 1.2 | 1.2 1.2 | | | | |
| | Engines, internal combustion, see Vehicle, self-propelled. | | | | | | | | | | | | | | | | |
| | Engine starting fluid, with flammable gas | 2.1 | UN1860 | | FLAMMABLE GAS. | B13 | 306 | 304 | 244 | Forbidden | 150 kg | 1.3 | 5 | | | 40, 85 | |
| | Epibromohydrin | 6.1 | UN2558 | I | POISON | | None | 201 | 243 | Forbidden | 30 L | 1 | 5 | | | 23, 25, 40, 95 | |
| E | Epichlorohydrin (RC-1000/454) | 6.1 | UN2023 | I | POISON | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1.2 | 1.2 | | | 23, 40, 95 | |
| | 1,2-Epoxy-3-ethoxypropane | 3 | UN2752 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1.3 | 1.3 | | | | |
| | Eradicators, paint or grease, liquid | 3 | UN1850 | I | FLAMMABLE LIQUID. | | 150 | 201 | 243 | 1 L | 30 L | 1.3 | 5 | | | | |
| | Eradicators, paint or grease, liquid | | | II | FLAMMABLE LIQUID. | | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | | | | |
| | Eradicators, paint or grease, liquid | | | III | FLAMMABLE LIQUID. | B1 | 150 | 203 | 242 | 60 L | 220 L | 1.2 | 1.3 | | | | |
| | Eradicators, paint or grease, liquid | 6.1 | UN1850 | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1.2 | 1 | | | | |
| | Eradicators, paint or grease, liquid | | | III | KEEP AWAY FROM FOOD. | | 163 | 203 | 241 | 60 L | 220 L | 1.2 | 1 | | | | |
| | Eradicators, paint or grease, liquid | 8 | UN1850 | II | CORROSIVE | B2 | 154 | 202 | 242 | 1 L | 30 L | 1.2 | 1 | | | | |
| | Eradicators, paint or grease, liquid | | | III | CORROSIVE | | 154 | 203 | 241 | 5 L | 60 L | 1.2 | 1 | | | | |
| | <i>Etching acid, liquid, n.o.s., see Hydro- fluoric acid, solution.</i> | | | | | | | | | | | | | | | | |
| | Ethane, compressed | 2.1 | UN1035 | | FLAMMABLE GAS. | B13 | 306 | 304 | 244 | Forbidden | 150 kg | 1.3 | 5 | | | 40, 85 | |
| D | Ethane-Propane mixture, refrigerated liquid | 2.1 | NA1961 | | FLAMMABLE GAS. | B13 | None | 316 | 244 | Forbidden | Forbidden | 1 | 5 | | | 40 | |
| | Ethane, refrigerated liquid | 2.1 | UN1961 | | FLAMMABLE GAS. | B13 | None | 316 | 244 | Forbidden | Forbidden | 1 | 5 | | | 40 | |
| | Ethanamine or Ethanamine solutions | 8 | UN2491 | III | CORROSIVE | T7 | 154 | 203 | 241 | 5 L | 60 L | 1.2 | 1.2 | | | | |
| | <i>Ethanol amine dinitrate</i> | Forbidden | | | | | | | | | | | | | | | |
| | Ethanol (Ethyl alcohol) or Ethanol (Ethyl alcohol) solutions, including Alcoholic beverages. | 3 | UN1170 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 248 | 5 L | 60 L | 1.3 | 1 | | | | |
| | <i>Ether, see Diethyl ether</i> | | | | | | | | | | | | | | | | |
| DE | Ethion (RC-10/4.54) | 6.1 | NA2783 | II | POISON | B1, T1 | None | 202 | 243 | Forbidden | 1 L | 1.2 | 1 | | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard Class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | |
|---------------------------------|---|------------------------|---------------------------------------|----------------------------------|-------------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|--------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raircraft | (9B) Cargo aircraft only | (9A) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Ethyl acetate..... | 3 | UN1173 | II | FLAMMABLE LIQUID. | T2 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | | |
| | Ethyl acetylene, inhibited..... | 2.1 | UN2452 | | FLAMMABLE GAS. | B13 | None | 304 | 244 | Forbidden | 150 kg | 1 | 1 | 5 | 40 | |
| | Ethyl acrylate, inhibited..... | 3 | UN1917 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | 40 | |
| | Ethyl alcohol, <i>see</i> Ethanol..... | | | | | | | | | | | | | | | |
| | Ethyl aldehyde, <i>see</i> Acetaldehyde..... | | | | | | | | | | | | | | | |
| | Ethylamine (FG-1000/454)..... | 2.1 | UN1036 | | | FLAMMABLE GAS. | B13 | None | 321 | 244 | Forbidden | 150 kg | 1,3 | 1,3 | 5 | 40, 85 |
| | Ethylamine, aqueous solution with not less than 50 per cent but not more than 70 per cent ethylamine..... | 3 | UN2270 | II | FLAMMABLE LIQUID. | N15, T14 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 5 | 12, 40 | |
| | Ethyl amyl ketone..... | 3 | UN2271 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 1,3 | | |
| | N-Ethylaniline..... | 6.1 | UN2272 | III | KEEP AWAY FROM FOOD. | T2 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 1,2 | 1,2 | 26, 34 |
| | 2-Ethylaniline..... | 6.1 | UN2273 | III | KEEP AWAY FROM FOOD. | T2 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 1,2 | 1,2 | 26, 34 |
| Ethylbenzene (FG-1000/454)..... | 3 | UN1175 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 1 | | |
| N-Ethyl-N-benzylaniline..... | 6.1 | UN2274 | III | KEEP AWAY FROM FOOD. | T2 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 1,2 | 1,2 | 34 | |
| N-Ethylbenzyltoluidines..... | 6.1 | UN2753 | III | KEEP AWAY FROM FOOD. | | | | | | | | | | | | |
| Ethyl borate..... | 3 | UN1176 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 1 | | |
| Ethyl bromide..... | 6.1 | UN1891 | II | POISON | T17 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 1 | 40, 48, 95 | |
| Ethyl bromoacetate..... | 6.1 | UN1603 | II | POISON | T14 | None | 202 | 243 | Forbidden | 1 L | 1 L | 1 | 1 | 5 | 23, 40, 95 | |
| 2-Ethylbutanol..... | 3 | UN2275 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 1,3 | 1,3 | | |
| Ethylbutyl acetate..... | 3 | UN1177 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 1,3 | 1,3 | | |
| Ethyl butyl ether..... | 3 | UN1179 | II | FLAMMABLE LIQUID. | B1, T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 1 | | |
| 2-Ethylbutyraldehyde..... | 3 | UN1178 | II | FLAMMABLE LIQUID. | B1, T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 1 | | |
| Ethyl butyrate..... | 3 | UN1180 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 1,3 | | |
| Ethyl chloride..... | 2.3 | UN1037 | II | POISON GAS, FLAMMABLE GAS. | B13, B33, 10. | None | 322 | 244 | Forbidden | Forbidden | Forbidden | 1,3 | 1,3 | 5 | 40, 85 | |
| Ethyl chloroacetate..... | 6.1 | UN1181 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 1,2 | 1,2 | 23, 40, 48, 85 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|---|--|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or rascal | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Ethyl chloroformate | 3 | UN1182 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B14, B32, N1, N11, N26, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40 | |
| | Ethyl-2-chloropropionate | 3 | UN2935 | III | FLAMMABLE LIQUID. | B1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Ethyl chlorothioformate | 3 | UN2826 | I | FLAMMABLE LIQUID, CORROSIVE. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1,3 | 21, 40, 95 | |
| | Ethyl crotonate | 3 | UN1862 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Ethyl cyanoacetate | 6.1 | UN2666 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 26, 34 | |
| | Ethyl-3,3-di-(tert-butylperoxy) butyrate, <i>not more than 50 per cent with inert inorganic solid.</i> | 5.2 | UN2598 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 kg | 10 kg | 1 | 5 | 12, 40 | |
| | Ethyl-3,3-di-(tert-butylperoxy) butyrate, <i>not more than 77 per cent in solution.</i> | 5.2 | UN2185 | II | ORGANIC PEROXIDE. | | 152 | 225 | None | 5 L | 10 L | 1 | 5 | 12, 40 | |
| | Ethyl-3,3-di-(tert-butylperoxy) <i>technically pure.</i> | 5.2 | UN2184 | II | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Ethylidichlorarsine | 8.1 | UN1892 | I | POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Ethylidichlorosilane | 4.3 | UN1183 | I | DANGEROUS WHEN WET, CORROSIVE, POISON, FLAMMABLE LIQUID. | A2, N1, N15, N26, N34, T18, T26. | None | 201 | 244 | Forbidden | 1 L | 1 | 1 | 40 | |
| | Ethylene chlorohydrin | 6.1 | UN1135 | I | POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,2 | 1,2 | 23, 40, 48, 95 | |
| | Ethylene, compressed | 2.1 | UN1962 | II | FLAMMABLE GAS. | B13 | 306 | 304 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 85 | |
| | Ethylenediamine (RQ-1000/454) | 8 | UN1604 | II | CORROSIVE, FLAMMABLE LIQUID. | T14 | 154 | 202 | 243 | 1 L | 30 L | 1,3 | 1,3 | 21, 40 | |
| | Ethylene diamine diperchlorate | Forbidden | | | | | | | | | | | | | |
| DE | Ethylenediaminetetraacetic acid (RQ-5000/ 2270) | ORM-E | NA9117 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| E | Ethylene dibromide (RQ-1000/454) | 6.1 | UN1605 | I | POISON | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,2 | 1,2 | 40, 95 | |
| | Ethylene dibromide and methyl bromide liquid mixtures, see Methyl bromide and ethylene dibromide, liquid mixtures. | | | | | | | | | | | | | | |
| E | Ethylene dichloride (RQ-5000/2270) | 3 | UN1184 | II | FLAMMABLE LIQUID, POISON. | T14 | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | Labels | Special provisions | (8) Packaging authorizations (§173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|--------------------------------|--|--|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (9A) Cargo vessel | (9B) Pass- enger vessel | (9C) Other stowage provisions | |
| | Ethylene glycol diethyl ether | 3 | UN1153 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L, | 220 L | 1,3 | 1,3 | | |
| | Ethylene glycol dinitrate | Forbidden | | | | | | | | | | | | | |
| | Ethylene glycol monobutyl ether | 6.1 | UN2369 | III | KEEP AWAY FROM FOOD | | 153 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | 22, 25, 40, 34 | |
| | Ethylene glycol monoethyl ether | 3 | UN1171 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Ethylene glycol monoethyl ether acetate | 3 | UN1172 | III | FLAMMABLE LIQUID | B1 T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Ethylene glycol monomethyl ether | 3 | UN1188 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Ethylene glycol monomethyl ether acetate | 3 | UN1189 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Ethyleneimine inhibited | 6.1 | UN1185 | I | POISON, FLAMMABLE LIQUID | B14, B32 N16 N17, N25 N32, 10 | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1,3 | | |
| | Ethylene oxide and carbon dioxide mix- tures, see Carbon dioxide and ethylene oxide mixtures etc. | 3 | UN2983 | I | FLAMMABLE LIQUID, POISON | N4, N15, N34 N40 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12, 40 | |
| | Ethylene oxide and propylene oxide mix- tures, not more than 30 per cent ethyl- ene oxide | 2.3 | UN1040 | II | POISON GAS FLAMMABLE GAS | 10 | None | 323 | 248 | Forbidden | Forbidden | 1,3 | 1 | 40, 85 85 | |
| | Ethylene oxide pure or with nitrogen | 2.1 | UN1038 | II | FLAMMABLE GAS | | None | 316 | 318, 319 | Forbidden | Forbidden | 1,3 | 5 | 40, 85 | |
| | Ethylene, refrigerated liquid (cryogenic liquid) | 2.3 | UN2453 | II | POISON GAS | B13, B33, 10 | None | 304 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 85 | |
| | Ethyl ether see Diethyl ether | | | | | | | | | | | | | | |
| | Ethyl fluoride | 3 | UN1180 | II | FLAMMABLE LIQUID | T8 | 150 | 202 | 242 | 1 L | 60 L | 1,3 | 5 | 12 | |
| | Ethyl formate | | | | | | | | | | | | | | |
| | Ethylhexaldehyde, see Octyl aldehydes etc. | | | | | | | | | | | | | | |
| | 2 Ethylhexylamine | 6.1 | UN2276 | III | CORROSIVE POISON | T2 | 154 | 203 | 241 | 5 L | 60 L | 1,3 | 1,3 | 21 | |
| | 2 Ethylhexylchloroformate | | UN2746 | II | CORROSIVE | | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 12, 13, 23, 25 40, 85 | |
| | Ethyl hydroperoxide | Forbidden | | | | | | | | | | | | | |
| | Ethyl isobutyrate | 3 | UN2385 | II | FLAMMABLE LIQUID | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---------------------------------|--|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk pack- aging | (9A) Passenger aircraft or raillar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Ethyl isocyanate | 3 | UN2481 | I | FLAMMABLE LIQUID, POISON. | B13, B14, B30, N15, N26, 10. | None | 226 | 244 | Forbidden | Forbidden | 1 | 5 | 12, 40, 48 | |
| | Ethyl lactate | 3 | UN1192 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Ethyl mercaptan | 3 | UN2363 | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | Forbidden | 60 L | 1,3 | 5 | 12, 13, 34, 35, 40 | |
| | Ethyl methacrylate | 3 | UN2277 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Ethyl methyl ether | 2.1 | UN1039 | | FLAMMABLE GAS. | B13 | None | 324 | 244 | Forbidden | 150 kg | 1,3 | 1 | 25, 40, 85 | |
| | Ethyl methyl ketone or Methyl ethyl ketone | 3 | UN1193 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Ethyl nitrate (nitric ether) | 3 | NA1993 | II | FLAMMABLE LIQUID. | | 150 | 202 | None | Forbidden | Forbidden | 1,3 | 1 | | |
| | Ethyl nitrite solutions | 3 | UN1194 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | None | Forbidden | Forbidden | 1,3 | 5 | 12, 40 | |
| | Ethyl orthoformate | 3 | UN2524 | II | FLAMMABLE LIQUID. | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Ethyl oxalate | 6.1 | UN2525 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Ethyl perchlorate | Forbidden | | | | | | | | | | | | | |
| | Ethylphenyldichlorosilane | 8 | UN2435 | II | CORROSIVE | B2, N16, N26, N34, T8, T26. | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | | |
| | Ethyl phosphonothioic dichloride, anhy- drous, see Corrosive liquid, n.o.s. | | | | | | | | | | | | | | |
| | Ethyl phosphorous dichloride, anhydrous, see Pyrophoric liquids, n.o.s. | | | | | | | | | | | | | | |
| | Ethyl phosphorodichloridate, see Corrosive liquid, n.o.s. | | | | | | | | | | | | | | |
| | 1-Ethyl piperidine | 3 | UN2386 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Ethyl propionate | 3 | UN1195 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Ethyl propyl ether | 3 | UN2615 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12 | |
| | Ethyl silicate, see Tetraethyl silicate | | | | | | | | | | | | | | |
| | Ethylsulfuric acid | 8 | UN2571 | II | CORROSIVE | B2, T9, T27. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 14 | |
| | N-Ethyltoluidines | 6.1 | UN2754 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 12, 22, 25, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|----------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| (1) | Ethytrichlorosilane | 3 | UN1196 | I | FLAMMABLE LIQUID, POISON, CORROSIVE, ETIOLOGIC AGENT. | B14, B32, N26, N34, 10. | None | 226 | 244 | Forbidden | Forbidden | 1,3 | 1 | 40 | |
| D | Etiologic agent, n.o.s.(see also Infectious substances, etc.) Explosive articles, see Articles, explosive. | 6.2 | NA2814 | | | | 196 | 196 | None | 50ml | 4 L | 5 | 5 | | |
| | Explosive, blasting, type A | 1.1D | UN0081 | | | | | | | | | | | | |
| | Explosive, blasting, type B | 1.1D | UN0082 | | | | | | | | | | | | |
| | Explosive, blasting, type B | 1.5D | UN0331 | | | | | | | | | | | | |
| | Explosive, blasting, type C | 1.1D | UN0083 | | | | | | | | | | | | |
| | Explosive, blasting, type D | 1.1D | UN0084 | | | | | | | | | | | | |
| | Explosive, blasting, type E | 1.1D | UN0241 | | | | | | | | | | | | |
| | Explosive, blasting, type E | 1.5D | UN0332 | | | | | | | | | | | | |
| | Explosive, forbidden. See Sec. 173.51 | Forbidden | | | | | | | | | | | | | |
| | Explosives, slurry, see Explosive, blasting, type E. | | | | | | | | | | | | | | |
| | Explosive substances, see Substances, ex- plosive. | | | | | | | | | | | | | | |
| | Explosives, water gels, see Explosive, blasting, type E. | | | | | | | | | | | | | | |
| | Extracts, aromatic, liquid | 3 | UN1169 | I | FLAMMABLE LIQUID. | T7, T30 | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | | | | III | FLAMMABLE LIQUID. | T7, T30 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Extracts, flavouring, liquid | 3 | UN1197 | I | FLAMMABLE LIQUID. | T7, T30 | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | | | | III | FLAMMABLE LIQUID. | T7, T30 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Fabric with animal or vegetable oil. See Fibers or fabrics, etc. | | | | | | | | | | | | | | |
| DE | Ferric ammonium citrate (RQ-1000/454) | ORM-E | NA9118 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Ferric ammonium oxalate (RQ-1000/454) | ORM-E | NA9119 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Ferric arsenate | 6.1 | UN1606 | III | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Ferric arsenite | 6.1 | UN1607 | III | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| E | Ferric chloride (RQ-1000/454) | 8 | UN1773 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| E | Ferric chloride, solution (RQ-1000/454) | 8 | UN2582 | III | CORROSIVE | T8 | 154 | 213 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| DE | Ferric fluoride (RQ-100/45.4) | ORM-E | NA9120 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| E | Ferric nitrate (RQ-1000/454) | 5.1 | UN1466 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| DE | Ferric sulfate (RQ-1000/454) | ORM-E | NA9121 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Ferrocenium | 4.1 | UN1323 | II | FLAMMABLE SOLID. | A19 | 151 | 212 | 240 | 15 kg | 50 kg | 1,3 | 1,3 | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (6173...) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | |
|-----------------|--|---------------------|--------------------------------|-----------------------|--|---------------------------|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|------------|--|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other subwage provisions | | | |
| (1) | | | | | | | | | | | | | | | | | |
| | Ferrosilicon, with more than 30 per cent but less than 90 per cent silicon. | 4.3 | UN1408 | III | DANGEROUS WHEN WET, KEEP AWAY FROM FOOD. | A1, A19 | None | 213 | 242 | 25 kg | 100 kg | 1,3 | 1,3 | 1,3 | 13, 40, 85 | | |
| DE | Ferrous ammonium sulfate (RQ-1000/454) | ORM-E | NA9122 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 1,2 | | | |
| | Ferrous arsenate | 6.1 | UN1608 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 1,2 | 95 | | |
| DE | Ferrous chloride, solid (RQ-100/45.4) | 8 | NA1759 | II | CORROSIVE | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 1,2 | | | |
| DE | Ferrous chloride, solution (RQ-100/45.4) | 8 | NA1760 | II | CORROSIVE | B2 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | 1,2 | | | |
| | Ferrous metal borings, shavings, turnings or cuttings in a form liable to self-heating. | 4.2 | UN2793 | III | SPONTANEOUSLY COMBUSTIBLE | A1, A19 | None | 213 | 241 | 25 kg | 100 kg | 1,2 | 1,2 | 1,2 | | | |
| DE | Ferrous sulfate (RQ-1000/454) | ORM-E | NA9125 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 1,2 | | | |
| | Fertilizer ammoniating solution with free ammonia. | 2.2 | UN1043 | III | NONFLAMMABLE GAS | B13 | 306 | 304 | 244 | Forbidden | 150 kg | 1,3 | 5 | 1,3 | 40, 85 | | |
| AIW | Fibers of Fabrics, animal or vegetable, n.o.s. with animal or vegetable oil. | 4.2 | UN1373 | III | SPONTANEOUSLY COMBUSTIBLE | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | 1,3 | | | |
| AIW | Fibers, animal or vegetable, n.o.s., burnt, wet or damp. | 4.2 | UN1372 | III | SPONTANEOUSLY COMBUSTIBLE | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | 1,3 | | | |
| | Films, nitrocellulose base, from which gelatine has been removed; film scrap, see Celluloid scrap. | | | | | | | | | | | | | | | | |
| | Films, nitrocellulose base, gelatine coated (except scrap). | 4.1 | UN1324 | III | FLAMMABLE SOLID | | None | 193 | None | 25 kg | 100 kg | 1 | 5 | 1,3 | 98 | | |
| | Fire extinguisher charges, corrosive liquid. | 8 | UN1774 | II | CORROSIVE | N15, N34, N41 | 154 | 202 | None | 1 L | 30 L | 1,2 | 1,2 | 1,2 | | | |
| | Fire extinguisher charges, expelling, explosive, see Cartridges, power device. | | | | | | | | | | | | | | | | |
| | Fire extinguishers with compressed or liquefied gas. | 2.2 | UN1044 | II | NONFLAMMABLE GAS | | 306 | 306 | None | 75 kg | 150 kg | 1,3 | 1,3 | 1,3 | 85 | | |
| | Firefighters, solid with flammable liquid | 4.1 | UN2623 | II | FLAMMABLE SOLID | A19 | None | 212 | None | 15 kg | 50 kg | 1,3 | 1,3 | 1,3 | | | |
| | Fireworks, type A | 1.1G | UN0333 | III | FLAMMABLE SOLID | A1, A19 | None | 213 | None | 25 kg | 100 kg | 1,3 | 1,3 | 1,3 | | | |
| | Fireworks, type B | 1.2G | UN0334 | | | | | | | | | | | | | | |
| | Fireworks, type C | 1.3G | UN0335 | | | | | | | | | | | | | | |
| | Fireworks, type D | 1.4G | UN0336 | | | | | | | | | | | | | | |
| | Fireworks, type D | 1.4S | UN0337 | | | | | | | | | | | | | | |
| | Fish meal or fish scrap, unstabilized. | 4.2 | UN1374 | II | SPONTANEOUSLY COMBUSTIBLE | A1, A19 | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1,3 | 1,3 | | | |
| ADW | Fish meal or fish scrap containing 6% to 12% water. | 9 | NA9300 | III | None | A1 | 155 | 213 | 241 | No limit | No limit | 1,2 | 1,2 | 1,2 | | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33-*) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|---|---------------------|--------------------------------|-----------------------|---|---------------------------|--|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk packag-ing | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pass-enger vessel | (10C) Other stowage provisions | |
| (11) | <i>Fissile radioactive materials, see Radioac-tive material, fissile, n.o.s.. Flammable compressed gas, see Com-pressed or liquefied gas, flammable, etc.. Flammable compressed gas (small recep-tacles not fitted with a dispersion device, not refillable), see Receptacles, etc.. Flammable gas in lighters, see Lighters for cigars or cigarettes, with flammable gas. Flammable liquid preparations n.o.s. for the purpose of cleaning enamel, lacquer, paint, varnish, etc.; removing, reducing or thinning liq. making products for polish-ing, vulcanizing or de-icing, or for dress-ing leather.</i> | 3 | UN1142 | I | FLAMMABLE LIQUID; T42 | T42 | 150 | 201 | 243 | 1 L | 5 L | 1,3 | 1 | | |
| | | | | II | FLAMMABLE LIQUID; T8, T31 | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | | | | III | FLAMMABLE LIQUID; T42 | B1, T7, T30, T42 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | | 3 | UN2924 | I | FLAMMABLE LIQUID; CORROSIVE; T15, T28 | T15, T28 | None | 201 | 243 | 0.5 L | 2.5 L | 1,3 | 5 | 40 | |
| | | | | II | FLAMMABLE LIQUID; CORROSIVE; T15, T28 | T15, T28 | None | 202 | 243 | 1 L | 5 L | 1,3 | 1 | 40 | |
| | | | | III | FLAMMABLE LIQUID; CORROSIVE; T42 | B1, T15, T28, T42 | 150 | 203 | 242 | 5 L | 60 L | 1,3 | 1,3 | 40 | |
| | | 3 | UN1993 | I | FLAMMABLE LIQUID; CORROSIVE; T42 | T42 | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID; CORROSIVE; T8, T31 | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | | | | III | FLAMMABLE LIQUID; CORROSIVE; B1, T7, T30, T42 | B1, T7, T30, T42 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | | 3 | UN1992 | I | FLAMMABLE LIQUID; POISON; T18 | T18 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 40 | |
| | | | | II | FLAMMABLE LIQUID; POISON; T18 | T18 | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | 40 | |
| | | | | III | FLAMMABLE LIQUID, KEEP AWAY FROM FOOD; T18 | B1, T18 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 40 | |
| | | 4.1 | UN2925 | I | FLAMMABLE SOLID; CORROSIVE; A19 | A19 | None | 211 | 242 | 1 kg | 15 kg | 1 | 5 | 40, 74 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|-----------------------------------|---|--|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raicar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | | | | II | FLAMMABLE SOLID, CORROSIVE. | | None | 212 | 242 | 15 kg | 50 kg | 1 | 5 | 40, 74 | |
| | | | | III | FLAMMABLE SOLID, CORROSIVE. | A1 | 151 | 213 | 242 | 25 kg | 100 kg | 1 | 5 | | |
| | Flammable solids, n.o.s. | 4.1 | UN1225 | II | FLAMMABLE SOLID, CORROSIVE. | | 151 | 212 | 240 | 15 kg | 50 kg | 1,3 | 1 | | |
| | | | | III | FLAMMABLE SOLID. | | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1 | | |
| | Flammable solids, poisonous, n.o.s. | 4.1 | UN2926 | I | FLAMMABLE SOLID, POISON. | A19 | None | 211 | 242 | 1 kg | 15 kg | 1,3 | 5 | | |
| | | | | II | FLAMMABLE SOLID, POISON. | | None | 212 | 242 | 15 kg | 50 kg | 1,3 | 1 | | |
| | | | | III | FLAMMABLE SOLID, POISON. | A1 | 151 | 213 | 242 | 25 kg | 100 kg | 1,3 | 1 | | |
| | Flares, aerial | 1.3G | UN0093 | | | | | | | | | | | | |
| | Flares, aerial | 1.4G | UN0403 | | | | | | | | | | | | |
| | Flares, aerial | 1.4S | UN0404 | | | | | | | | | | | | |
| | Flares, aerial | 1.1G | UN0420 | | | | | | | | | | | | |
| | Flares, aerial | 1.2G | UN0421 | | | | | | | | | | | | |
| | Flares, airplane, see Flares, aerial | | | | | | | | | | | | | | |
| | Flares, signal, see Cartridges, signal | | | | | | | | | | | | | | |
| | Flares, surface (other than water activated contrivances) | 1.1G | UN0418 | | | | | | | | | | | | |
| | Flares, surface (other than water activated contrivances) | 1.2G | UN0419 | | | | | | | | | | | | |
| | Flares, surface (other than water-activated contrivances) | 1.3G | UN0092 | | | | | | | | | | | | |
| | Flares, water-activated, see Contrivances, water-activated, etc. | | | | | | | | | | | | | | |
| | Flash powder, in units, see Photo-flash powder, in units. | | | | | | | | | | | | | | |
| | Flue dusts, poisonous, see Arsenical dust. | | | | | | | | | | | | | | |
| | Fluoboric acid | 8 | UN1775 | II | CORROSIVE | B2, B15, N3, N11, N26, N34, T15, T27. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| | Fluoric acid, see Hydrofluoric acid, solu- tion, etc. | | | | | | | | | | | | | | |
| | Fluorine, compressed | 2.3 | UN1045 | IA | POISON GAS, OXIDIZER. | 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 43, 95 | |
| | Fluoroacetic acid | 6.1 | UN2642 | I | POISON | | None | 211 | 242 | 1 kg | 15 kg | 1,3 | 1,3 | 12, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.155) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|--|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | 4-Fluoroaniline | 6.1 | UN2944 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 23, 34 | |
| | 2-Fluoroaniline | 6.1 | UN2941 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 23, 34 | |
| | Fluorobenzene | 3 | UN2387 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Fluorophosphoric acid anhydrous | 8 | UN1776 | II | CORROSIVE | B2, N3, N11, N26, N34, T9, T27. | None | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| | Fluorosilicates, n.o.s. | 6.1 | UN2856 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26, 34 | |
| | Fluorosilicic acid | 8 | UN1778 | II | CORROSIVE | B2, B15, N3, | None | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| | Fluorosulfonic acid | 8 | UN1777 | I | CORROSIVE | B41, B4, B6, N1, N3, N11, N26, N34, T12, T27. | None | 201 | 242 | 0.5 L | 2.5 L | 1 | 5 | 33, 40 | |
| | Fluorotoluenes | 3 | UN2388 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Fluorotoluenes | III | | III | FLAMMABLE LIQUID. | B1, T8 | 150 | 202 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Forbidden materials. See 173.21 | Forbidden | | III | None | T1 | 155 | 204 | 240 | 100 L | 220 L | 1,2 | 1,2 | 34 | |
| | Formaldehyde, solutions (RQ-1000/ 454) (flashpoint greater than 60.5 de- grees C). | 3 | UN1198 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 40 | |
| | Formaldehyde, solutions, flammable (RQ- 1000/454). | III | | III | FLAMMABLE LIQUID. | B1, T8 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 40 | |
| | Formalin, see Formaldehyde, solutions | 8 | UN1779 | II | CORROSIVE | B2, B12, B28, T8. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | 40 | |
| | Formic acid (RQ-5000/2270) | 1.1D 3 | UN0099 UN1863 | II III | FLAMMABLE LIQUID. FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Fracturing devices, explosive, for oil wells | | | | | | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Fuel, aviation, turbine engine | | | | | | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | Labels | Special provisions | (6) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--|---|------------------------|---------------------------------------|------------------------------|---|---------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|----|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or railcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| DE | Grenades, hand or rifle, with bursting charge. | 1.1D | UN0284 | III | OXIDIZER | A1 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 73 | |
| | Grenades, hand or rifle, with bursting charge. | 1.2D | UN0285 | | | | | | | | | | | | |
| | Grenades, hand or rifle, with bursting charge. | 1.1F | UN0292 | | | | | | | | | | | | |
| | Grenades, hand or rifle, with bursting charge. | 1.2F | UN0293 | | | | | | | | | | | | |
| | Grenades, illuminating, see Ammunition, illuminating, etc. | | | | | | | | | | | | | | |
| | Grenades, practice, hand or rifle. | 1.4S | UN0110 | | | | | | | | | | | | |
| | Grenades, practice, hand or rifle. | 1.3G | UN0318 | | | | | | | | | | | | |
| | Grenades, practice, hand or rifle. | 1.2G | UN0372 | | | | | | | | | | | | |
| | Grenades, smoke, see Ammunition, smoke, etc. | | | | | | | | | | | | | | |
| | Guanidine nitrate | 5.1 | UN1467 | Forbidden | III | OXIDIZER | A1 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 73 |
| | Guanyl nitrosaminoquanylidene hydrazine (dry). | Forbidden | UN0113 | | | | | | | | | | | | |
| | Guanyl nitrosaminoquanylidene hydrazine, wetted with not less than 30 per cent water, by weight. | 1.1A | | | | | | | | | | | | | |
| | Guanyl nitrosaminoquanyltetrazene (dry) | Forbidden | | | | | | | | | | | | | |
| | Guanyl nitrosaminoquanyltetrazene (Tetra- zene), wetted with not less than 30 per cent water by weight, or mixture of alco- hol and water. | 1.1A | UN0114 | | | | | | | | | | | | |
| Gunpowder, compressed or Gunpowder in pellets, see Black powder (UN 0026). | | | | | | | | | | | | | | | |
| Gunpowder, granular or as a meal, see Black powder (UN 0027). | | | | | | | | | | | | | | | |
| Guthion. See Azinphos methyl | | | | | | | | | | | | | | | |
| Gutta percha solution | | 3 | UN1205 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | |
| Hafnium powder, dry (a) mechanically pro- duced, particle size between 3 and 53 microns; (b) chemically produced, parti- cle size between 10 and 840 microns. | | 4.2 | UN2545 | III | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 1,3 | |
| | Hafnium powder, wetted with not less than 25 per cent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 mi- crons; (b) chemically produced, particle size less than 840 microns. | 4.1 | UN1326 | II | SPONTANE- OUSLY COMBUSTI- BLE FLAMMABLE SOLID. | A19, A20, N11, N34. | None | 212 | 241 | 15 kg | 50 kg | 1 | 1,3 | 5 | |
| Halogenated irritating liquids, n.o.s. | | 6.1 | UN1610 | I | POISON | T42 | None | 201 | 243 | Forbidden | 30 L | 1 | 1 | 5 | |
| | | | | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1 | 1 | 5 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|-------------------------|--------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|---|---|--|--|--|---------------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | | | |
| | | | | | | | | | | | | | | | | | | |
| | <i>Hand signal device, see Signal devices, hand.</i> | | | | | | | | | | | | | | | | | |
| DE | Hazardous substance, liquid or solid, n.o.s. | ORM-E | NA9188 | III | None | | | 156 | 203 | 241 | No limit | No limit | 1,2 | 1,2 | | | | |
| D | Hazardous waste, liquid or solid, n.o.s. | ORM-E | NA9189 | III | None | | | 156 | 203 | 241 | No limit | No limit | 1,2 | 1,2 | | | | |
| | Helium, compressed | 2.2 | UN1046 | | NONFLAMMA- BLE GAS. | B13 | | 306 | 302 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | | | | 85 |
| | <i>Helium-oxygen mixture, see Rare gases and oxygen mixtures.</i> | | | | | | | | | | | | | | | | | |
| | Helium, refrigerated liquid (<i>cryogenic liquid</i>) | | | | | | | | | | | | | | | | | |
| DE | Heptachlor (RQ-1/0.454) | 3 | UN3056 | III | FLAMMABLE LIQUID. | B1, T1 | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | | | |
| | n-Heptaldehyde | | | III | FLAMMABLE LIQUID. | | | 150 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | | | | |
| | Heptanes | 3 | UN1206 | II | FLAMMABLE LIQUID. | T2 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | | |
| | n-Heptene | 3 | UN2278 | II | FLAMMABLE LIQUID. | T8 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | | |
| | Hexachloroacetone | 6.1 | UN2661 | III | KEEP AWAY FROM FOOD. | T8 | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | | | 12, 34, 40 |
| | Hexachlorobenzene | 6.1 | UN2729 | III | KEEP AWAY FROM FOOD. | | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | | | 34 |
| | Hexachlorobutadiene | 6.1 | UN2279 | III | KEEP AWAY FROM FOOD. | T7 | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | | | 34 |
| E | Hexachlorocyclopentadiene (RQ-1/0.454) | 6.1 | UN2646 | I | POISON | T18, T26 | | None | 201 | 243 | 1 L | 30 L | 1 | 5 | | | | 40, 95 |
| | Hexachlorophene | 6.1 | UN2875 | III | KEEP AWAY FROM FOOD. | | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | | | 34 |
| | Hexadecyltrichlorosilane | 8 | UN1781 | II | CORROSIVE | B2, B6, N26, N34, T8. | | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | | | | 40 |
| | Hexadiene | 3 | UN2458 | II | FLAMMABLE LIQUID. | T7 | | None | 202 | 242 | Forbidden | 60 L | 1,3 | 5 | | | | 12 |
| | Hexaethyl tetraphosphate and compressed gas mixtures. | 2.3 | UN1612 | IB | POISON GAS | B14, B31, 10. | | None | 334 | 244 | Forbidden | Forbidden | 1 | 5 | | | | 40, 95 |
| | Hexaethyl tetraphosphate, liquid | 6.1 | UN1611 | I | POISON | A4 | | None | 201 | 243 | Forbidden | 30 L | 1,2 | 5 | | | | 40, 95 |
| | | | | II | POISON | N76 | | None | 202 | 243 | Forbidden | 60 L | 1,2 | 5 | | | | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | N77 | | None | 203 | 241 | Forbidden | 220 L | 1,2 | 5 | | | | 34, 40 |
| | <i>Hexaethyl tetraphosphate mixture, see Organophosphorous pesticide etc.</i> | | | | | | | | | | | | | | | | | |
| | Hexaethyl tetraphosphate, solid | 6.1 | UN1611 | I | POISON | N76 | | None | 211 | 242 | Forbidden | 15 kg | 1,2 | 5 | | | | 95 |
| | | | | II | POISON | N76 | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 5 | | | | 95 |
| | | | | III | KEEP AWAY FROM FOOD. | N77 | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 5 | | | | 34 |
| | Hexafluoroacetone | 2.3 | UN2420 | IB | POISON GAS | B14, B31, 10. | | None | 304 | 244 | Forbidden | Forbidden | 1 | 5 | | | | 40, 95 |
| | Hexafluoroacetone hydrate | 6.1 | UN2552 | II | POISON | | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | | | | 40, 95 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|--|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|--|---------------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | | |
| | Hexanitrodiphenyl urea..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hexanitroethane..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hexanitrooxanilide..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hexanitrosilbene..... | 1.1D | UN0392 | | | | | | | | | | | | | | |
| | Hexanoic acid, see Corrosive liquid, n.o.s..... | 3 | UN2282 | III | FLAMMABLE LIQUID. | B1, T1 | | 150 | 203 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | | | |
| | Hexanols..... | | | | | | | | | | | | | | | | |
| | Hexatonal, cast..... | 1.1D | UN0393 | II | FLAMMABLE LIQUID. | T8 | | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 5..... | | | 12 |
| | 1-Hexene..... | 3 | UN2370 | | | | | | | | | | | | | | |
| | Hexogen, see Cyclotrimethylenetrinitra- mine, etc.. | | | | | | | | | | | | | | | | |
| | Hexolite, dry or wetted a less than 15 per cent water, by weight. | 1.1D | UN0118 | | | | | | | | | | | | | | |
| | Hexyl, see Hexanitrodiphenylamine..... | | | | | | | | | | | | | | | | |
| | Hexyltrichlorosilane..... | 8 | UN1784 | II | CORROSIVE..... | B2, B6, N16, N26, N34, T8, T26. | | None | 202 | 242 | Forbidden..... | 30 L..... | 1..... | 1..... | | | 40 |
| | High explosives, see individual explosives' entries. | | | | | | | | | | | | | | | | |
| | HMX, see Cyclootetramethylene-tetranitra- mine, etc.. | | | | | | | | | | | | | | | | |
| | Hydrazine, anhydrous or Hydrazine aque- ous solutions with more than 64 per cent hydrazine, by weight. | 3 | UN2029 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B16, B17, B24, N1, N11, N26, N35, T25. | | None | 201 | 243 | Forbidden..... | 2.5 L..... | 1..... | 5..... | | | 40 |
| | Hydrazine azide..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hydrazine chlorate..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hydrazine dicarbonic acid diazide..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hydrazine hydrate or Hydrazine aqueous solutions, with not more than 64 per cent hydrazine, by weight. | 8 | UN2030 | II | CORROSIVE, POISON. | B16, B17, B24, T15. | | None | 202 | 243 | Forbidden..... | 30 L..... | 1..... | 5..... | | | 40, 42, 82 |
| | Hydrazine perchlorate..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hydrazine selenate..... | Forbid- den | | | | | | | | | | | | | | | |
| | Hydrides, metal, n.o.s..... | 4.3 | UN1409 | I | DANGEROUS WHEN WET. | A19, N34 | | None | 211 | 242 | Forbidden..... | 15 kg..... | 1..... | 5..... | | | 22 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|----------------|--|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| (1) | <i>Hydroiodic acid, anhydrous, see Hydrogen iodide, anhydrous.</i> <i>Hydroiodic acid, solution.....</i> | 8 | UN1787 | II | CORROSIVE..... | B2, N1, N11, N16, N34, N41, T9, T27. | 154 | 202 | 242 | 1 L..... | 30 L..... | 1 | 1 | 8 | |
| | <i>Hydrobromic acid, anhydrous, see Hydrogen bromide, anhydrous.</i> <i>Hydrobromic acid solution, more than 49 per cent strength.</i> | 8 | UN1788 | I | | B4, B15, N1, N11, N16, N34, N41. | None | 201 | 242 | Forbidden.... | Forbidden.... | 1 | 1 | 83, 33 | |
| | <i>Hydrobromic acid solution, not more than 49 per cent strength.</i> | 8 | UN1788 | II | CORROSIVE..... | B2, B15, N1, N11, N16, N34, N41. | 154 | 202 | 242 | 1 L..... | 30 L..... | 1 | 1 | | |
| | <i>Hydrocarbon gases, compressed, n.o.s. or Hydrocarbon gases mixtures, compressed, n.o.s.</i> | 2.1 | UN1964 | | FLAMMABLE GAS. | B13..... | 306 | 302 | 244 | Forbidden.... | 150 kg..... | 1,3 | 1 | 40, 85 | |
| | <i>Hydrocarbon gases, liquefied, n.o.s. or Hydrocarbon gases mixtures, liquefied, n.o.s.</i> | 2.1 | UN1965 | | FLAMMABLE GAS. | B13..... | 306 | 304 | 244 | Forbidden.... | 150 kg..... | 1,3 | 1 | 40, 85 | |
| E | <i>Hydrochloric acid, anhydrous, see Hydrogen chloride, anhydrous.</i> <i>Hydrochloric acid, solution (AC-5000/2270).</i> | 8 | UN1789 | II | CORROSIVE..... | B2, B6, B15, N1, N11, N34, N41, T9, T27. | 154 | 202 | 242 | 1 L..... | 30 L..... | 1 | 1 | 83, 33 | |
| E | <i>Hydrocyanic acid, anhydrous, see Hydrogen cyanide.</i> <i>Hydrocyanic acid, aqueous solutions (AC-10/4.54) not more than 20% HCN.</i> | 6.1 | UN1613 | I | POISON..... | B12, B14, B32, 10. | None | 195 | 244 | Forbidden.... | Forbidden.... | 1 | 5 | 40, 95 | |
| E | <i>Hydrocyanic acid, aqueous solutions (AC-10/4.54) less than 5% HCN.</i> <i>Hydrocyanic acid, liquefied, see Hydrogen cyanide, etc..</i> | 6.1 | UN1613 | II | POISON..... | B12, T18, T26. | None | 195 | 243 | Forbidden.... | 5 L..... | 1 | 5 | 40 | |

| Sym- bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica- tion numbers | Pack- ing group | Labels | Special provisions | Packaging authorizations (§ 173.***) | | | Quantity limitations | | | Vessel stowage requirements | | |
|--------------|---|-----------------|--------------------------------|-----------------------|---------------------------------|---|---|--------------------------------|------------------------|------------------------------------|------------------------|-----------------|-----------------------------|--------------------------------|--|
| | | | | | | | Excep- tions | Non- bulk pack- aging | Bulk packag- ing | Passenger aircraft or railer | Cargo aircraft only | Cargo vessel | Pass- enger vessel | Other stowage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| E | Hydrofluoric acid and Sulfuric acid mixtures (RQ-1000/454). | 8 | UN1786 | I | CORROSIVE, POISON. | B15, B23, N5, N11, N26, N34, T18, T27. | None | 201 | 243 | Forbidden | 2.5 L | 1 | 5 | 33, 40 | |
| E | Hydrofluoric acid, anhydrous, see Hydro- gen fluoride, anhydrous. Hydrofluoric acid, solution, more than 60 per cent (RQ-5000/2270). | 8 | UN1790 | I | CORROSIVE, POISON. | B4, B12, B15, B23, N5, N11, N26, N34, T18, T27. | None | 201 | 243 | 0.5 L | 2.5 L | 1 | 5 | 12 | |
| E | Hydrofluoric acid, solution, not more than 60 per cent (RQ-5000/2270). | 8 | UN1790 | II | CORROSIVE, POISON. | B12, B15, N5, N11, N26, N34, T18, T27. | None | 202 | 243 | 1 L | 30 L | 1 | 5 | 12 | |
| | Hydrofluoroboric acid, see Fluoboric acid. Hydrofluorosilicic acid, see Fluorosilicic acid. | | | | | | | | | | | | | | |
| | Hydrogen and Methane mixtures, com- pressed. | 2.1 | UN2034 | | FLAMMABLE GAS. | B13 | 306 | 302 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 85 | |
| | Hydrogen bromide, anhydrous | 2.3 | UN1048 | II | POISON GAS, CORROSIVE. | B13, B14, B33, 10. | None | 304 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| E | Hydrogen chloride, anhydrous (RQ-5000/ 2270). | 2.3 | UN1050 | II | POISON GAS, CORROSIVE. | B13, B34, 10. | None | 304 | 244 | Forbidden | Forbidden | 1 | 5 | 34, 40, 95 | |
| E | Hydrogen chloride, refrigerated liquid (RQ- 5000/2270). | 2.3 | UN2186 | II | POISON GAS, CORROSIVE. | B6, 10 | None | None | 314, 315 | Forbidden | Forbidden | 1,3 | 4 | 40 | |
| | Hydrogen, compressed | 2.1 | UN1049 | | FLAMMABLE GAS. | B13 | 306 | 302 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 57, 85 | |
| E | Hydrogen cyanide, anhydrous, stabilized (RQ-10/4.54). | 6.1 | UN1051 | I | POISON, FLAMMABLE LIQUID. | B12, B14, B30, 10. | None | 195 | 244 | Forbidden | Forbidden | 1 | 5 | 21, 25, 40, 95 | |
| E | Hydrogen cyanide, anhydrous, stabilized, absorbed in a porous inert material (RQ- 10/4.54). | 6.1 | UN1614 | I | POISON | B12 | None | 195 | 243 | Forbidden | 5 L | 1 | 5 | 25, 40, 95 | |
| | Hydrogen cyanide, unstabilized | | | | | | | | | | | | | | |
| E | Hydrogen fluoride, anhydrous (RQ-5000/ 2270). | Forbidden 8 | UN1052 | I | CORROSIVE, POISON. | B12, T24, T27. | None | 163 | 243 | Forbidden | Forbidden | 1 | 5 | 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (8173...) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|---------------------|------------------------------------|---------------------------|--------------------------------------|---|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk bulk pack- aging | (8C) Bulk pack- aging | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| (1) | Hydrogen iodide, anhydrous | 2.2 | UN2197 | | NONFLAMMA- BLE GAS, CORROSIVE. | B13 | 306 | 304 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 85 | |
| | Hydrogen iodide solution, see Hydroiodic acid, solution. | | | | | | | | | | | | | | |
| | Hydrogen peroxide, aqueous solutions with more than 40 per cent but not more than 60 per cent hydrogen peroxide (stabilized as necessary). | 5.1 | UN2014 | II | OXIDIZER, CORROSIVE. | B12, B17, B28, N1, N11, N41, T14. | None | 202 | 243 | Forbidden | Forbidden | 1 | 5 | 25, 46, 75 | |
| | Hydrogen peroxide, aqueous solutions with not less than 20 per cent but not more than 40 per cent hydrogen peroxide (stabilized as necessary). | 5.1 | UN2014 | II | OXIDIZER, CORROSIVE. | A2, B11, B12, B17, B28, N1, N11, N41, T14. | None | 202 | 243 | 1 L | 5 L | 1 | 5 | 25, 46, 75 | |
| | Hydrogen peroxide, aqueous solutions with not less than 8 per cent but less than 20 per cent hydrogen peroxide (stabilized as necessary). | 5.1 | UN2984 | III | OXIDIZER | A1, N41, 17. | 152 | 203 | 241 | 2.5 L | 30 L | 1,2 | 1 | 25, 46, 75 | |
| | Hydrogen peroxide, stabilized or hydrogen peroxide aqueous solutions, stabilized with more than 60 per cent hydrogen peroxide. | 5.1 | UN2015 | I | OXIDIZER, CORROSIVE. | B12, B17, B28, N1, N11, N41, T15. | None | 201 | 243 | Forbidden | Forbidden | 1 | 5 | 25, 46, 75 | |
| | Hydrogen, refrigerated liquid (cryogenic liquid). | 2.1 | UN1966 | | FLAMMABLE GAS. | | None | 316 | 318, 319 | Forbidden | Forbidden | 5 | 5 | 40, 85 | |
| | Hydrogen selenide, anhydrous | 2.3 | UN2202 | IA | POISON GAS, FLAMMABLE GAS. | 10 | None | 192 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| E | Hydrogen sulfate, see Sulfuric acid. | | | | | | | | | | | | | | |
| | Hydrogen sulfide, liquefied (FC-100/45.4) | 2.3 | UN1053 | IB | POISON GAS, FLAMMABLE GAS. | B13, 10 | None | 304 | 245 | Forbidden | Forbidden | 1 | 5 | 34, 40, 95 | |
| | Hydroquinone | 6.1 | UN2662 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Hydrosilicofluoric acid, see Fluorosilicic acid. | | | | | | | | | | | | | | |
| | 3-(2-Hydroxyethoxy)-4-pyrrolidin-1-ylbenzenediazonium zinc chloride. | 4.1 | UN3035 | II | FLAMMABLE SOLID. | | None | 214 | 240 | Forbidden | Forbidden | 1 | 5 | 2 | |
| | Hydroxylamine iodide | Forbidden | | | | | | | | | | | | | |
| AW | Hydroxylamine sulfate | 8 | UN2865 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 1,2 | |
| DE | Hypochlorite solution containing not more than 5% available chlorine by weight (FC-100/45.4). | ORM-E | NA9301 | III | None | | 156 | 203 | 241 | No limit | No limit | 1,2 | 1,2 | 1,2 | |

| Sym- bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifi- cation numbers | Pack- ing group | Labels | Special provisions | (8) Packaging (§ 173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--------------|--|-----------------|--------------------------------|-----------------------|-------------------------------------|----------------------------|------------------------------|--|--------------------------------|---|--------------------------------|--------------------------|-----------------------------------|---|------------|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or ratical (8A) | Cargo aircraft only (8B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (8A) | (8B) | (8C) | (10A) | (10B) | (10C) |
| E | Hypochlorite solutions with more than 5 per cent but less than 16 per cent available chlorine (RC-100/45.4). | 8 | UN1791 | III | CORROSIVE | N34, T7 | 154 | 203 | 241 | 5 L | 60 L | | 1,2 | 1 | |
| E | Hypochlorite solutions with not less than 16 per cent available chlorine (RC-100/45.4). | 8 | UN1791 | II | CORROSIVE | B2, B15, B37, N26, N34, T7 | 154 | 202 | 242 | 1 L | 30 L | | 1,2 | 1 | |
| | Hyponitrous acid | Forbidden | | | FLAMMABLE SOLID. | | None | 180 | None | Forbidden | 50 kg | | 1,3 | 5 | |
| | Igniter for aircraft thrust device for assisted take-off. | 4.1 | UN2792 | II | FLAMMABLE SOLID. | | | | | | | | | | |
| | Igniter fuse, metal clad, see Fuse, igniter, tubular, metal clad. | | | | | | | | | | | | | | |
| | Igniters | 1.1G | UN0121 | | | | | | | | | | | | |
| | Igniters | 1.2G | UN0314 | | | | | | | | | | | | |
| | Igniters | 1.3G | UN0315 | | | | | | | | | | | | |
| | Igniters Iminobispropylamine, see 3,3-iminodipropylamine. | 1.4G | UN0325 | | | | | | | | | | | | |
| | 3,3'-iminodipropylamine | 8 | UN2269 | III | CORROSIVE | T8 | 154 | 203 | 241 | 5 L | 60 L | | 1,2 | 1,2 | |
| | Infectious substances, affecting animals only, n.o.s. (See also Etiologic agent, n.o.s.) | 6.2 | UN2900 | | INFECTIOUS SUBSTANCE. | | 196 | 196 | None | 50ml | 4 L | | 5 | 5 | |
| | Infectious substances, affecting humans (See also Etiologic agent, n.o.s.) | 6.2 | UN2814 | | INFECTIOUS SUBSTANCE. | | 196 | 196 | None | 50ml | 4 L | | 5 | 5 | |
| | Inflammable, see Flammable. | | | | | | | | | | | | | | |
| | Initiating explosives (dry) | Forbidden | | | | | | | | | | | | | |
| | Ink, printer's, flammable | 3 | UN1210 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 173 | 242 | 5 L | 60 L | | 1,3 | 1 | |
| | Inositol hexanitrate (dry) | Forbidden | | | FLAMMABLE LIQUID. | B1, T7, T30 | 150 | 173 | 242 | 60 L | 220 L | | 1,3 | 1,3 | |
| | Insecticide gases, n.o.s. | 2.2 | UN1988 | | | | 306 | 304 | 244 | 75 kg | 150 kg | | 1,3 | 1,3 | 85 |
| | Insecticide gases, toxic, n.o.s. | 2.3 | UN1987 | IB | NONFLAMMABLE GAS, POISON GAS | B13 | None | 193, 334 | 245 | Forbidden | Forbidden | | 1 | 5 | 25, 40, 95 |
| | Inulin trinitrate (dry) | Forbidden | | | | | | | | | | | | | |
| | Iodine azide (dry) | Forbidden | | | | | | | | | | | | | |
| | Iodine monochloride | 8 | UN1792 | II | CORROSIVE | B6, N16, N34, N41, T6, T26 | None | 202 | 242 | Forbidden | 50 kg | | 1 | 5 | 40 |
| | Iodine pentafluoride | 5.1 | UN2495 | I | OXIDIZER, POISON, FLAMMABLE LIQUID. | T8 | None | 205 | 243 | Forbidden | 2.5 L | | 1 | 5 | 13, 40 |
| | 2-Iodobutane | 3 | UN2390 | II | | | 150 | 202 | 242 | 5 L | 60 L | | 1,3 | 1 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (c) Packaging authorizations (§ 173.***) | | | (8) Quantity limitations | | | (10) Vessel storage requirements | | |
|--|--|------------------------|---------------------------------------|---------------------------------|---|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Iodomethylpropanes | 3 | UN2391 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Iodopropanes | 3 | UN2392 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Iodoxy compounds (dry) | Forbidden | | III | FLAMMABLE LIQUID. | | 150 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | |
| | Iridium nitratopentamine iridium nitrate | Forbidden | | | | | | | | | | | | | |
| | Iron chloride, see Ferric chloride | Forbidden | | | | | | | | | | | | | |
| | Iron oxide, spent, or iron sponge, spent (obtained from coal gas purification). | 4.2 | UN1376 | III | SPONTANE- OUSLY COMBUSTI- BLE. | B18 | None | 213 | 240 | Forbidden | Forbidden | 1,3 | 5 | | |
| | Iron pentacarbonyl | 6.1 | UN1994 | I | POISON, FLAMMABLE LIQUID. | B14, B30, 10. | None | 192 | 244 | Forbidden | Forbidden | 1 | 5 | 21, 25, 40, 95 | |
| | Iron sesquichloride, see Ferric chloride. Irritating agents, see Tear gas substances, etc. | | | | | | | | | | | | | | |
| | Isobutane or isobutane mixtures see also Petroleum gases, liquified. | 2.1 | UN1969 | | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 |
| | Isobutanol or isobutyl alcohol | 3 | UN1212 | III | FLAMMABLE LIQUID. | T1 | 150 | 203 | 241 | 5 L | 60 L | 1,3 | 1 | | |
| Isobutyl acetate (RC-5000/2270) | 3 | UN1213 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | |
| Isobutyl acrylate | 3 | UN2527 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | | |
| Isobutyl alcohol, see Isobutanol | | | | | | | | | | | | | | | |
| Isobutyl aldehyde, see isobutyraldehyde | | | | | | | | | | | | | | | |
| Isobutylamine (RC-1000/454) | 3 | UN1214 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | | |
| Isobutyliene see also Petroleum gases, li- quified. | 2.1 | UN1055 | | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| Isobutyl formate | 3 | UN2393 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | |
| Isobutyl isobutyrate | 3 | UN2528 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |
| Isobutyl isocyanate | 3 | UN2486 | II | FLAMMABLE LIQUID. | T9 | None | 202 | 243 | 1 L | 60 L | 1 | 5 | 12, 40, 48 | | |
| Isobutyl methacrylate | 3 | UN2283 | III | POISON, FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |
| Isobutyl propionate | 3 | UN2394 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | |
| Isobutyraldehyde or isobutyl aldehyde | 3 | UN2045 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12, 40 | | |
| Isobutyric acid (RC-5000/2270) | 3 | UN2529 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.33) | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|--|---|--------------------------------|--|--------------------------------|-------------------------------------|-----------------------------------|---|--------|
| | | | | | | | (8A) Excep- tions | (8B) Non- built pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| DE | Jet perforators, see Charges, shaped, commercial. | | | | | | | | | | | | | | |
| DE | Jet tappers, without detonator, see Charges, shaped, etc. | | | | | | | | | | | | | | |
| DE | Jet thrust igniters, for rocket motors or jets, see Igniters. | | | | | | | | | | | | | | |
| DE | Jet thrust unit (Jato), see Rocket motors. | | | | | | | | | | | | | | |
| DE | Kelthane (RQ-5000/2270) | ORM-E | NA2761 | III | None | | 156 213 | 240 | No limit | No limit | 1,2 | 1,2 | | | |
| DE | Kepone (RQ-170.454) | ORM-E | NA2761 | III | None | | 156 213 | 240 | No limit | No limit | 1,2 | 1,2 | | | |
| DE | Kerosene | 3 | UN1223 | II | FLAMMABLE LIQUID. | T1 | 150 202 | 242 5 L | 5 L | 60 L | 1,3 | 1 | | | |
| | | | | III | FLAMMABLE LIQUID. | B1, T1 | 150 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |
| | | 3 | UN1224 | II | FLAMMABLE LIQUID. | T8, T30 | 150 202 | 242 | 5 L | 60 L | 1,3 | 1 | | | 12 |
| | | | | III | FLAMMABLE LIQUID. | B1, T7, T31 | 150 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |
| | | 2.2 | UN1056 | | NONFLAMMA- BLE GAS. | B13 | 306 302 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | | | 85 |
| | | 2.2 | UN1970 | | NONFLAMMA- BLE GAS. | B13 | 320 | 244 | 50 kg | 500 kg | 1,3 | 1,3 | | | 85 |
| D | Lacquer base, or Lacquer chips, dry | 4.1 | NA2557 | II | FLAMMABLE SOLID. | A19, N16 | 151 212 | 240 | 1 kg | 15 kg | 1 | 1 | | | |
| | Lacquer base or lacquer chips, nitrocellu- lose, dry, see Nitrocellulose, etc. (UN 2557). | | | | | | | | | | | | | | |
| | Lacquer base or lacquer chips, plastic, wet with alcohol or solvent, see Nitrocellu- lose (UN 2059, 2060, 2555, 2556) or Paints, enamels, etc. (UN 1263). | | | | | | | | | | | | | | |
| | Lauroyl peroxide, see Dilauroyl peroxide | | | | | | | | | | | | | | |
| E | Lead acetate (RQ-5000/2270) | 6.1 | UN1616 | III | KEEP AWAY FROM FOOD. | | 153 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | | 34 |
| E | Lead arsenates (RQ-5000/2270) | 6.1 | UN1617 | II | POISON. | | None 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | | | 95 |
| E | Lead arsenites | 6.1 | UN1618 | II | POISON. | | None 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | | | 95 |
| | Lead azide (dry) | Forbidden | | | | | | | | | | | | | |
| | Lead azide, wetted with not less than 20 per cent water, by weight, or mixture of alcohol and water. | 1.1A | UN0129 | | | | | | | | | | | | |
| DE | Lead chloride (RQ-5000/2270) | 6.1 | NA2291 | III | KEEP AWAY FROM FOOD. | | 153 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | | 34 |
| | Lead compounds, soluble, n.o.s. | | | | | | | | | | | | | | |
| | Lead cyanide | 6.1 | UN2291 | III | KEEP AWAY FROM FOOD. | | 153 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | | 34 |
| | Lead dioxide | 6.1 | UN1620 | II | POISON. | | None 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | | | 26, 95 |
| | Lead dross, see Lead sulphate, with more than 3% free acid. | 5.1 | UN1872 | III | OXIDIZER | A1 | 152 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | | 34 |
| DE | Lead fluoroborate (RQ-5000/2270) | 6.1 | NA2291 | III | KEEP AWAY FROM FOOD. | | 153 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|--|---|---|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- built pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or raillar (8A) | Cargo aircraft only (8B) | Cargo vessel (10A) | Pas- senger vessel (10B) | Other stowage provisions (10C) | |
| DE | Lindane (PG-1/0.454)..... | 6.1 | NA2761 | III | KEEP AWAY FROM FOOD. NONFLAMMA- BLE GAS. | | 153 | 213 | 240 | 100 kg..... | 200 kg..... | 1,2..... | 1,2..... | | |
| | Liquefied gases, non-flammable charged with nitrogen, carbon dioxide or air. Liquefied hydrocarbon gas, see Hydrocar- bon gases, liquefied, n.o.s., etc.. Liquefied natural gas, see Methane, etc. (UN 1972). | 2.2 | UN1058 | | | B13..... | 306 | 304 | 244 | 75 kg..... | 150 kg..... | 1,3..... | 1,3..... | 85 | |
| | Liquefied petroleum gas see Petroleum gases, liquefied. | | | | | | | | | | | | | | |
| | Lithium..... | 4.3 | UN1415 | II | DANGEROUS WHEN WET. | A19, N16, N26, N34, N45, 22. | None | 212 | None | Forbidden..... | 50 kg..... | 1..... | 5..... | | |
| | Lithium acetylide ethylenediamine complex, see Substances which in contact with water emit flammable gases. | | | | | | | | | | | | | | |
| | Lithium alkyls..... | 4.2 | UN2445 | I | SPONTANE- OUSLY COMBUSTI- BLE. | B11, T26, T40. | None | 181 | 244 | Forbidden..... | Forbidden..... | 1..... | 5..... | | |
| | Lithium aluminum hydride..... | 4.3 | UN1410 | I | DANGEROUS WHEN WET. | A19..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 1..... | 5..... | | |
| | Lithium aluminum hydride, ethereal..... | 4.3 | UN1411 | I | DANGEROUS WHEN WET. FLAMMABLE LIQUID. | A2, N1, N16, N34, N40. | None | 201 | 244 | Forbidden..... | 1 L..... | 1..... | 5..... | 40 | |
| | Lithium batteries..... | 4.3 | | II | DANGEROUS WHEN WET. | | None | 185 | None | Forbidden..... | 35 kg..... | 1,3..... | 5..... | | |
| | Lithium borohydride..... | 4.3 | UN1413 | I | DANGEROUS WHEN WET. | A19..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 1,3..... | 5..... | | |
| DE | Lithium chromate (PG-1000/454)..... | ORM-E | NA9134 | III | None..... | | 156 | 213 | 240 | No limit..... | No limit..... | 1,2..... | 1,2..... | | |
| | Lithium ferrosilicon..... | 4.3 | UN2630 | II | DANGEROUS WHEN WET. | A19..... | None | 212 | 241 | 15 kg..... | 50 kg..... | 1,3..... | 5..... | | |
| | Lithium hydride..... | 4.3 | UN1414 | I | DANGEROUS WHEN WET. | A19..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 1..... | 5..... | | |
| | Lithium hydride, fused solid..... | 4.3 | UN2805 | II | DANGEROUS WHEN WET. | A19, A20, N2. | None | 212 | 241 | 15 kg..... | 50 kg..... | 1..... | 5..... | | |
| | Lithium hydroxide, monohydrate..... | 6 | UN2680 | II | CORROSIVE..... | | 154 | 212 | 240 | 15 kg..... | 50 kg..... | 1,2..... | 1,2..... | | |
| | Lithium hydroxide, solution..... | 8 | UN2679 | II | CORROSIVE..... | B2, T8..... | 154 | 202 | 242 | 1 L..... | 30 L..... | 1,2..... | 1,2..... | 96 | |
| | Lithium hypochlorite, dry or Lithium hypo- chlorite mixtures. | 5.1 | UN1471 | II | OXIDIZER..... | N13, N34..... | 152 | 212 | None | 5 kg..... | 25 kg..... | 1,2..... | 1,2..... | | |
| | Lithium in cartridges, see Lithium..... | | | | | | | | | | | | | | |
| | Lithium nitrate..... | 5.1 | UN2722 | III | OXIDIZER..... | A1..... | 152 | 213 | 240 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | | |
| | Lithium nitride..... | 4.3 | UN2806 | I | DANGEROUS WHEN WET. | A19..... | None | 211 | 242 | Forbidden..... | 15 kg..... | 1,3..... | 5..... | | |
| | Lithium peroxide..... | 5.1 | UN1472 | II | OXIDIZER..... | N13, N34..... | 152 | 212 | None | 5 kg..... | 25 kg..... | 1,2..... | 1,2..... | 13 | |
| | Lithium silicon..... | 4.3 | UN1417 | II | DANGEROUS WHEN WET. | A19, A20..... | None | 212 | 241 | 15 kg..... | 50 kg..... | 1,3..... | 1,3..... | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | Labels (6) | Special provisions (7) | (8) Packaging authorizations: (§ 173.13...) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--|---|------------------------|---------------------------------------|--|----------------------------|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or raircraft (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| (1) | LNG, see Methane etc. (UN 1972) | 6.1 | UN1621 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | London Purple | | | | | | | | | | | | | | |
| | LPG, see Petroleum gases, liquefied | | | | | | | | | | | | | | |
| | Lye, see Sodium hydroxide, solutions | | | | | | | | | | | | | | |
| | Magnesium or Magnesium alloys with more than 50 per cent magnesium in pellets, turnings or ribbons. | 4.1 | UN1869 | III | FLAMMABLE SOLID. | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 39 | |
| | Magnesium alkyls | 4.2 | UN3053 | I | SPONTANEOUSLY COMBUSTIBLE. | B11, T28, T29, T42. | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | 18 | |
| | Magnesium aluminum phosphide | 4.3 | UN1419 | I | DANGEROUS WHEN WET. | A19, N34 | None | 211 | 242 | Forbidden | 15 kg | 1,3 | 5 | 40, 85 | |
| | Magnesium arsenate | 6.1 | UN1622 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Magnesium bisulfite solution, see Bisulfites, inorganic aqueous solutions, n.o.s. | | | | | | | | | | | | | | |
| | Magnesium bromate | 5.1 | UN1473 | III | OXIDIZER | A1 | 152 | 213 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| Magnesium chlorate | 5.1 | UN2723 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | | |
| Magnesium diamide | 4.2 | UN2004 | II | SPONTANEOUSLY COMBUSTIBLE. | A19, A20, N2. | None | 212 | 241 | 15 kg | 50 kg | 1 | 1 | | | |
| Magnesium diphenyl | 4.2 | UN2005 | I | SPONTANEOUSLY COMBUSTIBLE. | | None | 211 | 244 | Forbidden | Forbidden | 1 | 1 | | | |
| Magnesium dross, wet or hot | Forbidden | | | | | | | | | | | | | | |
| Magnesium fluorosilicate | 6.1 | UN2853 | III | KEEP AWAY FROM FOOD. | | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26, 34 | |
| Magnesium granules, coated, particle size not less than 149 microns. | 4.3 | UN2950 | I | DANGEROUS WHEN WET. | A1, A19 | None | 211 | None | 25 kg | 100 kg | 1,3 | 1,3 | | | |
| Magnesium hydride | 4.3 | UN2010 | I | DANGEROUS WHEN WET. | A19 | None | 211 | 242 | Forbidden | 15 kg | 1 | 5 | | | |
| Magnesium nitrate | 5.1 | UN1474 | III | OXIDIZER | A1, T2 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 46 | | |
| Magnesium perchlorate | 5.1 | UN1475 | II | OXIDIZER | B10, T8 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46 | | |
| Magnesium peroxide | 5.1 | UN1476 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 13 | | |
| Magnesium phosphide | 4.3 | UN2011 | I | DANGEROUS WHEN WET, POISON. | A19 | None | 211 | None | Forbidden | 15 kg | 1,3 | 5 | 85 | | |
| Magnesium, powder or Magnesium alloys, powder. | 4.3 | UN1418 | II | DANGEROUS WHEN WET, SPONTANEOUSLY COMBUSTIBLE. | A19 | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1,3 | 39 | | |
| Magnesium scrap, see Magnesium, etc. (UN 1869). | | | | | | | | | | | | | | | |
| Magnesium silicide | 4.3 | UN2624 | II | DANGEROUS WHEN WET. | A19, A20 | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk pack- aging (8C) | Passenger aircraft or relicar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| DE | Magnetized material. See 173.21. | 6.1 | NA2783 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | |
| DE | Malathion (RQ-10/4.54) | 6.1 | NA2215 | III | CORROSIVE. | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| E | Maleic acid (RQ-5000/2270) | 8 | UN2215 | III | CORROSIVE. | T7, T38 | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 34, 40 | |
| | Maleic anhydride (RQ-5000/2270) | 8 | UN2215 | III | CORROSIVE. | | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 12, 95 | |
| | Malonitrile | 6.1 | UN2847 | II | POISON. | | None | 213 | 240 | 25 kg | 100 kg | 1,3 | 1 | 34 | |
| | Maneb or Maneb preparations, stabilized against self-heating. | 4.3 | UN2968 | III | DANGEROUS WHEN WET. | A1, A19 | None | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 12, 13, 34 | |
| | Maneb or Maneb preparations with not less than 60 per cent maneb. | 4.2 | UN2210 | III | SPONTANEOUSLY COMBUSTIBLE. DANGEROUS WHEN WET. | A1, A19 | None | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 12, 13, 34 | |
| | Manganese nitrate | 5.1 | UN2724 | III | OXIDIZER. | A1 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Manganese resinates | 4.1 | UN1330 | III | FLAMMABLE SOLID. | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | | |
| | Mannitan tetranitrate | Forbidden | | | | | | | | | | | | | |
| | Mannitol hexanitrate (dry) | Forbidden | | | | | | | | | | | | | |
| | Mannitol hexanitrate (Nitromannite), wetted with not less than 40 per cent water, by weight or mixture of alcohol and water. Matches, block, see Matches, 'strike any- where'. | 1.1D | UN0133 | | | | | | | | | | | | |
| | Matches, fuses | 4.1 | UN2254 | III | FLAMMABLE SOLID. | | 186 | 186 | None | Forbidden | Forbidden | 1,3 | 1,3 | | |
| | Matches, safety (book, card or strike on box). | 4.1 | UN1944 | III | FLAMMABLE SOLID. | | 186 | 186 | None | 25 kg | 100 kg | 1,3 | 1,3 | | |
| | Matches, 'strike anywhere' | 4.1 | UN1331 | III | FLAMMABLE SOLID. | | 186 | 186 | None | Forbidden | Forbidden | 1,3 | 1 | | |
| | Matches, wax, 'Vesta' | 4.1 | UN1945 | III | FLAMMABLE SOLID. | | 186 | 186 | None | 25 kg | 100 kg | 1,3 | 1 | | |
| | Matting acid, see Sulfuric acid | | | | | | | | | | | | | | |
| | Medicines, corrosive, liquid, n.o.s. | 8 | UN1951 | II | CORROSIVE | B2 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| | Medicines, corrosive, solid, n.o.s. | 8 | UN1951 | III | CORROSIVE | | 154 | 203 | 241 | 5 L | 60 | 1,2 | 1,2 | | |
| | Medicines, flammable, liquid, n.o.s. | 3 | UN1951 | III | CORROSIVE | | 184 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| | | | | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | | | | I | FLAMMABLE LIQUID. | | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID. | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | | | | III | FLAMMABLE LIQUID. | B1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Medicines, flammable, solid, n.o.s. | 4.1 | UN1951 | II | FLAMMABLE SOLID. | | 151 | 212 | 240 | 15 kg | 50 kg | 1,3 | 1,3 | | |
| | Medicines, oxidizing substance, solid, n.o.s. | 5.1 | UN1951 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1 | 95 | |
| | Medicines, poisonous, liquid, n.o.s. | 6.1 | UN1951 | I | POISON | | 153 | 201 | 243 | 1 L | 30 L | 1,2 | 1 | 95 | |
| | | | | II | POISON | | 153 | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---------------------------|------------------------------|---|--|--------------------------------|--|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | Medicines, poisonous, solid, n.o.s. | 6.1 | UN1851 | I | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1 | 34 | |
| | Menthyl hydroperoxide, technically pure | | | II | POISON | | 153 | 211 | 242 | 5 kg | 50 kg | 1,2 | 1 | 95 | |
| | Menthyl hydroperoxide, technically pure | | | III | KEEP AWAY FROM FOOD. | | 153 | 212 | 242 | 25 kg | 100 kg | 1,2 | 1 | 95 | |
| | Menthyl hydroperoxide, technically pure | | | | | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1 | 34 | |
| | Mercaptan, liquid n.o.s. or Mercaptan mixtures, liquid, n.o.s. | 6.1 | UN3071 | I | ORGANIC PEROXIDE. | B21, T9, T35. | None | 225 | 243 | 1 L | 5 L | 1 | 5 | 12, 40 | |
| | | | | I | POISON, FLAMMABLE LIQUID. | B40, T42 | None | 202 | 243 | 1 L | 30 L | 1,3 | 1 | 21 | |
| | | | | II | POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1 | 21 | |
| | | | | III | POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 241 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Mercaptans, liquid, n.o.s. or Mercaptan mixtures, liquid, n.o.s. | 3 | UN1228 | II | FLAMMABLE LIQUID. | N16, T14 | None | 202 | 243 | Forbidden | 60 L | 1,3 | 5 | 12 | |
| DE | Mercaptodimethyl (RC-100/45.4) | ORM-E | NA2757 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Mercuric arsenate | 6.1 | UN1623 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercuric chloride | 6.1 | UN1624 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercuric compounds, see Mercury compounds, etc. | | | | | | | | | | | | | | |
| E | Mercuric nitrate (RC-10/4.54) | 6.1 | UN1625 | II | POISON | N73 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercuric potassium cyanide | 6.1 | UN1626 | I | POISON | N74, N75 | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 26, 95 | |
| E | Mercuric sulfate (RC-10/4.54) | 6.1 | UN1645 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercuric sulfocyanate, see Mercury thiocyanate. | | | | | | | | | | | | | | |
| | Mercuric, see Mercury nucleate | | | | | | | | | | | | | | |
| | Mercurous azide | Forbidden | | | | | | | | | | | | | |
| | Mercurous compounds, see Mercury compounds, etc. | | | | | | | | | | | | | | |
| E | Mercurous nitrate (RC-10/4.54) | 6.1 | UN1627 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercurous sulfate | 6.1 | UN1628 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury acetate | 6.1 | UN1629 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury acetylacrylate | Forbidden | | | | | | | | | | | | | |
| | Mercury ammonium chloride | 6.1 | UN1630 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury based pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23deg C. | 3 | UN2778 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel storage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|---|---|--------------------------------|--|--------------------------------|--------------------------|---|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- built pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other storage provisions | |
| | | | | II | FLAMMABLE LIQUID, POISON, POISON, FLAMMABLE LIQUID, POISON, FLAMMABLE LIQUID, POISON, FLAMMABLE LIQUID, KEEP AWAY FROM FOOD, POISON | | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |
| | Mercury based pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23deg C. | 6.1 | UN3011 | I | T42 | | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | | | | II | POISON, FLAMMABLE LIQUID, POISON, FLAMMABLE LIQUID, KEEP AWAY FROM FOOD, POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | Mercury based pesticides, liquid, toxic, n.o.s. | 6.1 | UN3012 | III | T14 | | 153 | 202 | 241 | 60 L | 220 L | 1,2 | 1 | 34, 40 | |
| | | | | I | POISON | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | Mercury based pesticides, solid, toxic, n.o.s. | 6.1 | UN2777 | I | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD, POISON | T14 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Mercury benzoate | 6.1 | UN1631 | I | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury bisulfate | 6.1 | UN1633 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury bromides | 6.1 | UN1634 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury compounds, liquid, n.o.s. | 6.1 | UN2024 | I | POISON | | None | 201 | 243 | 1 L | 30 L | 1,2 | 1 | 40, 95 | |
| | | | | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | | | | III | POISON | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1 | 34, 40 | |
| | Mercury compounds, solid, n.o.s. | 6.1 | UN2025 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | | | | III | KEEP AWAY FROM FOOD, CORROSIVE POISON | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| A | Mercury contained in manufactured articles | 8 | UN2809 | I | CORROSIVE | | None | 164 | None | No limit | No limit | 1,2 | 1 | 40 | |
| E | Mercury cyanide (RC-1/0.454) | 6.1 | UN1636 | II | POISON | N74, N75 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 26, 95 | |
| | Mercury fulminate, wetted with not less than 20 per cent water, or mixture of alcohol and water, by weight. | 1.1A | UN0135 | II | POISON | | None | 212 | 242 | 25 kg | 25 kg | a82 | 1,2 | 95 | |
| | Mercury gluconate | 6.1 | UN1637 | II | POISON | | None | 212 | 242 | 25 kg | 25 kg | | | | |
| | Mercury iodide aquabasic ammonobasic (Iodide of Millon's base) | Forbidden | | | | | | | | | | | | | |
| | Mercury iodide, solid | 6.1 | UN1638 | II | POISON | | None | 212 | 242 | 25 kg | 25 kg | 1,2 | 1,2 | 95 | |
| | Mercury iodide, solution | 6.1 | UN1638 | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| | Mercury metallic | 8 | UN2809 | III | CORROSIVE | | None | 164 | None | 2.5 L | 2.5 L | 1,2 | 1 | 40, 97 | |
| | Mercury nitride | Forbidden | | | | | | | | | | | | | |
| | Mercury nucleate | 6.1 | UN1639 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury oxide | 6.1 | UN1641 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury oxyanide | Forbidden | | | | | | | | | | | | | |
| | Mercury oxycyanide, desensitized | 6.1 | UN1642 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 26, 95 | |
| | Mercury potassium iodide | 6.1 | UN1643 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.30) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-------------------------------------|--|------------------------|---------------------------------------|------------------------------|--|------------------------------|---|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raider | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| E | Mercury salicylate..... | 6.1 | UN1644 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mercury thiocyanate (RC-10/4.5A)..... | 6.1 | UN1646 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Mesityl oxide..... | 3 | UN1229 | II | FLAMMABLE LIQUID | B1, T1 | None | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Metal alkyl halides, n.o.s..... | 4.2 | UN3049 | I | SPONTANE- OUSLY COMBUSTI- BLE | B11 | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | | |
| | Metal alkyl hydrides, n.o.s..... | 4.2 | UN3050 | I | SPONTANE- OUSLY COMBUSTI- BLE | B11 | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | | |
| | Metal alkyls, n.o.s..... | 4.2 | UN2003 | I | SPONTANE- OUSLY COMBUSTI- BLE | B11 | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | | |
| | Metal alkyl, solution, n.o.s..... | 3 | NA9195 | II | FLAMMABLE LIQUID | | 150 | 202 | 1 L | 4 L | 1,3 | 1 | | | |
| | Metaldenide..... | 4.1 | UN1932 | III | FLAMMABLE SOLID | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | | |
| | Metal salts of methyl nitramine (dry)..... | Forbidden | | | | | | | | | | | | | |
| | Methacrylaldehyde..... | 3 | UN2386 | II | FLAMMABLE LIQUID | T8 | None | 202 | 243 | 1 L | 60 L | 1,3 | 5 | 12, 40 | |
| D | Methacrylic acid, inhibited..... | 8 | UN2531 | III | CORROSIVE | T8 | 154 | 203 | 5 L | 60 L | 1,3 | 1,3 | 82, 12 | | |
| | Methacrylonitrile, inhibited..... | 6.1 | UN3078 | I | POISON, FLAMMABLE LIQUID | B14, B32, 10 | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1 | 21 | |
| | Methyl alcohol..... | 3 | UN2614 | II | FLAMMABLE LIQUID | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Methane and hydrogen, mixtures, see Hy- drogen and methane, mixtures, etc..... | | | | | | | | | | | | | | |
| | Methane, compressed or Natural gas, com- pressed (with high methane content)..... | 2.1 | UN1971 | | FLAMMABLE GAS | B13 | 306 | 302 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 85 | |
| | Methane, refrigerated liquid or Natural gas, refrigerated liquid (with high methane content) (cryogenic liquid)..... | 2.1 | UN1972 | | FLAMMABLE GAS | | None | 316 | 318, 319 | Forbidden | Forbidden | 1 | 5 | 40 | |
| | Methanol or Methyl alcohol..... | 3 | UN1230 | II | FLAMMABLE LIQUID, POISON | T8 | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | 40 | |
| | Methazoic acid..... | Forbidden | | | | | | | | | | | | | |
| | Methoxychlor (RC-1/0.45A)..... | ORM-E | NA2761 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 12, 40, | |
| | Methoxymethyl isocyanate..... | 3 | UN2605 | I | FLAMMABLE LIQUID, POISON | B14, B30, 10 | None | 226 | 244 | Forbidden | Forbidden | 1 | 5 | 48 | |
| 4-Methoxy-4-methylpentan-2-one..... | 3 | UN2283 | III | FLAMMABLE LIQUID | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|----------------------------------|----------------------------------|--|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|----------------------------------|--|
| | | | | | | | (BA) Excep- tions | (BB) Non- bulk pack- aging | (BC) Bulk packag- ing | (8A) Passenger aircraft or railcar | (8B) Cargo aircraft only | (8C) Cargo vessel | (9A) Cargo vessel | (9B) Pas- senger vessel | (9C) Other stowage provisions |
| (1) | Methyl acetate..... | 3 | UN1231 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl acetone..... | 3 | UN1232 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl acetylene and propadiene mixtures, stabilized..... | 2.1 | UN1060 | | FLAMMABLE GAS. | T8 | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Methyl acrylate, inhibited..... | 3 | UN1919 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,2 | 1 | 40 | |
| | Methylal..... | 3 | UN1234 | II | FLAMMABLE LIQUID. | T14 | None | 202 | 242 | Forbidden | 60 L | 1,3 | 5 | 12 | |
| | Methyl alcohol, see Methanol..... | | | | | | | | | | | | | | |
| | Methyl allyl chloride..... | 3 | UN2554 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12, 40 | |
| E | Methylamine, anhydrous (RC-1000/454)..... | 2.3 | UN1061 | II | POISON GAS, FLAMMABLE GAS. | B33, 10 | None | 304 | 314, 315 | Forbidden | Forbidden | 1,3 | 5 | 40 | |
| E | Methylamine, aqueous solution (RC-1000/ 454)..... | 3 | UN1235 | II | FLAMMABLE LIQUID. | B1, T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12, 41 | |
| | Methylamine dinitramine and dry salts thereof..... | Forbidden | | | | | | | | | | | | | |
| | Methylamine nitroform..... | Forbidden | | | | | | | | | | | | | |
| | Methylamine perchlorate (dry)..... | Forbidden | | | | | | | | | | | | | |
| | Methylamyl acetate..... | 3 | UN1233 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Methyl amyl ketone, see Amyl methyl ketone..... | | | | | | | | | | | | | | |
| | N-Methylaniline..... | 6.1 | UN2294 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 95 | |
| | Methyl benzoate..... | 6.1 | UN2938 | III | KEEP AWAY FROM FOOD. | T1 | 153 | 203 | 240 | 60 L | 220 L | 1,2 | 1,2 | | |
| | alpha-Methylbenzyl alcohol..... | 6.1 | UN2937 | III | KEEP AWAY FROM FOOD. | T1 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | | |
| | Methyl bromide..... | 2.3 | UN1062 | IB | POISON GAS..... | B13, B14, B31, 10. | None | 193 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 81, 85, 95 | |
| | Methyl bromide and chloropicrin mixtures with more than 2 per cent chloropicrin, see Chloropicrin and methyl bromide mixtures..... | | | | | | | | | | | | | | |
| | Methyl bromide and chloropicrin mixtures with not more than 2 per cent chloropi- crin, see Methyl bromide..... | | | | | | | | | | | | | | |
| E | Methyl bromide and ethylene dibromide mixtures, liquid (RC-1000/454)..... | 6.1 | UN1647 | I | POISON..... | B13, B14, B32, N65, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1 | 40, 95 | |
| | Methyl bromoacetate..... | 6.1 | UN2643 | II | POISON..... | T8 | None | 202 | 243 | 5 L | 60 L | 1 | 5 | 12, 40, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.**) | | | (9) Quantity limitations | | (10) Vessel storage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|--|---|--|--------------------------------|---|--------------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raillar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | 3-Methyl butan-2-one | 3 | UN2397 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | 3-Methyl-1-butene | 3 | UN2561 | I | FLAMMABLE LIQUID. | T20 | None | 201 | 243 | 1 L | 30 L | 1,3 | 5 | |
| | 2-Methyl-1-butene | 3 | UN2459 | I | FLAMMABLE LIQUID. | T14 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12, 40 |
| | 2-Methyl-2-butene | 3 | UN2460 | II | FLAMMABLE LIQUID. | T14 | None | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12 |
| | N-Methylbutylamine | 3 | UN2645 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | Methyl-tert-butylether | 3 | UN2398 | II | FLAMMABLE LIQUID. | T14 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 12 |
| | Methyl butyrate | 3 | UN1237 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | Methyl chloride | 2.3 | UN1063 | II | POISON GAS, FLAMMABLE GAS. | B13, B14, B33, 10. | None | 304 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 85, 95 |
| | <i>Methyl chloride and chloropicrin mixtures, see Chloropicrin and methyl chloride mixtures.</i> | | | | | | | | | | | | | |
| | Methyl chloride and methylene chloride mixture | 2.1 | UN1912 | | FLAMMABLE GAS. | B13, B38 | 306 | 304 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 85 |
| | Methyl chloroacetate | 6.1 | UN2295 | II | POISON, FLAMMABLE LIQUID. | T11 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 95 |
| | <i>Methyl chloroformate, see Methyl chloro- formate.</i> | | | | | | | | | | | | | |
| | <i>Methyl chloroform, see 1,1,1-Trichloroeth- ane.</i> | | | | | | | | | | | | | |
| | Methyl chloroformate | 3 | UN1238 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B6, B14, B32, N1, N11, N26, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40 |
| | Methylchloromethyl ether | 3 | UN1239 | I | FLAMMABLE LIQUID, POISON, | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 12, 40 |
| | Methyl-2-chloropropionate | 3 | UN2933 | III | FLAMMABLE LIQUID. | B1, T7 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | Methyl chlorosilane | 3 | UN2534 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | A2, B14, B30, N1, N15, N26, N34, 10. | None | 226 | 244 | Forbidden | Forbidden | 1,3 | 1 | 40 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.141) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|---|---|--|--------------------------------|--|--------------------------------|------------------------------------|---|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or raft (9A) | Cargo aircraft only (9B) | Cargo aircraft only (10A) | Pass- enger aircraft only (10B) | Other stowage provisions (10C) | |
| | Methyl cyanide..... | 3 | UN1648 | II | FLAMMABLE LIQUID, POISON. | T14 | None | 202 | 243 | 1 L..... | 60 L..... | 1,3..... | 1 | 40 | |
| | Methyl cyclohexane..... | 3 | UN2296 | II | FLAMMABLE LIQUID. | B1, T1 | 150 | 202 | 242 | 5 L..... | 80 L..... | 1,3..... | 1 | | |
| | Methyl cyclohexanols, flash point not more than 60.5 degrees C. | 3 | UN2617 | III | FLAMMABLE LIQUID. | B1, T2 | 150 | 203 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | | |
| | Methyl cyclohexanone..... | 3 | UN2287 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | | |
| | Methylcyclohexanone peroxide(s) not more than 87 per cent in solution with not more than 9 per cent available oxygen. | 5.2 | UN3046 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 19, 25, 40 | |
| | Methyl cyclopentane..... | 3 | UN2298 | II | FLAMMABLE LIQUID. | T6 | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1 | | |
| | Methyl dichloroacetate..... | 6.1 | UN2299 | III | KEEP AWAY FROM FOOD. | T1 | 153 | 203 | 241 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 34, 40 | |
| D | Methyl dichloroarsine..... | 2.3 | NA1556 | II | POISON GAS..... | B14, B32, 10. | None | 192 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Methyldichlorosilane..... | 4.3 | UN1242 | I | DANGEROUS WHEN WET, CORROSIVE, POISON, FLAMMABLE LIQUID. | A2, B6, B14, B32, N1, N15, N26, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 21, 40, 49, 91 | |
| | Methylene chloride, see Dichloromethane..... | | | | | | | | | | | | | | |
| | Methylene glycol dinitrate..... | Forbidden | | | | | | | | | | | | | |
| D | Methylene isocyanate..... | 6.1 | NA2929 | I | POISON, FLAMMABLE LIQUID. | B14, B30, 10. | None | 226 | 244 | Forbidden | Forbidden | L2..... | 1 | | |
| | Methyl ethyl ether see Ethyl methyl ether..... | | | | | | | | | | | | | | |
| | Methyl ethyl ketone, see Ethyl methyl ketone. | | | | | | | | | | | | | | |
| | Methyl ethyl ketone peroxide, in solution with more than 9 per cent by weight active oxygen. | Forbidden | | | | | | | | | | | | | |
| | Methyl ethyl ketone peroxide(s), not more than 40% in diisobutylperoxide, with not more than 8.2% available oxygen. | 5.2 | UN3068 | I | ORGANIC PEROXIDE. | | None | 255 | None | Forbidden | 5 L..... | 1 | 5 | | |
| | Methyl ethyl ketone peroxide(s), not more than 60 per cent in solution and not more than 9 per cent by weight active oxygen. | 5.2 | UN2127 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Methyl ethyl ketone peroxide(s), not more than 50 per cent in solution and not more than 9 per cent by weight active oxygen. | 5.2 | UN2550 | I | ORGANIC PEROXIDE. | | None | 225 | None | 1 L..... | 5 L..... | 1 | 5 | 12, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|----------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | 2-Methyl-5-ethyl pyridine | 6.1 | UN2300 | III | KEEP AWAY FROM FOOD. FLAMMABLE GAS. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Methyl fluoride | 2.1 | UN2454 | | FLAMMABLE LIQUID. | B13 | 306 | 304 | 244 | Forbidden | 150 kg | 1,3 | 5 | 40, 85 | |
| | Methyl formate | 3 | UN1243 | I | FLAMMABLE LIQUID. | T20 | 150 | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12 | |
| | 2-Methylfuran | 3 | UN2301 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12 | |
| | <i>a</i> -Methylglucoside tetranitrate | Forbidden | | | | | | | | | | | | | |
| | <i>a</i> -Methylglycerol trinitrate | Forbidden | | | | | | | | | | | | | |
| | 5-Methylhexan-2-one | 3 | UN2302 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Methylhydrazine | 3 | UN1244 | I | FLAMMABLE LIQUID. CORROSIVE. | B14, B32, N15, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 49 | |
| | Methyl iodide | 6.1 | UN2644 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 12, 40, 95 | |
| | Methyl isobutyl carbinol | 3 | UN2053 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Methyl isobutyl ketone | 3 | UN1245 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | <i>Methyl isobutyl ketone peroxide, in solution with more than 9 per cent by weight active oxygen.</i> | Forbidden | | | | | | | | | | | | | |
| | <i>Methyl isobutyl ketone peroxide(s), not more than 62 per cent in solution and not more than 9 per cent by weight active oxygen.</i> | 5.2 | UN2126 | I | ORGANIC PEROXIDE. | | None | 225 | None | 1 L | 5 L | 1 | 5 | 12, 40 | |
| | Methyl isocyanate or Methyl isocyanate so- lutions. | 3 | UN2480 | I | FLAMMABLE LIQUID. POISON. | B14, B30, N15, N26, 10. | None | 226 | 244 | Forbidden | Forbidden | 1 | 5 | 12, 40, 48 | |
| | Methyl isopropenyl ketone, inhibited | 3 | UN1246 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl isothiocyanate | 3 | UN2477 | I | FLAMMABLE LIQUID, POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1,3 | 12, 40, 48, 95 | |
| | Methyl isovalerate | 3 | UN2400 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl magnesium bromide, in ethyl ether | 4.3 | UN1928 | I | DANGEROUS WHEN WET. | N15 | None | 201 | 243 | Forbidden | 15 kg | 1 | 5 | | |
| E | Methyl mercaptan (FC-100/45.4) | 2.3 | UN1064 | IB | POISON GAS, FLAMMABLE GAS. | B14, B31, 10. | None | 304 | 314, 315 | Forbidden | Forbidden | 1,3 | 1 | 40, 85, 95 | |
| E | Methyl methacrylate monomer, inhibited (FC-5000/2270). | 3 | UN1247 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|--|--|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or raftcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other stowage provisions (10C) | |
| | Methylmorpholine..... | 3 | UN2535 | II | FLAMMABLE LIQUID, CORROSIVE. | B6, T8 | None | 202 | 243 | 1 L | 5 L | 1,3 | 1 | 40 | |
| | Methyl nitramine (Gty)..... | Forbidden | | | | | | | | | | | | | |
| | Methyl nitrite..... | Forbidden | | | | | | | | | | | | | |
| | Methyl norbornene dicarboxylic anhydride, see Corrosive liquids, n.o.s. | 3 | UN2606 | I | FLAMMABLE LIQUID, POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 12, 40 | |
| | Methyl orthosilicate..... | 3 | UN2606 | I | FLAMMABLE LIQUID, POISON. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 5 | 12, 40 | |
| DE | Methyl parathion (RC-100/45.4) liquid..... | 6.1 | NA2783 | II | POISON | N76 | None | 202 | 243 | Forbidden | 1 L | 1,3 | 1,3 | 12 | |
| DE | Methyl parathion (RC-100/45.4) solid..... | 6.1 | NA2783 | II | POISON | N77 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 12 | |
| | Methylpentadiene..... | 3 | UN2461 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 241 | 5 L | 60 L | 1,3 | 5 | 12 | |
| | Methylpentanes, see Hexanes | | | | | | | | | | | | | | |
| | 2-Methylpentan-2-ol..... | 3 | UN2560 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methylphenyldichlorosilane..... | 3 | UN2437 | II | FLAMMABLE LIQUID. | T8, T26 | 150 | 202 | 242 | 5 L | 60 L | 1 | 1 | 13, 40 | |
| D | Methyl phosphonic dichloride..... | 8 | NA9206 | I | CORROSIVE, POISON. | B8, B25, B32, N1, N15, N34, N43, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1 | | |
| | Methyl phosphonothioic dichloride, anhy- drous, see Corrosive liquid, n.o.s. | | | | | | | | | | | | | | |
| D | Methyl phosphonous dichloride, pyrophoric liquid..... | 6.1 | NA2845 | I | POISON, SPONTANE- OUSLY COMBUSTI- BLE, CORROSIVE. | B8, B14, B16, B32, 10. | None | 181 | 244 | Forbidden | Forbidden | 1 | 5 | 18 | |
| | Methyl picric acid (heavy metal salts of)..... | Forbidden | | | | | | | | | | | | | |
| | 1-Methylpiperidine..... | 3 | UN2399 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl propionate..... | 3 | UN1248 | II | FLAMMABLE LIQUID. | T2 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl propyl ether..... | 3 | UN2612 | II | FLAMMABLE LIQUID. | T14 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 5 | 12, 40 | |
| | Methyl propyl ketone..... | 3 | UN1249 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Methyl sulfate, see Dimethyl sulfate | | | | | | | | | | | | | | |
| | Methyl sulfide, see Dimethyl sulfide | | | | | | | | | | | | | | |
| | Methyltetrahydrofuran..... | 3 | UN2536 | II | FLAMMABLE LIQUID. | T7 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | (B) Packaging authorizations (§ 173.101-103) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|----------|---|--------------|-------------------------|----------------|---|--------------------|--|--------------------------|----------------------|------------------------------------|--------------------------|--------------------|----------------------------------|--------------------------------|--|
| | | | | | | | Excep-tions (9A) | Non-Bulk pack-aging (9B) | Bulk packag-ing (9C) | Passenger aircraft or railcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Passenger vessel (10B) | Other stowage provisions (10C) | |
| (1) | Nickel catalyst, dry..... | 4.2 | UN2881 | I | SPONTANE- OUSLY COMBUSTI- BLE. | N15, N34 | None | 211 | None | Forbidden..... | Forbidden..... | 1 | | | |
| | Nickel catalyst, wetted with not less than 40 per cent water or other suitable liquid, by weight, finely divided, activated or spent. | 4.2 | UN1378 | II | SPONTANE- OUSLY COMBUSTI- BLE. | A2, N2, N15, N34. | None | 212 | None | Forbidden..... | 50 kg..... | 1 | | | |
| DE | Nickel chloride (RQ-5000/2270) | ORM-E | NA9139 | III | None..... | | 156 | 213 | 240 | No limit..... | 1,2..... | 1,2 | | | |
| | Nickel cyanide..... | 6.1 | UN1653 | II | POISON..... | N74, N75 | None | 212 | 242 | 25 kg..... | 1,2..... | 1,2 | | 26, 95 | |
| DE | Nickel hydroxide (RQ-1000/454) | ORM-E | NA9140 | III | None..... | | 156 | 213 | 240 | No limit..... | 1,2..... | 1,2 | | | |
| E | Nickel nitrate (RQ-5000/2270) | 5.1 | UN2725 | III | OXIDIZER..... | A1 | 152 | 213 | 240 | 25 kg..... | 1,2..... | 1,2 | | | |
| | Nickel nitrite..... | 5.1 | UN2726 | III | OXIDIZER..... | A1 | 152 | 213 | 240 | 25 kg..... | 1,2..... | 1,2 | | 34, 56, 58 | |
| | Nickel picrate..... | Forbidden | | | | | | | | | | | | | |
| DE | Nickel sulfate (RQ-5000/2270) | ORM-E | NA9141 | III | None..... | | 156 | 213 | 240 | No limit..... | 1,2..... | 1,2 | | | |
| | Nicotine..... | 6.1 | UN1654 | III | POISON..... | | None | 202 | 243 | Forbidden..... | 60 L..... | 1 | | 95 | |
| | Nicotine compounds, n.o.s. or Nicotine preparations, n.o.s. liquid. | 6.1 | UN1655 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L..... | 220 L..... | 1,2 | | 34 | |
| | Nicotine compounds, n.o.s. or Nicotine preparations, n.o.s. solid. | 6.1 | UN1655 | I | POISON..... | | None | 211 | 242 | 5 kg..... | 50 kg..... | 1,2 | | 95 | |
| | Nicotine hydrochloride or Nicotine hydrochloride solution. | 6.1 | UN1656 | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2 | | 95 | |
| | Nicotine salicylate..... | 6.1 | UN1657 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg..... | 200 kg..... | 1,2 | | 34 | |
| | Nicotine sulfate, solid..... | 6.1 | UN1658 | II | POISON..... | | None | 202 | 243 | 5 L..... | 60 L..... | 1,2 | | 95 | |
| | Nicotine sulfate, solution..... | 6.1 | UN1658 | II | POISON..... | T14 | None | 202 | 243 | 25 kg..... | 100 kg..... | 1,2 | | 95 | |
| | Nicotine tartrate..... | 6.1 | UN1659 | II | POISON..... | | None | 212 | 242 | 5 L..... | 60 L..... | 1,2 | | 95 | |
| | Nitrated paper (unstable)..... | Forbidden | | | | | | | | | | | | | |
| | Nitrates, inorganic, n.o.s..... | 5.1 | UN1477 | II | OXIDIZER..... | B10 | 152 | 212 | 240 | 5 kg..... | 25 kg..... | 1,2 | | 46 | |
| | Nitrates of diazonium compounds..... | Forbidden | | | | | | | | | | | | | |
| E | Nitrating acid mixtures, spent with more than 50 per cent nitric acid (RQ-1000/454). | 8 | UN1826 | I | CORROSIVE, OXIDIZER. | B28, T12, T27. | None | 158 | 243 | Forbidden..... | 30 L..... | 5 | | 33, 40 | |
| E | Nitrating acid mixtures spent with not more than 50 per cent nitric acid (RQ-1000/454). | 8 | UN1826 | II | CORROSIVE..... | B2, B28, T12, T27. | None | 158 | 242 | Forbidden..... | 30 L..... | 5 | | 33, 40 | |
| E | Nitrating acid mixtures with more than 50 per cent nitric acid (RQ-1000/454). | 8 | UN1796 | I | CORROSIVE, OXIDIZER. | B28, T12, T27. | None | 158 | 243 | Forbidden..... | 2.5 L..... | 5 | | 33, 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|------------------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Nitrating acid mixtures with not more than 50 per cent nitric acid (RQ-1000/454). | 8 | UN1796 | II | CORROSIVE | B2, B28, T12, T27. | None | 158 | 242 | Forbidden | 30 L | 1 | 5 | 33, 40 | |
| E | Nitric acid, other than red fuming, with more than 70 per cent nitric acid (RQ-1000/454). | 8 | UN2031 | I | CORROSIVE | B4, B12, B17, B28, T9, T27. | None | 158 | 242 | Forbidden | 2.5 L | 1 | 5 | 33, 37, 38, 63 | |
| E | Nitric acid, other than red fuming, with not more than 70 per cent nitric acid (RQ-1000/454). | 8 | UN2031 | II | CORROSIVE | B2, B12, B17, B28, T9, T27. | None | 158 | 242 | Forbidden | 30 L | 1 | 5 | 33, 37, 38, 63 | |
| E | Nitric acid, red fuming (RQ-1000/454) | 8 | UN2032 | I | CORROSIVE, OXIDIZER, POISON. | B17, B28, B30, 10. | None | 158 | 244 | Forbidden | Forbidden | 1 | 5 | 33, 37, 38, 40, 63 | |
| | Nitric ether. See Ethyl nitrate | | | | | | None | 337 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Nitric oxide | 2.3 | UN1660 | IB | POISON GAS | B7, B14, B28, B31, B37, 10. | None | 337 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 43, 95 | |
| | Nitric oxide and nitrogen tetroxide mixtures | 2.3 | UN1975 | IA | POISON GAS, OXIDIZER. | 10 | None | 337 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 43, 95 | |
| | Nitrites, inorganic, n.o.s. | 5.1 | UN2627 | II | OXIDIZER | A33 | 152 | 212 | None | 5 kg | 25 kg | 1,2 | 1,2 | 34, 46, 56, 58 | |
| | N-Nitroaniline | Forbidden | | | | | | | | | | | | | |
| | Nitroanilines (o-,m-,p-) | 6.1 | UN1661 | II | POISON | T14 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Nitroanisole | 6.1 | UN2730 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | 12, 34 | |
| E | Nitrobenzene (RQ-1000/454) | 6.1 | UN1662 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 | |
| | m-Nitrobenzene diazonium perchlorate | Forbidden | | | | | | | | | | | | | |
| | Nitrobenzenesulfonic acid | 8 | UN2305 | II | CORROSIVE | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| | Nitrobenzol, see Nitrobenzene | | | | | | | | | | | | | | |
| | 5-Nitrobenzotriazol | 1.1D | UN0385 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 | |
| | Nitrobenzotrifluorides | 6.1 | UN2306 | III | KEEP AWAY FROM FOOD. | T8, T38 | 153 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | 12, 95 | |
| | Nitrobromobenzene | 6.1 | UN2732 | III | KEEP AWAY FROM FOOD. | | | | | | | | | | |
| | Nitrocellulose, dry or wetted with less than 25 per cent water (or alcohol), by weight. | 1.1D | UN0340 | | | | | | | | | | | | |
| | Nitrocellulose, plasticized with not less than 18 per cent plasticizing substance, by weight. | 1.3C | UN0343 | | | | | | | | | | | | |
| | Nitrocellulose, solution, flammable with not more than 12.6 per cent nitrogen, by weight, and not more than 55 per cent nitrocellulose, flash point less than 23 degrees C. | 3 | UN2059 | II | FLAMMABLE LIQUID. | A32, T9 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|---|---------------------|--------------------------------|-----------------------|----------------------------|-------------------------------------|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other stowage provisions | |
| | Nitromethane | 3 | UN1261 | II | FLAMMABLE LIQUID. | T25 | 150 | 202 | None | Forbidden | 60 L | Forbidden | 1,3 | 1,3 | |
| | N-Nitro-N-methylglycolamide nitrate | Forbidden | | | | | | | | | | | | | |
| | 2-Nitro-2-methylpropanol nitrate | Forbidden | | | | | | | | | | | | | |
| | Nitromuriatic acid, see Nitrohydrochloric acid. | | | | | | | | | | | | | | |
| | Nitronaphthalene | 4.1 | UN2538 | III | FLAMMABLE SOLID. | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | | |
| E | Nitrophenols (o-,m-,p-) (RC-1000/454) | 6.1 | UN1663 | III | KEEP AWAY FROM FOOD. | T8, T38 | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | m-Nitrophenyldinitro methane | Forbidden | | | | | | | | | | | | | |
| | Nitropropanes | 3 | UN2608 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | p-Nitrosodimethylaniline | 4.2 | UN1369 | II | SPONTANEOUSLY COMBUSTIBLE. | A19, A20, N34 | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 5 | 34 | |
| | Nitrostarch, dry or wetted with less than 20 per cent water, by weight. | 1.1D | UN0146 | I | FLAMMABLE SOLID. | A19, A20, N2, N34, N41 | None | 211 | None | 1 kg | 15 kg | 1 | 5 | | |
| | Nitrostarch, wetted with not less than 20 per cent water, by weight. | 4.1 | UN1337 | I | FLAMMABLE SOLID. | | None | 211 | None | 1 kg | 15 kg | 1 | 5 | | |
| | Nitrosugars (dry) | Forbidden | | | | | | | | | | | | | |
| | Nitrosyl chloride | 2.3 | UN1069 | II | POISON GAS, CORROSIVE. | 10 | None | 304 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Nitrosylsulfuric acid | 8 | UN2308 | II | CORROSIVE | B2, N1, N11, N26, N34, T9, T27, T14 | 154 | 202 | 242 | 1 L | 30 L | 1 | 5 | 40, 43 | |
| E | Nitrotoluenes, liquid (RC-1000/454), o- | 6.1 | UN1664 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| E | Nitrotoluenes, solid (RC-1000/454) m- or p- | 6.1 | UN1664 | II | POISON | T14 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Nitrotoluidines (mono) | 6.1 | UN2660 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Nitro urea | 1.1D | UN0147 | | | | | | | | | | | | |
| | Nitrous oxide and carbon dioxide mixtures, see Carbon dioxide and nitrous oxide mixtures. | | | | | | | | | | | | | | |
| | Nitrous oxide, compressed | 2.3 | UN1070 | II | POISON GAS, OXIDIZER. | B13, B33, 10 | None | 304 | 244 | Forbidden | Forbidden | 1,3 | 1,3 | 40, 85 | |
| | Nitrous oxide, refrigerated liquid | 2.3 | UN2201 | II | POISON GAS, OXIDIZER. | B6, B14, B33, 10, T14 | None | 316 | 314, 315 | Forbidden | Forbidden | 1,3 | 1 | 40, 85 | |
| | Nitroxylenes (o-,m-,p-) Nitroxytol, see Nitroxylenes. | 6.1 | UN1665 | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---------------------------------|-------------------------------------|--|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (9A) Cargo vessel | (9B) Pas- senger vessel | (10C) Other stowage provisions | |
| (1) | Nonanes..... | 3 | UN1920 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Nonflammable gas, n.o.s., see Com- pressed or Liquefied gases, e. tc. (UN 1955, 1956). Nonliquefied gases, see Compressed gases, etc.. Nonliquefied hydrocarbon gas, see Hydro- carbon gases, compressed, n.o.s.. Nonyltrichlorosilane..... | 8 | UN1799 | II | CORROSIVE..... | B2, B6, N26, N34, T8, T26. | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | 40 | |
| | 2,5 Norbornadiene..... | 3 | UN2251 | II | FLAMMABLE LIQUID. | | 150 | 202 | 241 | 5 L | 60 L | 1 | 5 | 12 | |
| | Nordhausen acid, see Sulfuric acid, fuming Octadecyltrichlorosilane..... | 8 | UN1800 | II | CORROSIVE..... | B2, B6, N26, N34, T8. | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | 40 | |
| | Octadiene..... | 3 | UN2309 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | 1,7-Octadine-3,5-diene-1,8-dimethoxy-9- octadecynoic acid. | Forbidden | | | | | | | | | | | | | |
| | Octafluorobut-2-ene..... | 2.2 | UN2422 | | NONFLAMMA- BLE GAS. | B13 | None | 304 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Octafluorocyclobutane..... | 2.2 | UN1976 | | NONFLAMMA- BLE GAS. | B13 | None | 304 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Octafluoropropane..... | 2.2 | UN2424 | | NONFLAMMA- BLE GAS. | B13 | None | 304 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Octanes..... | 3 | UN1262 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | n-Octanoyl peroxide, see Di-n-octanoyl peroxide, technically pure. Octogen, see Cyclooctamethylene tetra- tramine, etc. Octol, see Octolite, etc. Octolite (Octol), dry or wetted with less than 15 per cent water, by weight. Octyl aldehydes, flammable..... | 1.1D | UN0266 | | | | | | | | | | | | |
| | tert-Octylmercaptan..... | 3 | UN1191 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 21, 40 | |
| | Octyltrichlorosilane..... | 6.1 | UN3023 | I | POISON, FLAMMABLE LIQUID. | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,2 | 1,2 | 21, 40 | |
| | Oil gas..... | 8 | UN1801 | II | CORROSIVE..... | B2, B6, N26, N34, T8, T26. | None | 202 | 242 | Forbidden | 30 L | 1 | 1 | 40 | |
| | Oil gas..... | 2.1 | UN1071 | | FLAMMABLE GAS. | B13 | None | 304 | 244 | Forbidden | 150 kg | 1 | 5 | 40 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|------------------------------|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raircar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | <i>oleum</i> , see Sulfuric acid, fuming. Organic peroxides, mixtures | 5.2 | UN2756 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Organic peroxides, samples, n.o.s. | 5.2 | UN2255 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | Organic peroxides, trial quantities, n.o.s. | 5.2 | UN2899 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| D | Organic phosphate, Organic phosphate compound, or Organic phosphorus com- pound; mixed with compressed gas. Organochlorine pesticides liquid, flamma- ble, toxic, n.o.s., flash point less than 23 degrees C. | 2.3 | NA1955 | IB | POISON GAS | 10 | None | 334 | None | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Organochlorine pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN2995 | I | FLAMMABLE LIQUID, POISON. FLAMMABLE LIQUID, POISON. | T42 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 23, 40, 95 | |
| | Organochlorine pesticides, liquid, toxic, n.o.s. | 6.1 | UN2996 | I | POISON, FLAMMABLE LIQUID. KEEP AWAY FROM FOOD. POISON. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 23, 40, 95 | |
| | Organochlorine pesticides, solid toxic n.o.s. | 6.1 | UN2761 | I | POISON, KEEP AWAY FROM FOOD. POISON, KEEP AWAY FROM FOOD. FLAMMABLE LIQUID, POISON. | B1, T14 | 153 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | 23, 34, 40 | |
| | Organophosphorus pesticides, liquid, flamm- able, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2784 | I | FLAMMABLE LIQUID, POISON. FLAMMABLE LIQUID, POISON. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | Organophosphorus pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3017 | I | POISON, FLAMMABLE LIQUID, POISON. FLAMMABLE LIQUID, POISON. | N76, T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 23, 40, 95 | |
| | Organophosphorus pesticides, liquid, toxic, n.o.s. | 6.1 | UN3018 | I | POISON, KEEP AWAY FROM FOOD. POISON, KEEP AWAY FROM FOOD. POISON. | N76, T14 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1 | 23, 40, 95 | |
| | Organophosphorus pesticides, liquid, toxic, n.o.s. | 6.1 | UN3018 | II | POISON, KEEP AWAY FROM FOOD. POISON, KEEP AWAY FROM FOOD. POISON. | B1, N76, T14, N76, T42 | None | 201 | 243 | 60 L | 220 L | 1,3 | 1,3 | 23, 34, 40 | |
| | Organophosphorus pesticides, liquid, toxic, n.o.s. | 6.1 | UN3018 | II | POISON, KEEP AWAY FROM FOOD. POISON, KEEP AWAY FROM FOOD. POISON. | N76, T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (173.1-) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|---------------------|------------------------------------|---------------------------|---------------------------|---|--|-------------------------------------|-----------------------------|---------------------------------------|-----------------------------|----------------------------------|-------------------------------------|--------------------------------|---------------------------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk pack- aging | (9A) Passenger aircraft or raifair | (9B) Cargo aircraft only | (9C) Other stowage provisions | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other provisions |
| (1) | | | | | | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (9C) | (10A) | (10B) | (10C) |
| | | | | III | KEEP AWAY FROM FOOD. | N76, T14,... | 153 | 203 | 241 | 60 L | 220 L | | 1,2 | 1,2 | 34, 40 |
| | Organophosphorus pesticides, solid, toxic, n.o.s. | 6.1 | UN2783 | I | POISON | N77 | None | 211 | 242 | 5 kg | 50 kg | | 1,2 | 1,2 | 40, 95 |
| | | | | II | POISON | N77 | None | 212 | 242 | 25 kg | 100 kg | | 1,2 | 1,2 | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | N77 | 153 | 213 | 240 | 100 kg | 200 kg | | 1,2 | 1,2 | 34, 40 |
| | Organotin compounds, n.o.s. liquid | 6.1 | UN2788 | I | POISON | N1, N16, N33, N34, N1, N16, N33, N34, N1, N16, N33, N34 | None | 201 | 243 | 1 L | 30 L | | 1,2 | 1 | 40, 95 |
| | | | | II | POISON | | None | 202 | 243 | 5 L | 60 L | | 1,2 | 1 | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | | 1,2 | 1 | 34, 40 |
| | Organotin compounds, n.o.s. solid | 6.1 | UN2788 | I | POISON | A2, A5, N1 | None | 211 | 242 | 5 kg | 50 kg | | 1,2 | 1 | 40, 95 |
| | | | | II | POISON | A1, N1 | None | 212 | 242 | 25 kg | 100 kg | | 1,2 | 1 | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | A29 | 153 | 213 | 240 | 100 kg | 200 kg | | 1,2 | 1,2 | 34, 40 |
| | Organotin pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23deg C. | 3 | UN2787 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | | 1,3 | 5 | |
| | | | | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | | 1,3 | 1 | |
| | Organotin pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23deg C. | 6.1 | UN3019 | I | POISON, FLAMMABLE LIQUID. | | None | 201 | 243 | 1 L | 30 L | | 1 | 1 | 23, 40, 95 |
| | | | | II | POISON, FLAMMABLE LIQUID. | | None | 202 | 243 | 5 L | 60 L | | 1,2 | 1 | 23, 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | | 1,2 | 1,2 | 23, 34, 40 |
| | Organotin pesticides, liquid, toxic, n.o.s. | 6.1 | UN3020 | I | POISON | | None | 201 | 243 | 1 L | 30 L | | 1 | 1 | 40, 95 |
| | | | | II | POISON | | None | 202 | 243 | 5 L | 60 L | | 1,2 | 1 | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | | 1,2 | 1,2 | 34, 40 |
| | Organotin pesticides, solid, toxic, n.o.s. | 6.1 | UN2786 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | | 1,2 | 1,2 | 40, 95 |
| | | | | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | | 1,2 | 1,2 | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | | 1,2 | 1,2 | 34, 40 |
| | Orthoitraoiline, see Nitroanilines etc. Osmium tetroxide | 6.1 | UN2471 | I | POISON | N2, N33, N34 | None | 211 | 242 | 5 kg | 50 kg | | 1,2 | 1 | 40, 95 |
| | Oxalates, water soluble | 6.1 | UN2449 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | | 1,2 | 1,2 | 34 |
| D | Oxidizing substances, liquid, corrosive, n.o.s. | 5.1 | NA9183 | II | OXIDIZER, CORROSIVE. | B2 | None | 202 | 243 | Forbidden | 1 L | | 1 | 5 | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (6173...) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|---|---------------------|--------------------------------|-----------------------|------------------------------|---------------------------|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other stowage provisions | |
| (1) | Oxidizing substances, liquid, poisonous, n.o.s. | 5.1 | NA9199 | II | OXIDIZER, POISON. | | None | 202 | 243 | Forbidden | 1 L | 1 | 5 | | |
| | Oxidizing substances, n.o.s. liquid | 5.1 | UN1479 | I | OXIDIZER | A2 | None | 201 | None | Forbidden | Forbidden | 1 | 5 | 40, 46, 56 | |
| | | | | II | OXIDIZER | A2 | 152 | 202 | 242 | 1 L | 5 L | 1,2 | 1,2 | 40, 46, 56 | |
| | | | | III | OXIDIZER | A2 | 152 | 203 | 240 | 5 L | 60 L | 1,2 | 1,2 | 40, 46, 56 | |
| | Oxidizing substances, n.o.s. solid | 5.1 | UN1479 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | | |
| | Oxidizing substances, solid, corrosive, n.o.s. | 5.1 | UN3085 | I | OXIDIZER, CORROSIVE. | B10 | None | 211 | 242 | 1 kg | 15 kg | 1 | 4 | | |
| | | | | II | OXIDIZER, CORROSIVE. | B10 | None | 212 | 240 | 5 kg | 25 kg | 1 | 4 | | |
| | | | | III | OXIDIZER, CORROSIVE. | B10 | 152 | 213 | 240 | 25 kg | 100 kg | 1 | 4 | | |
| | Oxidizing substances, solid poisonous, n.o.s. | 5.1 | UN3087 | I | OXIDIZER, POISON. | B10 | None | 211 | 242 | 1 kg | 15 kg | 1,2 | 4 | | |
| | | | | II | OXIDIZER, POISON. | B10 | None | 212 | 240 | 5 kg | 25 kg | 1,2 | 4 | | |
| | | | | III | OXIDIZER, POISON. | B10 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 4 | | |
| | Oxygen and carbon dioxide mixtures, see Carbon dioxide and oxygen mixtures. | 2.2 | UN1072 | | NONFLAMMA-BLE GAS, OXIDIZER. | | 306 | 302 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Oxygen, compressed | 2.2 | UN190 | IA | POISON GAS | 10 | None | 304 | 245 | Forbidden | Forbidden | 1 | 5 | 13, 40 | |
| | Oxygen difluoride | 2.3 | UN2190 | | | | | | | | | | | | |
| | Oxygen mixtures with rare gases, see Rare gases and oxygen mixtures. | 2.2 | UN1073 | | NONFLAMMA-BLE GAS, OXIDIZER. | | 320 | 316 | 318 | Forbidden | Forbidden | 1 | 5 | 5 | |
| | Oxygen, refrigerated liquid (cryogenic liquid) | 2.2 | UN1073 | | NONFLAMMA-BLE GAS, OXIDIZER. | | | | | | | | | | |
| | Paint or Paint related material | 3 | UN1263 | I | FLAMMABLE LIQUID. | T7, T30 | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 173 | 242 | 5 L | 60 L | 1,2 | 1 | | |
| | | | | III | FLAMMABLE LIQUID. | T7, T30 | 150 | 173 | 241 | 60 L | 220 L | 1,3 | 5 | | |
| | Paint or Paint related material | 8 | UN3066 | II | CORROSIVE | B2, N71, T7 | 154 | 202 | 242 | 1 L | 5 L | 1,2 | 1,2 | | |
| | | | | III | CORROSIVE | N71, T7 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| | Paint driers, see Driers, paint or varnish, etc. | | | | | | | | | | | | | | |
| | Paper, unsaturated oil treated incompletely dried (includes carbon paper). | 4.2 | UN1379 | III | SPONTANE-OUSLY COMBUSTI-BLE. | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | | |
| E | Paraformaldehyde (RC-1000/454) | 4.1 | UN2213 | III | FLAMMABLE SOLID. | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging subcategories (§ 173.***) | | | (9) Quantity limitations | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|------------------------------------|------------------------------|--|--|--------------------------------|--|--------------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft/air | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | Paraldehyde | 3 | UN1264 | II | FLAMMABLE LIQUID. | T1 | (8A) 150 | (8B) 202 | (8C) 242 | 60 L | 220 L | 1,3 | 1 | |
| | Paranitroaniline, solid, see Nitroanilines etc. | | | | | | | | | | | | | |
| DE | Parathion (RQ-1/0.454) | 6.1 | NA2783 | I | POISON | | None | 201 | 243 | Forbidden | 1 L | 1,3 | 1,3 | |
| DE | Parathion and compressed gas mixture (RQ-1/0.454). | 2.3 | NA1967 | IB | POISON GAS | B14; B31; 10. | None | 202 | 243 | Forbidden | 5 L | 1,3 | 1,3 | |
| | Paris green, solid, see Copper acetoarsenite. | | | | | | | 334 | 244 | Forbidden | Forbidden | 1,3 | 5 | 40, 95 |
| DE | PCB. See Polychlorinated biphenyls. | | | | | | | | | | | | | |
| | Pelargonyl peroxide, see Di-n-nonanoyl peroxide, technically pure. | | | | | | | | | | | | | |
| | Pentaborane | 4.2 | UN1380 | I | SPONTANEOUSLY COMBUSTIBLE, POISON. | | None | 205 | 246 | Forbidden | Forbidden | 1 | 5 | |
| DE | Pentachloroethane | 6.1 | UN1669 | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 |
| | Pentachlorophenol (RQ-10/4.54) | ORM-E | NA2020 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | |
| | Pentaerythrite tetranitrate (dry) | Forbidden | | | | | | | | | | | | |
| | Pentaerythrite tetranitrate (Pentaerythritol tetranitrate; PETN) wetted with not less than 25 per cent water, by weight, or Pentaerythrite tetranitrate. (Pentaerythritol tetranitrate; PETN) desensitized with not less than 15 per cent phlegmatizer by weight. | 1.1D | UN0150 | | | | | | | | | | | |
| | Pentaerythrite tetranitrate (PETN) with not less than 7 per cent wax by weight. | | UN0411 | | | | | | | | | | | |
| | Pentaerythritol tetranitrate, see Pentaerythrite tetranitrate, etc. | | | | | | | | | | | | | |
| | Pentamethylheptane | 3 | UN2286 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | Pentan-2,4-dione | 3 | UN2310 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | n-Pentane or isopentane | 3 | UN1265 | I | FLAMMABLE LIQUID. | T20 | 150 | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12 |
| | Pentanitroaniline (dry) | Forbidden | | | | | | | | | | | | |
| | 3-Pentanol | 3 | UN2706 | II | FLAMMABLE LIQUID. | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | |
| | 1-Pentol | 8 | UN2705 | II | CORROSIVE | B2, T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 38 |
| | Pentolite, dry or wetted with less than 15 per cent water, by weight. | 1.1D | UN0151 | II | | | | | | | | | | |
| | Perchlorates, inorganic, n.o.s. | 5.1 | UN1481 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 |
| | Perchloric acid more than 50 per cent but not more than 72 per cent acid, by weight. | 5.1 | UN1873 | I | OXIDIZER, CORROSIVE. | A2, N1, N34, N41, T9, T27. | None | 201 | 243 | Forbidden | 2.5 L | 1 | 5 | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|---|---------------------|--------------------------------|-----------------------|------------------------------|---|--|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other stowage provisions | |
| | <i>Perchloric acid, more than 72 per cent acid by weight.</i> | Forbidden 8 | UN1802 | II | CORROSIVE, OXIDIZER. | N15, N34, N41, T9. | None | 202 | 243 | Forbidden | 30 L | 1 | 1 | 37 | |
| | <i>Perchloric acid not more than 50 per cent acid by weight.</i> | | | | | | | | | | | | | | |
| | <i>Perchloroethylene, see Tetrachloroethylene.</i> | | | | | | | | | | | | | | |
| | <i>Perchloromethylmercaptan</i> | 6.1 | UN1670 | I | POISON | B14, B25, B32, N1, N15, N17, N26, N34, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | <i>Perchloryl fluoride</i> | 2.3 | UN3083 | 1B | POISON GAS, OXIDIZER. | B12, B14, B31, 10. | None | 302 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 43, 95 | |
| | <i>Perfusion caps, see Primers, cap type.</i> | | | | | | | | | | | | | | |
| | <i>Perfluoro-2-butene, see Octafluorobut-2-ene.</i> | | | | | | | | | | | | | | |
| | <i>Perfumery products with flammable solvents.</i> | 3 | UN1266 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 15 L | 60 L | 1,3 | 1 | | |
| | <i>Permanganates, inorganic, n.o.s. (except Ammonium permanganate, which is forbidden).</i> | 5.1 | UN1482 | II | FLAMMABLE LIQUID, OXIDIZER | B1, T7, T30, B10 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | <i>Peroxides, inorganic, n.o.s.</i> | 5.1 | UN1483 | II | OXIDIZER | A20, B10, N26, N34. | None | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 56, 69 | |
| | <i>Peroxyacetic acid, more than 43 per cent and with more than 6 per cent hydrogen peroxide.</i> | Forbidden | | | | | | | | | | | | | |
| | <i>Peroxyacetic acid not more than 43 per cent in acetic acid, or Peroxyacetic acid in a mixture of acid and water, with not more than 6 per cent hydrogen peroxide and not more than 1 per cent sulfuric acid.</i> | 5.2 | UN2131 | I | ORGANIC PEROXIDE. | | None | 225 | None | Forbidden | Forbidden | 1 | 5 | 12, 40 | |
| | <i>Peroxyacetic acid, not more than 16 per cent in a mixture with at least 39 per cent water, at least 15 per cent acetic acid, not more than 24 per cent hydrogen peroxide, with stabilizer.</i> | 5.2 | UN3045 | I | ORGANIC PEROXIDE, CORROSIVE. | | None | 225 | None | 1 kg | 5 kg | 1 | 5 | 12, 40 | |
| | <i>Pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C.</i> | 3 | UN3021 | I | FLAMMABLE LIQUID, POISON. | B5 | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|--|--------------------------------|-------------------------|-------------------------------------|----------------------------------|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (8A) Passenger aircraft or railer | (8B) Cargo aircraft only | (8A) Cargo vessel | (8A) Cargo vessel | (8B) Pas- senger vessel | (8C) Other stowage provisions |
| | | | | II | FLAMMABLE LIQUID, POISON, POISON, FLAMMABLE LIQUID, POISON, FLAMMABLE LIQUID. | | None | 202 | 243 | 1 L..... | 60 L..... | 1,3..... | 1,3..... | 1..... | |
| | Pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN2903 | I | T42..... | T42..... | None | 201 | 243 | 1 L..... | 30 L..... | 1..... | 1..... | 1..... | 23, 40, 95 |
| | | | | II | POISON, FLAMMABLE LIQUID. | T14..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | 1..... | 23, 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | T14..... | 153 | 203 | 242 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 1,2..... | 23, 34, 40 |
| | Pesticides, liquid, toxic, n.o.s. | 6.1 | UN2902 | I | POISON..... | T42..... | None | 201 | 243 | 1 L..... | 30 L..... | 1..... | 1..... | 1..... | 40, 95 |
| | | | | II | POISON..... | T14..... | None | 202 | 243 | 5 L..... | 60 L..... | 1,2..... | 1,2..... | 1..... | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | T14..... | 153 | 203 | 241 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 1,2..... | 34, 40 |
| | Pesticides, solid, toxic, n.o.s. | 6.1 | UN2588 | I | POISON..... | | None | 211 | 242 | 5 kg..... | 50 kg..... | 1,2..... | 1,2..... | 1,2..... | 40, 95 |
| | | | | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 1,2..... | 40, 95 |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg..... | 200 kg..... | 1,2..... | 1,2..... | 1,2..... | 34, 40 |
| | PETN, see Pentaerythrite tetranitrate PETN/TNT, see Pentolite, etc. Petrol, see Gasoline. Petroleum crude oil..... | 3 | UN1267 | II | FLAMMABLE LIQUID. | T8, T31..... | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 5..... | 12 |
| | | | | III | FLAMMABLE LIQUID. | B1, T8, T31..... | 150 | 203 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | 1,3..... | 12 |
| | Petroleum distillates, n.o.s. | 3 | UN1268 | I | FLAMMABLE LIQUID. | T42..... | 150 | 201 | 243 | 1 L..... | 30 L..... | 1,3..... | 1,3..... | 5..... | 12 |
| | | | | II | FLAMMABLE LIQUID. | T7, T30..... | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 5..... | 12 |
| | | | | III | FLAMMABLE LIQUID. | B1, T7, T30..... | 150 | 203 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | 1,3..... | 12 |
| | Petroleum ether, see Petroleum spirit Petroleum gases, liquefied Petroleum naphtha, see Naphtha, petrole- um. Petroleum oil..... | 2.1 | UN1075 | | FLAMMABLE GAS. | | 306 | 304 315 | 314, 315 | Forbidden..... | 150 kg..... | 1,3..... | 1,3..... | 1..... | 40, 85 |
| | | 3 | UN1270 | II | FLAMMABLE LIQUID. | T8, T31..... | 150 | 202 | 242 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 5..... | 12 |
| | | | | III | FLAMMABLE LIQUID. | B1, T8, T31..... | 150 | 203 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | 1,3..... | 12 |
| | Petroleum spirit..... | 3 | UN1271 | I | FLAMMABLE LIQUID. | T8..... | 150 | 201 | 243 | 5 L..... | 60 L..... | 1,3..... | 1,3..... | 5..... | 12 |
| | | | | II | FLAMMABLE LIQUID. | B1, T8..... | 150 | 202 | 242 | 60 L..... | 220 L..... | 1,3..... | 1,3..... | 1..... | 12 |
| | | | | III | FLAMMABLE LIQUID. | T8..... | 150 | 202 | 241 | 60 L..... | 220 L..... | 1,2..... | 1,2..... | 1,2..... | |
| | Phenacyl bromide..... | 6.1 | UN2645 | II | POISON..... | | None | 212 | 242 | 25 kg..... | 100 kg..... | 1,3..... | 1,3..... | 1..... | 12, 40, 95 |

| (1) Sym- bols | (2) Hazardous materials descriptions, and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.171) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---|---|------------------------|---------------------------------------|------------------------------|---------------------------|------------------------------|---|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raircraft | (9B) Cargo aircraft only | (9A) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| E | Phenetidines | 6.1 | UN2311 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Phenol, molten (PG-1000/454) | 6.1 | UN2312 | II | POISON | B14, T8, T38. | None | 202 | 243 | Forbidden | Forbidden | 1 | 1 | 40, 95 | |
| | Phenol, solid (PG-1000/454) | 6.1 | UN1671 | II | POISON | N78, T14 | None | 212 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Phenol solutions (PG-1000/454) | 6.1 | UN2821 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| | Phenolsulfonic acid, liquid | 8 | UN1803 | II | CORROSIVE | B2, N16, N34, N41, T8. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | | |
| | Phenoxy pesticides, liquid, flammable, toxic n.o.s., flash point less than 23 degrees C. | 3 | UN2766 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| | Phenoxy pesticides, liquid, toxic, flamma- ble, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN2999 | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |
| | | | | | | | | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 23, 40, 95 |
| | | | | | | | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 23, 40, 95 |
| | | | | | | | | 153 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | 23, 34, 40 |
| D | Phenoxy pesticides, liquid, toxic, n.o.s. | 6.1 | UN3000 | I | POISON | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | | | | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | T14 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Phenoxy pesticides, solid, toxic, n.o.s. | 6.1 | UN2765 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 40, 95 | |
| | | | | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 | |
| | Phenylacetoneitrile, liquid | 6.1 | UN2470 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 26, 34 | |
| | Phenylacetyl chloride | 8 | UN2577 | II | CORROSIVE | B2, T8, T26. | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | 40 | |
| | Phenylcarbylamine chloride | 6.1 | UN1672 | I | POISON | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Phenylchloroformate | 6.1 | UN2746 | II | POISON, CORROSIVE. | T12 | None | 202 | 243 | 1 L | 30 L | 1,3 | 1,3 | 12, 13, 23, 25, 40, 95 | |
| Phenylchloroarsine | 6.1 | NA1556 | I | POISON | B3, B14, B30, 10. | None | 226 | 244 | Forbidden | Forbidden | 1 | 5 | | | |
| <i>m</i> -Phenylenediamineperchlorate (dry) | Forbidden | | | | | | | | | | | | | | |
| Phenylenediamines (o-,m-,p-) | 6.1 | UN1673 | III | KEEP AWAY FROM FOOD. | | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| Phenyldiazine | 6.1 | UN2572 | II | POISON | | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173. ...) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---------------------------------|---|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Phenyl isocyanate | 6.1 | UN2487 | I | POISON. | B14, B32, N1, N33, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1,3 | 21, 25, 40, 95 | |
| | Phenyl mercaptan | 6.1 | UN2337 | I | POISON, FLAMMABLE LIQUID. | B14, B36, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1,3 | 21, 40, 95 | |
| | Phenylmercuric acetate | 6.1 | UN1674 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Phenylmercuric compounds, n.o.s. | 6.1 | UN2026 | I | POISON. | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 95 | |
| | | | | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| | Phenylmercuric hydroxide | 6.1 | UN1894 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Phenylmercuric nitrate | 6.1 | UN1895 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Phenyl phosphorus dichloride | 8 | UN2798 | II | CORROSIVE | B2, B15, T8, T26. | 154 | 202 | 242 | Forbidden | 30 L | 1,2 | 1 | 40 | |
| | Phenyl phosphorus trichloride | 8 | UN2799 | II | CORROSIVE | B2, B15, T8, T26. | 154 | 202 | 242 | Forbidden | 30 L | 1,2 | 1 | 40 | |
| | Phenyltrichlorosilane | 8 | UN1804 | I | CORROSIVE, POISON. | B6, B14, B32, N26, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1 | | |
| | Phenyl urea pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2768 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |
| | Phenyl urea pesticides, liquid, toxic, flam- mable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3001 | I | POISON, FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 23, 40, 95 | |
| | | | | II | POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 23, 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | B1, T14 | 153 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | 23, 34, 40 | |
| | Phenyl urea pesticides, liquid, toxic, n.o.s. | 6.1 | UN3002 | I | POISON. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | | | | II | POISON. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | T14 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Phenyl urea pesticides, solid, toxic, n.o.s. | 6.1 | UN2767 | I | POISON. | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 40, 95 | |
| | | | | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 | |
| E | Phosgene (PG-5000/2270) | 2.3 | UN1076 | IA | POISON GAS, CORROSIVE. | B7, 10 | None | 192 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|---------------------|------------------------------------|---------------------------|---|---|--|--|--------------------------------|---|---------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft, only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | 9-Phosphabicyclonanes (Cyclo-octa- diene phosphines). | 4.2 | UN2940 | II | SPONTANE- OUSLY COMBUSTI- BLE. | A19 | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1,3 | | |
| | Phosphine | 2.3 | UN2199 | IA | POISON GAS, FLAMMABLE GAS. | B7, 10 | None | 192 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Phosphoric acid (RC-5000/2270) | 8 | UN1805 | III | CORROSIVE | N26, N34, T7. | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| E | Phosphoric acid triethylenimine, see Tri- (1-aziridinyl) phosphine oxide, solution. Phosphoric anhydride, see Phosphorus pentoxide. | | | | | | | | | | | | | | |
| | Phosphorous acid, ortho | 8 | UN2834 | III | CORROSIVE | T7 | 154 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 48 | |
| | Phosphorus, amorphous (RC-1/0.454) | 4.1 | UN1338 | III | FLAMMABLE SOLID. | A1, A19, B12, B26. | None | 213 | 243 | 25 kg | 100 kg | 1,3 | 1,3 | | |
| E | Phosphorus bromide, see Phosphorus tri- bromide. Phosphorus chloride, see Phosphorus tri- chloride. Phosphorus heptasulfide, free from yellow and white phosphorus. Phosphorus oxybromide | 4.1 | UN1339 | II | FLAMMABLE SOLID. | A20, B10, N34. | None | 212 | 240 | 15 kg | 50 kg | 1,3 | 1 | 74 | |
| | | 8 | UN1939 | II | CORROSIVE | B8, B10, N15, N34, N41. | None | 212 | 240 | Forbidden | 50 kg | 1 | 1 | 12, 40 | |
| | | 8 | UN2576 | II | CORROSIVE | B2, B8, N15, N34, N41. | None | 202 | 242 | Forbidden | Forbidden | 1 | 1 | 40 | |
| E | Phosphorus oxybromide, molten | | | | | | | | | | | | | | |
| | Phosphorus oxychloride (RC-5000/2270) | 8 | UN1810 | I | CORROSIVE, POISON. | B8, B14, B25, B32, N26, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1 | 80, 40 | |
| | Phosphorus pentabromide | 8 | UN2691 | II | CORROSIVE | B10, N26, N34. | 154 | 202 | 240 | Forbidden | 50 kg | 1,3 | 1 | 12, 40 | |
| E | Phosphorus pentachloride | 8 | UN1806 | II | CORROSIVE | B10, N26, N34. | None | 202 | 240 | Forbidden | 50 kg | 1 | 1 | 40 | |
| | Phosphorus pentafluoride | 2.3 | UN2198 | IA | POISON GAS | B13, 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Phosphorus pentasulfide, free from yellow and white phosphorus (RC-100/45.4). | 4.3 | UN1340 | II | DANGEROUS WHEN WET. | A20, B10, N34. | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1,3 | 74 | |
| | Phosphorus pentoxide | 8 | UN1807 | II | CORROSIVE | B10, N26, N34. | 154 | 212 | 240 | Forbidden | 50 kg | 1,2 | 1,2 | 9 | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.111) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|--|---------------------|--------------------------------|-----------------------|---|--|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other stowage provisions | |
| | Phosphorus sesquisulfide, free from yellow and white phosphorus. Phosphorus tribromide..... | 4.1 8 | UN1341 UN1808 | II II | FLAMMABLE SOLID. CORROSIVE..... | A20, B10, N34. B2, B25, N1, N11, N26, N34, N34, T8. | None None | 212 202 | 240 242 | 15 kg..... Forbidden..... | 50 kg..... 30 L..... | 1,3..... 1..... | 1..... 1..... | 74 80, 40 | |
| E | Phosphorus trichloride (RC-5000/2270) | 8 | UN1809 | I | CORROSIVE, POISON. | B6, B14, B25, B32, N1, N26, N34, N34, 10. | None | 227 | 244 | Forbidden..... | Forbidden..... | 1..... | 1..... | 80, 40 | |
| | Phosphorus trioxide | 8 | UN2578 | III | CORROSIVE..... | A20, B10, N34. | 154 | 213 | 241 | 25 kg..... | 100 kg..... | 1,3..... | 1,3..... | 12 | |
| | Phosphorus insulfide, free from yellow and white phosphorus. | 4.1 | UN1343 | II | FLAMMABLE SOLID. | A20, B10, N34. | None | 212 | 240 | 15 kg..... | 50 kg..... | 1,3..... | 1..... | 74 | |
| | Phosphorus, white or yellow dry or under water or in solution (RC-1/0.454). | 4.2 | UN1381 | I | SPONTANE- OUSLY COMBUSTI- BLE, POISON. | A19, B12, B26, N1, N15, N34, T15, T26, T33. | None | 211 | 243 | Forbidden..... | Forbidden..... | 1,3..... | 5..... | | |
| E | Phosphorus white, molten (RC-1/0.454) | 4.2 | UN2447 | I | SPONTANE- OUSLY COMBUSTI- BLE, POISON. | A19, B12, B26, N1, N15, N34, T15, T26, T29. | None | 211 | 243 | Forbidden..... | Forbidden..... | 1..... | 5..... | | |
| | Phosphorus (white or red) and a chlorate, mixtures of. Phosphoryl chloride, see Phosphorus oxychloride. | Forbidden | | | | | | | | | | | | | |
| | Photo-flash powder, in units | 1.1G | UN0094 | | | | | | | | | | | | |
| | Photo-flash powder, in units | 1.2G | UN0096 | | | | | | | | | | | | |
| | Photo-flash powder, in units | 1.3G | UN0305 | | | | | | | | | | | | |
| | Phthalic anhydride..... | 8 | UN2214 | III | CORROSIVE..... | T7, T38..... | 154 | 213 | 240 | 25 kg..... | 100 kg..... | 1,2..... | 1,2..... | 34 | |
| | Phthalimide derivative pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2774 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden..... | 30 L..... | 1,3..... | 5..... | | |
| | | | | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L..... | 60 L..... | 1,3..... | 1..... | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard Class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (13.1.1) | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|--|---------------------|--------------------------------|-----------------------|--|---------------------------|--|-----------------------------|-----------------------------|---------------------------------------|-----------------------------|-------------------------------------|-----------------------|----------------------------|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas-senger vessel |
| | Phthalimide derivative pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3007 | I | POISON, FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 23, 40, 95 |
| | Phthalimide derivative pesticides, liquid, toxic, n.o.s. | 6.1 | UN3008 | III | POISON, FLAMMABLE LIQUID. KEEP AWAY FROM FOOD. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 23, 40, 95 |
| | Phthalimide derivative pesticides, solid, toxic, n.o.s. | 6.1 | UN2773 | I | POISON | T14 | None | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | 23, 34, 40 |
| | Picolines | 3 | UN2313 | II | POISON | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 |
| | Picric acid, see Trinitrophenol, etc. | 4.1 | NA1344 | III | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 |
| | Picrite, see Nitroguanidine, etc. | | | III | KEEP AWAY FROM FOOD. | T14 | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 |
| | Picryl chloride, see Trinitrochlorobenzene | | | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 40, 95 |
| | Pinane hydroperoxide, see Pinanyl hydroperoxide, technically pure. | 5.2 | UN2162 | I | FLAMMABLE SOLID. | A19, A20, N34, N41. | None | 211 | None | Forbidden | Forbidden | 1 | 5 | |
| | Pinanyl hydroperoxide or Pinane hydroperoxide, technically pure. | 6.1 | UN2472 | III | ORGANIC PEROXIDE. KEEP AWAY FROM FOOD. | B19, T25 | None | 225 | 243 | 1 L | 5 L | 1 | 5 | 12, 40 |
| | Pindone liquid | 6.1 | UN2472 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 |
| | Pindone solid | 6.1 | UN2472 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 260L | 100 kg | 200 kg | 1,2 | 1,2 | 34 |
| | alpha-Pinene | 3 | UN2368 | III | FLAMMABLE LIQUID. | T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | Pine oil | 3 | UN1272 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | |
| | Piperazine | 8 | UN2579 | III | CORROSIVE | T7 | 154 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | 12 |
| | Piperidine | 3 | UN2401 | II | FLAMMABLE LIQUID. | T2 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 13 |
| | Pivaloyl chloride, see Trimethyl acetyl chloride. | | | | | | | | | | | | | |
| | Plastics, nitrocellulose based, spontaneously combustible, n.o.s. | 4.2 | UN2006 | III | SPONTANEOUSLY COMBUSTIBLE. | | None | 213 | None | Forbidden | Forbidden | 1 | 1 | |
| | Plastic solvent, n.o.s., see Flammable liquids, n.o.s. | | | | | | | | | | | | | |

D

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---|--|---------------------|--------------------------------|-----------------------|----------------------------------|---------------------------|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|----------------------|-------------------------------------|----------------------------------|---------------------|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (8A) Passenger aircraft or railcar | (8B) Cargo aircraft only | (8A) Cargo vessel | (8B) Pas-senger vessel | (8C) Other stowage provisions | |
| AEW D | Poisonous gases, n.o.s., see Compressed or liquefied gases, flammable or toxic, n.o.s. | 6.1 | UN2927 | I | POISON, CORROSIVE. | B38, T42 | None | 201 | 243 | 0.5 L | 2.5 L | 1,2 | 1 | 20, 40, 95 | |
| | Poisonous liquids, corrosive, n.o.s. | | | | | | | | | | | | | | II |
| | Poisonous liquids, flammable, n.o.s. | 6.1 | UN2929 | I | POISON, FLAMMABLE LIQUID. | T15 | None | 201 | 243 | 1 L | 30 L | 1,2 | 1 | 21, 40, 95 | |
| | Poisonous liquids, n.o.s. | | | | | | | | | | | | | | II |
| | Poisonous liquids, n.o.s. | 6.1 | UN2810 | I | POISON, FLAMMABLE LIQUID. | B38, B40, T42 | None | 201 | 243 | 1 L | 30 L | 1,2 | 1 | 40, 95 | |
| | Poisonous solids, corrosive, n.o.s. | | | | | | | | | | | | | | II |
| | Poisonous solids, n.o.s. | 6.1 | UN2928 | I | POISON, CORROSIVE. | T15 | None | 211 | 242 | 1 kg | 25 kg | 1,2 | 1 | 20, 40, 95 | |
| | Poisonous solids, flammable, n.o.s. | | | | | | | | | | | | | | II |
| | Poisonous solids, n.o.s. | 6.1 | UN2930 | I | POISON, FLAMMABLE SOLID. | B38, B40, T42 | None | 211 | 242 | 1 kg | 15 kg | 1,2 | 1 | 24, 40, 95 | |
| | Poisonous solids, n.o.s. | | | | | | | | | | | | | | II |
| Poisonous solids, n.o.s. | 6.1 | UN2811 | I | POISON, SOLID. | B38, B40, T42 | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1 | 95 | | |
| Poisonous solids, n.o.s. | | | | | | | | | | | | | | II | POISON, SOLID. |
| Poisonous solids, n.o.s. | 6.1 | UN3086 | I | POISON, SOLID. | B38, B40, T42 | None | 211 | 242 | 1 kg | 15 kg | 1,2 | 1 | 40, 89, 95 | | |
| Poisonous solids, oxidizing, n.o.s. | | | | | | | | | | | | | | II | POISON, SOLID. |
| Polyalkylamines, n.o.s., see Alkylamines, etc. | 9 5.2 | UN2315 NA2255 | II | None | B10, B66 | 155 None | 202 225 | 240 246 | 100 L 5 kg | 220 L 5 kg | 1,2 1 | 1,2 5 | 34 | | |
| Polychlorinated biphenyls (PC-10/4.54) | | | | | | | | | | | | | | II | None |
| Polyester resin kits | 9 | UN2211 | III | None | None | 221 | 221 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 84 | | |
| Polystyrene beads, expandable, impregnated with flammable liquid. | | | | | | | | | | | | | | II | DANGEROUS WHEN WET. |
| Potassium | 4.3 | UN2257 | II | DANGEROUS WHEN WET. | A19, A20, B27, N6, N34, T15, T26 | None | 212 | 244 | Forbidden | 50 kg | 1 | 5 | 5 | | |
| Potassium arsenate (PC-1000/4.54) | 6.1 | UN1677 | II | POISON. | None | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | | |

| (1) Sym- bol | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.17) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|--------------------|--|------------------------|---------------------------------------|------------------------------|---|--|--|--|--------------------------------|---|--------------------------------|-------------------------|-------------------------------------|-----------------------------------|---|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or rescue | (9B) Cargo aircraft only | (9C) Cargo vessel | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions |
| | n-Propyl acetate | 3 | UN1276 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | |
| | Propyl alcohol, <i>see</i> Propanol | | | | | | | | | | | | | | |
| | Propylamine | 3 | UN1277 | II | FLAMMABLE LIQUID. | N34, T14 | None | 202 | 242 | Forbidden | 60 L | 1,3 | 1,3 | 5 | 12, 40 |
| | Propyl benzene | 3 | UN2364 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | |
| | Propyl chloride | 3 | UN1278 | II | FLAMMABLE LIQUID. | N34, T14 | None | 202 | 242 | Forbidden | 60 L | 1,3 | 1,3 | 5 | 12 |
| | n-Propyl chloroformate | 3 | UN2740 | I | FLAMMABLE LIQUID, POISON, CORROSIVE. | B6, B14, B32, N1, N11, N26, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1,3 | 1,3 | 5 | 21, 40, 95 |
| | Propylene chlorohydrin | 6.1 | UN2611 | II | POISON | T9 | None | 202 | 243 | 5 L | 60 L | 1,3 | 1,3 | 1,3 | 12, 21, 25, 40, 95 |
| | 1,2-Propylenediamine | 8 | UN2258 | II | CORROSIVE, FLAMMABLE LIQUID. | N1, N11, N34, T8. | None | 202 | 243 | 1 L | 30 L | 1,3 | 1,3 | 1,3 | 40 |
| E | Propylene dichloride (RQ-5000/2270) | 3 | UN1279 | II | FLAMMABLE LIQUID. | N36, T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | |
| | Propyleneimine, inhibited | 3 | UN1921 | I | FLAMMABLE LIQUID. | N1, N15, N34, T25. | None | 201 | 243 | Forbidden | 30 L | 1,3 | 1,3 | 5 | 40 |
| E | Propylene oxide (RQ-5000/2270) | 3 | UN1280 | I | FLAMMABLE LIQUID. | N1, N15, N34, T20, T29. | None | 201 | 243 | Forbidden | 30 L | 1,3 | 1,3 | 5 | 12 |
| | Propylene <i>see also</i> Petroleum gases, liqui- fied. | 2.1 | UN1077 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1,3 | 1 | 40, 85 |
| | Propylene tetramer | 3 | UN2850 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 1,3 | |
| | Propyl formates | 3 | UN1281 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1,3 | 1 | |
| | n-Propyl isocyanate | 3 | UN2482 | I | FLAMMABLE LIQUID, POISON. | N15, N26, T18, T26. | None | 201 | 243 | Forbidden | 30 L | 1 | 1 | 5 | 12, 40, 48 |
| | <i>Propyl mercaptan, see</i> Propanethiols | | | | | | | | | | | | | | |
| | n-Propyl nitrate | 3 | UN1865 | II | FLAMMABLE LIQUID. | T25 | 150 | 202 | None | 5 L | 60 L | 1,3 | 1,3 | 1 | |
| | Propyltrichlorosilane | 8 | UN1816 | I | CORROSIVE, FLAMMABLE LIQUID. | B1, B6, N16, N26, N34, T8, T26. | None | 201 | 243 | Forbidden | Forbidden | 1 | 1 | 1 | 21, 40 |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|---|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raikcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Rockets, with bursting charge | 1.1F | UN0180 | I | POISON | | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| | Rockets, with bursting charge | 1.1E | UN0181 | II | POISON | | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | Rockets, with bursting charge | 1.2E | UN0182 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Rockets, with bursting charge | 1.2F | UN0295 | | | | | | | | | | | | |
| | Rockets, with expelling charge | 1.2C | UN0436 | | | | | | | | | | | | |
| | Rockets, with expelling charge | 1.3C | UN0437 | | | | | | | | | | | | |
| | Rockets, with expelling charge | 1.4C | UN0438 | | | | | | | | | | | | |
| | Rockets, with inert head | 1.3C | UN0183 | | | | | | | | | | | | |
| | Rodenticides, n.o.s.(liquid) | 6.1 | UN1681 | | | | | | | | | | | | |
| | Rodenticides, n.o.s. (solid) | 6.1 | UN1681 | | | | | | | | | | | | |
| | Rodenticides, n.o.s. (solid) | 6.1 | UN1681 | | | | | | | | | | | | |
| | Rubber scrap or Rubber shoddy, powdered or granulated. | 4.1 | UN1345 | II | FLAMMABLE | | 151 | 212 | 240 | 15 kg | 50 kg | 1,3 | 1,3 | 40, 95 | |
| | Rubber solution | 3 | UN1287 | II | SOLID. FLAMMABLE LIQUID | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40, 95 | |
| | Rubidium | 4.3 | UN1423 | III | FLAMMABLE LIQUID DANGEROUS WHEN WET. | B1, T7, T30, A19, N26, N34, N45, 22. | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 40, 95 | |
| | Rubidium hydroxide | 8 | UN2678 | II | CORROSIVE | T8 | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 40, 95 | |
| | Rubidium hydroxide solution | 8 | UN2677 | II | CORROSIVE | B2 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | 40, 95 | |
| | Safety fuse, see Fuse, safety | | | | | | | | | | | | | | |
| | Safety squibs, see Squibs, etc. | | | | | | | | | | | | | | |
| | Samples, explosive, other than initiating ex- plosives. | | UN0190 | | | | | | | | | | | | |
| | Sand acid, see Fluorosilicic acid | | | | | | | | | | | | | | |
| | Seed cake with more than 1.5 per cent oil and not more than 11 per cent moisture. | 4.2 | UN1386 | III | None | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 5 | 95 | |
| | Seed cake with not more than 1.5 per cent oil and not more than 11 per cent mois- ture. | 4.2 | UN2217 | III | None | | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | 95 | |
| | Selenates or Selenites. | 6.1 | UN2630 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 5 | 95 | |
| | Selenic acid. | 8 | UN1905 | I | CORROSIVE | N34 | None | 211 | 240 | Forbidden | 25 kg | 1,2 | 1,2 | 95 | |
| | Selenites, see Selenates or Selenites. | | | | | | | | | | | | | | |
| | Selenium disulfide | 6.1 | UN2657 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Selenium hexafluoride | 2.3 | UN2194 | IA | POISON GAS | 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Selenium nitride | Forbidden | | | | | | | | | | | | | |
| DE | Selenium oxide (FG-1000/454) | 6.1 | NA2811 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 95 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---------------------------|--|---|--|--------------------------------|--|------------------------------------|-------------------------|-------------------------------------|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (8A) Passenger aircraft or railer | (8B) Cargo aircraft aircraft | (8A) Cargo vessel | (8B) Cargo vessel | (8C) Other stowage provisions | |
| | Silane | 2.1 | UN2203 | | FLAMMABLE GAS. | B13 | None | 302 | 244 | Forbidden | Forbidden | 1 | 5 | 25, 40, 74 | |
| | Silicofluoric acid, see Fluorosilicic acid | | | | | | | | | | | | | | |
| | Silicon chloride, see Silicon tetrachloride | 4.1 | UN1346 | III | FLAMMABLE SOLID. | A1 | None | 213 | 240 | 100 kg | 100 kg | 1, 3 | 1, 3 | 80, 40 | |
| | Silicon powder, amorphous | | | | | | 154 | 202 | 242 | 1 L | 30 L | 1 | 1 | | |
| | Silicon tetrachloride | 6 | UN1818 | II | CORROSIVE | B2, B6, N1, N11, N34, N41, T18, T26, T29. | | | | | | | | | |
| | Silicon tetrafluoride | 2.3 | UN1859 | III | POISON GAS, CORROSIVE. | B13, B14, B34, 10. | None | 302 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Silver acetylide (dry) | Forbidden | | | | | | | | | | | | | |
| | Silver arsenite | 6.1 | UN1683 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1, 2 | 1, 2 | 95 | |
| | Silver azide (dry) | Forbidden | | | | | | | | | | | | | |
| | Silver chlorite (dry) | Forbidden | | | | | | | | | | | | | |
| | Silver cyanide | 6.1 | UN1684 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1, 2 | 1, 2 | 26, 40, 95 | |
| | Silver fulminate (dry) | Forbidden | | | | | | | | | | | | | |
| | Silver nitrate (RC-170.454) | 5.1 | UN1493 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1, 2 | 1, 2 | 34 | |
| | Silver oxalate (dry) | Forbidden | | | | | | | | | | | | | |
| | Silver picrate (dry) | Forbidden | | | | | | | | | | | | | |
| | Silver picrate, wetted with not less than 30 per cent water, by weight. | 4.1 | UN1347 | I | FLAMMABLE SOLID. | | None | 211 | None | Forbidden | Forbidden | 1 | 5 | | |
| | Sludge, acid | 6 | UN1906 | II | CORROSIVE | B2, N1, N26, N34, T8, T14, T27. | None | 202 | 242 | Forbidden | Forbidden | 1, 2 | 1 | 14, 33 | |
| D | Small arms ammunition | ORM-D | None | III | None | | None | 230 | None | 85 lb gross | 65 lb gross | 1, 2 | 1, 2 | | |
| D | Smokeless powder for small arms (100 pounds or less). | 4.1 | NA1325 | I | FLAMMABLE SOLID. | | None | 171 | None | Forbidden | Forbidden | | | | |
| | Soda lime with more than 4 per cent sodium hydroxide. | 6 | UN1807 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1, 2 | 1, 2 | | |

E

D

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|-------------------------|--|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raifair | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Sodium (RQ-1000/454) | 4.3 | UN1428 | II | DANGEROUS WHEN WET. | A19, A20, B22, N2, N16, N26, N34, T15, T29. | None | 212 | 243 | Forbidden | 50 kg | 1 | 5 | | |
| AW | Sodium aluminate, solid | 8 | UN2812 | III | CORROSIVE | B2, T8 | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Sodium aluminate, solution | 8 | UN1819 | II | CORROSIVE | | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| | Sodium aluminum hydride | 4.3 | UN2835 | II | DANGEROUS WHEN WET. | A19, A20, N2. | None | 212 | 242 | Forbidden | 50 kg | 1 | 5 | | |
| | Sodium ammonium vanadate | 6.1 | UN2863 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| | Sodium arsenite | 6.1 | UN2473 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34 | |
| E | Sodium arsenate (RQ-1000/454) | 6.1 | UN1685 | II | POISON | | None | 212 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| E | Sodium arsenite, aqueous solutions (RQ-1000/454) | 6.1 | UN1686 | II | POISON | T15 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| | Sodium azide | 6.1 | UN2027 | III | KEEP AWAY FROM FOOD. | T15 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Sodium fluoride, see Sodium hydrogen fluoride. | | | | | | | | | | | | | | |
| | Sodium bisulfate, solid or solution, see Sodium hydrogen sulfate, solid or solution. | | | | | | | | | | | | | | |
| | Sodium bisulfite, solid or solution, see Sodium hydrogen sulfite, solid or solution. | | | | | | | | | | | | | | |
| | Sodium borohydride | 4.3 | UN1426 | I | DANGEROUS WHEN WET. | | None | 211 | 242 | Forbidden | 15 kg | 1,3 | 5 | | |
| | Sodium bromate | 5.1 | UN1494 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| | Sodium cacodylate | 6.1 | UN1698 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 26, 95 | |
| | Sodium chlorate | 5.1 | UN1495 | II | OXIDIZER | B10, N13, N34, T8. | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| | Sodium chlorate mixed with dinitrotoluene, see Explosive blasting, type C. | | | | | | | | | | | | | | |
| | Sodium chlorate, solution | 5.1 | UN2428 | II | OXIDIZER | A2, B6, T8. | 152 | 202 | 241 | 1 L | 5 L | 1,2 | 1 | 46, 56 | |
| | Sodium chlorite | 5.1 | UN1496 | II | OXIDIZER | B10, N13, T8. | None | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| | Sodium chlorite solution with more than 5 per cent available chlorine. | 8 | UN1908 | II | CORROSIVE | B2, N1, N11, N25, N26, N34. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | Packaging sur-tizations (§ 173.101) | | | Quantity limitations | | | Vessel storage requirements | | |
|----------|--|--------------|-------------------------|----------------|----------------------------|-------------------------|-------------------------------------|---------------------|-----------------|-------------------------------|---------------------|--------------|-----------------------------|--------------------------|--|
| | | | | | | | Excep-tions | Non-bulk pack-aging | Bulk packag-ing | Passenger aircraft or railcar | Cargo aircraft only | Cargo vessel | Passenger vessel | Other storage provisions | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| | Sodium chloroacetate | 6.1 | UN2659 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,3 | 1,3 | 12, 13, 34 | |
| DE | Sodium chromate (RQ-1000/454) | ORM-E | NA9145 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 26, 40, 95 | |
| | Sodium cuprocyanide, solid | 6.1 | UN2318 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 26, 40, 95 | |
| | Sodium cuprecyanide, solution | 6.1 | UN2317 | I | POISON | T8, T26 | None | 201 | 243 | 1 L | 30 L | 1,2 | 1 | 40, 52, 95 | |
| E | Sodium cyanide (RQ-10/4.54) | 6.1 | UN1689 | I | POISON | N74, N75, T18, T26. | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 26, 95 | |
| | Sodium 2-diazo-1-naphthol-4-sulphonate | 4.1 | UN3040 | II | FLAMMABLE SOLID. | | None | 214 | None | Forbidden | Forbidden | 1 | 5 | 25 | |
| | Sodium 2-diazo-1-naphthol-5-sulphonate | 4.1 | UN3041 | II | FLAMMABLE SOLID. | | None | 214 | None | Forbidden | Forbidden | 1 | 5 | 25 | |
| | Sodium dichloroisocyanurate or Sodium dichloro-s-triazinetrione, see Dichloroisocyanuric acid etc. | | | | | | | | | | | | | | |
| DE | Sodium dichromate (RQ-1000/454) | ORM-E | NA9144 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 36 | |
| | Sodium dinitro-o-cresolate, dry or wetted with less than 15 per cent water, by weight. | 1.3C | UN0294 | | | | None | 211 | None | 1 kg | 15 kg | 1 | 5 | | |
| | Sodium dinitro-o-cresolate, wetted with not less than 15 per cent water, by weight. | 4.1 | UN1348 | I | FLAMMABLE SOLID. POISON. | A19, A20, N2, N34, N41. | None | 211 | None | 1 kg | 15 kg | 1 | 5 | 36 | |
| | Sodium dithionite or Sodium hydrosulfite | 4.2 | UN1384 | II | SPONTANEOUSLY COMBUSTIBLE. | A19, A20 | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1,3 | 13 | |
| DE | Sodium dodecylbenzenesulfonate (RQ-1000/454) | ORM-E | NA9146 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 26, 34 | |
| E | Sodium fluoride (RQ-5000/2270) | 6.1 | UN1690 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26, 34 | |
| | Sodium Fluoride (RQ-5000/2270) | 6.1 | UN1690 | III | KEEP AWAY FROM FOOD. | T8 | 153 | 213 | 241 | 60 L | 220 L | 1,2 | 1,2 | 26 | |
| | Sodium fluoroacetate | 6.1 | UN2629 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 5 | 40, 95 | |
| | Sodium fluorosilicate | 6.1 | UN2674 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 26, 34 | |
| | Sodium hydrate, see Sodium hydroxide | | | | | | | | | | | | | | |
| | Sodium hydride | 4.3 | UN1427 | I | DANGEROUS WHEN WET. | A19 | None | 211 | 242 | Forbidden | Forbidden | 1 | 5 | | |
| E | Sodium hydrogen fluoride (RQ-5000/2270) | 8 | UN2439 | II | CORROSIVE | N3, N34 | 154 | 212 | 240 | 15 kg | 50 kg | 1,3 | 1,3 | 12, 25, 26, 40 | |
| | Sodium hydrogen sulfate, solid | 8 | UN1821 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| AW | Sodium hydrogen sulfate, solution | 8 | UN2837 | II | CORROSIVE | B2, N26, N34, T8, T26. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| ADEW | Sodium hydrogen sulfite, solid (RQ-5000/2270) | 8 | NA2693 | III | CORROSIVE | | 154 | 213 | 240 | 5 kg | 50 kg | 1,2 | 1,2 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (\$173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|----------------------------|------------------------------|--|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft/car | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| ADEW | Sodium hydrogen sulfite, solution (RQ-5000/2270). | 8 | NA2693 | III | CORROSIVE | | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| DE | Sodium hydrosulfide, solution (RQ-5000/2270). | 8 | NA2922 | II | CORROSIVE | B2 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| E | Sodium hydrosulfide, with less than 25 per cent water of crystallization (RQ-5000/2270). | 4.2 | UN2318 | II | SPONTANEOUSLY COMBUSTIBLE. | A19, A20, N26. | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 1,3 | | |
| E | Sodium hydrosulfide with not less than 25 per cent water of crystallization (RQ-5000/2270). | 8 | UN2949 | II | CORROSIVE | N26 | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 26 | |
| E | Sodium hydroxide, see Sodium dithionite. | | | | | | | | | | | | | | |
| E | Sodium hydroxide, solid (RQ-1000/454). | 8 | UN1823 | II | CORROSIVE | B2, N34, T8. | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| E | Sodium hydroxide solution (RQ-1000/454). | 8 | UN1824 | II | CORROSIVE | | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1,2 | | |
| E | Sodium hypochlorite, solution, see Hypochlorite solutions. | | | | | | | | | | | | | | |
| E | Sodium metal, liquid alloy, see Alkali metal alloys, liquid. | | | | | | | | | | | | | | |
| E | Sodium methylate (RQ-1000/454). | 4.2 | UN1431 | II | SPONTANEOUSLY COMBUSTIBLE. | A19 | None | 211 | 242 | Forbidden | 15 kg | 1,3 | 1 | | |
| E | Sodium methylate solutions in alcohol (RQ-1000/454). | 3 | UN1289 | II | FLAMMABLE LIQUID. | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| E | Sodium monoxide. | 8 | UN1825 | III | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 202 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| E | Sodium nitrate. | 5.1 | UN1498 | III | CORROSIVE | | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | | |
| E | Sodium nitrate and potassium nitrate mixtures. | 5.1 | UN1499 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| E | Sodium nitrite (RQ-100/45.4). | 5.1 | UN1500 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 34, 56, 58 | |
| E | Sodium pentachlorophenate. | 6.1 | UN2567 | III | POISON | A1, A29, 27. | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| E | Sodium perchlorate. | 5.1 | UN1502 | III | OXIDIZER | B10, T8 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46 | |
| E | Sodium permanganate. | 5.1 | UN1503 | III | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 56, 69 | |
| E | Sodium peroxide. | 5.1 | UN1504 | I | OXIDIZER | A20, N16, N34. | None | 211 | None | Forbidden | 15 kg | 1,2 | 1 | 13, 31, 45, 46 | |
| DE | Sodium persulfate. | 5.1 | UN1505 | III | OXIDIZER | A1 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| DE | Sodium phenolate, solid. | 8 | UN2497 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| DE | Sodium phosphate, dibasic (RQ-5000/2270). | ORM-E | NA9147 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Sodium phosphate, tribasic (RQ-5000/2270). | ORM-E | NA9148 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.24) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk packag- ing | (8C) Bulk packag- ing | (9A) Passenger aircraft or raft | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Stibine | 2.3 | UN2676 | IB | POISON GAS, FLAMMABLE GAS. | 10 | None | 304 | 245 | Forbidden | Forbidden | 1 | 5 | 40 | |
| | <i>Storage batteries, wet, see Batteries, wet etc.</i> | | | | | | | | | | | | | | |
| | Strontium arsenite | 6.1 | UN1691 | II | POISON | A1, B10, | None | 212 | 242 | 100 kg | 100 kg | 1,2 | 1,2 | 95 | |
| | Strontium chlorate | 5.1 | UN1506 | II | OXIDIZER | N13, N34, T8. | 152 | 212 | 240 | 25 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| DE | Strontium chromate (RC-1000/454) | ORM-E | NA9149 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Strontium nitrate | 5.1 | UN1507 | III | OXIDIZER | A1, A29 | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Strontium perchlorate | 5.1 | UN1508 | II | OXIDIZER | B10, T8 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46 | |
| | Strontium peroxide | 5.1 | UN1509 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 13 | |
| | Strontium phosphide | 4.3 | UN2013 | I | DANGEROUS WHEN WET, POISON. | A19 | None | 211 | None | Forbidden | 15 kg | 1,3 | 5 | 40, 85 | |
| E | Strychnine or Strychnine salts (RC-10/ 4.54) | 6.1 | UN1692 | I | POISON | | None | 211 | 242 | Forbidden | 50 kg | 1,2 | 1,2 | 40, 95 | |
| E | Styphnic acid, see Trinitroresorcinol, etc. | | | | | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| | Styrene monomer, inhibited (RC-1000/454) | 3 | UN2055 | II | POISON | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Substances, explosive, n.o.s. | 1.1L | UN0357 | | FLAMMABLE LIQUID. | T1 | | | | | | | | | |
| | Substances, explosive, n.o.s. | 1.2L | UN0358 | | | | | | | | | | | | |
| | Substances, explosive, n.o.s. | 1.3L | UN0359 | | | | | | | | | | | | |
| | Substances which in contact with water emit flammable gases, n.o.s. liquid. | 4.3 | UN2813 | I | DANGEROUS WHEN WET. | A2, A19 | None | 201 | 244 | Forbidden | 1 L | 1,3 | 5 | 40 | |
| | | | | II | DANGEROUS WHEN WET. | A2, A19 | None | 203 | 243 | 1 L | 5 L | 1,3 | 5 | 40 | |
| | | | | III | DANGEROUS WHEN WET. | A2, A19 | None | 203 | 241 | 5 L | 60 L | 1,3 | 1,3 | 40 | |
| I | Substances which in contact with water emit flammable gases, n.o.s. (solid). | 4.3 | UN2813 | I | DANGEROUS WHEN WET. | | None | 211 | 242 | Forbidden | 15 kg | 1,3 | 5 | | |
| | Substituted nitrophenol pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 degrees C. | 3 | UN2780 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| | | | | II | FLAMMABLE LIQUID, POISON. | | None | 202 | 243 | 1 L | 60 L | 1,3 | 1 | | |
| | | | | I | POISON, FLAMMABLE LIQUID. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 21, 40, 95 | |
| | Substituted nitrophenol pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23 degrees C. | 6.1 | UN3013 | II | POISON, FLAMMABLE LIQUID, POISON. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 21, 40, 95 | |
| | | | | III | FLAMMABLE LIQUID, KEEP AWAY FROM FOOD. | B1, T14 | 153 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | 21, 34, 40 | |
| | Substituted nitrophenol pesticides, liquid, toxic, n.o.s. | 6.1 | UN3014 | I | POISON | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | Packaging authorizations (§ 173.101) | | | Quantity limitations | | | Vessel stowage requirements | | | | |
|----------|--|--------------|-------------------------|----------------|--|---------------------------------|--------------------------------------|---------------------|-----------------|----------------------|-----------|------|-----------------------------|----------------|-------|-------|-------|
| | | | | | | | Excep-tions | Non-bulk packag-ing | Bulk packag-ing | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) |
| (1) | | | | | | | | | | | | | | | | | |
| | Substituted nitrophenol pesticides, solid, toxic, n.o.s. | 6.1 | UN2779 | I | POISON KEEP AWAY FROM FOOD. POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | | | |
| | Succinic acid peroxide, see Disuccinic acid peroxide. | | | II | POISON KEEP AWAY FROM FOOD. | T14 | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | | | |
| | Sucrose octanitrate (dry) | Forbidden | | III | | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 | | | |
| E | Sulfuric acid (RQ-1000/450) over 65.25% concentration. | 8 | UN1830 | II | CORROSIVE | B2, N1, N26, N34, T9, T27. | None | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 33, 38, 83 | | | |
| | Sulfamic acid | 8 | UN2967 | III | CORROSIVE | A1 | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 19, 74 | | | |
| | Sulfur | 4.1 | UN1350 | III | FLAMMABLE SOLID. | | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | | | | |
| | Sulfur and chlorate, loose mixtures of | Forbidden | | | | | | | | | | | | | | | |
| E | Sulfur chloride (mono) see Sulfur chlorides | 8 | UN1828 | I | CORROSIVE | B4, B6, N1, N26, N35, T18, T27. | None | 201 | 242 | Forbidden | 2.5 L | 1 | 1 | 8 | | | |
| | Sulfur chlorides (RQ-1000/454) | | | | | | | | | | | | | | | | |
| | Sulfur dichloride, see Sulfur chlorides | | | | | | | | | | | | | | | | |
| | Sulfur dioxide, liquefied | 2.3 | UN1079 | II | POISON GAS | B14, B33, 10. | None | 304 | 314, 315 | Forbidden | Forbidden | 1,3 | 5 | 40, 85, 95 | | | |
| | Sulfur dioxide solution, see Sulfurous acid | | | | | | | | | | | | | | | | |
| | Sulfurated hydrogen, see Hydrogen sulfide, liquefied. | | | | | | | | | | | | | | | | |
| | Sulfur hexafluoride | 2.2 | UN1080 | | NONFLAMMABLE GAS. | B13 | 306 | 304 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | | | |
| E | Sulfuric acid, fuming (RQ-1000/454) | 8 | UN1831 | I | CORROSIVE, POISON. | N1, N11, N26, N34. | None | 201 | 243 | Forbidden | 2.5 L | 1,2 | 1 | 14, 33, 36, 40 | | | |
| E | Sulfuric acid, spent (RQ-1000/454) over 65.25% concentration. | 8 | UN1832 | II | CORROSIVE | B2, N1, N26, N34, T9, T27. | None | 202 | 242 | Forbidden | 30 L | 1,2 | 1 | | | | |
| E | Sulfuric acid, spent up to 65.25% concentration (RQ-1000/454). | 8 | UN1832 | II | CORROSIVE | B2, N1, N26, N34, T9, T27. | None | 202 | 242 | Forbidden | 30 L | 1,2 | 1 | 14, 33, 36 | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|---|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Sulfuric acid up to 65.25% concentration (RC-1000/454). Sulfuric and hydrofluoric acid mixtures, see Hydrofluoric and sulfuric acid mixtures. Sulfuric anhydride, see Sulfur trioxide, inhibited. Sulfur, molten. | 8 | UN1830 | II | CORROSIVE | B2, B15, N1, N26, N34, T9, T27. | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 14, 33, 38 | |
| | Sulfurous acid | 4.1 | UN2448 | III | FLAMMABLE SOLID. | T9, T38 | None | 213 | 241 | Forbidden | Forbidden | 1 | 1 | 74 | |
| | Sulfur tetrafluoride | 8 | UN1833 | II | CORROSIVE | B2, T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 40 | |
| | Sulfur trioxide, inhibited | 2.3 | UN2418 | IA | POISON GAS | 10 | None | 302 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | Sulfur trioxide, molten | 8 | UN1829 | I | CORROSIVE | B4, B12, B29, B16, N26, N34, T16, T27. | None | 201 | 242 | Forbidden | Forbidden | 1,2 | 1,2 | 90, 98, 40 | |
| D | Sulfur trioxide, uninhibited | 8 | NA1829 | I | CORROSIVE | B4, B12, B14, B29, N16, N26, N34, T16, T27. | None | 201 | 243 | Forbidden | Forbidden | 1,2 | 1,2 | 98, 13, 28 | |
| | Sulfuryl chloride | 8 | UN1834 | I | CORROSIVE | B4, B6, N1, N11, N26, N34, T18, T27. | None | 201 | 242 | 0.5 L | 2.5 L | 1 | 1 | 80, 40 | |
| DE | Sulfuryl fluoride | 2.3 | UN2191 | III | POISON GAS | B34, T0 | None | 304 | 314, 315 | Forbidden | Forbidden | 1,3 | 5 | 40, 85, 95 | |
| D | 2,4,5-T. See 2,4,5-Trichlorophenoxyacetic acid. 2,4,5-T amine, ester, or salt. See 2,4,5-Trichlorophenoxyacetic acid, amine, ester, or salt. Tars, liquid including road asphalt and oils, bitumen and cut backs. | 3 | UN1999 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | TDE (1,1-Dichloro-2,2-bis(p-chlorophenyl) ethane) (RC-1/0.454). Tear gas candles. | 6.1 | NA2761 | III | FLAMMABLE LIQUID. KEEP AWAY FROM FOOD. POISON, FLAMMABLE SOLID. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 24, 40, 95 | |
| | | 6.1 | UN1700 | II | | | None | 340 | None | Forbidden | Forbidden | 1 | 5 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|----------------------|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|--|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | | | |
| D | <i>Tear gas cartridges, see Ammunition, tear-producing, etc.</i> | | | | | | | | | | | | | | | | | |
| | <i>Tear gas devices with more than 2 per cent tear gas substances, by mass.</i> | 2.3 | NA1693 | II | POISON GAS | 10 | None | 340 | None | Forbidden | Forbidden | 1 | 5 | 40, 95 | | | | |
| | <i>Tear gas devices, with not more than 2 per cent tear gas substances, by mass, see Aerosols, etc.</i> | | | | | | | | | | | | | | | | | |
| | <i>Tear gas grenades, see Tear gas candles</i> | 6.1 | UN1693 | I | POISON | | None | 201 | None | Forbidden | Forbidden | 1 | 5 | 40, 95 | | | | |
| | <i>Tear gas substances, n.o.s., liquid</i> | 6.1 | UN1693 | II | POISON | | None | 202 | None | 5 L | Forbidden | 1 | 5 | 40, 95 | | | | |
| | <i>Tear gas substances, n.o.s., solid</i> | 2.3 | UN2195 | II | POISON | | None | 212 | None | 25 kg | Forbidden | 1 | 5 | 95 | | | | |
| | <i>Tellurium hexafluoride</i> | | | II | POISON GAS | B14, B31, 10. | None | 302 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 85, 95 | | | | |
| | <i>Terpane hydrocarbons, n.o.s.</i> | 3 | UN2319 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | | | |
| | <i>Terpinolene</i> | 3 | UN2541 | III | FLAMMABLE LIQUID. | T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | | | | |
| | <i>Tetraazido benzene quinone</i> | Forbidden | | | | | | | | | | | | | | | | |
| A | <i>Tetrabromoethane</i> | 6.1 | UN2504 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | | | | |
| | <i>Tetrachloroethane</i> | 6.1 | UN1702 | II | POISON | N36 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 | | | | |
| | <i>Tetrachloroethylene</i> | 6.1 | UN1897 | III | KEEP AWAY FROM FOOD. | N36 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | | | | |
| | <i>Tetraethylammonium perchlorate (dry)</i> | Forbidden | | | | | | | | | | | | | | | | |
| | <i>Tetraethyl dithiopyrophosphate and gases in solution or Tetraethyl dithiopyrophosphate and gases mixtures LC50 less than or equal to 200 ppm.</i> | 2.3 | UN1703 | II | POISON GAS | 10 | None | 334 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 85, 95 | | | | |
| | <i>Tetraethyl dithiopyrophosphate and gases in solution or tetraethyl dithiopyrophosphate and gas mixtures LC50 over 200 up to 500 ppm.</i> | | | | | | | | | | | | | | | | | |
| | <i>Tetraethyl dithiopyrophosphate, dry</i> | 6.1 | UN1704 | I | POISON | 49 | None | 211 | 242 | Forbidden | 50 kg | 1 | 5 | 95 | | | | |
| | | | | II | POISON | 49 | None | 212 | 242 | Forbidden | 100 kg | 1 | 5 | 95 | | | | |
| | | | | III | KEEP AWAY FROM FOOD. | 49 | 153 | 213 | 240 | Forbidden | 200 kg | 1 | 5 | 34 | | | | |
| | <i>Tetraethyl dithiopyrophosphate, liquid</i> | 6.1 | UN1704 | I | POISON | N76 | None | 201 | 243 | Forbidden | 30 L | 1 | 5 | 40, 95 | | | | |
| | | | II | POISON | N76 | None | 202 | 243 | Forbidden | 60 L | 1 | 5 | 40, 95 | | | | | |
| | | | III | KEEP AWAY FROM FOOD. | N76 | None | 203 | 241 | Forbidden | 220 L | 1 | 5 | 34, 40 | | | | | |
| AW DE | <i>Tetraethylenepentamine</i> | 8 | UN2320 | III | CORROSIVE | T2 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | 8 | | | | |
| | <i>Tetraethyl lead, liquid (FC-100/45.4)</i> | 6.1 | NA1649 | I | POISON | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | | | | |
| | <i>Tetraethyl pyrophosphate and compressed gas mixtures (FC-100/45.4) LC50 less than or equal to 200 ppm.</i> | 2.3 | UN1705 | II | POISON GAS | 10 | None | 334 | 245 | Forbidden | Forbidden | 1 | 5 | 40, 85, 95 | | | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|--|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | | |
| | 2,3,5,6-Tetranitroso-1,4-dinitrobenzene | Forbidden | | | | | | | | | | | | | | |
| | 2,3,5,6-Tetranitroso nitrobenzene (dry) | Forbidden | UN2413 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1.3 | | | |
| | Tetrapropylorthotitanate | | | | | | | | | | | | | | | |
| | Tetrazene, see Guanyl nitrosaminoguanyl- tetrazene. | | | | | | | | | | | | | | | |
| | Tetrazine (dry) | Forbidden | | | | | | | | | | | | | | |
| | Tetrazoj-1-acetic acid | 1.4C | UN0407 | | | | | | | | | | | | | |
| | Tetrazolyl azide (dry) | Forbidden | | | | | | | | | | | | | | |
| | Tetryl, see Trinitrophenylmethyl nitramine | | | | | | | | | | | | | | | |
| | Textile waste, wet, n.o.s. | 4.2 | UN1857 | III | SPONTANE- OUSLY COMBUSTI- BLE | | None | 213 | 241 | Forbidden | Forbidden | 1.3 | 1.3 | | | |
| | Thallium chlorate | 5.1 | UN2573 | II | OXIDIZER, POISON. | | None | 212 | 242 | 5 kg | 25 kg | 1.2 | 1.2 | 46, 56, 95 | | |
| | Thallium compounds, n.o.s. | 6.1 | UN1707 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1.2 | 95 | | |
| | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1.2 | 1.2 | 34 | | |
| | Thallium nitrate | 6.1 | UN2727 | II | POISON. | | None | 212 | 242 | 5 kg | 25 kg | 1.2 | 1.2 | 89, 95 | | |
| | Thallium sulfate, solid (FIG-1000/45-4) | 6.1 | NA1707 | I | POISON | | None | 211 | 242 | 5 kg | 50 kg | 1.2 | 1.2 | | | |
| | Thia-4-pentanal | 6.1 | UN2785 | I | POISON | B14, B32, 10. | None | 227 | 244 | Forbidden | Forbidden | 1 | 1.3 | 40, 95 | | |
| | Thioacetic acid | 3 | UN2436 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | | | |
| | Thiocarbonylchloride, see Thiophosgene | | | | | | | | | | | | | | | |
| | Thioglycol | 6.1 | UN2966 | II | POISON | T8 | None | 202 | 243 | 5 L | 60 L | 1.2 | 1.2 | 95 | | |
| | Thioglycolic acid | 8 | UN1940 | II | CORROSIVE | B2, N26, N34. | 154 | 202 | 242 | 1 L | 30 L | 1.2 | 1.2 | 9 | | |
| | Thioctic acid | 6.1 | UN2936 | II | POISON | T8 | None | 212 | 242 | 25 kg | 100 kg | 1.2 | 1.2 | 95 | | |
| | Thionyl chloride | 8 | UN1836 | I | CORROSIVE | B4, N1, N11, N34, N35. | None | 201 | 242 | Forbidden | 2.5 L | 1 | 1 | 80, 40, | | |
| | Thiophene | 3 | UN2414 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1.3 | 1 | | | |
| | Thiophosgene | 6.1 | UN2474 | I | POISON | B14, B32, N28, N33, N34, 10. | None | 227 | 244 | Forbidden | Forbidden | 1.2 | 1 | 26, 40, 95 | | |

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| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|---|---|---|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--------|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or relicar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Thiophosphoryl chloride | 8 | UN1837 | II | CORROSIVE | B2, B8, B25, N1, N26, N34, T12. | None | 202 | 242 | Forbidden | 30 L | Forbidden | 1 | 1 | 80, 40 |
| | Thorium metal, pyrophoric | 7 | UN2975 | | RADIOACTIVE, SPONTANE- OUSLY COMBUSTI- BLE. | | None | 418 | None | Forbidden | Forbidden | Forbidden | 1,2 | 1,2 | |
| | Thorium nitrate, solid | 7 | UN2976 | | RADIOACTIVE, OXIDIZER. | | None | 419 | None | Forbidden | 15 kg | Forbidden | 1,2 | 1,2 | |
| | Tin chloride, fuming, see Stannic chloride, anhydrous. | | | | | | | | | | | | | | |
| | Tinctures, medicinal | 3 | UN1293 | II | FLAMMABLE LIQUID. | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 1 | |
| | Tinning flux, see Zinc chloride | | | | | | | | | | | | | | |
| | Tin perchlorate or Tin tetrachloride, see Stannic chloride, anhydrous. | | | | | | | | | | | | | | |
| | Titanium hydride | 4.1 | UN1871 | II | FLAMMABLE SOLID. | A19, A20, N34. | None | 212 | 241 | 15 kg | 50 kg | 1,3 | 5 | 5 | |
| | Titanium powder, dry (a) mechanically pro- duced, particle size between 3 and 53 microns; (b) chemically produced, parti- cle size between 10 and 840 microns. | 4.2 | UN2546 | II | SPONTANE- OUSLY COMBUSTI- BLE. | A19, A20, N5, N34. | None | 212 | 241 | 5 kg | 50 kg | 1 | 5 | 5 | |
| | Titanium powder, wetted with not less than 25 per cent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 mi- crons; (b) chemically produced, particle size less than 840 microns. | 4.1 | UN1352 | II | FLAMMABLE SOLID. | A19, A20, B10, N34. | None | 212 | 240 | 15 kg | 50 kg | 1,3 | 5 | 5 | |
| | Titanium sponge granules or Titanium sponge powders. | 4.1 | UN2878 | III | FLAMMABLE SOLID. | A1 | None | 213 | 240 | 25 kg | 100 kg | 1 | 5 | 5 | |
| | Titanium sulfate solution. | 8 | NA1760 | II | CORROSIVE | B2, B15 | None | 213 | 242 | 1 L | 30 L | 1,2 | 1,2 | 1,2 | |
| | Titanium tetrachloride | 8 | UN1838 | I | CORROSIVE, POISON. | B14, B32, B41, N1, N11, N34, N41, N41, 10. | None | 227 | 244 | Forbidden | Forbidden | Forbidden | 1 | 1 | 80, 40 |
| D | Titanium trichloride mixtures | 8 | UN2869 | II | CORROSIVE | N26, N34 | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 1,2 | 40 |
| | Titanium trichloride, pyrophoric or Titanium trichloride mixtures, pyrophoric. | 4.2 | UN2441 | II | SPONTANE- OUSLY COMBUSTI- BLE, CORROSIVE. | A19, A20, N2, N26, N34. | None | 212 | 244 | 15 kg 15 kg | 50 kg 50 kg | 1,3 1,3 | 1,3 1,3 | 1,3 1,3 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|---|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | TNT, see Trinitrotoluene, etc. TNT mixed with aluminum, see Trinitrol Toe puffs, nitrocellulose base | 4.1 | UN1353 | III | FLAMMABLE SOLID. | A1 | None | 213 | 240 | 25 kg | 100 kg | 1 | 5 | | |
| | Toluene (RC-1000/454) | 3 | UN1294 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Toluene diisocyanate | 6.1 | UN2078 | II | POISON | T14 | None | 202 | 243 | Forbidden | 60 L | 1,2 | 1 | 22, 25, 40, 95 | |
| | Toluene sulfonic acid, see Alkyl, Aryl or Toluene sulfonic acid etc. Toluidines (liquid) Toluidines (solid) 2,4-Toluylenediamine | 6.1 6.1 6.1 | UN1708 UN1708 UN1709 | II II III | POISON POISON KEEP AWAY FROM FOOD. | T14 T7 | None None 153 | 202 212 203 | 243 241 241 | 5 L 25 kg 60 L | 60 L 100 kg 220 L | 1,2 1,2 1,2 | 1,2 1,2 1,2 | 2,6, 95 95 34 | |
| DE | Torpedoes with bursting charge Torpedoes with bursting charge | 1.1E 1.1F | UN0329 UN0330 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| | Toxaphene (RC-1/0.454) 2,4,5-TP. See 2,4,5-Trichlorophenoxypro- pionic acid or acid ester. 2,4,5-TP ester. See 2,4,5-Trichlorophenox- ypropionic acid ester. Tracers for ammunition Tracers for ammunition Tractors, see Vehicles, self propelled Triethylamine | 1.3G 1.4G | UN0212 UN0306 | II III | FLAMMABLE LIQUID. KEEP AWAY FROM FOOD. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| DE | Triallyl borate | 6.1 | UN2609 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,3 | 1,3 | 12, 13, 22, 25, 34 | |
| | Triazine pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23deg C. | 3 | UN2764 | I | FLAMMABLE LIQUID, POISON. | | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | | |
| E | Triazine pesticides, liquid, toxic, flammable, n.o.s., flash point not less than 23deg C. | 6.1 | UN2997 | I | FLAMMABLE LIQUID, POISON. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 21, 40, 95 | |
| | | | | II | FLAMMABLE LIQUID, POISON, FLAMMABLE LIQUID. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 21, 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | T14 | 153 | 203 | 242 | 60 L | 220 L | 1,2 | 1,2 | 21, 40, 34 | |
| | | | | I | POISON FROM FOOD. | T42 | None | 201 | 243 | 1 L | 30 L | 1 | 1 | 40, 95 | |
| E | Triazine pesticides, liquid, toxic, n.o.s. | 6.1 | UN2998 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1 | 40, 95 | |
| | | | | III | KEEP AWAY FROM FOOD. | T14 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | | | | I | POISON FROM FOOD. | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 40, 95 | |
| | Triazine pesticides, solid, toxic, n.o.s. | 6.1 | UN2763 | II | POISON | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |

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|---------------------|--|------------------------|---------------------------------------|------------------------------|--|--------------------------------|---|--|--------------------------------|--|--------------------------------|-------------------------------------|-----------------------------------|---|--|
| | | | | | | | (BA) Excep- tions | (BB) Non- bulk pack- aging | (BC) Bulk packag- ing | (9A) Passenger aircraft or railer | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| DE | Tri-(1-aziridinyl)phosphine oxide, solution | 6.1 | UN2501 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 34, 40 | |
| | Tributylamine | 8 | UN2542 | II | POISON. | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| | Trichlorfon (RQ-100/45.4) | 6.1 | NA2783 | III | CORROSIVE. | T1 | None | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| | | | | | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | |
| | Trichloroacetic acid | 8 | UN1839 | II | CORROSIVE. | N26, N34 | 154 | 212 | 240 | 15 kg | 50 kg | 1,2 | 1,2 | 8 | |
| | Trichloroacetic acid, solution | 8 | UN2564 | II | CORROSIVE. | B2, N1, N11, N26, N34, T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | | |
| E | Trichloroacetyl chloride | 8 | UN2442 | II | CORROSIVE. | B2, N1, N16, N17, N26, N34, T8 | None | 202 | 242 | Forbidden | Forbidden | 1 | 5 | 40 | |
| | Trichlorobenzenes, liquid | 6.1 | UN2321 | III | KEEP AWAY FROM FOOD. | T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Trichlorobutene | 6.1 | UN2322 | II | POISON. | T8 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 25, 40, 95 | |
| | 1,1,1-Trichloroethane | 6.1 | UN2831 | III | KEEP AWAY FROM FOOD. | N36, T7 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Trichloroethylene (RQ-1000/45.4) | 6.1 | UN1710 | III | KEEP AWAY FROM FOOD. | N36, T1 | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34, 40 | |
| | Trichloroisocyanuric acid, dry | 5.1 | UN2468 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 13, 25, 72 | |
| DE | Trichloromethyl perchlorate | Forbidden | | | | | | | | | | | | | |
| | Trichlorophenol (RQ-10/4.5.4) | 6.1 | NA2020 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | No limit | 1,2 | 1,2 | | |
| DE | 2,4,5-Trichlorophenoxyacetic acid, acid amine, acid ester, or acid salt (RQ-100/45.4) | ORM-E | NA2765 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | 2,4,5-Trichlorophenoxypropionic acid or acid ester (RQ-100/45.4) | ORM-E | NA2765 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| D | Trichlorosilane | 4.3 | UN1295 | I | DANGEROUS WHEN WET, FLAMMABLE LIQUID, CORROSIVE. | N16, N26, N34, T24, T26 | None | 201 | 244 | Forbidden | Forbidden | 1 | 5 | 40 | |
| | (mono-(Trichloro) tetrá-(monopotassium dichloro)-penta-s-triazinetriene, dry (containing over 39% available chlorine). Trichloro-s-triazinetriene dry, containing over 39% available chlorine, see Trichloroisocyanuric acid, dry. | 5.1 | NA2468 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,3 | 1,3 | | |

| (1) Sym-bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica-tion numbers | (5) Pack-ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§ 173.101) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|-----------------|---|---------------------|--------------------------------|-----------------------|---------------------------|--------------------------------------|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------|-------------------------------------|-----------------------------------|--|
| | | | | | | | (8A) Excep-tions | (8B) Non-bulk pack-aging | (8C) Bulk packag-ing | (9A) Passenger aircraft or railcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas-senger vessel | (10C) Other stowage provisions | |
| DE | Tricresyl phosphate with more than 3 per cent ortho isomer. | 6.1 | UN2574 | II | POISON | N1, N16, N33, N34, T8. | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 95 | |
| | Triethanolamine, dodecylbenzenesulfonate (RQ-1000/454). | ORM-E | NA9151 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| | Triethylamine | 3 | UN1296 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | |
| | Triethylene tetramine | 8 | UN2259 | II | CORROSIVE | B2, T8 | 154 | 202 | 242 | 1 L | 30 L | 1,2 | 1 | 26, 40, 71 | |
| | Triethyl phosphite | 3 | UN2323 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | 52 | |
| | Trifluoroacetic acid | 8 | UN2699 | I | CORROSIVE | B4, N1, N3, N11, N26, N34, T18, T27. | None | 201 | 242 | 0.5 L | 2.5 L | 1,3 | 1 | 12, 38, 40 | |
| | Trifluorochloroethylene, inhibited | 2.1 | UN1082 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Trifluoroethane, compressed | 2.1 | UN2035 | | FLAMMABLE GAS. | B13 | 306 | 304 | 244 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| D | Trifluoromethane | 2.2 | UN1984 | | NONFLAMMABLE GAS. | | 306 | 304 | 314, 315 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |
| | Trifluoromethane and chlorotrifluoromethane mixture (constant boiling mixture) (P-503). See Refrigerant gas, n.o.s. | | | | | | | | | | | | | | |
| | 3-Trifluoromethylaniline | 6.1 | UN2948 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 40, 95 | |
| | 2-Trifluoromethylaniline | 6.1 | UN2942 | III | KEEP AWAY FROM FOOD. | | 153 | 203 | 241 | 60 L | 220 L | 1,2 | 1,2 | 34 | |
| | Triformoxime trinitrate | Forbidden | | | | | | | | | | | | | |
| | Trisobutylene | 3 | UN2324 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 203 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Trisocyanatoisocyanurate of isophoronedi-socyanate, solution, 70 per cent, by weight. | 3 | UN2906 | III | FLAMMABLE LIQUID. | B1, T7, T30. | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Triisopropyl borate | 3 | UN2616 | II | FLAMMABLE LIQUID. | T8, T31 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Trimethoxysilane | 6.1 | NA1992 | III | FLAMMABLE LIQUID. | B1, T8, T31. | 150 | 202 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | | | | | POISON, FLAMMABLE LIQUID. | B3, B14, B32. | None | 201 | 244 | Forbidden | Forbidden | 1,3 | 5 | 12 | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|---|------------------------|---------------------------------------|------------------------------|---|---------------------------------|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raicar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| | Tritrotoluene (TNT) and Trinitrobenzene mixtures or Trinitrotoluene (TNT) and Hexanitrostilbene mixtures. | 1.1D | UN0388 | | | | | | | | | | | | |
| | Tritrotoluene (TNT), dry or wetted with less than 30 per cent water, by weight. | 1.1D | UN0209 | | | | | | | | | | | | |
| | Tritrotoluene (TNT) mixtures containing Trinitrobenzene and Hexanitrostilbene. | 1.1D | UN0389 | | | | | | | | | | | | |
| | Tritrotoluene (TNT), wetted with not less than 30 per cent water, by weight. | 4.1 | UN1356 | | I FLAMMABLE SOLID. | A2, A19, N2, N34, N41. | None | 211 | None | 0.5 kg | 0.5 kg | 1,3 | 5 | 36 | |
| | 2,4,6-Trinitro-1,3,5-triazido benzene (dry) | Forbidden | | | | | | | | | | | | | |
| | Tri-(b-nitroxyethyl) ammonium nitrate | Forbidden | | | | | | | | | | | | | |
| | Tripropylamine | 3 | UN2260 | | II FLAMMABLE LIQUID, CORROSIVE. | T8 | None | 202 | 243 | 1 L | 5 L | 1,3 | 1 | 40 | |
| | Tripolyene | 3 | UN2057 | | II FLAMMABLE LIQUID. | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Tris, bis-bifluoroamino diethoxy propane (TYDPA). | Forbidden | | | | | | | | | | | | | |
| | Tritonal | 1.1D | UN0390 | | | | | | | | | | | | |
| | Tungsten hexafluoride | 2.3 | UN2196 | | IB POISON GAS | B14, B31, 10. | None | 338 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 85, 95 | |
| | Turpentine | 3 | UN1299 | | III FLAMMABLE LIQUID. | B1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Turpentine substitute | 3 | UN1300 | | II FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Undecane | 3 | UN2330 | | III FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| | Uranium hexafluoride, fissile (containing more than 1% U-235). | 7 | UN2977 | | RADIOACTIVE, CORROSIVE. | | 453 | 417 | None | | | 1,2 | 1,2 | | |
| | Uranium hexafluoride, fissile excepted or non-fissile. | 7 | UN2978 | | RADIOACTIVE, CORROSIVE. | | 421 | 425 | 425 | | | | | | |
| | Uranium metal, pyrophoric | 7 | UN2979 | | RADIOACTIVE, SPONTANE- OUSLY COMBUSTI- BLE. | | None | 418 | None | Forbidden | Forbidden | 1,2 | 1,2 | | |
| DE | Uranyl acetate (RQ-5000/2270). | 7 | NA9180 | | RADIOACTIVE. | | 421, 425 | 415, 416 | None | | | 1,2 | 1,2 | | |
| E | Uranyl nitrate hexahydrate solution (RQ-5000/2270). | 7 | UN2980 | | RADIOACTIVE, CORROSIVE. | | 421, 425 | 415, 416, 417 | None | | | 1,2 | 1,2 | | |

| (1) Sym- bols | Hazardous materials descriptions and proper shipping names (2) | Hazard class (3) | Identifica- tion numbers (4) | Pack- ing group (5) | Labels (6) | Special provisions (7) | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel storage requirements | | |
|---|---|------------------------|---------------------------------------|------------------------------|---|------------------------------|--|--|--------------------------------|--|--------------------------------|-----------------------|-------------------------------------|---|--|
| | | | | | | | Excep- tions (8A) | Non- bulk pack- aging (8B) | Bulk packag- ing (8C) | Passenger aircraft or railer (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Pass- enger vessel (10B) | Other storage provisions (10C) | |
| E | Uranyl nitrate, solid (RQ-5000/2270) | 7 | UN2981 | | RADIOACTIVE, OXIDIZER. | | None | 419 | None | Forbidden | | 1,2 | 1,2 | | |
| | Urea hydrogen peroxide | 5.1 | UN1511 | III | OXIDIZER | A1, A29, N26. | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 13, 25 | |
| | Urea nitrate, dry or wetted with less than 20 per cent water, by weight. | 1.1D | UN0220 | | | | None | 211 | None | 1 kg | 15 kg | 1,3 | 1,3 | | |
| | Urea nitrate, wetted with not less than 20 per cent water, by weight. | 4.1 | UN1357 | I | FLAMMABLE SOLID. | A19, N2, N34, N41. | None | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| Urea peroxide, see Urea hydrogen perox- ide. | | | | | | | | | | | | | | | |
| Valeraldehyde | 3 | UN2058 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 242 | 1 L | 30 L | 1 | 1 | 40 | |
| Valeric acid, see Corrosive liquids, n.o.s. | | | | | | | | | | | | | | | |
| Valeryl chloride | 8 | UN2502 | II | CORROSIVE | B2, N1, N11, N26, N34, T8. | 154 | 202 | 242 | 242 | Forbidden | 30 L | 1 | 1 | 40 | |
| Vanadium oxytrichloride | 8 | UN2443 | II | CORROSIVE | B2, B16, N1, N11, N16, N26, N34, N34, T8, T26. | 154 | 201 | 242 | 242 | Forbidden | 2.5 L | 1 | 1 | 80, 40 | |
| Vanadium pentoxide fused(RQ-1000/454) | ORM-E | NA2862 | III | None | | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 40 | |
| Vanadium pentoxide, nonfused form (RQ- 1000/454). | 6.1 | UN2862 | II | POISON | | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| Vanadium tetrachloride | 8 | UN2444 | I | CORROSIVE | B4, N1, N11, N26, N34, T8, T26. | None | 201 | 242 | 242 | Forbidden | 2.5 L | 1 | 1 | 80, 40 | |
| Vanadium trichloride | 8 | UN2475 | III | CORROSIVE | | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 40 | |
| Vanadium trioxide, nonfused form | 6.1 | UN2860 | II | POISON | | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| Vanadyl sulfate | 6.1 | UN2931 | II | POISON | | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| Vanadyl sulfate (RQ-1000/454) | ORM-E | NA9152 | III | None | | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| Vehicles, self-propelled including internal combustion engines or other apparatus containing an internal combustion engine or electric storage battery(see also Wheel chair, electric). | 9 | None | III | None | | | 220 | 220 | None | No limit | No limit | 1,2 | 1,2 | | |
| Very signal cartridge, see Cartridges, signal. | | | | | | | | | | | | | | | |
| Vinyl acetate, inhibited (RQ-1000/454) | 3 | UN1301 | II | FLAMMABLE LIQUID. | T8 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40, 85 | |
| Vinyl bromide, inhibited | 2.1 | UN1085 | | FLAMMABLE GAS. | B13 | | 306 | 304 | 244 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| Vinyl butyrate, inhibited | 3 | UN2838 | II | FLAMMABLE LIQUID. | T7 | | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifica- tion numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging (§ 173.33) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|----------------------------|--|------------------------|---------------------------------------|------------------------------|--|---|--------------------------------|--|--------------------------------|--|--------------------------------|--------------------------|--|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or raifcar | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Vinyl chloride, inhibited | 2.1 | UN1086 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Vinyl chloroacetate | 6.1 | UN2589 | II | POISON | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 21, 95 | |
| | Vinyl ethyl ether, inhibited | 3 | UN1302 | I | FLAMMABLE LIQUID. | T14. | None | 201 | 243 | Forbidden | 30 L | 1,3 | 5 | 12 | |
| | Vinyl fluoride, inhibited | 2.1 | UN1860 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Vinylidene chloride, inhibited (RC-5000/ 2270). | 3 | UN1303 | I | FLAMMABLE LIQUID. | T23, T29 | 150 | 201 | 243 | 1 L | 30 L | 1,3 | 5 | 12 | |
| | Vinyl isobutyl ether, inhibited | 3 | UN1304 | II | FLAMMABLE LIQUID. | T8 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| | Vinyl methyl ether, inhibited | 2.1 | UN1087 | | FLAMMABLE GAS. | | 306 | 304 | 314, 315 | Forbidden | 150 kg | 1,3 | 1 | 40, 85 | |
| | Vinyl nitrate polymer | Forbidden | | | | | | | | | | | | | |
| | Vinyl pyridenes, inhibited | 6.1 | UN3073 | II | POISON, FLAMMABLE LIQUID. | T8 | None | 212 | 243 | 5 L | 60 L | 1,3 | 1,3 | | |
| | Vinyl toluene, inhibited mixed isomers | 3 | UN2618 | III | KEEP AWAY FROM FOOD, FLAMMABLE LIQUID. | T8 | 153 | 213 | 241 | 60 L | 220 L | 1,3 | 1,3 | | |
| A | Vinyltrichlorosilane, inhibited | 3 | UN1305 | I | FLAMMABLE LIQUID, CORROSIVE. | B6, N1, N26, N34, T14, T26. | None | 201 | 243 | Forbidden | 2.5 L | 1,3 | 1 | 40 | |
| | Warheads, rocket with burster or expelling charge. | 1.4D | UN0370 | | | | | | | | | | | | |
| | Warheads, rocket with burster or expelling charge. | 1.4F | UN0371 | | | | | | | | | | | | |
| | Warheads, rocket with bursting charge | 1.1D | UN0286 | | | | | | | | | | | | |
| | Warheads, rocket with bursting charge | 1.2D | UN0287 | | | | | | | | | | | | |
| | Warheads, rocket with bursting charge | 1.1F | UN0369 | | | | | | | | | | | | |
| | Warheads, torpedo with bursting charge | 1.1D | UN0221 | | | | | | | | | | | | |
| | Water reactive substances, n.o.s., see Sub- stances which in contact with water, etc. | | | | | | | | | | | | | | |
| | Wheel chair, electric (spillable or non- spillable type batteries). | 9 | None | III | None | | | 222 | 222 | None | No limit | No limit | 1,2 | 1,2 | |
| | White acid, see Hydrofluoric acid mixtures | | | | | | | | | | | | | | |
| Wood preservatives, liquid | 3 | UN1306 | II | FLAMMABLE LIQUID. | T7, T30 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | 40 | | |
| I | Wool waste, wet | 4.2 | UN1387 | III | FLAMMABLE LIQUID, SPONTANE- OUSLY COMBUSTI- BLE | B1, T7, T30. | None | 213 | 241 | Forbidden | Forbidden | 1,3 | 1,3 | | |
| | Xenon | 2.2 | UN2036 | | NONFLAMMA- BLE GAS. | B13 | 306 | 302 | 244 | 75 kg | 150 kg | 1,3 | 1,3 | 85 | |

| Sym-bols | Hazardous materials descriptions and proper shipping names | Hazard class | Identifica-tion numbers | Pack-ing group | Labels | Special provisions | (8) Packaging authorizations (§ 173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|----------|---|--------------|-------------------------|----------------|----------------------|----------------------------------|--|--------------------------|----------------------|------------------------------------|--------------------------|--------------------|----------------------------------|--------------------------------|--|
| | | | | | | | Excep-tions (8A) | Non-bulk pack-aging (8B) | Bulk packag-ing (8C) | Passenger aircraft or railcar (9A) | Cargo aircraft only (9B) | Cargo vessel (10A) | Passenger vessel (10B) | Other stowage provisions (10C) | |
| (1) | | | | | (6) | (7) | (8A) | (8B) | (8C) | (9A) | (9B) | (10A) | (10B) | (10C) | |
| E | Xenon, refrigerated liquid | 2.2 | UN2591 | | NONFLAMMA-BLE GAS. | | 320 | 316 | 318 | 50 kg | 500 kg | 1,3 | 1 | 85 | |
| E | Xylenes (RQ-1000/454) | 3 | UN1307 | II | FLAMMABLE LIQUID. | T1 | 150 | 202 | 242 | 5 L | 60 L | 1,3 | 1 | | |
| E | Xylenols (RQ-1000/454) | 6.1 | UN2261 | III | FLAMMABLE LIQUID. | B1, T1 | 150 | 203 | 242 | 60 L | 220 L | 1,3 | 1,3 | | |
| E | Xylydines | 6.1 | UN1711 | II | POISON. | T8 | None | 212 | 243 | 25 kg | 100 kg | 1,2 | 1,2 | 40, 95 | |
| E | Xylyl bromide | 6.1 | UN1701 | II | POISON. | T14 | None | 202 | 243 | 5 L | 60 L | 1,2 | 1,2 | 26, 95 | |
| | | | | I | POISON. | B14, B30, N1, N11, N26, N33, 10. | None | 226 | 244 | Forbidden | Forbidden | 1 | 5 | 40, 95 | |
| | <i>p</i> -Xylyl diazide | Forbidden | | | | | | | | | | | | | |
| DE | Mercury oleate | 6.1 | UN1640 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| DE | Zinc acetate (RQ-1000/454) | ORM-E | NA9153 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Zinc ammonium chloride (RQ-5000/2270) | ORM-E | NA9154 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Zinc ammonium nitrite | 5.1 | UN1512 | II | OXIDIZER | B10 | None | 212 | 240 | 5 kg | 25 kg | 1,3 | 5 | | |
| DE | Zinc arsenate or Zinc arsenite or Zinc arsenate and Zinc arsenite mixtures. | 6.1 | UN1712 | II | POISON. | | None | 212 | 242 | 25 kg | 100 kg | 1,2 | 1,2 | 95 | |
| DE | Zinc ashes | 4.3 | UN1435 | III | DANGEROUS WHEN WET. | A1, A19 | None | 213 | 241 | 25 kg | 100 kg | 1,3 | 1,3 | | |
| DE | Zinc bisulfite solution see Bisulfites, inorganic aqueous solutions, n.o.s. | | | | | | | | | | | | | | |
| DE | Zinc borate (RQ-1000/454) | ORM-E | NA9155 | III | None | A1, A29 | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 46, 56 | |
| DE | Zinc bromate | 5.1 | UN2469 | III | OXIDIZER | | 152 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| DE | Zinc bromide (RQ-5000/2270) | ORM-E | NA9156 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Zinc carbonate (RQ-1000/454) | ORM-E | NA9157 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Zinc chlorate | 5.1 | UN1513 | II | OXIDIZER | B10, N13, N34. | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 46, 56 | |
| E | Zinc chloride, anhydrous (RQ-5000/2270) | 8 | UN2331 | III | CORROSIVE | | None | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | | |
| E | Zinc chloride, solution (RQ-5000/2270) | 8 | UN1840 | III | CORROSIVE | T7 | 154 | 203 | 241 | 5 L | 60 L | 1,2 | 1,2 | | |
| E | Zinc cyanide (RQ-10/4.54) | 6.1 | UN1713 | I | POISON. | | None | 211 | 242 | 5 kg | 50 kg | 1,2 | 1,2 | 26, 95 | |
| E | Zinc dithionite or Zinc hydrosulfite (RQ-1000/454). | 9 | UN1931 | III | None | | 155 | 204 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | 13, 26 | |
| DE | Zinc ethyl, see Diethylzinc | | | | | | | | | | | | | | |
| DE | Zinc fluoride (RQ-1000/454) | ORM-E | NA9158 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | 26, 34 | |
| E | Zinc fluorosulfate (RQ-5000/2270) | 6.1 | UN2855 | III | KEEP AWAY FROM FOOD. | | 153 | 213 | 240 | 100 kg | 200 kg | 1,2 | 1,2 | | |
| DE | Zinc formate (RQ-1000/454) | ORM-E | NA9159 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |
| DE | Zinc hydrosulfite, see Zinc dithionite | | | | | | | | | | | | | | |
| DE | Zinc murexide solution, see Zinc chloride, solution. | | | | | | | | | | | | | | |
| E | Zinc nitrate (RQ-5000/2270) | 5.1 | UN1514 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 56, 69 | |
| E | Zinc permanganate | 5.1 | UN1515 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | 13 | |
| E | Zinc peroxide | 5.1 | UN1516 | II | OXIDIZER | B10 | 152 | 212 | 240 | 5 kg | 25 kg | 1,2 | 1,2 | | |
| DE | Zinc phenolsulfonate (RQ-5000/2270) | ORM-E | NA9160 | III | None | | 156 | 213 | 240 | No limit | No limit | 1,2 | 1,2 | | |

| (1) Sym- bols | (2) Hazardous materials descriptions and proper shipping names | (3) Hazard class | (4) Identifi- cation numbers | (5) Pack- ing group | (6) Labels | (7) Special provisions | (8) Packaging authorizations (§173.***) | | | (9) Quantity limitations | | | (10) Vessel stowage requirements | | |
|---------------------|--|------------------------|---------------------------------------|------------------------------|--|--|---|--|--------------------------------|--|--------------------------------|--------------------------|-------------------------------------|---|--|
| | | | | | | | (8A) Excep- tions | (8B) Non- bulk pack- aging | (8C) Bulk packag- ing | (9A) Passenger aircraft or airliner | (9B) Cargo aircraft only | (10A) Cargo vessel | (10B) Pas- senger vessel | (10C) Other stowage provisions | |
| E | Zinc phosphide (RQ-1000/454) | 4.3 | UN1714 | I | DANGEROUS WHEN WET, POISON. | A19 | None | 211 | None | Forbidden | 15 kg | 1,3 | 5 | 85 | |
| | Zinc powder or Zinc dust | 4.3 | UN1436 | II | DANGEROUS WHEN WET, SPONTANE- OUSLY COMBUSTI- BLE. | A19 | None | 212 | 242 | 15 kg | 50 kg | 1,3 | 1,3 | | |
| | Zinc resinate | 4.1 | UN2714 | III | FLAMMABLE SOLID. | A1 | 151 | 213 | 240 | 25 kg | 100 kg | 1,3 | 1,3 | | |
| | Zinc selenate, see Selenates or Selenites Zinc selenite, see Selenates or Selenites Zinc silicofluoride, see Zinc fluorosilicate | | | | | | | | | | | | | | |
| DE | Zinc sulfate (RQ-1000/454) Zirconium, dry, coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns). Zirconium, dry, finished sheets, strip or coiled wire. | ORM-E 4.1 | NA9161 UN2858 | III III | None FLAMMABLE SOLID. | A1 | 156 151 | 213 213 | 240 240 | No limit 25 kg | No limit 100 kg | 1,2 1,3 | 1,2 1,3 | | |
| | Zirconium hydride | 4.2 | UN2009 | III | SPONTANE- OUSLY COMBUSTI- BLE. | A1, A19 | None | 213 | 240 | 25 kg | 100 kg | 1 | 5 | | |
| E | Zirconium nitrate (RQ-5000/2270) Zirconium picramate, dry or wetted with less than 20 per cent water, by weight. Zirconium picramate, wetted with not less than 20 per cent water, by weight. | 4.1 5.1 1.3C | UN1437 UN2728 UN0236 | II III | FLAMMABLE SOLID. OXIDIZER | A19, A20, N34, A1, A29 | None | 212 213 | 240 240 | 15 kg 25 kg | 50 kg 100 kg | 1,3 1,2 | 5 1,2 | 25 | |
| DE | Zirconium potassium fluoride (RQ-5000/ 2270). Zirconium powder, dry (a) mechanically produced, particle size between 3 and 53 microns; (b) chemically produced, particle size between 10 and 840 mi- crons. Zirconium powder, wetted with not less than 25 per cent water (a visible excess of water must be present), (a) mechani- cally produced, particle size less than 53 microns; (b) chemically produced, parti- cle size less than 840 microns. Zirconium scrap | 4.1 4.2 | UN1517 NA9162 UN2008 | III II | None FLAMMABLE SOLID. SPONTANE- OUSLY COMBUSTI- BLE. | N34, N41 A19, A20, N5, N34 A19, A20, N34. | None 156 None | 211 213 212 | None 240 241 | Forbidden No limit 15 kg | 15 kg No limit 50 kg | 1 1,2 1 | 5 1,2 5 | 36 | |
| | Zirconium sulfate (RQ-5000/2270) Zirconium suspended in a liquid | 4.2 8 3 | UN1932 NA9163 UN1908 | III III II | SPONTANE- OUSLY COMBUSTI- BLE. CORROSIVE FLAMMABLE LIQUID. | B10, N34 N34 | None None | 213 202 | 240 242 | Forbidden 50 kg Forbidden | Forbidden No limit 60 L | 1 1,2 1 | 5 1,2 5 | 5 12 | |

| Sym-bols (1) | Hazardous materials descriptions and proper shipping names (2) | Hazard class (3) | Identifica-tion numbers (4) | Pack-ing group (5) | Labels (6) | Special provisions (7) | Packaging authorizations (8) (§ 173.101) | | | Quantity limitations (9) | | | Vessel stowage requirements (10) | | |
|-----------------|---|---------------------|--------------------------------|-----------------------|-----------------|---------------------------|---|-----------------------------|-------------------------|---------------------------------------|-----------------------------|-----------------------------|-------------------------------------|---------------------------|-----------------------------------|
| | | | | | | | Excep-tions (8A) | Non-bulk packag-ing (8B) | Bulk packag-ing (8C) | Passenger aircraft or railcar (9A) | Cargo aircraft only (9B) | Cargo aircraft only (9C) | Cargo vessel (10A) | Passenger vessel (10B) | Other stowage provisions (10C) |
| E | Zirconium tetrachloride (FQ-5000/2270) | 8 | UN2503 | III | CORROSIVE | | 154 | 213 | 240 | 25 kg | 100 kg | 1,2 | 1,2 | 1,2 | |

§ 172.102 Special provisions.

(a) General. When Column 7 of the § 172.101 Table refers to a special provision for a hazardous material, the meaning and requirements of that provision are as set forth in this section. When a special provision specifies packagings or packaging requirements, they are in addition to the standard requirements for all packagings prescribed in § 173.24 of this subchapter and any other applicable packaging requirements in Subparts A and B of Part 173 of this subchapter.

(b) Description of codes for special provisions. Special provisions may contain packaging provisions, prohibitions, exceptions from requirements for particular quantities or forms of materials and requirements or prohibitions applicable to specific modes of transportation, as follows:

(1) A code consisting only of numbers (for example, "11") is multi-modal in application and may apply to bulk and non-bulk packagings.

(2) A code containing the letter "A" refers to a special provision which applies only to transportation by aircraft.

(3) A code containing the letter "B" refers to a special provision which applies only to bulk packaging requirements. Unless otherwise provided in this subchapter, these special provisions do not apply to IM portable tanks.

(4) A code containing the letter "H" refers to a special provision which applies only to transportation by highway.

(5) A code containing the letter "N" refers to a special provision which applies only to non-bulk packaging requirements.

(6) A code containing the letter "R" refers to a special provision which applies only to transportation by rail.

(7) A code containing the letter "T" refers to a special provision which applies only to transportation in IM portable tanks.

(8) A code containing the letter "W" refers to a special provision which applies only to transportation by water.

(c) Tables of special provisions. The following tables list, and set forth the requirements of, the special provisions referred to in Column 7 of the § 172.101 Table.

(1) Numeric provisions. These provisions are multi-modal and apply to bulk and non-bulk packagings:

| Code | Special provisions |
|------|--|
| 10 | Packagings shall be marked "INHALATION HAZARD" in accordance with Subpart D of Part 172. |

| Code | Special provisions |
|------|--|
| 11 | The hazardous material must be packaged as either a liquid or a solid, as appropriate, depending on its physical form at 55° C (131° F) at atmospheric pressure. |
| 17 | Aqueous solutions of hydrogen peroxide containing less than 8 percent hydrogen peroxide are not subject to the requirements of this subchapter. |
| 22 | If the hazardous material is in dispersion in organic liquid, the organic liquid must have a flash point above 50° C (122° F). |
| 28 | The dehydrated sodium salt of dichloroisocyanuric acid is not subject to the requirements of this subchapter. |
| 31 | Materials which have undergone sufficient heat treatment to render them nonhazardous are not subject to the requirements of this subchapter. |
| 33 | Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited. |
| 42 | Fish meal or fish scrap may not be offered for transportation if the temperature of the material exceeds 49° C (120.2° F). |
| 66 | The organic peroxide included in a Polyester resin kit must be specifically listed in the § 172.101 Table and be permitted for transportation. |

(2) "A" codes. These provisions apply only to transportation by aircraft:

| Code | Special provisions |
|------|---|
| A1 | Single packagings are not permitted on passenger aircraft. |
| A2 | Single packagings are not permitted on aircraft. |
| A4 | Liquids having an inhalation toxicity of Packing Group I are not permitted on aircraft. |
| A5 | Solids having an inhalation toxicity of Packing Group I are not permitted on passenger aircraft and may not exceed a maximum net quantity per package of 15 kg (33.1 pounds) on cargo aircraft. |
| A19 | Combination packagings, consisting of outer fiber drums or plywood drums, with inner plastic packagings, are not authorized for transportation by aircraft. |
| A20 | Plastic bags as inner receptacles of combination packagings are not authorized for transportation by aircraft. |
| A29 | Combination packagings consisting of outer expanded plastic boxes with inner plastic bags are not authorized for transportation by aircraft. |
| A33 | Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited. |

(3) "B" codes. These provisions apply only to bulk packagings:

| Code | Special provisions |
|------|--|
| B1 | If the material has a flash point at or above 100° F (37.8° C) and below 200° F (93.3° C), then the bulk packaging requirements of § 173.241 of this subchapter are applicable. If the material has a flash point of less than 100° F, then the bulk packaging requirements of § 173.242 of this subchapter are applicable. |
| B2 | MC 306 cargo tanks, DOT 57 portable tanks, and riveted tank cars are not authorized. |
| B4 | Riveted tank cars, AAR 206 tank cars, MC 306 cargo tanks, and DOT 57 portable tanks are not authorized. |
| B5 | Lading temperature may not exceed 240° F (115.6° C). Only the following bulk packagings are authorized for ammonium nitrate solutions with 15 percent or more water: DOT 103 ALW, 111A60 ALW tank cars and MC 307 and MC 312 cargo tanks with at least 25 psig (172.4 kPa) design pressure. The packaging shall be designed for a working temperature of at least 250° F (121.1° C). Transportation by vessel is not authorized. |
| B6 | Packagings shall be made of steel. |
| B7 | Safety relief devices are not authorized. Openings for safety relief devices shall be plugged or blank flanged. |
| B8 | Packagings shall be made of nickel, stainless steel, or steel with nickel, stainless steel, lead or other suitable corrosion resistant metallic lining. |

| Code | Special provisions |
|------|---|
| B9 | Bottom outlets are not authorized. |
| B10 | Packagings must be leak tight. |
| B11 | Tank cars must have a test pressure of at least 300 psi (2,068.5 kPa). Cargo and portable tanks must have a design pressure of at least 175 psig (1,206.6 kPa). Pressure relief devices on any tank must be set to function at 175 psig (1,206.6 kPa). |
| B12 | Tank cars and tank car tanks shall be marked with the name of the lading in accordance with the requirements of § 172.330. |
| B13 | For compressed gases, §§ 173.314 and 173.315 of this subchapter specify authorized packagings, package pressure ratings and filling requirements. |
| B14 | Each tank shall be thermally insulated by completely covering it with at least 100 millimeters (3.94 inches) of cork or other suitable insulation material of sufficient thickness that the overall thermal conductance is not more than 0.080 Btu per hour per square foot per degree Fahrenheit differential. |
| B15 | Packagings shall be protected with non-metallic linings impervious to the lading unless the tanks conform to the provisions of § 172.343-2(c) of this subchapter. |
| B16 | The lading shall be completely covered with an inert gas. |
| B17 | Packagings shall be made of aluminum. |
| B18 | Open steel hoppers or bins are authorized. |
| B19 | The hazardous material may not exceed 45% concentration in a non-volatile solvent. |
| B20 | The hazardous material may not exceed 50% concentration in a non-volatile solvent. |
| B21 | The hazardous material may not exceed 60% concentration in a non-volatile solvent. |
| B22 | The hazardous material may not exceed 90% concentration in a non-volatile solvent. |
| B23 | Tanks shall be made of steel that is rubber lined or unlined. Unlined tanks shall be passivated before being placed in service. If unlined tanks are washed out with water, they shall be repassivated prior to return to service. Lading in unlined tanks must be inhibited so that the corrosive effect on steel is not greater than that of hydrofluoric acid of 65% concentration. |
| B24 | Molybdenum content of stainless steel may not exceed 0.5%. |
| B25 | Packagings shall be made from monel or nickel or monel-lined or nickel-lined steel. |
| B26 | Tanks shall be insulated. Insulation must be at least 4 inches (101.6 mm) thick except that 2 inches of insulation is authorized for tanks with exterior heating jackets. Interior heating coils are not authorized. The lading shall be immersed in water or blanketed with an inert gas and loaded at a temperature not exceeding 140° F (60° C). After unloading, the tank shall be filled to its entire capacity with an inert gas or with water having a temperature not exceeding 140° F (60° C). Before a tank car is offered for return movement, it shall be placarded with "FLAMMABLE SOLID-RESIDUE" placards as described in § 172.525. When lading is immersed in water, tanks may not have bottom outlets. |
| B27 | Tanks must have a service pressure of 150 psig (1,034.3 kPa). Tank cars and tank car tanks must have a test pressure rating of 200 psi (1,379 kPa). Lading shall be blanketed at all times with a dry inert gas at a pressure not to exceed 15 psig (103.4 kPa). |
| B28 | Packagings shall be made of stainless steel. |
| B29 | When the lading is transported in a molten state, tanks may be equipped with heating coils except that interior heating coils are prohibited. Standpipe heaters for tank cars are permitted. |
| B30 | MC 330 and MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24(b). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.300 inch (7.62 mm) or the thickness required for a tank with a design pressure at least equal to 1.5 times the vapor pressure of the lading at 115° F (46.1° C). Notwithstanding the provisions of § 173.244(a) of this subchapter, only DOT 105J500W tank cars and DOT Class 106 and 110 tank car tanks are authorized. |

| Code | Special provisions |
|------|--|
| B31 | MC 330 and MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.300 inch (7.62 mm) or the thickness required for a tank with a design pressure at least equal to 1.5 times the vapor pressure of the lading at 115° F (48.1° C). Notwithstanding the provisions of §§ 173.243(a) and 173.244(a) of this subchapter, only DOT 105J300W, 112J340W and 114J340W tank cars and DOT Class 106 and 110 tank car tanks are authorized. |
| B32 | MC 330 and MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.250 inch (6.35 mm) or the thickness required for a tank with a design pressure at least equal to 1.3 times the vapor pressure of the lading at 115° F (48.1° C). Notwithstanding the provisions of § 173.244(a) of this subchapter, only DOT 105J300W, 112J340W and 114J340W tank cars and DOT Class 106 and 110 tank car tanks are authorized. |
| B33 | MC 330 or MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.250 inch (6.35 mm) or the thickness required for a tank with a design pressure at least equal to 1.2 times the vapor pressure of the lading at 115° F (48.1° C). Notwithstanding the provisions of §§ 173.243(a) and 173.244(a) of this subchapter, only DOT 105J300W, 112J340W and 114J340W tank cars and DOT Class 106 and 110 tank car tanks are authorized. |
| B34 | MC 330 or MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel with a design pressure at least equal to 1.1 times the vapor pressure of the lading at 115° F (48.1° C). Steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). |
| B35 | If LC50 is more than 200 ppm but not more than 1000 ppm, Note B31 applies. If LC50 is more than 1000 ppm but not more than 3000 ppm, Note B33 applies. If LC50 is more than 3000 ppm but not more than 5000 ppm, Note B34 applies. |
| B36 | Only DOT 105J500W tank cars or DOT Class 106 or 110 tank car tanks are authorized. |
| B37 | The amount of nitric oxide charged into any tank car or tank car tank may not exceed 200 psig (1,379 kPa) at 70° F (21.1° C). The amount of nitric oxide charged into cargo or portable tanks may not exceed 200 psig (1,379 kPa) at 70° F (21.1° C) or 0.55 times tank design pressure (MAWP) whichever is less. |
| B38 | If LC50 is more than 1000 ppm but not more than 3000 ppm, Note B31 applies. If LC50 is more than 3000 ppm but not more than 5000 ppm, Note B33 applies. |
| B39 | Mixtures with flashpoints less than 23° C (73.4° F) must bear FLAMMABLE placards as prescribed in Subpart F of Part 172. |
| B40 | For liquid materials which are toxic by inhalation (see § 173.133(a)(2) of this subchapter), if LC50 is 200 ppm or less, Note B30 applies; if LC50 is more than 200 ppm but not more than 1000 ppm, Note B32 applies. |
| B41 | Notwithstanding the periodic retest intervals specified in Retest Table 1 of 173.31 of this subchapter, the retest interval for safety relief valves on each single-unit tank car tank is 2 years and the retest interval on the tank and interior heater systems, if any, is as follows: a. For a tank 10 years old or newer, 5 years; b. For a tank older than 10 years but not older than 22 years, 3 years; and c. For a tank older than 22 years, 1 year. |

(4) "H" codes. These provisions apply only to transportation by highway:
(Reserved.)

(5) "N" codes. These provisions apply only to non-bulk packagings:

| Code | Special provisions |
|------|--|
| N1 | For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packagings. |
| N2 | For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with cushioning material in tightly closed metal receptacles before packing in outer packagings. |
| N3 | Glass inner packagings are permitted in combination or composite packagings only if the hazardous material is free from hydrofluoric acid. |
| N4 | For combination or composite packagings, glass inner packagings, other than ampoules, are not permitted. |
| N5 | Glass materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material. |
| N11 | For combination packagings, if plastic inner packagings are used, they must be packed in tightly closed metal receptacles before packing in outer packagings. |
| N12 | Plastic packagings are not authorized. |
| N13 | For combination packagings, if plastic bags are used, they must be packed in tightly closed metal receptacles before packing in outer packagings. |
| N14 | Only plastic bags are permitted as inner packagings for combination packagings. |
| N15 | Plastic materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material. |
| N16 | Plastic single packagings are not authorized. |
| N17 | Plastic composite packagings are not authorized. |
| N25 | Steel single packagings are not authorized. |
| N26 | Steel packagings must be corrosion-resistant or have protection against corrosion. |
| N32 | Aluminum materials of construction are not authorized for single packagings. |
| N33 | Aluminum drums are not authorized. |
| N34 | Aluminum materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material. |
| N35 | When aluminum or aluminum alloy materials of construction are used, they must be resistant to corrosion. |
| N36 | Aluminum or aluminum alloy materials of construction are permitted only for halogenated hydrocarbons that will not react with aluminum. |
| N40 | For combination packagings, when metal inner packagings are permitted, only specification cylinders constructed of metals which are compatible with the hazardous material may be used. |
| N41 | Metal (other than aluminum) materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material. |
| N42 | Metal (other than aluminum) materials of construction are not authorized for single packagings. |
| N43 | Metal drums are permitted as single packagings only if constructed of nickel or monel. |
| N44 | Only metal packagings are authorized. |
| N45 | For combination packagings, only copper cartridges are permitted as inner packagings when the hazardous material is not in dispersion. |
| N55 | For combination packagings, fiber drums (1G) only are permitted as outer packagings. |
| N65 | Outgassing must be sufficient to prevent cylinders or spheres from becoming liquid full at 55° C (130° F). The vacant space (outgassing) may be charged with a nonflammable nonliquefied compressed gas if the pressure in the cylinder or sphere at 55° C (130° F) does not exceed 125% of the marked service pressure. |
| N70 | For combination packagings, only plywood boxes (4D) and fiberboard boxes (4G) are permitted as outer packagings. |

| Code | Special provisions |
|------|---|
| N71 | Combination packagings consisting of inner glass packagings of not over 1.0 liter (1.08 quarts) capacity each or inner metal packagings of not over 5.0 liters (5.28 quarts) capacity each, placed in strong outer packagings, are authorized. Packagings are not subject to the requirements of Part 178 of this subchapter. |
| N72 | Packagings must be examined by the Bureau of Explosives and approved by the Director, OHMT. |
| N73 | Packagings consisting of outer wooden or fiberboard boxes with inner glass, metal or other strong containers; metal or fiber drums; kegs or barrels; or strong metal cans are authorized and need not conform to the requirements of Part 178 of this subchapter. |
| N74 | Packages consisting of tightly closed inner containers of glass, earthenware, metal or polyethylene, capacity not over 0.5 kg (1.1 pounds) securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, not over 15 kg (33.1 pounds) net weight, are authorized and need not conform to the requirements of Part 178 of this subchapter. |
| N75 | Packages consisting of tightly closed inner packagings of glass, earthenware or metal, securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, capacity not over 2.5 kg (5.51 pounds) net weight, are authorized and need not conform to the requirements of Part 178 of this subchapter. |
| N76 | For materials of not more than 25 percent active ingredient by weight, packages consisting of inner metal packagings not greater than 250 mL (8.5 fluid ounces) capacity each, packed in strong outer packagings together with sufficient absorbent material to completely absorb the liquid contents are authorized and need not conform to the requirements of Part 178 of this subchapter. |
| N77 | For materials of not more than two percent active ingredients by weight, packagings need not conform to the requirements of Part 178 of this subchapter, if liquid contents are absorbed in an inert material. |
| N78 | Packages consisting of inner glass, earthenware, or polyethylene or other nonfragile plastic bottles or jars not over 0.5 kg (1.1 pounds) capacity each, or metal cans not over five pounds capacity each, packed in outer wooden boxes, barrels or kegs, or fiberboard boxes are authorized and need not conform to the requirements of Part 178 of this subchapter. Net weight of contents in fiberboard boxes may not exceed 65 pounds (29.5 kg). Net weight of contents in wooden boxes, barrels or kegs may not exceed 100 pounds (45.4 kg). |
| N79 | Packages consisting of tightly closed metal inner packagings not over 0.5 kg (1.1 pounds) capacity each, packed in outer wooden or fiberboard boxes, or wooden barrels, are authorized and need not conform to the requirements of Part 178 of this subchapter. Net weight of contents may not exceed 15 kg (33.1 pounds). |
| N80 | Packages consisting of one inner metal can, not over 2.5 kg (5.51 pounds) capacity, packed in an outer wooden or fiberboard box, or a wooden barrel, are authorized and need not conform to the requirements of Part 178 of this subchapter. |

(6) "R" codes. These provisions apply only to transportation by rail:
(Reserved.)

(7) "T" codes. These provisions apply only to transportation in IM portable tanks. They are divided into two groupings, one of which appears as the IM Tank Table in paragraph (c)(7)(i) of this section, and the second of which imposes specific requirements and appears in paragraph (a)(7)(ii) of this section.

(i) IM Tank Table. Column 1 lists the

code for the special provisions as specified in Column 7 of the § 172.101 Table. Column 2 specifies the IM tank type, either IM 101 (§§ 178.270 and 178.271 of this subchapter) or IM 102 (§§ 178.270 and 178.272 of this subchapter). Column 3 specifies the minimum test pressure, in bars (1 bar=14.5 psig), at which the periodic

hydrostatic testing required by § 173.32b of this subchapter must be conducted. Column 4 specifies either the section referenced for requirements for bottom openings or "Prohibited", which means bottom openings are prohibited. Column 5 specifies the section reference for requirements applicable to pressure relief devices.

IM TANK TABLE

| Code | IM tank type | Minimum test pressure (Bars) | Bottom outlets | Pressure relief devices |
|------|--------------|------------------------------|-----------------|--------------------------|
| (1) | (2) | (3) | (4) | (5) |
| T1 | 102 | 1.5 | § 173.32c(g)(1) | § 178.270-11(a)(1), (2). |
| T2 | 102 | 1.5 | § 173.32c(g)(2) | § 178.270-11(a)(1), (2). |
| T7 | 101 | 2.65 | § 173.32c(g)(1) | § 178.270-11(a)(1), (2). |
| T8 | 101 | 2.65 | § 173.32c(g)(2) | § 178.270-11(a)(1), (2). |
| T9 | 101 | 2.65 | Prohibited | § 178.270-11(a)(1), (2). |
| T11 | 101 | 2.65 | § 173.32c(g)(2) | § 178.270-11(a)(3). |
| T12 | 101 | 2.65 | Prohibited | § 178.270-11(a)(3). |
| T13 | 101 | 4 | § 173.32c(g)(1) | § 178.270-11(a)(1), (2). |
| T14 | 101 | 4 | § 173.32c(g)(2) | § 178.270-11(a)(1), (2). |
| T15 | 101 | 4 | Prohibited | § 178.270-11(a)(1), (2). |
| T16 | 101 | 4 | § 173.32c(g)(1) | § 178.270-11(a)(3). |
| T17 | 101 | 4 | § 173.32c(g)(2) | § 178.270-11(a)(3). |
| T18 | 101 | 4 | Prohibited | § 178.270-11(a)(3). |
| T20 | 101 | 6 | § 173.32c(g)(2) | § 178.270-11(a)(1), (2). |
| T21 | 101 | 6 | Prohibited | § 178.270-11(a)(1), (2). |
| T23 | 101 | 6 | § 173.32c(g)(2) | § 178.270-11(a)(3). |
| T24 | 101 | 6 | Prohibited | § 178.270-11(a)(3). |
| T28 | 101 | 10 | Prohibited | § 178.270-11(a)(1), (2). |
| T39 | 101 | 10 | Prohibited | § 178.270-11(a)(3). |

(ii) IM Tank special provisions. These provisions apply only to transportation in IM portable tanks:

| Code | Special provisions |
|------|---|
| T25 | This hazardous material is not permitted for transport in IM portable tanks. |
| T26 | Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 6.35mm (0.250 inch) mild steel. |
| T27 | Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 6.0mm (0.315 inch) mild steel. |
| T29 | The lading shall be completely covered with nitrogen or an inert gas. |
| T30 | IM 102 portable tanks without bottom openings authorized for a hazardous material with a flash point of 32 °F (0 °C) or greater and a vapor pressure not greater than 9.5 psia (65.5 kPa) at 150 °F (65.6 °C). |
| T31 | IM 102 portable tanks without bottom openings or with bottom openings conforming to § 173.32c(g)(2) of this subchapter are authorized for a hazardous material with a flash point of 32 °F (0 °C) or greater and a vapor pressure not greater than 9.5 psia (65.5 kPa) at 150 °F (65.6 °C). |
| T32 | Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 10.0mm (0.394 inch) mild steel with at least 5.0mm (0.197 inch) lead lining. |
| T33 | Dry phosphorus is not permitted. For transport in a molten state, the tank shall be insulated in accordance with Note T38. Air shall be eliminated from the interior of the tank. The tank may be heated, however, interior heating coils are prohibited. |
| T35 | Each tank shall be equipped with reclosing (spring loaded) pressure relief valves set to discharge at pressures determined according to the pressure characteristics of the organic peroxide lading. |
| T36 | Each tank shall be equipped with pressure relief devices with sufficient venting capacity to prevent the tank from bursting. |

| Code | Special provisions |
|------|--|
| T37 | Tert-butyl hydroperoxide may not exceed 65% concentration in water, unless otherwise approved by the Director, OHMT. Each tank shall be made of aluminum of at least 99.5% purity, stainless steel or carbon steel. The material of construction must be compatible with the lading. The tank shall be equipped with pressure relief devices impervious to the lading. Aluminum tanks and carbon steel tanks shall be insulated in accordance with Note T38. |
| T38 | Each tank shall be thermally insulated by completely covering it with at least 100 millimeters (3.94 inches) of cork or other suitable insulation material of sufficient thickness that the overall thermal conductance is not more than 0.080 Btu per hour per square foot per degree Fahrenheit differential. |
| T40 | Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 10.0mm (0.394 inch) mild steel. |
| T41 | Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 12.0mm (0.472 inch) mild steel. |
| T42 | Transport in IM portable tanks is permitted only under conditions approved by the Director, OHMT. |

(8) "W" codes. These provisions apply only to transportation by water:

| Code | Special provisions |
|------|---|
| W41 | When offered for transportation by water, this material must be packaged in bales and be securely and tightly bound with rope, wire or similar means. |

Subpart C—Shipping Papers

In § 172.200, paragraph (b) would be revised to read as follows:

§ 172.200 Applicability.

(b) This subpart does not apply to any material, other than a hazardous substance or waste, that is:

- (1) Regulated only by air, water, or both (as indicated by the letters "A" or "W", or both, in Column 1 of the § 172.101 Table) when offered for transportation or transported in another mode of transport; or
- (2) An ORM-D material, unless it is offered or intended for transportation, or transported, by aircraft.

§ 172.201 [Amended]

In § 172.201, in paragraph (a)(3), the word "subpart" would be changed to "subchapter" and paragraphs (a)(4)(i) and (a)(4)(ii) would be removed.

In § 172.202, paragraphs (a), (b), (c) and (d) would be revised, and paragraph (f) would be added to read as follows:

§ 172.202 Description of hazardous material on shipping papers.

(a) The shipping description of a hazardous material on the shipping paper must include:

- (1) The proper shipping name prescribed for the material in Column 2 of the § 172.101 Table;
- (2) The hazard class prescribed for the material as shown in Column 3 of the § 172.101 Table;

(i) For Class 3, the description "Combustible liquid" must appear in parentheses immediately following the hazard class if the material is classed, under § 173.120(b) of this subchapter, as a combustible liquid.

(ii) Class names, IMO class and division numbers or subsidiary hazard classes may be entered in parentheses following the numerical hazard class;

(3) The identification number prescribed for the material as shown in Column 4 of the § 172.101 Table;

(4) The packing group, if any, prescribed for the material in Column 5 of the § 172.101 Table preceded by the letters "PG"; and

(5) Except for empty packagings, the total quantity (by weight, volume or as otherwise appropriate) of the hazardous material covered by the description.

(b) Except as provided in this subpart, the basic description specified in paragraphs (a) (1), (2), (3) and (4) of this section must be shown in sequence with no additional information interspersed. For example: "Gasoline, 3, UN1203, PG II".

(c) The total quantity of the material covered by one description must appear before or after, or both before and after, the description required and authorized by this subpart. The type of packaging

and destination marks may be entered in any appropriate manner before or after the basic description.

Abbreviations may be used to express units of measurement and types of packagings.

(d) Technical and chemical group names may be entered in parentheses between the proper shipping name and hazard class. An appropriate modifier, such as "contains" or "containing," may be used. For example: "Flammable liquids, n.o.s. (contains Xylene and Benzene), 3, UN1993, PG II".

(f) *Technical names.* If the material is described by an n.o.s. entry in the § 172.101 Table, the technical name of the material shall be entered in parentheses immediately following the proper shipping name. For example, "Corrosive liquids, n.o.s. (Caprylyl chloride), 8, UN1760, PG II". If the material is a mixture of two or more hazardous materials, the names of at least two components most predominately contributing to the hazard or hazards of the mixture shall be entered in parentheses. For example, "Flammable liquids, corrosive, n.o.s. (Methyl alcohol, Potassium hydroxide), 3, UN2924, PG II". The provisions of this paragraph do not apply:

(1) If the n.o.s. description for the material (other than a mixture of hazardous materials of different classes meeting the definitions of more than one hazard class) contains the name of the chemical element or group which is primarily responsible for the material being included in the hazard class indicated. For example: "Mercury compounds, solid, n.o.s., 6.1, UN2025, PG II".

(2) If the n.o.s. description for the material (which is a mixture of hazardous materials of different classes meeting the definition of more than one hazard class) contains the name of the chemical element or group responsible for the material meeting the definition of one of these classes. In such cases, only the technical name of the component that is not appropriately identified in the n.o.s. description shall be entered in parentheses. For example: "Carbamate pesticides, liquid, flammable, toxic, n.o.s., flash point less than 23 °C (contains Xylene), 3(6.1), UN2758, PG II".

In § 172.203, paragraphs (i)(3) and (l) would be removed, and paragraphs (c), (i)(2), (j) and (k)(4) would be revised to read as follows:

§ 172.203 Additional description requirements.

(c) *Hazardous substances.* (1) If the proper shipping name for a material that is a hazardous substance does not identify the constituents making it a hazardous substance, the name or names of such hazardous substance constituents as shown in the § 172.101 Table shall be entered in association with the basic description.

(2) The letters "RQ" shall be entered on the shipping paper either before or after, or both before and after, the basic description required by § 172.202 for each hazardous substance (see definition in § 171.8). For example: "RQ, Allyl alcohol, 3, UN1098, PG I"; or "Benzonitrile, 6.1, UN2224, PG II, RQ".

(i) * * *

(2) The entry "skin corrosive only" must be included in association with the basic description to authorize "under deck" stowage for Corrosive liquids, n.o.s. and Corrosive solids, n.o.s. that meet only the corrosion to skin criteria of § 173.136(a) of this subchapter.

(j) *Dangerous when wet material.* The words "Dangerous when wet" shall be entered on the shipping paper in association with the basic description for a material which meets the definition of a dangerous when wet material in § 173.124(c) of this subchapter.

(k) * * *

(4) For Division 2.3 materials and for materials which meet the definition for Division 6.1, Packing Group I, and which are toxic by inhalation under the criteria specified in § 173.133(a)(2) of this subchapter, the words "Poison-Inhalation Hazard" shall be entered on the shipping paper in association with the shipping description. However, the word "Poison" need not be repeated if it otherwise appears in the shipping description.

Subpart D—Marking

Section 172.301 would be revised to read as follows:

§ 172.301 General marking requirements for non-bulk packagings.

(a) *Proper shipping name and identification number.* Except as otherwise provided by this subchapter, each person who offers for transportation a hazardous material in a non-bulk packaging shall mark the package with the proper shipping name and identification number (preceded by "UN" or "NA" as appropriate) for the material as shown in the § 172.101 Table. The proper shipping name for a hazardous waste (as defined in § 171.8 of this subchapter) is not required to include the word "waste" if the package

bears the EPA marking prescribed by 40 CFR 262.32.

(b) *Technical names.* (1) In addition to the marking required by paragraph (a) of this section, a package containing a hazardous material, which is described by an n.o.s. entry in the § 172.101 Table, must be marked with the technical name of the material, in parentheses immediately following (or below) the proper shipping name. For example: "Corrosive liquids, n.o.s. (Caprylyl chloride), UN1760".

(2) If the material is a mixture of two or more hazardous materials, the names of at least two components most predominately contributing to the hazard or hazards of the mixture shall be entered in parentheses. For example: "Flammable liquids, corrosive, n.o.s. (Methanol, Potassium hydroxide), UN2924".

(3) The provisions of this paragraph do not apply:

(i) If the "n.o.s." description for the material (other than a mixture of hazardous materials of different classes meeting the definition of more than one hazard class) contains the name of the chemical element or group which is primarily responsible for the material being included in the hazard class indicated. For example: "Mercury compounds, solid, n.o.s., UN2025".

(ii) If the "n.o.s." description for the material (which is a mixture of hazardous materials of different classes meeting the definition of more than one hazard class) contains the name of the chemical element or group responsible for the material meeting the definition of one of these classes. In such cases, only the technical name of the component that is not appropriately identified in the "n.o.s." description is required to be entered in parentheses. For example: "Carbamate pesticides, liquid, flammable, toxic, n.o.s. (Xylene), UN2758".

(c) *Exemption packagings.* The outside of each package authorized by an exemption must be plainly and durably marked "DOT-E" followed by the exemption number assigned.

(d) *Previously marked packagings.* A package which has been previously marked as required for the material it contains and on which the marking remains legible, need not be remarked. (For empty packagings, see § 173.29 of this subchapter.)

(e) *Marking exceptions.* Identification numbers are not required on packages which contain only the following materials:

(1) Limited quantities as defined in § 171.8 of this subchapter;

(2) ORM-D materials.

Section 172.302 would be revised to read as follows:

§ 172.302 General marking requirements for bulk packagings.

(a) *Identification numbers.* Except as otherwise provided in this subpart, no person may offer for transportation or transport a hazardous material in a bulk packaging unless the packaging is marked as required by § 172.332 with the identification number specified for the material in the § 172.101 Table—

(1) On each side and each end, if the packaging has a capacity of 1000 gallons (3,785.4 liters) or more, or

(2) On two opposing sides, if the packaging has a capacity of less than 1000 gallons (3,785.4 liters).

(b) *Size of markings.* Except as otherwise provided, markings required by this subpart on bulk packagings must have a width of at least 6.0 mm (0.24 inches) and a height of—

(1) 100 mm (3.9 inches) for rail cars;

(2) 75 mm (3.0 inches) for cargo tanks, and

(3) 50 mm (2.0 inches) for other bulk packages.

(c) *Exemption packagings.* The outside of each bulk package used under the terms of an exemption must be plainly and durably marked "DOT-E" followed by the exemption number assigned.

(d) *Technical names.* Each bulk packaging marked with a proper shipping name which contains the term "n.o.s.", must be marked with the technical name of the hazardous material, in the manner prescribed in § 172.301(b).

(e) Each bulk packaging marked with a proper shipping name, common name or identification number as required by this subpart must remain marked when it is emptied unless it is—

(1) Sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or

(2) Refilled, with a material requiring different markings or no markings, to such an extent that any residue remaining in the packaging is no longer hazardous.

(f) Specific requirements for marking portable tanks, cargo tanks, tank cars and multi-unit tank car tanks are prescribed in §§ 172.326, 172.328 and 172.330.

A new § 172.303 would be added to read as follows:

§ 172.303 Prohibited marking.

(a) No person may offer for transportation or transport a package which is marked with the proper shipping name or identification number of a hazardous material unless the

package contains the identified hazardous material or its residue.

(b) This section does not apply to transportation of a package (or packaging) in a transport vehicle or freight container if the package (or packaging) is not visible during transportation and is loaded by the shipper and unloaded by the shipper or consignee.

Section 172.306 would be revised to read as follows:

§ 172.306 Consignee's or consignor's name and address.

Each person who offers for transportation a hazardous material in a non-bulk package shall mark that package with the name and address of the consignor or consignee except when the package is—

(a) Transported by highway only and will not be transferred from one motor carrier to another; or

(b) Part of a carload lot, truckload lot or freight container load, and the entire contents of the rail car, truck or freight container are shipped from one consignor to one consignee.

In § 172.308, paragraph (a)(3) would be added to read as follows:

§ 172.308 Authorized abbreviations.

(a) * * *

(3) Abbreviations which appear as authorized descriptions in Column 2 of the § 172.101 Table are authorized. For example, "PCB", "2, 4-D", etc.

Section 172.312 would be revised to read as follows:

§ 172.312 Liquid hazardous materials in non-bulk packagings.

(a) Except as provided in this section, each non-bulk package having inner packagings containing liquid hazardous materials must be:

(1) Packed with closures upward, and

(2) Legibly marked with package orientation markings as specified in ISO Standard R780-1968 on two opposite vertical sides of the package with the arrows pointing in the correct upright direction.

(b) Except as otherwise prescribed in Part 173 of this subchapter, cylinders of liquefied compressed gas are not required to be marked "THIS SIDE UP" or "THIS END UP."

(c) Arrows for purposes other than indicating proper package orientation may not be displayed on a package containing a liquid hazardous material.

(d) Except when offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of one liter or less prepared in accordance with § 173.150 (b) or (c) of this subchapter are excepted from the

requirements of paragraph (a) of this section.

(e) When offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of one liter or less prepared in accordance with § 173.150 (b) or (c) of this subchapter are excepted from the requirements of paragraph (a) of this section when packed with sufficient absorption material between the inner and outer packagings to completely absorb the liquid contents.

A new § 172.313 would be added to read as follows:

§ 172.313 Poisonous hazardous materials.

(a) For Division 2.3 materials and for poisonous liquids subject to the "Poison-Inhalation Hazard" shipping paper description of § 172.203(k)(4), the package containing the material shall be marked "Inhalation Hazard" in association with the required label(s) or placard(s). (See § 172.302(b) for size of markings on bulk packages.) Bulk packagings must be marked on two opposing sides.

(b) Each non-bulk plastic packaging used as a single or composite packaging for materials meeting the definition of Division 6.1 (in § 173.132 of this subchapter) shall be permanently marked, by embossment or other durable means, with the word "POISON" in letters at least 6.3mm (0.25 inches) in height. Additional text or symbols related to hazard warning may be included in the marking. The marking shall be located within 150mm (5.9 inches) of the closure of the packaging.

In § 172.316, paragraph (a) and the beginning of the first sentence in paragraph (c) preceding the word "certification" are revised to read as follows:

§ 172.316 Packagings containing material classed as ORM-D or ORM-E.

(a) Each non-bulk packaging containing a material classed as ORM-D or ORM-E must be marked on at least one side or end with the appropriate ORM designation immediately following or below the proper shipping name of the material. The appropriate ORM designation must be placed within a rectangle that is approximately 6.3mm (0.25 inches) larger on each side than the designation. The appropriate designation for each ORM must be:

(1) ORM-D-AIR for an ORM-D that is prepared for air shipment and packaged in accordance with the provisions of § 173.27 of this subchapter.

(2) ORM-D for an ORM-D other than as described in subparagraph (a)(1) above.

(3) ORM-E for an ORM-E.

(c) The marking ORM-D or ORM-E is the ***

Section 172.324 would be revised to read as follows:

§ 172.324 Hazardous substances in non-bulk packagings.

(a) If the proper shipping name for a material that is a hazardous substance does not identify the constituents making it a hazardous substance, the name or names of the hazardous substance constituents as shown in the § 172.101 Table shall be entered in association with the proper shipping name on each non-bulk packaging.

(b) The letters "RQ" shall be displayed in association with the proper shipping name on a non-bulk packaging that contains a hazardous substance.

Section 172.326 would be revised to read as follows:

§ 172.326 Portable tanks.

(a) *Shipping name.* No person may offer for transportation or transport a portable tank containing a hazardous material unless it is legibly marked on two opposing sides with the proper shipping name specified for the material in § 172.101.

(b) [Reserved]

(c) *Owner's name.* The name of the owner or of the lessee, if applicable, must be displayed on a portable tank that contains a hazardous material.

(d) If the identification number marking required by § 172.302(a) is not visible, a transport vehicle or freight container used to transport a portable tank must be marked on each side and each end as required by § 172.332 with the identification number specified for the material in the § 172.101 Table.

Section 172.328 would be revised to read as follows:

§ 172.328 Cargo tanks.

(a) *Providing and affixing identification numbers.* Unless a cargo tank is already marked with the identification numbers required by this subpart, the identification numbers must be provided or affixed as follows:

(1) A person who offers a motor carrier a hazardous material for transportation in a cargo tank shall provide the motor carrier the identification numbers on placards or shall affix orange panels containing the required identification numbers, prior to or at the time the material is offered for transportation.

(2) A person who offers a cargo tank containing a hazardous material for transportation shall affix the required identification numbers on panels or placards prior to or at the time the cargo tank is offered for transportation.

(b) [Reserved]

(c) *Required markings: Gases.* Except for certain nurse tanks which must be marked as specified in § 173.315(m) of this subchapter, each cargo tank transporting a Class 2 material subject to this subchapter must be marked, in lettering no less than 50mm (1.97 inches), on each side and each end with—

(1) The proper shipping name specified for the gas in the § 172.101 Table, or

(2) An appropriate common name for the material such as "Refrigerant Gas".

(d) *QT/NQT markings.* Each MC 330 and MC 331 cargo tank must be marked near the specification plate, in letters no less than 50mm (1.97 inches) in height, with—

(1) QT, if the cargo tank is constructed of quenched and tempered steel, or

(2) NQT, if the cargo tank is constructed of other than quenched and tempered steel.

In § 172.330, the phrase "or § 172.102 (when authorized)" would be removed from paragraphs (c)(2) and (e), the phrase "or § 172.102" would be removed from paragraph (c)(1), and paragraphs (a) and (b) would be revised to read as follows:

§ 172.330 Tank cars and multi-unit tank car tanks.

(a) *Shipping name.* No person may offer for transportation or transport a hazardous material—

(1) In a tank car unless the tank car is marked on each side, when required by § 172.102 or Part 173 of this subchapter, with the proper shipping name specified for the material in the § 172.101 Table or with a common name authorized in this subchapter for the material such as "Refrigerant Gas".

(2) In a multi-unit tank car tank unless the tank is marked on opposing sides with the proper shipping name specified for the material in the § 172.101 Table or with a common name authorized in this subchapter for the material.

(b) A motor vehicle or rail car used to transport a multi-unit tank car tank containing a hazardous material must be marked on each side and each end, as required by § 172.332, with the identification number specified for the material in the § 172.101 Table.

In § 172.332, paragraph (c)(3) would be revised to read as follows:

§ 172.332 Identification number markings.

(c) ***

(3) An identification number may be displayed only on a placard corresponding to the primary hazard class of the hazardous material.

§ 172.334 [Amended]

In § 172.334 the phrase "POISON GAS", would be removed from paragraph (a), and the phrase "or § 172.102 (when authorized)" would be removed from paragraph (b).

Subpart E—Labeling

Section 172.400 would be revised to read as follows:

§ 172.400 General labeling requirements.

(a) Each person who offers for transportation or transports a hazardous material in any of the following packages or containment devices, shall label the package or containment device with labels specified for the material in the § 172.101 Table and in this subpart:

- (1) A non-bulk package;
- (2) A portable tank of less than 1000 gallons (3,785.4 liters) capacity;
- (3) A DOT Specification 106 or 110 multi-unit tank car tank; and
- (4) An overpack, freight container or unit load device, of no greater than 640 cubic feet (18.1 cubic meters) capacity, which contains a package for which labels are required.

(b) Labeling is required for a hazardous material which meets one or more hazard class definitions, in accordance with Column 6 of the § 172.101 Table and the following table:

| Hazard class or division | Label name | Label design section reference (§) |
|-------------------------------|---------------------------|------------------------------------|
| 1.1 | EXPLOSIVE 1.1 | 172.411 |
| 1.2 | EXPLOSIVE 1.2 | 172.411 |
| 1.3 | EXPLOSIVE 1.3 | 172.411 |
| 1.4 | EXPLOSIVE 1.4 | 172.411 |
| 1.5 | EXPLOSIVE 1.5 | 172.411 |
| 2.1 | FLAMMABLE GAS | 172.417 |
| 2.2 | NON-FLAMMABLE GAS | 172.415 |
| 2.3 | POISON GAS | 172.416 |
| 3 (flammable liquid) | FLAMMABLE LIQUID | 172.419 |
| 3 (combustible liquid) | (None) | |
| 4.1 | FLAMMABLE SOLID | 172.420 |
| 4.2 | SPONTANEOUSLY COMBUSTIBLE | 172.422 |
| 4.3 | DANGEROUS WHEN WET | 172.423 |
| 5.1 | OXIDIZER | 172.426 |
| 5.2 | ORGANIC PEROXIDE | 172.427 |
| 6.1 (Packing Groups I and II) | POISON | 172.430 |
| 6.1 (Packing Group III) | KEEP AWAY FROM FOOD | 172.431 |
| 6.2 (international) | INFECTIOUS SUBSTANCE | 172.432 |
| 6.2 (domestic) | ETIOLOGIC AGENT | 172.444 |

| Hazard class or division | Label name | Label design section reference (§) |
|-----------------------------------|------------------------|------------------------------------|
| 7 (see § 172.403) | RADIOACTIVE WHITE-I | 172.436 |
| 7 | RADIOACTIVE YELLOW-II | 172.438 |
| 7 | RADIOACTIVE YELLOW-III | 172.440 |
| 7 (empty packages, see § 173.427) | EMPTY | 172.450 |
| 8 | CORROSIVE | 172.442 |
| 9 | (None) | |
| ORM-D | (None) | |
| ORM-E | (None) | |

A new § 172.400a would be added to read as follows:

§ 172.400a Exceptions from labeling.

(a) Notwithstanding the provisions of § 172.400, a label is not required on—

(1) A cylinder containing a compressed gas that is—

- (i) Not poisonous;
- (ii) Carried by a private or contract motor carrier;
- (iii) Not overpacked; and
- (iv) Durably and legibly marked in accordance with CGA Pamphlet C-7, Appendix A.

(2) A package or unit of military explosives (including ammunition) shipped by or on behalf of the DOD when in—

- (i) Freight containerload, carload or truckload shipments, if loaded and unloaded by the shipper or DOD; or
 - (ii) Unitized or palletized break-bulk shipments by cargo vessel under charter to DOD if at least one required label is displayed on each unitized or palletized load.
- (3) A package containing a hazardous material other than ammunition that is—
- (i) Loaded and unloaded under the supervision of DOD personnel, and
 - (ii) Escorted by DOD personnel in a separate vehicle.

(4) A compressed gas cylinder permanently mounted in or on a transport vehicle.

(5) A freight container, an aircraft unit load device or a portable tank, which—

- (i) Is placarded in accordance with Subpart F of this part, or
- (ii) Conforms to paragraph(a)(3) or (b)(3) of § 172.512.

(6) An overpack or unit load device in or on which each different required label on packages of hazardous materials is visible.

(7) A package of low specific activity radioactive material, when transported under § 173.425(b) of this subchapter.

(b) Notwithstanding the provisions of § 172.402 of this subpart, a subsidiary hazard label corresponding to Class 3, Packing Group III or Class 8, Packing Group III (that is, a FLAMMABLE or CORROSIVE label, respectively) is not

required to be displayed on a package containing a multiple hazard material, unless the package is offered or intended for transportation by aircraft or vessel.

(c) Certain exceptions to labeling requirements are provided for small quantities and limited quantities in applicable sections in Part 173 of this subchapter.

§ 172.401 [Amended]

In § 172.401, paragraph (d) would be removed.

Section 172.402 would be revised to read as follows:

§ 172.402 Additional labeling requirements.

(a) *Subsidiary hazard labels.* Each package containing a material meeting the definition of more than one hazard class also shall be labeled as follows:

(1) A material classed as Class (or Division) 1.1, 1.2, 2.3, or 7, shall be labeled for each subsidiary hazard class.

(2) A material classed as Division 6.1, Packing Group I or II, which meets the definition of a flammable liquid, shall be labeled with the FLAMMABLE LIQUID label.

(3) A material classed as Class (or Division) 3, 4.1, 4.2, 4.3, 5.1 or 8, which meets the definition of a Division 6.1, Packing Group I or II material, shall be labeled with the POISON label.

(4) A material classed as Class (or Division) 3, 4.1, 4.2, 4.3, 5.1, or 6.1 (Packing Group I or II) which meets the definition of Class 8, shall be labeled with the CORROSIVE label.

(5) Irrespective of hazard class, a poisonous material subject to the "Poison-Inhalation Hazard" shipping paper description of § 172.203 (k)(4), shall be labeled with the POISON or POISON GAS label, as appropriate.

(6) A material which has a subsidiary hazard of being dangerous when wet, as defined in § 173.124, shall be labeled with the DANGEROUS WHEN WET label.

(b) *CARGO AIRCRAFT ONLY label.*

Each person who offers for transportation or transports by aircraft a package containing a hazardous material which is authorized on cargo aircraft only shall label the package with a CARGO AIRCRAFT ONLY label specified in § 172.448.

Section 172.405 would be revised to read as follows:

§ 172.405 Authorized label modifications.

(a) For Classes 2, 3, 4, 5, 6, or 8, text indicating a hazard (for example FLAMMABLE LIQUID) is not required on a label when—

(1) The label otherwise conforms to the provisions of this subpart, and

(2) The hazard class or division number is displayed in the lower corner of a label corresponding to the primary hazard class of the material.

(b) Except as provided in paragraph (a) of this section, class and division numbers are not required on labels for Classes 2, 3, 4, 5, 6, 7, or 8. Class and division numbers should not be displayed on subsidiary hazard labels.

Section 172.406 would be revised to read as follows:

§ 172.406 Placement of labels.

(a) *General.* (1) Except as provided in paragraphs (b) and (e) of this section, each label required by this subpart must—

- (i) Be printed on or affixed to a surface (other than the bottom) of the package or containment device containing the hazardous material; and
- (ii) Be located on the same surface of the package as the proper shipping name marking, if the package dimensions are adequate.

(2) Except as provided in paragraph (e) of this section, duplicate labeling is not required on a package or containment device (such as to satisfy redundant labeling requirements).

(b) *Exceptions.* A label may be printed on or placed on a securely affixed tag, or may be affixed by other suitable means to:

(1) A package that contains no radioactive material and which has dimensions less than those of the required label;

(2) A compressed gas cylinder; and

(3) A package which has such an irregular surface that a label cannot be satisfactorily affixed.

(c) *Placement of multiple labels.*

When primary and subsidiary hazard labels are required, they must be displayed next to each other. Placement conforms to this requirement if labels are within 150 mm (5.9 inches) of one another.

(d) Each label must be printed on or affixed to a background of contrasting color, or must have a dotted or solid line outer border.

(e) *Duplicate labeling.* When labeling is required, duplicate labels must be displayed on at least two sides or two ends (other than the bottom) of—

(1) Each non-bulk package or overpack having a volume of 64 cubic feet (1.8 cubic meters) or more;

(2) Each non-bulk package containing a radioactive material;

(3) Each DOT 106 or 110 multi-unit tank car tank. Labels must be displayed on each end;

(4) Each portable tank of less than 1000 gallons (3,785.4 liters) capacity; and

(5) Each freight container or aircraft unit load device having a volume of 64 cubic feet (1.8 cubic meters) or more, but less than 640 cubic feet (18.1 cubic meters). One of each required label must be displayed on or near the closure.

(f) *Obscured labels.* A label must be clearly visible and may not be obscured by markings or attachments.

Section 172.407 would be revised to read as follows:

§ 172.407 **Label specifications.**

(a) *Durability.* Each label, whether printed on or affixed to a package, must be durable and weather resistant. A label on a package must be able to withstand, without deterioration or a substantial change in color, a 30-day exposure to conditions incident to transportation that reasonably could be expected to be encountered by the labeled package.

(b) *Design.* (1) Except for size and color, the printing, inner border, and symbol on each label must be as shown in §§ 172.411 through 172.448, as appropriate.

(2) The dotted line border shown on each label is not part of the label specification, except when used as an alternative for the solid line outer border to meet the requirements of § 172.406(d).

(c) *Size.* (1) Each diamond (square-on-point) label prescribed in this subpart must be at least 100 mm (3.9 inches) on each side with each side having a solid line inner border 5.0 to 6.3 mm (0.20 to 0.25 inches) from the edge.

(2) The CARGO AIRCRAFT ONLY label must be a rectangle measuring at least 110 mm (4.3 inches) in height by 120 mm (4.7 inches) in width. The word "DANGER" must be shown in letters measuring at least 12.7 mm (0.5 inches) in height.

(3) Except as otherwise provided in this subpart, the hazard class number, or division number, as appropriate, must be at least 6.3 mm (0.25 inches) and not greater than 12.7 mm (0.5 inches).

(4) When text indicating a hazard is displayed on a label, the label name must be shown in letters measuring at least 7.6 mm (0.30 inches) in height except that—

(i) For a SPONTANEOUSLY COMBUSTIBLE or DANGEROUS WHEN WET label, respectively, the words "Spontaneously" and "When Wet" must be shown in letters measuring at least 5.1 mm (0.2 inches) in height.

(ii) For a KEEP AWAY FROM FOOD label, the word "HARMFUL" must be shown in letters measuring at least 7.6 mm (0.3 inches) in height.

(5) The symbol on each label must be proportionate in size to that shown in the appropriate section of this subpart.

(d) *Color.* (1) The background color on each label must be as prescribed in §§ 172.411 through 172.448, as appropriate.

(2) The symbol, text, numbers, and border must be shown in black on a label except that—

(i) White may be used on a label with a one color background of green, red or blue; and

(ii) White must be used for the text and class number for the CORROSIVE label.

(3) Black and any color on a label must be able to withstand, without substantial change, a 72-hour fadeometer test (for a description of equipment designed for this purpose, see ASTM G 23-69 (1975) or G 26-70).

(4) A color on a label, upon visual examination, must fall within the color tolerances displayed on the appropriate Label and Placard Color Tolerance Chart.

(i) A set of six charts, dated January 1973, for comparison with labels and placards surfaced with paint, lacquer, enamel, plastic or other opaque coatings, or ink, may be purchased from the Office of Hazardous Materials Transportation, U.S. Department of Transportation, Washington, DC 20590, for \$5.50.

(ii) A set of six charts, dated January 1974, for comparison with labels and placards surfaced with ink, may be similarly purchased for \$12.50.

(iii) Both sets of charts may be inspected in Room 8426, Nassif Building, 400 7th Street, SW, Washington, DC 20590, or any of the offices of the Federal Highway Administration listed at 49 CFR 390.40.

(iv) The technical specifications for each chart are set forth in Appendix A to this part.

(5) The specified label color must extend to the edge of the label in the area designated on each label except the CORROSIVE, RADIOACTIVE YELLOW-II AND RADIOACTIVE YELLOW-III labels on which the color must extend only to the inner border.

(e) *Form identification.* A label may contain form identification information, including the name of its maker, provided that information is printed outside the solid line inner border in no larger than 10-point type.

(f) *Exceptions.* A label conforming to specifications in the UN Recommendations may be used in place of a corresponding label which conforms to the requirements of this subpart.

Section 172.411 would be revised to read as follows:

§ 172.411 **EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 labels.**

(a) Except for size and color, the EXPLOSIVE 1.1, EXPLOSIVE 1.2 and EXPLOSIVE 1.3 labels must be as follows:



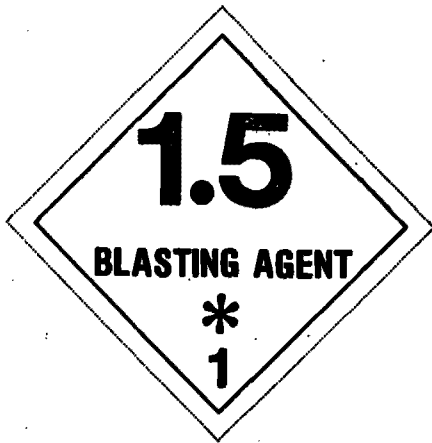
(b) In addition to complying with § 172.407, the background color on the EXPLOSIVE 1.1, EXPLOSIVE 1.2 and EXPLOSIVE 1.3 labels must be orange. The "***" shall be replaced with the appropriate division number and compatibility group. The compatibility group letter must be the same size as the division number and must be shown as a capitalized Roman letter.

(c) Except for size and color, the EXPLOSIVE 1.4 and EXPLOSIVE 1.5 labels must be as follows:

EXPLOSIVE 1.4:



EXPLOSIVE 1.5:



(d) In addition to complying with § 172.407, the background color on the EXPLOSIVE 1.4 and EXPLOSIVE 1.5 labels must be orange. The "*" shall be replaced with the appropriate compatibility group. The compatibility group letter must be shown as a capitalized Roman letter measuring at least 12.7mm (0.5 inches) in height. Division numerals must measure at least 30mm (1.2 inches) in height and at least 5mm (0.2 inches) in width.

Section 172.415 would be revised to read as follows:

§ 172.415 NON-FLAMMABLE GAS label.

(a) Except for size and color, the NON-FLAMMABLE GAS label must be as follows:

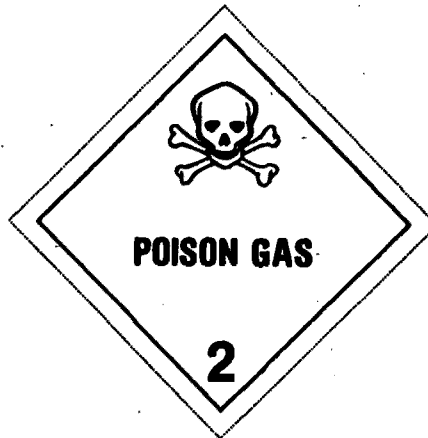


(b) In addition to complying with § 172.407, the background color on the NON-FLAMMABLE GAS label must be green.

Section 172.416 is revised to read as follows:

§ 172.416 POISON GAS label.

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



(b) In addition to complying with § 172.407, the background on the POISON GAS label must be white.

Section 172.417 would be revised to read as follows:

§ 172.417 FLAMMABLE GAS label.

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



(b) In addition to complying with § 172.407, the background color on the FLAMMABLE GAS label must be red.

Section 172.419 would be revised as follows:

§ 172.419 FLAMMABLE LIQUID label.

(a) Except for size and color the FLAMMABLE LIQUID label must be as follows:

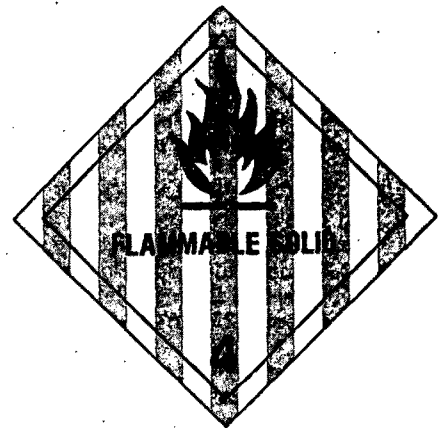


(b) In addition to complying with § 172.407, the background color on the FLAMMABLE LIQUID label must be red.

Section 172.420 would be revised to read as follows:

§ 172.420 FLAMMABLE SOLID label.

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



(b) In addition to complying with § 172.407, the background on the FLAMMABLE SOLID label must be white with vertical red stripes equally spaced on each side of a red stripe placed in the center of the label. The red vertical stripes must be spaced so that, visually, they appear equal in width to the white spaces between them. The symbol (flame) and text (when used) must be overprinted. The text "FLAMMABLE SOLID" may be placed in a white rectangle.

Section 172.422 would be revised to read as follows:

§ 172.422 SPONTANEOUSLY COMBUSTIBLE label.

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



(b) In addition to complying with § 172.407, the background color on the lower half of the SPONTANEOUSLY COMBUSTIBLE label must be red and the upper half must be white.

Section 172.423 would be revised to read as follows:

§ 172.423 DANGEROUS WHEN WET label.

(a) Except for size and color, the DANGEROUS WHEN WET label must be as follows:



(b) In addition to complying with § 172.407, the background color on the DANGEROUS WHEN WET label must be blue.

Section 172.426 would be revised as follows:

§ 172.426 OXIDIZER label.

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



(b) In addition to complying with § 172.407, the background color on the OXIDIZER label must be yellow.

Section 172.427 would be revised to read as follows:

§ 172.427 ORGANIC PEROXIDE label.

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



(b) In addition to complying with § 172.407, the background color on the ORGANIC PEROXIDE label must be yellow.

Section 172.430 would be revised as follows:

§ 172.430 POISON label.

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



(b) In addition to complying with § 172.407, the background on the POISON label must be white.

A new § 172.431 would be added to read as follows:

§ 172.431 KEEP AWAY FROM FOOD label.

(a) Except for size and color, the KEEP AWAY FROM FOOD label must be as follows:



(b) In addition to complying with § 172.407, the background on the KEEP AWAY FROM FOOD label must be white.

Section 172.432 would be revised to read as follows:

§ 172.432 INFECTIOUS SUBSTANCE label.

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



(b) In addition to complying with § 172.407, the background on the INFECTIOUS SUBSTANCE label must be white.

Section 172.436 would be revised to read as follows:

§ 172.436 RADIOACTIVE WHITE-I label.

(a) Except for size and color, the RADIOACTIVE WHITE-I label must be as follows:



(b) In addition to complying with § 172.407, the background on the RADIOACTIVE WHITE-I label must be white. The printing and symbol must be black, except for the "I" which must be red.

Section 172.438 would be revised to read as follows:

§ 172.438 RADIOACTIVE YELLOW-II label.

(a) Except for size and color, the RADIOACTIVE YELLOW-II must be as follows:



(b) In addition to complying with § 172.407, the background color on the RADIOACTIVE YELLOW-II label must be yellow in the top half and white in the lower half. The printing and symbol must be black, except for the "II" which must be red.

Section 172.440 would be revised to read as follows:

§ 172.440 RADIOACTIVE YELLOW-III label.

(a) Except for size and color, the RADIOACTIVE YELLOW-III label must be as follows:



(b) In addition to complying with § 172.407, the background color on the RADIOACTIVE YELLOW-III label must be yellow in the top half and white in the lower half. The printing and symbol must be black, except for the "III" which must be red.

Section 172.442 would be revised to read as follows:

§ 172.442 CORROSIVE label.

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



(b) In addition to complying with § 172.407, the background on the CORROSIVE label must be white in the top half and black in the lower half.

§ 172.444 [Amended]

In § 172.444, paragraphs (b) and (c) would be removed.

Section 172.448 would be revised to read as follows:

§ 172.448 CARGO AIRCRAFT ONLY label.

(a) Except for size and color, the CARGO AIRCRAFT ONLY label must be as follows:



(b) The CARGO AIRCRAFT ONLY label must be black on an orange background.

Subpart F—Placarding

Section 172.500 would be revised to read as follows:

§ 172.500 Applicability of placarding requirements.

(a) Each person who offers for transportation or transports any hazardous material subject to this subchapter shall comply with the applicable placarding requirements of this subpart.

(b) This subpart does not apply to—

- (1) Infectious substances;
- (2) Hazardous materials classed as ORM-D or E or Class 9;
- (3) Hazardous materials authorized by this subchapter to be offered for transportation as Limited Quantities when identified as such on shipping papers in accordance with § 172.203(b);
- (4) Hazardous materials which are packaged as small quantities under the provisions of § 173.4 of this subchapter; and
- (5) Combustible liquids in non-bulk packagings.

Section 172.502 would be revised to read as follows:

§ 172.502 Prohibited and permissive placarding.

(a) *Prohibited placarding.* Except as provided in paragraph (c) of this section, no person may affix or display on a bulk packaging, freight container, unit load device, motor vehicle or rail car any placard described in this subpart unless—

- (1) The material being offered or transported is a hazardous material, and
- (2) The placard represents a hazard of the hazardous material being offered or transported.

(b) No person may affix or display any sign or other device on a bulk packaging, freight container, unit load device, motor vehicle or rail car, that by its color, design, shape or content could be confused with any placard prescribed in this subpart.

(c) *Exceptions.* The restrictions in paragraphs (a) and (b) of this section do not apply to a bulk packaging, freight container, unit load device, motor vehicle or rail car which is placarded in conformance with the TDG Regulations, the IMDG Code or the UN Recommendations.

(d) The restrictions of paragraph (b) of this section do not apply to the display of an identification number on a white square-on-point configuration in accordance with § 172.336(b).

(e) *Permissive placarding.* Placards may be displayed for a hazardous material in accordance with this subpart even when not required if—

- (1) The material and placards conform to the requirements of paragraph (a) of this section, and
- (2) Neither an identification number, hazard class nor division number is

displayed on a placard corresponding to a subsidiary hazard of the hazardous material.

Section 172.504 would be revised to read as follows:

§ 172.504 General placarding requirements.

(a) *General.* Except as otherwise provided in this subchapter, each bulk packaging, freight container, unit load device, motor vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2 of this section and in accordance with other placarding requirements of this subpart, including the specifications for the placards named in the tables and described in detail in §§ 172.519 through 172.558.

(b) *DANGEROUS placard.* A freight container, unit load device, motor vehicle or rail car which contains non-bulk packagings with two or more categories of hazardous materials that require different placards specified in Table 2 may be placarded with DANGEROUS placards instead of the separate placarding specified for each of the materials in Table 2. However, when 5,000 pounds (2,267.9 Kg) or more of one category of material is loaded therein at one loading facility, the placard specified in Table 2 for that category must be applied.

(c) *Exception for less than 1,000 pounds.* For non-bulk packagings, when the gross weight of all hazardous materials covered by Table 2 is less than 1,000 pounds (453.6 Kg), no placard is required on a freight container, unit load device, motor vehicle, or rail car for the Table 2 materials. This paragraph does not apply to transportation by aircraft or vessel, or to transport vehicles, freight containers and unit load devices subject to § 172.505.

(d) *Exception for empty non-bulk packages.* A non-bulk packaging that contains only the residue of a hazardous material covered by Table 2 of paragraph (e) of this section need not be included in determining placarding requirements.

(e) *Placarding tables.* Placards are specified for hazardous materials in accordance with the following tables:

TABLE 1

| Category of material (Hazard class or division number and additional description, as appropriate) | Placard name | Placard design section reference (§) |
|---|---------------------|--------------------------------------|
| 1.1..... | EXPLOSIVES 1.1..... | 172.522 |
| 1.2..... | EXPLOSIVES 1.2..... | 172.522 |
| 2.3 (poisonous gas)..... | POISON GAS..... | 172.540 |

TABLE 1—Continued

| Category of material (Hazard class or division number and additional description, as appropriate) | Placard name | Placard design section reference (§) |
|---|-------------------------|--------------------------------------|
| 4.3..... | DANGEROUS WHEN WET..... | 172.548 |
| 6.1 (PG I inhalation hazard only)..... | POISON..... | 172.554 |
| 7 (Radioactive Yellow III label only)..... | RADIOACTIVE..... | 172.556 |

TABLE 2

| Category of material (Hazard class or division number and additional description, as appropriate) | Placard name | Placard design section reference (§) |
|---|-----------------------------------|--------------------------------------|
| 1.3..... | EXPLOSIVES 1.3..... | 172.522 |
| 1.4..... | EXPLOSIVES 1.4..... | 172.523 |
| 1.5..... | EXPLOSIVES 1.5..... | 172.524 |
| 2.1 (flammable gas)..... | FLAMMABLE GAS..... | 172.532 |
| 2.2 (nonflammable gas)..... | NON-FLAMMABLE GAS..... | 172.528 |
| 3 (flammable liquid)..... | FLAMMABLE..... | 172.542 |
| 3 (combustible liquid)..... | COMBUSTIBLE..... | 172.544 |
| 4.1..... | FLAMMABLE SOLID..... | 172.546 |
| 4.2..... | SPONTANEOUSLY COMBUSTIBLE..... | 172.547 |
| 5.1..... | OXIDIZER..... | 172.550 |
| 5.2..... | COMBUSTIBLE ORGANIC PEROXIDE..... | 172.552 |
| 6.1 (PG I or II, other than PG I inhalation hazard)..... | POISON..... | 172.554 |
| 6.1 (PG III)..... | KEEP AWAY FROM FOOD..... | 172.553 |
| 6.2..... | (none)..... | |
| 7 (Radioactive White-I or Yellow-II label)..... | (none)..... | |
| 7 (Radioactive Yellow-III label)..... | RADIOACTIVE..... | 172.556 |
| 8..... | CORROSIVE..... | 172.558 |
| 9..... | (none)..... | |
| ORM-D..... | (none)..... | |
| ORM-E..... | (none)..... | |

(f) *Additional placarding exceptions.*

(1) An EXPLOSIVES 1.2 placard is not required for Division 1.2 explosives on a motor vehicle, rail car, freight container or unit load device which contains Division 1.1 explosives, and is placarded with EXPLOSIVES 1.1 placards, as required.

(2) A FLAMMABLE placard may be used in place of a COMBUSTIBLE placard on a cargo tank, a portable tank or a compartmented tank car which contains both flammable and combustible liquids.

(3) A NON-FLAMMABLE GAS placard is not required on a motor vehicle which contains non-flammable gas if the motor vehicle also contains flammable gas and it is placarded with FLAMMABLE GAS placards, as required.

(4) An EXPLOSIVES 1.4, 1.5 or OXIDIZER placard is not required for Division 1.4, 1.5 or 5.1 materials on a freight container, unit load device, motor vehicle or rail car which also contains Division 1.1 or 1.2 explosives and is placarded with EXPLOSIVES 1.1 or 1.2 placards, as required.

(5) For transportation by motor vehicle or rail car only, an OXIDIZER placard is not required for Division 5.1 materials on a motor vehicle, rail car or freight container which also contains Division 1.5 explosives and is placarded with EXPLOSIVES 1.5 placards, as required.

Section 172.505 would be revised to read as follows:

§ 172.505 Multiple placarding.

(a) Each transport vehicle, portable tank, freight container or unit load device that contains a poisonous material subject to the "Poison-Inhalation Hazard" shipping description of § 172.203(k)(4) shall be placarded with POISON or POISON GAS placards, as appropriate, on each side and each end, in addition to the placards required by § 172.504. This requirement does not apply to non-bulk packages having primary receptacles of one liter (1.06 quarts) or less. Duplication of the POISON or POISON GAS placard is not required.

(b) Each transport vehicle, portable tank or freight container that contains 1000 pounds (453.6 kg) or more gross weight of fissile or low specific activity uranium hexafluoride shall be placarded with RADIOACTIVE and CORROSIVE placards on each side and each end.

(c) Each transport vehicle, portable tank, freight container or unit load device that contains a material which has a subsidiary hazard of being dangerous when wet, as defined in § 173.124, shall be placarded with DANGEROUS WHEN WET placards, on each side and each end, in addition to the placards required by § 172.504.

§ 172.508 [Amended]

In paragraph (a) of § 172.508, the phrase "§§ 172.502 and 172.504 as these sections pertain to placarding the rail car" would be revised to read "this subpart."

In § 172.510 paragraph (b) would be removed and reserved, and paragraph (a) would be revised to read as follows:

§ 172.510 Special placarding provisions: Rail.

(a) *Square background required.* Each EXPLOSIVES 1.1, EXPLOSIVES 1.2, POISON GAS and POISON GAS—RESIDUE placard affixed to a rail car must be placed on a square background as described in § 172.527.

(b) [Reserved]

§ 172.512 [Amended]

In § 172.512 the following changes would be made:

1. In paragraph (a)(1), the section reference "§ 172.504(c)(1)" would be revised to read "§ 172.504(c)".

2. In paragraph (a)(2), the phrase "paragraphs (c)(1) and (c)(2)" would be revised to read "paragraph (c)".

3. In paragraphs (b)(1) and (b)(2), the section references "§ 172.406(e)(3)" and "§ 172.406(e)", respectively, would be revised to read "Subpart E of this part, including § 172.406(e)."

Section 172.514 would be revised to read as follows:

§ 172.514 Bulk packagings other than tank cars.

(a) Each person who offers for transportation a bulk packaging, other than a tank car, which contains a hazardous material shall affix the placards specified for the material in §§ 172.504 and 172.505. However, a portable tank having a capacity of less than 1,000 gallons (3,785.4 liters)—

(1) May be placarded on only two opposite sides; or

(2) May be labeled instead of placarded, in accordance with Subpart E of this part.

(b) Each bulk packaging, other than a tank car, that is required to be placarded when it contains a hazardous material, must remain placarded when it is emptied, unless it is—

(1) Sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or

(2) Refilled, with a material requiring different placards or no placards, to such an extent that any residue remaining in the packaging is no longer hazardous.

In § 172.516, the introductory text of paragraph (c) would be revised and paragraph (c)(7) would be added to read as follows:

§ 172.516 Visibility and display of placards.

(c) Each placard on a transport vehicle, bulk packaging, freight container or aircraft unit load device must—

(7) Be affixed to a background of contrasting color, or must have a dotted or solid line outer border which contrasts with the background color.

Section 172.519 would be revised to read as follows:

§ 172.519 General specifications for placards.

(a) *Strength and durability.* Placards must conform to the following:

(1) A placard may be made of any plastic, metal or other material capable of withstanding, without deterioration or a substantial reduction in effectiveness, a 30-day exposure to open weather conditions.

(2) Each placard must be able to pass a 60 p.s.i. Mullen test.

(3) A placard made of tagboard must be at least equal to that designated commercially as white tagboard. Tagboard must have a weight of at least 200 pounds (90.7 kg) per ream of 24 by 36-inch (61.0 by 91.4 cm) sheets.

(4) Reflective or retroreflective materials may be used on a placard if the prescribed colors, strength and durability are maintained.

(b) *Design.* (1) Except as provided in § 172.332, each placard must be as described in this subpart, and except for size and color, the printing, inner border and symbol must be as shown in §§ 172.521 through 172.558, as appropriate.

(2) The dotted line border shown on each placard is not part of the placard specification. However, a dotted or solid line outer border may be used when needed to indicate the full size of a placard that is part of a larger format or is on a background of a non-contrasting color.

(3) For Classes 2, 3, 4, 5, 6 or 8, text indicating a hazard (for example, "FLAMMABLE") is not required.

(4) For a placard corresponding to the primary hazard class of a material, the hazard class or division number must be displayed in the lower corner of the placard. However, no hazard class or division number may be displayed on a placard corresponding to a subsidiary hazard of the material.

(c) *Size.* (1) Each placard prescribed in this subpart must measure 273mm (10.75 inches) on each side and must have a solid line inner border 12.7mm (0.5 inches) from each edge.

(2) Except as otherwise provided in this subpart, the hazard class or division number, as appropriate, must be shown in numerals measuring at least 41.0mm (1.62 inches) in height.

(3) Except as otherwise provided in this subpart, when text indicating a hazard is displayed on a placard, the printing must be in letters measuring at least 45.0mm (1.77 inches) in height.

(d) *Color.* (1) The background color, symbol, text, numerals and inner border on a placard must be as specified in §§ 172.521 through 172.558, as appropriate.

(2) Black and any color on a placard must be able to withstand, without substantial change—

(i) A 72-hour fadeometer test (for a description of equipment designed for this purpose, see ASTM G 23-89 (1975) or ASTM G 28-70); and

(ii) A 30-day exposure to open weather.

(3) Upon visual examination, a color on a placard must fall within the color tolerances displayed on the appropriate Office of Hazardous Materials Label and Placard Color Tolerance Chart (see § 172.407(d)(4)).

(4) The placard color must extend to the inner border and may extend to the edge of the placard in the area designated on each placard except the color on the CORROSIVE and RADIOACTIVE placards (black and yellow, respectively) must extend only to the inner border.

(e) *Form identification.* A placard may contain form identification information, including the name of its maker, provided that information is printed outside of the solid line inner border in no larger than 10-point type.

(f) *Exceptions.* A placard conforming to specifications in the UN Recommendations or the TDG Regulations may be used in place of a corresponding placard which conforms to the requirements of this subpart.

Section 172.522 would be revised to read as follows:

§ 172.522 EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards.

(a) Except for size and color, the EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards must be as follows:



(b) In addition to complying with § 172.519, the background color on the EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards must be

orange. The "*" shall be replaced with the appropriate division number. The symbol, text, numerals and inner border must be black.

Section 172.523 would be revised to read as follows:

§ 172.523 EXPLOSIVES 1.4 placard.

(a) Except for size and color, the EXPLOSIVES 1.4 placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the EXPLOSIVES 1.4 placard must be orange. The division numeral, 1.4, must measure at least 63.5mm (2.5 inches) in height. The text, numerals and inner border must be black.

Section 172.524 would be revised to read as follows:

§ 172.524 EXPLOSIVES 1.5 placard.

(a) Except for size and color, the EXPLOSIVES 1.5 placard must be as follows:

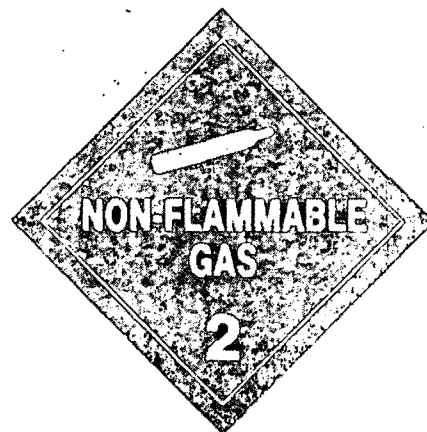


(b) In addition to complying with § 172.519, the background color on the EXPLOSIVES 1.5 placard must be orange. The division numeral, 1.5, must measure at least 63.5mm (2.5 inches) in height. The text, numerals and inner border must be black.

Section 172.528 would be revised to read as follows:

§ 172.528 NON-FLAMMABLE GAS placard.

(a) Except for size and color, the NON-FLAMMABLE GAS placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the NON-FLAMMABLE GAS placard must be green. The letters in both words must be at least 38.1mm (1.5 inches) high. The symbol, text, class number and inner border must be white.

§ 172.530 [Removed]

Section 172.530 would be removed.

Section 172.532 would be revised to read as follows:

§ 172.532 FLAMMABLE GAS placard.

(a) Except for size and color, the FLAMMABLE GAS placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the FLAMMABLE GAS placard must be red. The symbol, text, class number and inner border must be white.

§ 172.536 [Removed]

Section 172.536 would be removed.

Section 172.540 would be revised to read as follows:

§ 172.540 POISON GAS placard.

(a) Except for size and color, the POISON GAS placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the POISON GAS placard must be white. The symbol, text, class number and inner border must be black.

Section 172.542 would be revised to read as follows:

§ 172.542 FLAMMABLE placard.

(a) Except for size and color, the FLAMMABLE placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the FLAMMABLE placard must be red. The symbol, text, class number and inner border must be white.

(c) The word "GASOLINE" may be used in place of the word "FLAMMABLE" on a placard that is displayed on a cargo tank or a portable tank being used to transport gasoline by highway. The word "GASOLINE" must be shown in white.

Section 172.544 would be revised to read as follows:

§ 172.544 COMBUSTIBLE placard.

(a) Except for size and color, the COMBUSTIBLE placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the COMBUSTIBLE placard must be red. The symbol, text, class number and

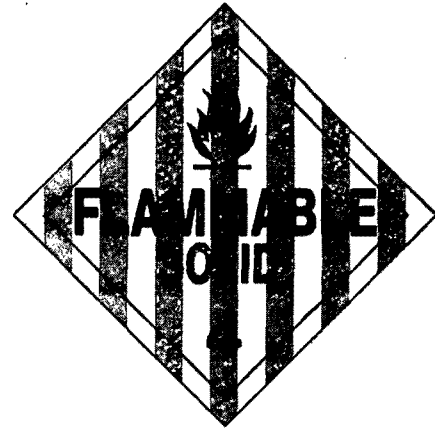
inner border must be white. On a COMBUSTIBLE placard with a white bottom as prescribed by § 172.332(c)(4), the class number must be red or black.

(c) The words "FUEL OIL" may be used in place of the word "COMBUSTIBLE" on a placard that is displayed on a cargo tank or portable tank being used to transport by highway fuel oil that is not classed as a flammable liquid. The words "FUEL OIL" must be shown in white.

Section 172.546 would be revised to read as follows:

§ 172.546 FLAMMABLE SOLID placard.

(a) Except for size and color, the FLAMMABLE SOLID placard must be as follows:

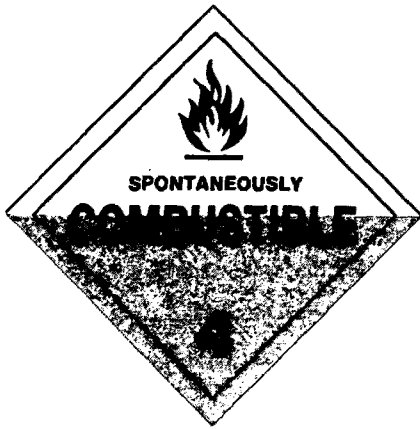


(b) In addition to complying with § 172.519, the background on the FLAMMABLE SOLID placard must be white with seven vertical red stripes. The stripes must be equally spaced, with one red stripe placed in the center of the label. Each red stripe and each white space between two red stripes must be 25.4mm (1.0 inches) wide. The letters in the word "SOLID" must be at least 38.1mm (1.5 inches) high. The symbol, text, class number and inner border must be black.

A new § 172.547 would be added to read as follows:

§ 172.547 SPONTANEOUSLY COMBUSTIBLE placard.

(a) Except for size and color, the SPONTANEOUSLY COMBUSTIBLE placard must be as follows:

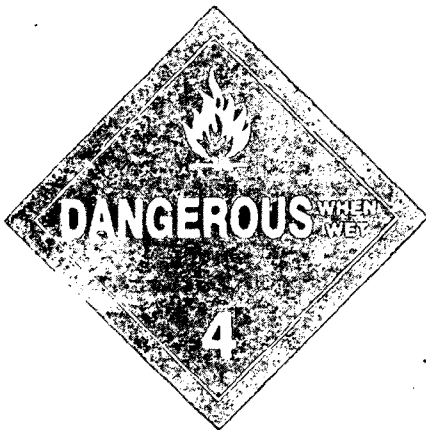


(b) In addition to complying with § 172.519, the background color on the SPONTANEOUSLY COMBUSTIBLE placard must be red in the lower half and white in upper half. The letters in the word "SPONTANEOUSLY" must be at least 33mm (1.3 inches) high. The symbol, text, class number and inner border must be black.

Section 172.548 would be revised to read as follows:

§ 172.548 DANGEROUS WHEN WET placard.

(a) Except for size and color, the DANGEROUS WHEN WET placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the DANGEROUS WHEN WET placard must be blue. The letters in the words "WHEN WET" must be at least 25.4mm (1.0 inches) high. The symbol, text, class number and inner border must be white.

Section 172.550 would be revised to read as follows:

§ 172.550 OXIDIZER placard.

(a) Except for size and color, the OXIDIZER placard must be as follows:

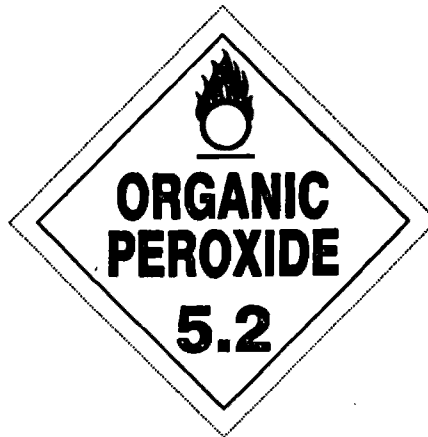


(b) In addition to complying with § 172.519, the background color on the OXIDIZER placard must be yellow. The symbol, text, division number and inner border must be black.

Section 172.552 would be revised to read as follows:

§ 172.552 ORGANIC PEROXIDE placard.

(a) Except for size and color, the ORGANIC PEROXIDE placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the ORGANIC PEROXIDE placard must be yellow. The symbol, text, division number and inner border must be black.

A new § 172.553 would be added to read as follows:

§ 172.553 KEEP AWAY FROM FOOD placard.

(a) Except for size and color, the KEEP AWAY FROM FOOD placard must be as follows:



(b) In addition to complying with § 172.519, the background on the KEEP AWAY FROM FOOD placard must be white. The size of the lettering below the word "HARMFUL" must be proportional to that shown. The symbol, text, class number and inner border must be black.

Section 172.554 would be revised to read as follows:

§ 172.554 POISON placard.

(a) Except for size and color, the POISON placard must be as follows:



(b) In addition to complying with § 172.519, the background on the POISON placard must be white. The symbol, text, class number and inner border must be black.

Section 172.556 would be revised to read as follows:

§ 172.556 RADIOACTIVE placard.

(a) Except for size and color, the RADIOACTIVE placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the RADIOACTIVE placard must be white in the lower portion with a yellow triangle in the upper portion. The base of the yellow triangle must be 28.6mm \pm 5mm (1.13 inches \pm 0.20 inches) above the placard horizontal center line. The symbol, text, class number and inner border must be black.

Section 172.558 would be revised to read as follows:

§ 172.558 CORROSIVE placard.

(a) Except for size and color, the CORROSIVE placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the CORROSIVE placard must be black in the lower portion with a white triangle in the upper portion. The base of the white triangle must be 38.1 mm \pm 5 mm (1.5 inches) above the placard horizontal center line. The text and class number must be white. The symbol and inner border must be black.

Appendix B—[Reserved]

Appendix B to Part 172 would be removed and reserved.

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

The authority citation for Part 173 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806, 1807, 1808; 49 CFR Part 1, unless otherwise noted.

With the exception of Subparts C and I, the table of contents for Part 173 would be revised as follows:

Subpart A—General

Sec.

- 173.1 Purpose and scope.
- 173.2 Hazardous materials classes and index to hazard class definitions.
- 173.2a Classification of a material having more than one hazard.
- 173.3 Packaging and exceptions.
- 173.3a Poisonous liquids which are toxic by inhalation.
- 173.4 Exceptions for small quantities.
- 173.5 Agricultural operations.
- 173.7 U.S. Government material.
- 173.9 Cars, truck bodies or trailers containing lading which has been fumigated or treated with Class 3 Divisions 2.1 or 2.3, or Division 6.1 materials.
- 173.10 Tank car shipments.
- 173.11 Shipper's registration statements; flammable cryogenic liquids.
- 173.12 Exceptions for shipment of waste materials.

Subpart B—Preparation of Hazardous Materials for Transportation

- 173.21 Forbidden materials and packages.
- 173.22 Shipper's responsibility.
- 173.23 Previously authorized packaging.
- 173.24 General requirements for packagings and packages.
- 173.24a Additional general requirements for non-bulk packagings and packages.
- 173.24b Additional general requirements for bulk packagings and packages.
- 173.25 Authorized packages and overpacks.
- 173.26 Quantity limitations.
- 173.27 General requirements for transportation by aircraft.
- 173.28 Reuse, reconditioning and remanufacture of packagings.
- 173.29 Empty packagings.
- 173.30 Loading and unloading of transport vehicles.
- 173.31 Qualification, maintenance, and use of tank cars.
- 173.32 Qualification, maintenance and use of portable tanks.
- 173.32a Approval of Specification IM portable tanks.
- 173.32b Periodic testing and inspection of Specification IM portable tanks.
- 173.32c Use of Specification IM portable tanks.
- 173.33 Qualification, maintenance and use of cargo tanks.

173.34 Qualification, maintenance and use of cylinders.

173.40 General packaging requirements for poisonous materials required to be packaged in cylinders.

Subpart D—Definitions, Classification, Packing Group Assignments and Exceptions for Hazardous Materials Other Than Class 1 and Class 7

- 173.115 Class 2, Divisions 2.1, 2.2, and 2.3—Definitions.
 - 173.116 Class 2—Assignment of Packing Group.
 - 173.120 Class 3—Definitions.
 - 173.121 Class 3—Assignment of Packing Group.
 - 173.124 Class 4, Divisions 4.1, 4.2 and 4.3—Definitions.
 - 173.125 Class 4—Assignment of Packing Group.
 - 173.128 Class 5, Divisions 5.1 and 5.2—Definitions.
 - 173.129 Class 5—Assignment of Packing Group.
 - 173.132 Class 6, Division 6.1—Definitions.
 - 173.133 Division 6.1—Assignment of Packing Group.
 - 173.134 Class 6, Division 6.2—Definition.
 - 173.136 Class 6—Definitions.
 - 173.137 Class 6—Assignment of Packing Group.
 - 173.140 Class 8—Definitions.
 - 173.141 Class 8—Assignment of Packing Group.
 - 173.144 Other Regulated Materials (ORM)—Definitions.
 - 173.145 Other Regulated Materials—Assignment of Packing Group.
 - 173.150 Exceptions for Class 3 (flammable and combustible liquids).
 - 173.151 Exceptions for Division 4.1 (flammable solids).
 - 173.152 Exceptions for Division 5.1 (oxidizers) and Division 5.2 (organic peroxides).
 - 173.153 Exceptions for Division 6.1 (poisonous materials).
 - 173.154 Exceptions for Class 8 (corrosive materials).
 - 173.155 Exceptions for Class 9 (miscellaneous hazardous materials).
 - 173.156 Exceptions for ORM materials.
- Subpart E—Non-bulk Packaging for Hazardous Materials Other Than Class 1 and Class 7**
- 173.158 Nitric acid.
 - 173.159 Batteries, wet.
 - 173.160 Bombs, smoke, non-explosive (corrosive).
 - 173.161 Chemical kits.
 - 173.162 Gallium.
 - 173.163 Hydrogen fluoride.
 - 173.164 Mercury (metallic and articles containing mercury).
 - 173.171 Smokeless powder for small arms.
 - 173.172 Aircraft hydraulic power unit fuel tank.
 - 173.173 Paint, paint-related material, adhesives and ink.
 - 173.174 Refrigerating machines.
 - 173.160 Aircraft thrust devices.
 - 173.181 Pyrophoric materials (liquids).

- 173.182 Barium azide—50 percent or more water wet.
- 173.183 Nitrocellulose base film.
- 173.184 Highway or rail fusee.
- 173.185 Lithium batteries and cells.
- 173.186 Matches.
- 173.187 Pyrophoric solids, metals or alloys, n.o.s.
- 173.188 White or yellow phosphorus.
- 173.192 Packaging for certain Packing Group I poisonous materials.
- 173.193 Bromoacetone, methyl bromide, chloropicrin and methyl bromide or methyl chloride mixtures, etc.
- 173.194 Gas identification sets.
- 173.195 Hydrocyanic acid, liquid (prussic acid) and hydrocyanic acid liquefied.
- 173.196 Infectious substances (etiologic agents).
- 173.198 Nickel carbonyl.
- 173.201 Non-bulk packagings for liquid hazardous materials in Packing Group I.
- 173.202 Non-bulk packagings for liquid hazardous materials in Packing Group II.
- 173.203 Non-bulk packagings for liquid hazardous materials in Packing Group III.
- 173.204 Non-bulk, non-specification packagings for certain hazardous materials.
- 173.205 Specification cylinders for liquid hazardous materials.
- 173.211 Non-bulk packagings for solid hazardous materials in Packing Group I.
- 173.212 Non-bulk packagings for solid hazardous materials in Packing Group II.
- 173.213 Non-bulk packagings for solid hazardous materials in Packing Group III.
- 173.214 Packagings which require approval by the Director, OHMT.
- 173.216 Asbestos, blue or white.
- 173.217 Carbon dioxide, solid (dry ice).
- 173.218 Fish meal or fish scrap.
- 173.219 Life rafts, aircraft survival kits, etc.
- 173.220 Internal combustion engines, self-propelled vehicles, and mechanical equipment containing internal combustion engines or wet batteries.
- 173.221 Polystyrene beads, expandable.
- 173.222 Wheelchairs equipped with wet electric storage batteries.
- 173.225 Packagings for organic peroxides.
- 173.226 Liquids toxic by inhalation, Division 6.1, Packing Group I, Zone A.
- 173.227 Liquids toxic by inhalation, Division 6.1, Packing Group I, Zone B.
- 173.228 Bromine pentafluoride or bromine trifluoride.
- 173.229 Chloric acid solution or chlorine dioxide hydrate, frozen.
- 173.230 Non-bulk packagings for ORM-D materials.

Subpart F—Bulk Packaging for Hazardous Materials Other Than Classes 1 and 7

- 173.240 Bulk packaging for certain flammable solids (Division 4.1), solid oxidizers (Division 5.1), corrosive solids (Class 8) and other similar low hazard materials.
- 173.241 Bulk packaging for certain combustible liquids (Class 3), flammable solids (Divisions 4.2 and 4.3), and other similar hazardous materials.
- 173.242 Bulk packaging for certain medium hazard liquids and solids, including solids with dual hazards.

- 173.243 Bulk packaging for certain high hazard liquids and dual hazard liquids which pose a moderate hazard.
- 173.244 Bulk packaging for certain pyrophoric liquids (Division 4.2), poisonous liquids with inhalation hazards (Division 6.1) and gases (Class 2).
- 173.245 Bulk packaging for extremely hazardous materials such as poisonous gases (Division 2.3).
- 173.248 Ethylene oxide.
- 173.249 Bromine.

Subpart G—Gases; Preparation and Packaging

- 173.300a Approval of independent inspection agency.
- 173.300b Approval of non-domestic chemical analyses and tests.
- 173.300c Termination of approval.
- 173.301 General requirements for shipment of compressed gases in cylinders.
- 173.302 Charging of cylinders with non-liquefied compressed gases.
- 173.303 Charging of cylinders with compressed gas in solution (acetylene).
- 173.304 Charging of cylinders with liquefied compressed gas.
- 173.305 Charging of cylinders with a mixture of compressed gas and other material.
- 173.306 Limited quantities of compressed gases.
- 173.307 Exceptions for compressed gases.
- 173.308 Cigarette lighter or other similar device charged with fuel.
- 173.314 Requirements for compressed gases in tank cars.
- 173.315 Compressed gases in cargo tanks and portable tanks.
- 173.316 Cryogenic liquids in cylinders.
- 173.318 Cryogenic liquids in cargo tanks.
- 173.319 Cryogenic liquids in tank cars.
- 173.320 Cryogenic liquids; exceptions.
- 173.321 Ethylamine.
- 173.322 Ethyl chloride.
- 173.323 Ethylene oxide.
- 173.324 Ethyl methyl ether.
- 173.334 Organic phosphates mixed with compressed gas.
- 173.335 Gas generator assemblies.
- 173.336 Nitrogen dioxide, liquid; nitrogen peroxide liquid, and nitrogen tetroxide, liquid.
- 173.337 Nitric oxide.
- 173.338 Tungsten hexafluoride.
- 173.340 Tear gas devices.

Subpart H—[Reserved]

Subparts J, K, L, M, N, O—[Reserved]

Appendix A—Method of testing Corrosion to Skin

Appendix B—Procedure for Testing Chemical Compatibility and Rate of Permeation in Polyethylene Packagings and Receptacles

Appendix C—Procedure for Base Level Vibration Testing

Subpart A—General

In § 173.1, paragraph (d) would be added as follows:

§ 173.1 Purpose and scope.

(d) In general, the Hazardous Materials Regulations (HMR) contained in this subchapter are based on the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods and are consistent with international regulations issued by the International Civil Aviation Organization and the International Maritime Organization. However, the HMR are not consistent in all respects with the UN Recommendations, the ICAO Technical Instructions or the IMDG Code, and compliance with the HMR will not guarantee acceptance by regulatory bodies outside of the United States.

Section 173.2 would be revised as follows:

§ 173.2 Hazardous materials classes and index to hazard class definitions.

The hazard class of a hazardous material is indicated either by its class (or division) number, its class name, or by the letters "ORM-D" or "ORM-E". The following table lists class numbers, division numbers, class or division names and those sections of this subchapter which contain definitions for classifying hazardous materials, including forbidden materials.

| Class No. | Division No. (if any) | Name of class or division | 49 CFR reference for definitions |
|-----------|-----------------------|--|----------------------------------|
| None..... | | Forbidden materials..... | 173.21 |
| None..... | | Forbidden explosives..... | 173.53 |
| 1..... | 1.1 | Explosives (with a mass explosion hazard)..... | 173.50 |
| 1..... | 1.2 | Explosives (with a projection hazard)..... | 173.50 |
| 1..... | 1.3 | Explosives (with predominately a fire hazard)..... | 173.50 |
| 1..... | 1.4 | Explosives (with no significant blast hazard)..... | 173.50 |
| 1..... | 1.5 | Very insensitive explosives; blasting agents..... | 173.50 |
| 2..... | 2.1 | Flammable gas..... | 173.115 |
| 2..... | 2.2 | Non-flammable compressed gas..... | 173.115 |
| 2..... | 2.3 | Poisonous gas..... | 173.115 |
| 3..... | | Flammable and combustible liquids..... | 173.120 |
| 4..... | 4.1 | Flammable solids..... | 173.124 |
| 4..... | 4.2 | Spontaneously combustible materials..... | 173.124 |
| 4..... | 4.3 | Dangerous when wet materials..... | 173.124 |
| 5..... | 5.1 | Oxidizers..... | 173.126 |
| 5..... | 5.2 | Organic peroxides..... | 173.126 |
| 6..... | 6.1 | Poisonous materials..... | 173.132 |
| 6..... | 6.1 | Irritating materials..... | 173.381 |

| Class No. | Division No. (if any) | Name of class or division | 49 CFR reference for definitions |
|-----------|-----------------------|--|----------------------------------|
| 6 | 6.2 | Etiologic or infectious substances | 173.134 |
| 7 | | Radioactive materials | 173.403 |
| 8 | | Corrosive materials | 173.136 |
| 9 | | Miscellaneous hazardous materials | 173.140 |
| None | | Other regulated materials: ORM-D and ORM-E | 173.144 |

Section 173.2a would be added to read as follows:

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

(a) *Materials not subject to precedence of hazard ranking.* (1) A material with more than one hazard which is specifically identified and classed in the § 172.101 Table is not subject to the precedence of hazard ranking of this section, (unless that material does not pose the hazard of the class assigned in the § 172.101 Table, and is not preceded, in Column I of the Table, with a "+" symbol.)

(2) *Class 1.* An explosive shall be classed and approved in accordance with Subpart C of this part.

(3) *Division 5.2.* A material meeting the definition in § 173.128 for organic peroxide shall be classed in Division 5.2.

(4) *Division 6.2.* A material meeting the definition in § 173.134 for etiologic agent shall be classed in Division 6.2.

(5) *Class 7-limited quantities.* A limited quantity radioactive material that meets the definitions for more than one hazard class shall be classed in accordance with § 173.421-2.

(b) *Precedence of hazard.* Except as otherwise provided in this section, a material meeting the definitions for more than one hazard class as defined in this part shall be classed according to the highest applicable hazard class of the following hazard classes, which are listed in descending order of hazard:

(1) Class 7 (radioactive materials, except limited quantities).

(2) Division 2.3 (poisonous gases).

(3) Division 2.1 (flammable gases).

(4) Division 2.2 (nonflammable gases).

(5) Class 3 (flammable liquids and combustible liquids) or 8 (corrosive materials) or Division 4.1 (flammable solids), 4.2 (spontaneously combustible materials), 4.3 (dangerous when wet materials), 5.1 (oxidizers) or 6.1 (poisonous liquids or solids). Materials meeting more than one of these hazards shall be assigned a hazard class in accordance with paragraph (c) of this section.

(6) Class 9 (miscellaneous hazardous materials).

(7) ORM-E (hazardous wastes and hazardous substances).

(c) *Precedence of hazard table.* A material meeting the definitions for more than one hazard class for Classes 3 and 8 and Divisions 4.1, 4.2, 4.3, 5.1 and 6.1 shall be assigned a hazard class based on the following table:

PRECEDENCE OF HAZARD TABLE

[Hazard class and packing group]

| Hazard Class and packing group | 4.2* | 4.3* | 5.1* I | 5.1* II | 5.1* III | 6.1 I(i) | 6.1 I(d) | 6.1 I(o) | 6.1 II | 6.1 III | 8 I(l) | 8 I(s) | 8 II(l) | 8 II(s) | 8 III(l) | 8 III (s) |
|--------------------------------|------|------|--------|---------|----------|----------|----------|----------|--------|---------|--------|--------|---------|---------|----------|-----------|
| 3 I | | | 3 | 3 | 3 | 6.1 | 3 | 3 | 3 | 3 | 8 | (1) | 3 | (1) | 3 | (1) |
| 3 II | | | 3 | 3 | 3 | 6.1 | 3 | 3 | 3 | 3 | 8 | (1) | 3 | (1) | 3 | (1) |
| 3 III | | | 3 | 3 | 3 | 6.1 | 6.1 | 6.1 | 6.1 | 3 | 8 | (1) | 8 | (1) | 3 | (1) |
| 4.1 I* | 4.2 | 4.3 | 4.1 | 4.1 | 4.1 | 6.1 | 6.1 | 4.1 | 4.1 | 4.1 | (1) | 4.1 | (1) | 4.1 | (1) | 4.1 |
| 4.1 II* | 4.2 | 4.3 | 4.1 | 4.1 | 4.1 | 6.1 | 6.1 | 6.1 | 4.1 | 4.1 | (1) | 4.1 | (1) | 4.1 | (1) | 4.1 |
| 4.1 III* | 4.2 | 4.3 | 4.1 | 4.1 | 4.1 | 6.1 | 6.1 | 6.1 | 6.1 | 4.1 | (1) | 8 | (1) | 8 | (1) | 4.1 |
| 4.2 I* | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 6.1 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| 4.2 II* | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 | 6.1 | 6.1 | 4.2 | 4.2 | 4.2 | 4.2 | 8 | 4.2 | 4.2 | 4.2 | 4.2 |
| 4.2 III* | 4.3 | 5.1 | 5.1 | 4.2 | 6.1 | 6.1 | 6.1 | 6.1 | 4.2 | 8 | 8 | 8 | 8 | 8 | 4.2 | 4.2 |
| 4.3 I* | | | 5.1 | 4.3 | 4.3 | 6.1 | 6.1 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 | 4.3 |
| 4.3 II* | | | 5.1 | 4.3 | 4.3 | 6.1 | 6.1 | 4.3 | 4.3 | 4.3 | 8 | 8 | 4.3 | 4.3 | 4.3 | 4.3 |
| 4.3 III* | | | 5.1 | 5.1 | 4.3 | 6.1 | 6.1 | 6.1 | 6.1 | 4.3 | 8 | 8 | 8 | 8 | 4.3 | 4.3 |
| 5.1 I* | | | | | | 6.1 | 6.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 | 5.1 |
| 5.1 II* | | | | | | 6.1 | 6.1 | 5.1 | 5.1 | 5.1 | 8 | 8 | 5.1 | 5.1 | 5.1 | 5.1 |
| 5.1 III* | | | | | | 6.1 | 6.1 | 6.1 | 5.1 | 5.1 | 8 | 8 | 8 | 8 | 5.1 | 5.1 |
| 6.1 I(i) | | | | | | | | | | | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| 6.1 I(d) | | | | | | | | | | | 8 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| 6.1 I(o) | | | | | | | | | | | 8 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| 6.1 II(i) | | | | | | | | | | | 8 | 6.1 | 6.1 | 6.1 | 6.1 | 6.1 |
| 6.1 II(d) | | | | | | | | | | | 8 | 6.1 | 8 | 6.1 | 6.1 | 6.1 |
| 6.1 II(o) | | | | | | | | | | | 8 | 8 | 8 | 6.1 | 6.1 | 6.1 |
| 6.1 III | | | | | | | | | | | 8 | 8 | 8 | 8 | 8 | 8 |

- (i) Inhalation Toxicity.
- (d) Dermal Toxicity.
- (o) Oral Toxicity.
- (l) Liquid.
- (s) Solid.

* There are no established criteria for determining packing groups within Divisions 4.1, 4.2, 4.3 and 5.1. Degree of hazard for these materials should be assessed by analogy with similar materials identified in the § 172.101 Table, allocating the materials to Packing Group I (high hazard), Packing Group II (medium hazard) or Packing Group III (low hazard).

1 An impossible combination.

Section 173.3 would be revised to read as follows:

§ 173.3 Packaging and exceptions.

(a) The packaging of hazardous materials for transportation by air, highway, rail, or water must be as specified in this part. Methods of manufacture, packing, and storage of hazardous materials, that affect safety in transportation, must be open to inspection by a duly authorized representative of the initial carrier or of the Department. Methods of manufacture and related functions necessary for completion of a DOT specification or UN standard packaging must be open to inspection by a representative of the Department.

(b) The regulations setting forth packaging requirements for a specific material apply to all modes of transportation unless otherwise stated, or unless exceptions from packaging requirements are authorized.

(c) *Salvage drums.* Packages of hazardous materials that are damaged or found leaking and hazardous materials that have spilled or leaked may be placed in a metal or plastic removable head salvage drum that is compatible with the lading and shipped for repackaging or disposal under the following conditions:

(1) The drum must be a UN 1A2, 1B2, 1N2 or 1H2 drum marked for the performance standard commensurate with the packing group of the material it is to contain. Maximum capacity of the drum may not exceed 450 liters (118.88 gallons).

(2) Each drum shall be provided when necessary with sufficient cushioning and absorption material to prevent excessive movement of the damaged package and to absorb all free liquid. All cushioning and absorbent material used in the drum must be compatible with the hazardous material.

(3) Each drum shall be marked with the proper shipping name of the material inside the defective packaging and the name and address of the consignee. In addition, the drum shall be marked "Salvage Drum".

(4) Each drum shall be labeled as prescribed for the respective material.

(5) The shipper shall prepare shipping papers in accordance with Subpart C of Part 172 of this subchapter.

(6) The overpack requirement of § 173.25 does not apply to drums used in accordance with this paragraph.

Section 173.3a would be revised to read as follows:

§ 173.3a Poisonous liquids which are toxic by inhalation.

Notwithstanding the requirements of Part 172 and Part 173 of this subchapter, any hazardous material that meets the definition of Class 6, Division 6.1, Packing Group I, for inhalation toxicity (See §§ 173.132 and 173.133) shall be packaged in non-bulk packagings in accordance with § 173.226 or § 173.227, as appropriate, or in bulk packagings in accordance with § 173.244 and shall be described on shipping papers, marked, labeled, and placarded in accordance with §§ 172.203(k)(4), 173.313(a), 172.402(a)(5) and 172.505(a), of this subchapter respectively.

Section 173.4 would be revised to read as follows:

§ 173.4 Exceptions for small quantities.

(a) Small quantities of Class 3, Division 4.1, Division 5.1, Division 5.2, Class 8, and Division 6.1 materials, and Class 7 materials that also meet the definition of one or more of these hazard classes, are not subject to any other requirements of this subchapter if:

(1) The maximum quantity of material per inner receptacle is limited to:

(i) Thirty (30) milliliters for authorized liquids, other than Division 6.1, Packing Group I, materials;

(ii) Thirty (30) grams for authorized solids, other than Division 6.1, Packing Group I, materials;

(iii) One (1) gram for authorized materials classed as Division 6.1, Packing Group I; and

(iv) An activity level not exceeding that specified in §§ 173.421, 173.422 or 173.424, as appropriate, for a package containing a Class 7 material.

(2) With the exception of temperature sensing devices, each inner receptacle:

(i) Is not liquid-full at 55 °C (131 °F), and

(ii) Is constructed of plastic having a minimum thickness of no less than 0.008-inch (0.2 millimeters), or earthenware, glass, or metal;

(3) Each inner receptacle with a removable closure has its closure held securely in place with wire, tape, or other positive means;

(4) Unless equivalent cushioning and absorbent material surrounds the inside packaging, each inner receptacle is securely packed in an inside packaging with cushioning and absorbent material that:

(i) Will not react chemically with the material, and

(ii) Is capable of absorbing the entire contents (if a liquid) of the receptacle;

(5) The inside packaging is securely packed in a strong outside packaging;

(6) The completed package, as demonstrated by prototype testing, is capable of sustaining—

(i) Each of the following free drops made from a height of 1.8 meters (5.91 feet) directly onto a solid unyielding surface without breakage or leakage from any inner receptacle and without a substantial reduction in the effectiveness of the package:

(A) One drop flat on bottom;

(B) One drop flat on top;

(C) One drop flat on the long side;

(D) One drop flat on the short side; and

(E) One drop on a corner at the junction of three intersecting edges; and

(ii) A compressive load in pounds, determined by multiplying by two the maximum horizontal cross section of the package (in square inches) in the position in which it would normally be transported, without a substantial reduction in effectiveness; the load shall be applied continuously during a period of 24 hours, uniformly against the top and bottom of the package which is in the position in which it is intended to be normally transported.

Note.—Each of the above tests may be performed on a different, but identical, package; i.e., all tests need not be performed on the same package.

(7) Placement of the material in the package or packing different materials in the package does not result in a violation of § 173.21;

(8) The gross weight of the completed package does not exceed 65 pounds (29.5 kg);

(9) The shipper certifies conformance with this section by marking the outside of the package with the statement: "This package conforms to conditions and limitations specified in 49 CFR 173.4";

(10) The package is not opened or otherwise altered until it is no longer in commerce; and

(11) The package, unless specifically approved by the Director, OHMT, does not contain a material assigned any of the following identification numbers associated with the hazardous materials description in the § 172.101 Table:

1092, 1131, 1259, 1380, 1397, 1419, 1422, 1432, 1483, 1491, 1504, 1749, 1798, 1831, 1873, 2031, 2032, 2495, 2626, 2813, 2845, 2924, 2925, 9191, 9193

(b) A package containing a Class 7 material also must conform with the requirements of § 173.421 (a) through (e), or § 173.422 (a) through (f), as appropriate. After May 2, 1987, a package containing a Class 7 material may not be offered for transportation

aboard a passenger-carrying aircraft unless that material is intended for use in, or incident to, research, medical diagnosis or treatment.

§ 173.5 [Amended]

In § 173.5, quantity references would be revised as follows:

a. In paragraph (a)(2), the reference to "1 gallon" would be changed to "4 liters (4.2 quarts)" and the reference to "25 pounds" would be changed to "15 kg (33.1 pounds)".

b. In paragraph (a)(3) the reference to "100 pounds" would be changed to "50 kg (110.2 pounds)."

c. In paragraph (b) the reference to "55 gallons" would be changed to "220 L (58.1 gallons)".

§ 173.6 [Removed]

Section 173.6 would be removed.

§ 173.7 [Amended]

In § 173.7, in paragraphs (b) and (d), the word "radioactive" would be changed to "Class 7".

Section 173.9 would be revised as follows:

§ 173.9 Cars, truck bodies or trailers containing lading which has been fumigated or treated with Class 3, Divisions 2.1, 2.3, or 6.1 materials.

(a) Delivery for transportation by rail carrier of any rail car, freight container, truck body, or trailer containing lading which has been fumigated or treated with Class 3 or Division 2.1 materials is prohibited until 48 hours have elapsed after such fumigation or treatment, or until the rail car, freight container, truck body or trailer has been ventilated so as to remove any danger of fire or explosion due to the presence of flammable vapors.

(b) Any rail car, freight container, truck body or trailer containing lading which has been fumigated or treated with Division 6.1 or Division 2.3 materials, such as carbolic acid, liquid or solid, chlorpicrin, hydrocyanic acid, methyl bromide, etc., must be placarded on each door or near thereto with the FUMIGANT placard prescribed in paragraph (c) of this section.

(c) **FUMIGANT placard.** The FUMIGANT placard must consist of red letters on a white background which is at least 25 cm (9.8 inches) wide and 20 cm (7.9 inches) high. It must contain the name of the fumigant and other text as follows:

DANGER

The lading of this car has been
**FUMIGATED or
TREATED**
with

(Name of poisonous liquid, solid, or gas)

BEFORE UNLOADING, open both doors and DO NOT ENTER until car is free of gas. REMOVE ALL POISONOUS MATERIAL before release of empty car.

(d) See § 174.615 of this subchapter for requirements for cleaning fumigated cars.

§ 173.10 [Amended]

In § 173.10, terms would be revised as follows:

1. In paragraph (a) the term "flammable gas" would be changed to "Division 2.1 material" and the term "flammable liquid" would be changed to "Class 3 material".

2. In paragraph (b) the term "compressed gas" would be changed to "Class 2 material".

3. In paragraph (e), the phrase "Flammable liquids and flammable gases" would be changed to "Class 3 and Division 2.1 materials."

Section 173.12 would be revised to read as follows:

§ 173.12 Exceptions for shipment of waste materials.

(a) **Open head drums.** If a hazardous material that is a hazardous waste is required by this subchapter to be shipped in a closed head drum (i.e., a drum with a 7.0 cm (2.75 inches) or less bung opening) and the hazardous waste contains solids or semisolids that make its placement in a closed head drum impracticable, an equivalent (except for closure) open head drum maybe used for the hazardous waste.

(b) **"Lab packs".** Waste materials classed as Class or Division 3, 4.1, 4.2, 4.3, 5.1, 6.1, 8, 9 or ORM-E are excepted from the specification packaging requirements of this subchapter if packaged in combination packagings in accordance with this paragraph and transported for disposal or recovery by private or contract motor carrier by highway only. In addition, a generic description from the § 172.101 Table may be used in place of specific chemical names, when two or more chemically compatible waste materials in the same hazard class are packaged in the same outside packaging.

Additional packaging requirements are as follows:

(1) The outer packaging must be a 1A2 or 1B2 metal drum, a 1D plywood drum, a 1G fiber drum or a 1H2 plastic drum;

(2) The inner packagings must be either glass not exceeding 4 liters (4.2 quarts) rated capacity or metal or plastic not exceeding 20 liters (21.1 quarts) rated capacity;

(3) Each outer packaging may contain only one class of hazardous material;

(4) Inner packagings containing liquid must be surrounded by a chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents;

(5) Gross weight of the complete package may not exceed 205 kg (451.9 lbs); and

(6) Materials meeting the definition of Division 6.1, Packing Group I, or Division 4.2, Packing Group I, may not be packaged or described under the provisions of this paragraph.

(c) **Nonreusable packagings.** A packaging which is nonreusable according to the specification requirements of Part 178 of this subchapter or to § 173.28 of this part may be reused for the shipment of hazardous waste to designated facilities subject to the following conditions:

(1) Except as authorized by this paragraph, the waste must be packaged in accordance with this part and offered for transportation in accordance with the requirements of this subchapter.

(2) Transportation is performed by highway only.

(3) A package is not offered for transportation less than 24 hours after it is finally closed for transportation, and each package is inspected for leakage and is found to be free from leaks immediately prior to being offered for transportation.

(4) Each package is loaded by the shipper and unloaded by the consignee, unless the motor carrier is a private or contract carrier.

(5) The packaging may be used only once under this paragraph and may not be used again for shipment of hazardous materials except in accordance with § 173.28.

Subpart B—Preparation of Hazardous Materials for Transportation

Section 173.21 would be revised as follows:

§ 173.21 Forbidden materials and packages.

Unless otherwise provided in this subchapter, the offering for transportation or transportation of the following is forbidden:

(a) Materials that are designated "Forbidden" in Column 3 of the § 172.101 Table.

(b) Forbidden explosives as defined in § 173.51 of this part.

(c) Electrical devices which are likely to create sparks or generate a dangerous quantity of heat, unless packaged in a manner which precludes such an occurrence.

(d) For carriage by aircraft, any package which has a magnetic field of more than 0.00525 gauss measured at 15 feet (4.6 meters) from any surface of the package.

(e) A material in the same packaging, freight container, or overpack with another material, the mixing of which is likely to cause a dangerous evolution of heat, flammable or poisonous gases or vapors, or to produce corrosive materials.

(f) A package containing a material which is likely to decompose or polymerize at a temperature of 130 °F (54.4 °C) or less with an evolution of a dangerous quantity of heat or gas unless stabilized or inhibited in a manner that will preclude such evolution, subject to the following:

(1) For organic peroxides, the decomposition temperature of 130 °F (54.4 °C) does not apply if the controlled temperature requirements specified in Chapter 11 of the UN Recommendations are applied to determine when refrigeration is required, and refrigeration is approved as required by paragraph (f)(3) of this section.

(2) The determination of whether a material is forbidden under this paragraph may be made by using the Self Accelerating Decomposition Temperature (SADT) Test published by the Organic Peroxide Producers Safety Division (OPPSD).

(3) Refrigeration may be used as a means of stabilization only when approved by the Director, OHMT. For status of approvals previously issued by the Bureau of Explosives, see § 171.19 of this subchapter.

(g) Packages which give off a flammable gas or vapor, released from a material not otherwise subject to this subchapter, likely to create a flammable mixture with air in a transport vehicle.

(h) Packages containing materials (other than those classed as explosive) which will detonate in a fire.

(1) For purposes of this paragraph, "detonate" means an explosion in which the shock wave travels through the material at a speed greater than the speed of sound.

(2) When tests are required to evaluate the performance of a package under the provisions of this paragraph,

the testing must be done or approved by one of the agencies specified in § 173.86.

(i) Except as noted in paragraph (i)(1) of this section, a package containing a cigarette lighter, or other similar device, equipped with an ignition element and containing fuel.

(1) A cigarette lighter or similar device subject to this paragraph may be shipped if the design of the device and its packaging has been examined by the Bureau of Explosives and specifically approved by the Director, OHMT. The examination of cigarette lighters and similar devices containing gaseous fuel will include scrutiny for compliance with § 173.308 of this part. For the status of approvals previously issued by the Bureau of Explosives, see § 171.19 of this subchapter.

In § 173.23, paragraph (a) would be revised as follows:

§ 173.23 Previously authorized packaging.

(a) When the regulations specify a packaging with a specification marking prefix of "DOT," a packaging marked prior to January 1, 1970, with the prefix of "ICC" may be used in its place if the packaging otherwise conforms to applicable specification requirements.

Section 173.24 would be revised as follows:

§ 173.24 General requirements for packagings and packages.

(a) *Applicability.* Except as otherwise provided in this subchapter, the provisions of this section apply to—

- (1) Bulk and non-bulk packagings;
- (2) New packagings and packagings which are reused; and
- (3) Specification and non-specification packagings.

(b) Each package used for the shipment of hazardous materials under this subchapter shall be designed, constructed, maintained, filled, its contents so limited, and closed, so that under conditions normally incident to transportation—

- (1) There will be no release of hazardous materials to the environment;
- (2) The effectiveness of the packaging will not be significantly reduced; and
- (3) There will be no mixture of gases or vapors in the package which could, through any credible spontaneous increase of heat or pressure, significantly reduce the effectiveness of the packaging.

(c) *Authorized packagings.* A packaging is authorized for a hazardous material only if—

- (1) The packaging is prescribed or permitted for the hazardous material in a packaging section specified for that material in Column 8 of the § 172.101

Table and conforms to applicable requirements in the special provisions of Column 7 of the § 172.101 Table and, for specification packagings (including UN standard packagings), the specification requirements in Parts 178 and 179 of this subchapter; or

(2) The packaging is permitted under and conforms to provisions contained in §§ 171.11, 171.12, 171.12a, 173.3, 173.4, 173.5, 173.6, 173.7, or 176.11 of this subchapter.

(d) *DOT specification and UN standard packagings.* For DOT specification packagings (including UN standard packagings), conformance to the applicable specifications in Parts 178 and 179 of this subchapter is required in all details. For performance-oriented packagings covered by Subpart L of Part 178 of this subchapter, each packaging must be capable of meeting the performance test requirements specified in Subpart M of Part 178 of this subchapter for the applicable packing group shown in Column 5 of the § 172.101 Table.

(e) *Compatibility.* (1) Even though certain packagings are specified in this Part, it is, nevertheless, the responsibility of the person offering a hazardous material for transportation to ensure that such packagings are compatible with their lading. This particularly applies to corrosivity, permeability, softening, premature aging and embrittlement.

(2) Packaging materials and contents must be such that there will be no significant chemical or galvanic reaction between the materials and contents of the package.

(3) *Plastic packagings and receptacles.* (i) Plastic used in packagings and receptacles must be of a type compatible with the lading and may not be permeable to an extent that a hazardous condition is likely to occur during transportation, handling or refilling.

(ii) Each plastic packaging or receptacle which is used for liquid hazardous material must be capable of withstanding without failure the procedure specified in Appendix B of this Part ("Procedure for Testing Chemical Compatibility and Rate of Permeation in Plastic Packagings and Receptacles"). The maximum rate of permeation of hazardous lading through or into the plastic packaging or receptacles may not exceed 0.5 percent for materials meeting the definition of a Division 6.1 material according to § 173.132 and 2.0 percent for other hazardous materials, when subjected to a temperature no lower than—

(A) 18 °C (64 °F) for 180 days in accordance with Test Method 1;

(B) 50 °C (122 °F) for 28 days in accordance with Test Method 2; or

(C) 60 °C (140 °F) for 14 days in accordance with Test Method 3.

(iii) Alternative procedures or rates of permeation are permitted if they yield a level of safety equivalent to or greater than that provided by paragraph (e)(3)(ii) of this section and are specifically approved by the Director, OHMT.

(4) *Mixed contents.* (i) Hazardous materials may not be packed or mixed together in the same outer packaging with other hazardous or nonhazardous materials if such materials are capable of reacting dangerously with each other and causing—

(A) Combustion or dangerous evolution of heat;

(B) Evolution of flammable, poisonous or asphyxiant gases;

(C) Formation of corrosive materials; or

(D) Formation of unstable materials.

(f) *Closures.* (1) Closures on packagings shall be so designed and closed that under conditions (including the effects of temperature and vibration) normally incident to transportation—

(i) Except as provided in paragraph (g) of this section, there is no release of hazardous materials to the environment from the opening to which the closure is applied; and

(ii) The closure is secure and leakproof.

(2) Except as otherwise provided in this subchapter, a closure (including gaskets or other closure components, if any) used on a specification packaging must conform to all applicable requirements of the specification.

(g) *Venting.* Venting of packagings, to reduce internal pressure which may develop by the evolution of gas from the contents, is permitted only when—

(1) Transportation by aircraft is not involved;

(2) Except as otherwise provided in this subchapter, the evolved gases are not toxic, flammable or asphyxiant gases;

(3) The packaging is designed so as to preclude a significant release of hazardous materials from the receptacle; and

(4) For shipments in bulk packagings, venting is authorized for the specific hazardous material by a special provision in the § 172.101 Table or by the applicable bulk packaging specification in Part 178 of this subchapter.

(h) *Outage and filling limits.* (1) *General.* When filling packagings and receptacles for liquids, sufficient ullage

(outage) must be left to ensure that neither leakage nor permanent distortion of the packaging or receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to be encountered during transportation. Liquids must not completely fill a receptacle at a temperature of 55 °C (131 °F) or less.

(2) *Compressed gases and cryogenic liquids.* Filling limits for compressed gases and cryogenic liquids are specified in §§ 173.301 through 173.306 for cylinders and §§ 173.314 through 173.319 for bulk packagings.

(i) *Air transportation.* Packages offered or intended for transportation by aircraft must conform to the general requirements for transportation by aircraft in § 173.27.

Section 173.24a would be added, as follows:

§ 173.24a Additional general requirements for non-bulk packagings and packages.

(a) *Packaging design.* (1) *Closures.* A closure device must be so designed that it is unlikely that it can be incorrectly or incompletely closed, and must be such that it may be checked easily to determine that it is completely closed. Except as provided in § 172.312 of this subchapter, a combination packaging containing liquid hazardous materials must be packed so that closures on inner receptacles are upright.

(2) *Friction.* The nature and thickness of the outer packaging must be such that friction during transportation is not likely to generate an amount of heat sufficient to alter dangerously the chemical stability of the contents.

(3) *Securing and cushioning.* Inner packagings of combination packagings must be so packed, secured and cushioned to prevent their breakage or leakage and to control their movement within the outer packaging under conditions normally incident to transportation. Cushioning material must not be capable of reacting dangerously with the contents of the inner packagings.

(4) *Metallic devices.* Nails, staples and other metallic devices shall not protrude into the interior of the outer packaging in such a manner as to be likely to damage inner packagings or receptacles.

(5) *Vibration.* Each non-bulk package must be capable of withstanding, without rupture or leakage, the vibration test procedure specified in Appendix C of this Part ("Procedure for Base Level Vibration Testing").

(b) *Non-bulk packaging filling limits.*

(1) A single or composite non-bulk packaging may be filled with a liquid hazardous material only when the

specific gravity of the material does not exceed that marked on the packaging, or a specific gravity of 1.2 if not marked.

(2) A single or composite non-bulk packaging may not be filled with a solid hazardous material to a gross mass greater than the maximum gross mass marked on the packaging.

(3) Packagings tested as prescribed in § 178.605 of this subchapter and marked with the hydrostatic test pressure as prescribed in § 178.503(a)(5) of this subchapter may be used for liquids only when the vapor pressure of the liquid conforms to one of the following:

(i) The vapor pressure must be such that the total pressure in the packaging (i.e., the vapor pressure of the liquid plus the partial pressure of air or other inert gases, less 100 kPa (14.5 psi)) at 55 °C (131 °F), determined on the basis of a maximum degree of filling in accordance with subparagraph (1) of this paragraph and a filling temperature of 15 °C (59 °F), will not exceed two-thirds of the marked test pressure;

(ii) The vapor pressure at 50 °C (122 °F) must be less than four-sevenths of the sum of the marked test pressure plus 100 kPa (14.5 psi); or

(iii) The vapor pressure at 55 °C (131 °F) must be less than two-thirds of the sum of the marked test pressure plus 100 kPa (14.5 psi).

(c) *Mixed contents.* (1) An outer non-bulk packaging may contain more than one hazardous material only when—

(i) The inner and outer packaging used for each hazardous material conforms to the relevant packaging sections of this Part applicable to each of the hazardous materials;

(ii) The package as prepared for shipment meets the performance tests prescribed in Part 178 for the packing group indicating the highest order of hazard for the hazardous materials contained in the package;

(iii) Corrosive materials in bottles are further packed in securely closed inner receptacles before packing in outer packagings; and

(iv) For transportation by aircraft, the total net quantity does not exceed the lowest permitted maximum net quantity per package as shown in Column 9a or 9b, as appropriate, of the § 172.101 Table. The permitted maximum net quantity must be calculated in kilograms if a package contains both a liquid and a solid.

(2) A packaging containing inner packagings of Division 6.2 materials may not contain other hazardous materials, except dry ice.

Section 173.24b would be added, as follows:

§ 173.24b Additional general requirements for bulk packagings and packages.

(a) *Pressure relief devices on bulk packagings.* Except when installed in series with a pressure relief valve, a non-reclosing pressure relief device may not be used on a bulk packaging containing a hazardous material that is flammable or poisonous or both.

(b) *Outage and filling limits.*—(1) *Tank car and multi-unit tank car tank filling limits.* (i) Hazardous materials may not be loaded into the dome of a tank car.

(ii) If the dome of the tank car does not provide sufficient outage, then vacant space must be left in the shell to make up the required outage.

(iii) Liquids other than flammable liquids must be so loaded in tank cars and multi-unit tank car tanks that the outage is at least one percent of the total capacity of the tank and dome at the reference temperature of 115 °F (46.1 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks. Tanks must not be liquid full at 131 °F (55 °C).

(iv) Flammable liquids must be so loaded in tank cars and multiunit tank car tanks that the outage is at least two percent of the total capacity of the tank and dome at the reference temperature of 115 °F (46.1 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks. Tanks must not be liquid full at 131 °F (55 °C).

(2) *Cargo tank and portable tank filling limits.* The outage in a cargo tank, portable tank, or compartment thereof must be at least one percent of the total capacity of the tank or compartment at the reference temperature of 115 °F (46.1 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks. Tanks must not be liquid full at 131 °F (55 °C).

(3) *Bulk packagings for liquids toxic by inhalation.* For a liquid which is toxic by inhalation under the criteria in § 173.133(a)(2), the outage in a bulk packaging must be at least five percent of the total capacity of the tank or compartment at the reference temperature of 115 °F (46 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks.

(c) *Equivalent steel.* Where the regulations permit steel other than stainless steel to be used in place of a specified stainless steel (for example, as in § 172.102 of this subchapter, special provision B30), the minimum thickness for the steel must be obtained from one of the following formulas, as appropriate:

Formula for metric units:

$$e_1 = (10e_0/Rm_1A_1)^2$$

Formula for non-metric units:

$$e_1 = (112.3e_0/Rm_1A_1)^2$$

where:

e_0 = Required thickness of the reference stainless steel in millimeters or inches, for metric units or non-metric units, respectively;

e_1 = Equivalent thickness of the non-stainless steel in millimeters or inches, for metric units or non-metric units, respectively;

Rm_1 = Specified minimum tensile strength of the non-stainless steel (from the appropriate specification in Part 178 of this subchapter) in deka-newtons per square millimeter or pounds per square inch, for metric units or non-metric units, respectively;

A_1 = Specified minimum percentage elongation of the non-stainless steel (from the appropriate specification in Part 178 of this subchapter) multiplied by 100 (for example, 20% times 100 equals 20).

In § 173.25, paragraph (b) would be removed, paragraph (a)(3) would be revised, and paragraph (a)(5) would be added as follows:

§ 173.25 Authorized packages and overpacks.

(a) * * *

(3) Each package subject to the orientation marking requirements of § 172.312 of this subchapter is packed in the overpack with its filling holes up and the overpack is marked with package orientation marking arrows on two opposite vertical sides of the overpack with the arrows pointing in the correct direction of orientation.

* * * * *

(5) Packages containing corrosive or oxidizing materials in Packing Group I may not be overpacked with any other materials.

Section 173.26 would be revised as follows:

§ 173.26 Quantity limitations.

When quantity limitations do not appear in the packaging requirements of this subchapter, the permitted gross weight or capacity authorized for a packaging is as shown in the packaging specification or standard in Part 178 or 179, as applicable, of this subchapter.

Section 173.27 would be revised as follows:

§ 173.27 General requirements for transportation by aircraft.

(a) The requirements of this section are in addition to the requirements in § 173.24 and apply to packages offered or intended for transportation by aircraft. Notwithstanding any Packing Group III performance level specified in Column 5 of the § 172.101 Table, the required performance level for such packages when offered or intended for transportation by aircraft is at the Packing Group II performance level, unless otherwise excepted from

performance requirements in Subpart E of this part.

(b) Packages authorized on board aircraft. (1) When Column 9a of the § 172.101 Table indicates that a material is "Forbidden", that material may not be offered for transportation or transported by passenger-carrying aircraft.

(2) When Column 9b of the § 172.101 Table indicates that a material is "Forbidden", that material may not be offered for transportation or transported by aircraft.

(3) The maximum quantity of hazardous material in a package that may be offered for transportation or transported by passenger-carrying aircraft or cargo aircraft may not exceed that quantity prescribed for the material in Column 9a or 9b, respectively, of the § 172.101 Table.

(4) A package containing a hazardous material which is authorized on cargo aircraft but not on passenger aircraft must be labeled with the CARGO AIRCRAFT ONLY label required by § 172.402(b) of this subchapter and may not be offered for transportation or transported on passenger-carrying aircraft.

(c) *Pressure requirements.* (1) Packagings must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during transportation by aircraft.

(2) Packagings for which retention of liquid is a basic function must be capable of withstanding without leakage the greater of—

(i) An internal pressure which produces a pressure of not less than 75 kPa (10.88 psi) for liquids in Packing Group III of Class 3 or Division 6.1, or 95 kPa (13.8 psi) for other liquids; or

(ii) A pressure related to the vapor pressure of the liquid to be conveyed, determined by one of the following:

(A) The total pressure measured in the receptacle (i.e., the vapor pressure of the material and the partial pressure of air or other inert gases, less 100 kPa (14.5 psi)) at 55 °C (131 °F), multiplied by a safety factor of 1.5; determined on the basis of a filling temperature of 15 °C (59 °F) and a degree of filling such that the receptacle is not completely liquid full at a temperature of 55 °C (131 °F) or less;

(B) 1.75 times the vapor pressure at 50 °C (122 °F) less 100 kPa (14.5 psi); or

(C) 1.5 times the vapor pressure at 55 °C (131 °F) less 100 kPa (14.5 psi).

(3) Notwithstanding the provisions of subparagraph (2) of this paragraph—

(i) Hazardous materials may be contained in an inner packaging which does not itself meet the pressure requirement provided that the inner

packaging is packed within a supplementary packaging which does meet the pressure requirement and other applicable packaging requirements of this subchapter.

(ii) Packagings which are subject to the hydrostatic pressure test and marking requirements of §§ 178.605 and 178.504(a)(5), respectively, of this subchapter must have a marked test pressure of not less than 250 kPa (36.3 psi) for liquids in Packing Group I, 80 kPa (11.6 psi) for liquids in Packing Group III of Class 3 or Division 6.1, and 100 kPa (14.5 psi) for other liquids.

(d) *Closures.* Stoppers, corks or other such friction-type closures must be held securely, tightly and effectively in place by positive means.

(e) *Absorbent materials.* Except as otherwise provided in this subchapter, liquids in Packing Group I or II of Class 3, 4, 5, 6, or 8, when in glass or earthenware inner packagings, must be packaged using material capable of absorbing and not likely to react dangerously with the liquid. Absorbent material is not required if the inner packagings are so protected that breakage of them and leakage of their contents from the outer packaging is not likely to occur under normal conditions of transportation and is not required for packagings containing liquids in Packing Group III for transport on cargo aircraft only. Where absorbent material is required and an outer packaging is not liquid-tight, a means of containing the liquid in the event of leakage must be used in the form of a leakproof liner, plastic bag or other equally efficient means of containment. Where absorbent material is required, the quantity and disposition of it in each outer packaging must be as follows:

(1) For packagings containing liquids in Packing Group I for transport on passenger-carrying aircraft, each packaging must contain sufficient absorbent material to absorb the contents of all inner packagings containing such liquids;

(2) For packagings containing liquids in Packing Group I for transport on cargo aircraft only and packagings containing liquids in Packing Group II for transport on passenger aircraft, each package must contain sufficient absorbent material to absorb the contents of any one of the inner packagings containing such liquids and, where they are of different sizes and quantities, sufficient absorbent material to absorb the contents of the inner packaging containing the greatest quantity of liquid.

(f) *Combination packagings.* Unless otherwise specified in this Part, or in § 171.11 of this subchapter, when

combination packagings are offered for transportation by aircraft, inner packagings must conform to the quantity limitations set forth in Table 1 for transport on passenger-carrying aircraft and Table 2 for transport on cargo aircraft only, as follows:

TABLE 1—MAXIMUM NET CAPACITY OF INNER PACKAGINGS FOR TRANSPORTATION ON PASSENGER-CARRYING AIRCRAFT

| Maximum net quantity per package column 9a of the § 172.101 table. | Maximum authorized net capacity of inner packagings | |
|--|---|-----------------------------------|
| | Glass, earthenware or fiber inner packagings | Metal or plastic inner packagings |
| Liquids: | | |
| Not greater than 0.5L..... | 0.5L | 0.5L |
| Greater than 0.5L, not greater than 1L..... | 0.5L | 1L |
| Greater than 1L, not greater than 5L..... | 1L | 5L |
| Greater than 5L, not greater than 60L..... | 2.5L | 10L |
| Greater than 60L, not greater than 220L..... | 5L | 25L |
| Greater than 220L..... | No limit | No Limit |
| Solids: | | |
| Not greater than 5 kg..... | 0.5 kg | 1 kg |
| Greater than 5 kg, not greater than 25 kg..... | 1 kg | 2.5 kg |
| Greater than 25 kg, not greater than 200 kg..... | 5 kg | 10 kg |
| Greater than 200 kg..... | No limit | No Limit |

TABLE 2—MAXIMUM NET CAPACITY OF INNER PACKAGINGS FOR TRANSPORTATION ON CARGO AIRCRAFT ONLY

| Maximum net quantity per package from column 9a of the § 172.101 table | Maximum authorized net capacity of inner packagings | |
|--|---|-----------------------------------|
| | Glass, earthenware or fiber inner packagings | Metal or plastic inner packagings |
| Liquids: | | |
| Not greater than 2.5L..... | 1L | 1L |
| Greater than 2.5L, not greater than 30L..... | 2.5L | 2.5L |
| Greater than 30L, not greater than 60L..... | 5L | 10L |
| Greater than 60L, not greater than 220L..... | 5L | 25L |
| Greater than 220L..... | No limit | No limit |
| Solids: | | |
| Not greater than 15 kg..... | 1 kg | 2.5 kg |
| Greater than 15 kg, not greater than 50 kg..... | 2.5 kg | 5 g |
| Greater than 50 kg, not greater than 200 kg..... | 5 kg | 10 kg |
| Greater than 200 kg..... | No limit | No limit |

(g) *Cylinders.* For any cylinder containing hazardous materials and incorporating valves, sufficient protection must be provided to prevent operation of and damage to, the valves during transportation, by one of the following methods:

- (1) By equipping each cylinder with securely attached valve caps or protective headrings; or
- (2) By boxing or crating the cylinder.

(h) *Tank cars and cargo tanks.* Tank cars and cargo tanks containing hazardous materials may not be transported aboard aircraft.

Section 173.28 would be revised as follows:

§ 173.28 **Reuse, reconditioning and remanufacture of packagings.**

(a) *Reuse.* Packagings and receptacles used more than once must be in such condition, including closure devices and cushioning materials, that they conform in all respects to the prescribed requirements of this subchapter, including the following provisions and limitations:

- (1) Before reuse, each packaging must be inspected and must not be reused unless free from rupture, corrosion, other damage or incompatible residue;
- (2) Before reuse, packaging subject to the leakproofness test with air prescribed in § 178.604 shall be leakproofness tested and marked as required by paragraph (b) of this section and § 178.503(c) of this subchapter;
- (3) Packagings made of paper, plastic film, textile or fiberboard are not authorized for reuse; and

(4) Metal and plastic drums, jerricans and the metal or plastic outer packagings of composite packagings are authorized for reuse only when they are marked in millimeters with the minimum thickness of the packaging material and conform to the following minimum construction criteria:

| Marked, or rated, capacity (net mass) not over | Minimum thickness of packaging material | |
|--|---|--------------------------|
| | Metal drum or jerrican | Plastic drum or jerrican |
| 20L (20 kg)..... | 0.6 mm (0.024 in.) | 1.2 mm (0.047 in.) |
| 40L (40 kg)..... | 0.7 mm (0.028 in.) | 1.8 mm (0.071 in.) |
| 120L (120 kg)..... | 0.9 mm (0.035 in.) | 2.2 mm (0.087 in.) |
| 220L (220 kg)..... | 1.0 mm (0.039 in.) | 2.2 mm (0.087 in.) |
| 450L (400 kg)..... | 1.8 mm (0.071 in.) | 5.0 mm (0.197 in.) |

(5) Plastic inner packagings of composite packagings must have a minimum thickness of 1.5mm (0.059 inch).

(b) *Reconditioning.* For the purpose of this subchapter, reconditioning is the repair, replacement of non-integral packaging components (such as removable gaskets, closure devices, cushioning material, etc.) or leakproofness testing of non-bulk packagings, other than cylinders. A person who reconditions a packaging manufactured under the provisions of Subpart L of Part 178 of this subchapter, shall mark that packaging as required by

§ 178.503(c) of this subchapter. The marking is the certification of the reconditioner that the packaging conforms to the standard for which it is marked and that all functions performed by the reconditioner which are prescribed by this subchapter have been performed in compliance with this subchapter.

(c) *Remanufacture.* For the purpose of this subchapter, remanufacture is the conversion of a non-specification, non-bulk packaging to a DOT specification or UN standard, the conversion of a packaging meeting one specification or standard to another specification or standard (for example, conversion of 1A1 non-removable head drums to 1A2 removable head drums) or the replacement of integral structural packaging components (such as non-removable heads on drums). A person who remanufactures a non-bulk packaging to conform to a specification or standard in Part 178 of this subchapter is subject to the requirements of Part 178 as a manufacturer.

Section 173.29 would be revised as follows:

§ 173.29 Empty packagings.

(a) Except as otherwise provided in this section, an empty packaging containing only the residue of a hazardous material shall be offered for transportation and transported in the same manner as when it previously contained a greater quantity of that hazardous material.

(b) Notwithstanding the requirements of paragraph (a) of this section, an empty packaging is not subject to any other requirements of this subchapter if it conforms to the following provisions:

(1) Any hazardous material shipping name and identification number markings, and any hazard warning labels or placards are removed or obliterated. This provision does not apply to transportation in a transport vehicle or a freight container if the packaging is not visible during transportation and the packaging is loaded by the shipper and unloaded by the shipper or consignee;

(2) The packaging—

- (i) Is unused; or
- (ii) Is sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or
- (iii) Is refilled with a material which is not hazardous to such an extent that any residue remaining in the packaging no longer poses a hazard; or
- (iv) Contains only the residue of—
 - (A) A Class 9 or ORM-D material; or
 - (B) An ORM-E material which no longer meets the definition in § 171.8 of

this subchapter for either a hazardous substance or a hazardous waste; or

(C) A nonflammable gas with no subsidiary hazard at a pressure less than 40 psia (275.8 kPa) at 70° F (21° C); and

(3) Any material contained in the packaging does not meet the definitions in § 171.8 of this subchapter for either a hazardous substance or a hazardous waste.

(c) A non-bulk packaging containing only the residue of a hazardous material covered by Table 2 of § 172.504 of this subchapter—

(1) Does not have to be included in determining the applicability of the placarding requirements of Subpart F of Part 172 of this subchapter; and

(2) Is not subject to the shipping paper requirements of this subchapter when collected and transported by a contract or private carrier for reconditioning, remanufacture or reuse.

(d) Notwithstanding the stowage requirements in Columns 10a and 10b of the § 172.101 Table for transportation by vessel, an empty drum or cylinder may be stowed on deck or under deck.

(e) Specific provisions for describing an empty packaging on a shipping paper appear in § 172.203(e) of this subchapter.

(f) An empty tank car must conform to the placarding requirements specified in § 172.510(c) of this subchapter.

In § 173.31, in paragraph (a)(1) the words "dangerous articles" would be revised to read "hazardous materials", paragraphs (a)(5), (a)(6) and (a)(7) would be revised, and paragraphs (a)(8) through (a)(12) would be added, as follows:

§ 173.31 Qualification, maintenance, and use of tank cars.

(a) * * *

(5) Each DOT specification tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

(6) After December 31, 1987, each non-specification tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

(7) Pressure relief devices on tank car tanks must be of a type and design approved by the AAR Committee on Tank Cars and be made of metal not subject to deterioration by the lading.

(8) A Specification DOT-106A or 110A multi-unit tank car tank may be offered for transportation aboard a passenger vessel only as authorized in § 173.32(a)(4).

(9) Lading temperature must be within the tank design temperature range.

(10) Tank test pressure must be equal to or greater than the greatest of the following:

(i) 160 percent of the sum of lading vapor pressure at the reference temperature of 46.1° C (115° F) for uninsulated tanks or 40.8° C (105° F) for insulated tanks plus static head plus gas padding pressure in the ullage space or dome of tank;

(ii) 133 percent of the maximum loading or unloading pressure, whichever is greater; or

(iii) The minimum pressure prescribed by the specification in Part 179 of this subchapter or for the specific hazardous material in the applicable packaging section in Subpart F or G of this Part.

(11) Air pressure may not be used to load or unload any lading which may create an enriched mixture within the flammability range of the lading in the vapor space of the tank.

(12) Tank car tanks in service for Class 3, 4 or Division 6.1 liquids must be equipped with reclosing pressure relief devices having adequately sized venting capacity.

In § 173.32 paragraph (a)(6), and paragraphs (q) through (u) would be added as follows:

§ 173.32 Qualification, maintenance and use of portable tanks.

(a) * * *

(6) A DOT 51 portable tank may be used where DOT 56 or DOT 57 type portable tanks or DOT 60 portable tanks are authorized. A DOT 60 portable tank may be used where DOT 56 or DOT 57 type portable tanks are authorized. A higher integrity tank used instead of a specified portable tank must meet the same design profile; e.g., a DOT 51 portable tank must be lined, if used instead of a lined DOT 60 portable tank.

(q) *Loading requirements.* A portable tank may not be loaded with a hazardous material that—

- (1) Has a lading density exceeding the tank's design maximum density, or
- (2) Is warmer or colder than the tank's design temperature range.

(r) Tank design pressure must be equal to or greater than the greatest of the following:

(1) 120 percent of the sum of lading vapor pressure plus static head plus gas padding pressure in the ullage space or dome of tank;

(2) The maximum loading or unloading pressure, whichever is greater; or

(3) The pressure prescribed for the specific hazardous material in Subpart F

or G of this part, or in Part 172, as applicable.

(s) Where a DOT 60 or marine portable tank is authorized, minimum tank design pressure is 25 psi (172.4 Kpa) for any liquid lading that meets more than one hazard class definition, unless otherwise specified.

(t) Air pressure may not be used to load or unload any lading which may create an enriched mixture within the flammability range of the lading in the vapor space of the tank.

(u) A portable tank in service for a Class 3 or 4 material, or Division 6.1 liquid, must be equipped with a reclosing pressure relief valve having adequately-sized venting capacity.

In § 173.32c, paragraphs (a), (b), (g)(2) and (o) would be revised to read as follows:

§ 173.32c Use of Specification IM portable tanks.

(a) No person may offer a hazardous material for transportation in an IM portable tank except as authorized by this subchapter.

(b) Except as otherwise provided in this subpart, an IM portable tank may not be used for the transportation of a hazardous material unless it meets the requirements of this subchapter.

* * * * *

(g) * * *

(2) When this subparagraph is specified for a hazardous material by the IM Tank Table in § 172.102 of this subchapter, each filling or discharge connection located below the normal liquid level of the tank, or compartment thereof, has three serially-mounted closures consisting of an internal discharge valve capable of being closed from a location remote from the valve itself, an external valve, and a bolted blank flange or other suitable, liquid-tight closure on the outlet side of the external valve.

* * * * *

(o) An IM 101 tank may be used whenever an IM 102 tank is authorized provided it meets the requirements for pressure relief devices, bottom outlets and any other special provisions specified for the IM 102 tank in § 172.102 of this subchapter.

§ 173.32d [Removed]

Section 173.32d would be removed.

In 173.33, paragraphs (l) through (q) would be added, as follows:

§ 173.33 Qualification, maintenance and use of cargo tanks.

* * * * *

(l) A cargo tank may not be loaded with a hazardous material that:

(1) Has a density exceeding the tank's design maximum density; or

(2) Is warmer or colder than the tank design temperature range.

(m) Tank design pressure must be equal to or greater than the greatest of the following:

(1) 120 percent of the sum of lading vapor pressure plus static head plus gas padding pressure in the ullage space or dome of tank;

(2) The maximum loading or unloading pressure, whichever is greater; or

(3) The pressure prescribed in Subpart F or G of this part, for the specific hazardous material as applicable, including—

(i) For compressed gases and certain refrigerated liquids, the pressure prescribed in § 173.315; and

(ii) For cryogenic liquids, the pressure prescribed in § 173.318.

(n) An MC 331 type cargo tank may be used where MC 306, MC 307 or MC 312 type cargo tanks are authorized. An MC 307 or MC 312 type cargo tank may be used where MC 306 type cargo tanks are authorized. A higher integrity tank used in lieu of a specified tank must meet the same design profile (for example, an MC 331 cargo tank must be lined if used in place of a lined MC 312 cargo tank.)

(o) Unless otherwise specified, where MC 307 and MC 312 cargo tanks are authorized, minimum tank design pressure is 25 psi (172.4 kPa) for any liquid lading that meets more than one hazard class definition.

(p) Air pressure may not be used to load or unload any lading which may create an enriched mixture within the flammability range of the lading in the vapor space of the tank. (See § 173.33(b)(3).)

(q) A cargo tank in service for a Class 3 or 4 material or Division 6.1 liquid must be equipped with a reclosing pressure relief valve having adequately-sized venting capacity. (See § 173.33(d) (1) and (2).)

A new § 173.40 would be added to read as follows:

§ 173.40 General packaging requirements for poisonous materials required to be packaged in cylinders.

When this section is referenced in the packaging section for a hazardous material elsewhere in this Part, the following requirements are applicable to cylinders used for that material:

(a) *Authorized cylinders.* A cylinder must conform to one of the specifications for cylinders in Subpart C of Part 178 of this subchapter, except that Specification 8, 8AL and 39 cylinders are not authorized.

(b) *Outage and pressure requirements.*

The pressure of the hazardous material at 55° C (131° F) must not exceed the service pressure of the cylinder. Sufficient outage shall be provided so that the cylinder will not be liquid full at 55° C (131° F).

(c) *Closures.* Each cylinder must be closed with a plug or valve conforming to the following:

(1) Each plug or valve must have a taper-threaded connection directly to the cylinder and be capable of withstanding the test pressure of the cylinder;

(2) Each valve must be of the packless type with non-perforated diaphragm, except that for corrosive materials, a valve may be of the packed type provided the assembly is made gas-tight by means of a seal cap with gasketed joint attached to the valve body or the cylinder to prevent loss of material through or past the packing;

(3) Each valve outlet must be sealed by a threaded cap or threaded solid plug, and

(4) Cylinder, valves, plugs, outlet caps, luting and gaskets must be compatible with each other and with the lading.

(d) *Additional protection.* Additional protection requirements for thin-walled cylinders and for cylinders equipped with valves are as follows:

(1) Each cylinder which has a wall thickness at any point of less than 2.03 mm (0.080 inch) and each cylinder which does not have fitted valve protection must be overpacked in a 4C1, 4D, 4F, 4G, 4H1 or 4H2 box. The box must conform to overpack provisions in § 173.25. Box and valve protection must be of sufficient strength to protect all parts of the cylinder and valve, if any, from deformation and breakage resulting from a drop of 2.0 meters (6.56 ft) or more onto a concrete floor, impacting at an orientation most likely to cause damage.

(2) Each cylinder equipped with a valve, if not overpacked in a box in accordance with paragraph (d)(1) of this section, must be equipped with a protective cap or other means of valve protection sufficient to protect the valve from deformation and breakage resulting from a drop of 2.0 meters (6.56 ft) or more onto a concrete floor, impacting at an orientation most likely to cause damage.

(e) *Interconnection.* Cylinders may not be interconnected.

In Part 173, Subparts D, E and F would be revised as follows:

Subpart D—Definitions, Classification, Packing Group Assignments and Exceptions for Hazardous Materials other than Class 1 and Class 7

§ 173.115 Class 2, Divisions 2.1, 2.2, and 2.3—Definitions.

(a) *Division 2.1 (Flammable gas)*. (1) For the purpose of this subchapter, a "flammable gas" (Division 2.1) means any material which is a gas at 20° C (68° F) or less and 1 atmosphere (atm) of pressure (a material which has a boiling point of 20° C (68° F) or less at 1 atm) which—

(i) Is ignitable at 1 atm when in a mixture of 13% or less by volume with air; or

(ii) Has a flammable range at 1 atm with air of at least 12% regardless of the lower limit.

(2) The limits specified in paragraph (a)(1) of this section shall be determined at 1 atmosphere of pressure and a temperature of 20° C (68° F) in accordance with ASTM E681-79 Standard Test Method for Limits of Flammability of Chemicals.

(b) *Division 2.2 (non-flammable compressed gas—including compressed gas, liquefied gas, pressurized cryogenic gas and compressed gas in solution)*. For the purpose of this subchapter, a "non-flammable compressed gas" (Division 2.2) means any material (or mixture) which—

(1) Exerts in the packaging a pressure of 40 psia (275.8 kPa) at 21.1° C (70° F) or, regardless of the pressure at 21.1° C (70° F), exerts in the container a pressure of 104 psia (717.1 kPa) at 54.4° C (130° F); and

(2) Does not meet the definition of Division 2.1 or 2.3.

(c) *Division 2.3 (Poisonous gas)*. For the purpose of this subchapter, "poisonous gas" (Division 2.3) means a material which is a gas at 20° C (68° F) or less and one atmosphere of pressure (a material which has a boiling point of 20° C (68° F) or less at 1 atmosphere and which—

(1) Is known to be so toxic to humans as to pose a hazard to health during transportation, or

(2) In the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has an LC50 less than 5000 ppm.

(d) *Non-liquefied compressed gas*. A "non-liquefied compressed gas" means a gas, other than in solution, which in a packaging under the charged pressure is entirely gaseous at a temperature of 20° C (68° F).

(e) *Liquefied compressed gas*. A "liquefied compressed gas" means a gas which in a packaging under the charged

pressure, is partially liquid at a temperature of 20° C (68° F).

(f) *Compressed gas in solution*. A "compressed gas in solution" is a non-liquefied compressed gas which is dissolved in a solvent.

(g) *Cryogenic liquid*. A "cryogenic liquid" means a refrigerated liquefied gas having a boiling point colder than -130° F (-90° C) at one atmosphere, absolute. A material meeting this definition is subject to requirements of this subchapter without regard to whether it meets the definition of a non-flammable compressed gas in paragraph (b) of this section. Each cryogenic liquid is partially described as "(* * *, refrigerated liquid (cryogenic liquid))" in the § 172.101 Table.

(h) *Flammable range*. The term "flammable range" means the difference between the minimum and maximum volume percentages of the material in air that forms a flammable mixture.

(i) *Service pressure*. The term "service pressure" means the authorized pressure marking on the packaging. For example, for a cylinder marked "DOT 3A1800", the service pressure is 1800 psig.

(j) *Refrigerant gas or Dispersant gas*. The terms "Refrigerant gas" or "Dispersant gas" apply to all nonpoisonous refrigerant gases, dispersant gases (fluorocarbons) listed in §§ 172.101, 173.304(a)(2), 173.314(c), 173.315(a)(1) and 173.315(h), and mixtures thereof, or any other compressed gas meeting one of the following:

(1) A nonflammable mixture containing not less than 50% fluorocarbon content, having a vapor pressure not exceeding 260 psig (1792.7 kPa) at 130° F (54.4° C).

(2) A flammable mixture containing not less than 50% fluorocarbon content, not over 40% by weight of a flammable component, having a vapor pressure not exceeding 260 psig (1792 kPa) at 130° F (54.4° C).

§ 173.116 Class 2 Assignment of packing group.

(a) The packing group of a Class 2, Division 2.3 material is assigned in Column 5 of the § 172.101 Table. There are no packing groups for Divisions 2.1 and 2.2. When the § 172.101 Table provides more than one packing group for a Division 2.3 material, or indicates that the packing group be determined on the basis of the grouping criteria for Division 2.3, the packing group shall be determined by applying the following criteria:

| Packing group | Inhalation toxicity |
|---------------|--|
| IA..... | LC50 less than or equal to 200 ppm. |
| IB..... | LC50 greater than 200 ppm and less than or equal to 1000 ppm. |
| II..... | LC50 greater than 1000 ppm and less than or equal to 3000 ppm. |
| III..... | LC50 greater than 3000 ppm or less than or equal to 5000 ppm. |

(b) The criteria specified in paragraph (a) of this section are represented graphically in § 173.133, Figure 1.

§ 173.120 Class 3—Definitions.

(a) *Flammable liquid*. (1) For the purpose of this subchapter, a "flammable liquid" (Class 3) means any liquid having a flash point of not more than 60.5° C (141° F) with the following exceptions:

(i) Any liquid meeting one of the definitions specified in § 173.300 of this part.

(ii) Any mixture having one or more components with a flash point greater than 60.5° C (141° F) or higher, that makes up at least 99 percent of the total volume of the mixture.

(2) For the purposes of this subchapter, a distilled spirit of 140 proof or lower is considered to have a flash point no lower than 23° C (73° F).

(b) *Combustible liquid*. (1) For the purpose of this subchapter, a "combustible liquid" (Class 3) means—

(i) Any liquid that does not meet the definition of any other hazard class specified in this subchapter and has a flash point above 60.5° C (141° F) and below 93.3° C (200° F); or

(ii) Any material that does not meet the definition of any other hazard class specified in this subchapter, has a flash point of 93.3° C (200° F) or greater and is offered for transportation or transported as a liquid at a temperature at or above its flash point.

(2) If a material has a flash point at or above 93.3° C (200° F) and does not meet the definition of a combustible liquid or any other hazard class, then it is not subject to the requirements of this subchapter.

(3) Except when offered or intended for transportation by vessel or aircraft, a flammable liquid with a flash point at or above 38° C (100° F) that does not meet the definition of any other hazard class may be reclassified as a combustible liquid.

(c) *Flash point*. (1) "Flash point" means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. It shall be determined as follows:

(i) For a homogeneous, single-phase, liquid having a viscosity less than 45 S.U.S. at 38° C (100° F) that does not form a surface film while under test, one of the following test procedures shall be used:

(A) Standard Method of Test for Flash Point by Tag Closed Tester (ASTM D56-79); or

(B) Standard Methods of Test for Flash Point of Liquids by Setaflash Closed Tester (ASTM D3278-78).

(ii) For a liquid other than one meeting all of the criteria of paragraph (c)(1)(i) of this section, one of the following test procedures shall be used:

(A) Standard Method of Test for Flash Point by Pensky-Martens Closed Tester (ASTM D93-80). For cutback asphalt, use Method B of ASTM 93-80 or alternate tests authorized in this standard; or

(B) Standard Methods of Test for Flash Point of Liquids by Setaflash Closed Tester (ASTM D3278-78).

(2) For a liquid that is a mixture of compounds that have different volatility and flash points, its flash point shall be determined as specified in paragraph (c)(1) of this section, on the material in the form in which it is to be shipped. If it is determined by this test that the flash point is higher than 20° F (-6.7° C) a second test shall be made as follows: A portion of the mixture shall be placed in an open beaker (or similar container) of such dimensions that the height of the liquid can be adjusted so that the ratio of the volume of the liquid to the exposed surface area is 6 to one. The liquid shall be allowed to evaporate under ambient pressure and temperature (20 to 25° C) for a period of 4 hours or until 10 percent by volume has evaporated, whichever comes first. A flash point is then run on a portion of the liquid remaining in the evaporation container and the lower of the two flash points shall be the flash point of the material.

(3) For flash point determinations by Setaflash closed tester, the glass syringe specified need not be used as the method of measurement of the test sample if a minimum quantity of 2 milliliters is assured in the test cup.

(d) If experience or other data indicate that the hazard of a material is greater or less than indicated by the criteria specified in paragraphs (a) and (b) of this section, the Director, OHMT, may revise the classification or make the material subject or not subject to the requirements of Parts 170-189 of this subchapter.

§ 173.121 Class 3—Assignment of Packing Group.

(a) The packing group of a Class 3 material is as assigned in Column 5 of the § 172.101 Table. When the § 172.101 Table provides more than one packing group for a hazardous material, or indicates that the packing group is to be determined on the basis of the grouping criteria for Class 3, the packing group shall be determined by applying the following criteria:

| Packing group | Flash point (closed-cup) | Initial boiling point |
|---------------|---------------------------|-----------------------|
| I | >23° C (73° F) | <35° C (95° F) |
| II | <23° C (73° F) | >35° C (95° F) |
| III | >23° C, <60.5° C (141° F) | >35° C (95° F) |

(b) Criteria for inclusion of viscous Class 3 materials in Packing Group III.

(1) Viscous Class 3 materials in Packing Group II with a flash point of less than 23° C (73° F) may be grouped in Packing Group III provided that—

(i) Less than 3 percent of the clear solvent layer separates in the solvent separation test;

(ii) The mixture contains not more than 5 percent of substances in Packing Group I or II of Division 6.1 or Class 8, or not more than 5 percent of substances in Packing Group I of Class 3 requiring a POISON or CORROSIVE subsidiary label;

(iii) The capacity of the packaging is not more than 30 L (7.9 gallons); and

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

| Flowtime in seconds | Flash point in degrees C |
|---------------------|--------------------------|
| 4 mm Cup | 8 mm Cup |
| Over 20 | Over 17 |
| Over 60 | Over 10 |
| Over 100 | Over -5 |
| Over 160 | Over -1 |
| Over 220 | Over -5 |
| | No lower limit |

(2) The methods by which the tests referred to in paragraph (b)(1) shall be performed are as follows:

(i) **Viscosity Test.** The flowtime in seconds is determined at 23° C (73° F) using the ISO Standard cup with a 4.0 millimeters (0.16 inches) jet (ISO-2431-72). Where the flowtime exceeds 200 seconds, a second test is carried out using the ISO standard cup but modified to take a jet of 8 millimeters (0.31 inches) diameter.

(ii) **Solvent Separation Test.** This test is carried out at 23° C (73° F) using a 100.0 milliliters (3.38 ounces) measuring cylinder of the stoppered type of approximately 25.0 centimeters (9.84 inches) total height and of a uniform internal diameter of approximately 30 millimeters (1.18 inches) over the

calibrated section. The sample should be stirred to obtain a uniform consistency, and poured in up to the 100 milliliter mark. The stopper should be inserted and the cylinder left standing undisturbed for 24 hours. After 24 hours, the height of the upper separated layer should be measured and the percentage of this layer as compared with the total height of the sample calculated.

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

(a) **Division 4.1 (Flammable solid).** For the purpose of this subchapter, "flammable solid" (Division 4.1) means any solid material, other than one classed as an explosive, which, under the conditions normally incident to transportation is likely to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard.

(b) **Division 4.2 (Spontaneously combustible material).** For the purpose of this subchapter, "spontaneously combustible material" (Division 4.2) means a material which is likely to heat spontaneously under conditions normally incident to transportation, or to heat up in contact with air and being then likely to catch fire. This class includes pyrophoric liquids. A "pyrophoric liquid" means a liquid that ignites spontaneously in dry or moist air at or below 54.5° C (130.1° F).

(c) **Division 4.3 (Dangerous when wet materials).** For the purpose of this subchapter, "dangerous when wet material" (Division 4.3) means a material that, by interaction with water, is liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

§ 173.125 Class 4—Assignment of Packing Group.

The packing group of a Class 4 material shall be as assigned in Column 5 of the § 172.101 Table.

§ 173.128 Class 5, Divisions 5.1 and 5.2—Definitions.

(a) **Division 5.1 (Oxidizer).** For the purpose of this subchapter, "oxidizer" (Division 5.1) means a material such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

(b) **Division 5.2 (Organic peroxide).** For the purpose of this subchapter "organic peroxide" (Division 5.2) means an organic compound containing the bivalent -O-O- structure and which may be considered a derivative of hydrogen

peroxide where one or more of the hydrogen atoms have been replaced by organic radicals unless:

(1) The material meets the definition of an explosive as prescribed in Subpart C of this part, in which case it must be classed as an explosive.

(2) The material is forbidden to be offered for transportation according to § 172.101 or § 173.21 of this subchapter.

(3) It is determined that the predominant hazard of the material containing an organic peroxide is other than that of an organic peroxide, or

(4) The Director, OHMT, has determined that the material does not present a hazard in transportation.

§ 173.129 Class 5—Assignment of Packing Group.

The packing group of a Class 5 material shall be as assigned in Column 5 of the § 172.101 Table.

§ 173.132 Class 6, Division 6.1—Definitions.

(a) For the purpose of this subchapter, "poisonous materials" (Division 6.1) means a material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or which, in the absence of adequate data on human toxicity, is presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals:

(1) **Oral Toxicity.** A liquid with an LD₅₀ for acute oral toxicity of not more than 500 mg/kg or a solid with an LD₅₀ for acute oral toxicity of not more than 200 mg/kg.

(2) **Dermal Toxicity.** A material with an LD₅₀ for acute dermal toxicity of not more than 1000 mg/kg.

(3) **Inhalation Toxicity.** (i) A dust or mist with an LC₅₀ for acute toxicity on inhalation of not more than 10 mg/L; or

(ii) A material with a saturated vapor concentration in air at 20 °C (68 °F) of not more than one-fifth of the LC₅₀ for acute toxicity on inhalation of vapors and with an LC₅₀ for acute toxicity on inhalation of vapors of not more than 5000 ml/m³.

(b) For the purposes of this subchapter—

(1) LD₅₀ for acute toxicity means that dose of the material administered which is most likely to cause death within 14 days in half of both male and female young adult albino rats. The number of animals tested must be sufficient to give a statistically significant result and be in conformity with good pharmacological practices. The result is expressed in mg/kg body mass.

(2) LD₅₀ for acute dermal toxicity means that dose of the material which, administered by continuous contact for 24 hours with the bare skin of an albino rabbit, is most likely to cause death within 14 days in half of the animals tested. The number of animals tested must be sufficient to give a statistically significant result and be in conformity with good pharmacological practices. The result is expressed in mg/kg body mass.

(3) LC₅₀ for acute toxicity on inhalation means that concentration of vapor, mist, or dust which, administered by continuous inhalation for one hour to both male and female young adult albino rats, is most likely to cause death within 14 days in half of the animals tested. If the material is administered to the animals as a dust or mist, more than 90 percent of the particles available for inhalation in the test must have a diameter of 10 microns or less if it is reasonably foreseeable that such concentrations could be encountered by a human during transport. The result is expressed in mg/L of air for dusts and mists or in mL/m³ of air (parts per million) for vapors.

(i) When provisions of this subchapter require the use of the LC₅₀ for acute toxicity on inhalation of dusts and mists based on a one-hour exposure and such data is not available, the LC₅₀ for acute toxicity on inhalation based on a four-hour exposure may be multiplied by four and the product substituted for the one-hour LC₅₀ for acute toxicity on inhalation.

(ii) When the provisions of this subchapter require the use of the LC₅₀ for acute toxicity on inhalation of vapors based on a one-hour exposure

and such data is not available, the LC₅₀ for acute toxicity on inhalation based on a four-hour exposure may be multiplied by two and the product substituted for the one-hour LC₅₀ for acute toxicity on inhalation.

(c) The foregoing categories shall not apply if the Director, OHMT has determined that the physical characteristics of the material or its probable hazards to humans as shown by documented experience indicate that the material will not cause serious sickness or death.

§ 173.133 Division 6.1—Assignment of Packing Group.

(a) The packing group of Division 6.1 materials shall be as assigned in Column 5 of the § 172.101 Table. When the § 172.101 Table provides more than one packing group for a hazardous material, the packing group shall be determined by applying the following criteria:

(1) The packing group assignment for routes of administration other than inhalation of vapors shall be in accordance with the following table:

| Packing group | Oral toxicity LD ₅₀ (mg/kg) | Dermal toxicity LD ₅₀ (mg/kg) | Inhalation toxicity by dusts and mists LC ₅₀ (mg/L) |
|---------------|---|--|--|
| I..... | <5..... | <40 | <0.5 |
| II..... | >5, <50..... | >40, <200 | >0.5, <2 |
| III..... | solids: >50, <200..... liquids: >50, <500..... | >200, <1000 | >2, <10 |

(2) The packing group assignment based on inhalation of vapors shall be in accordance with the following table:

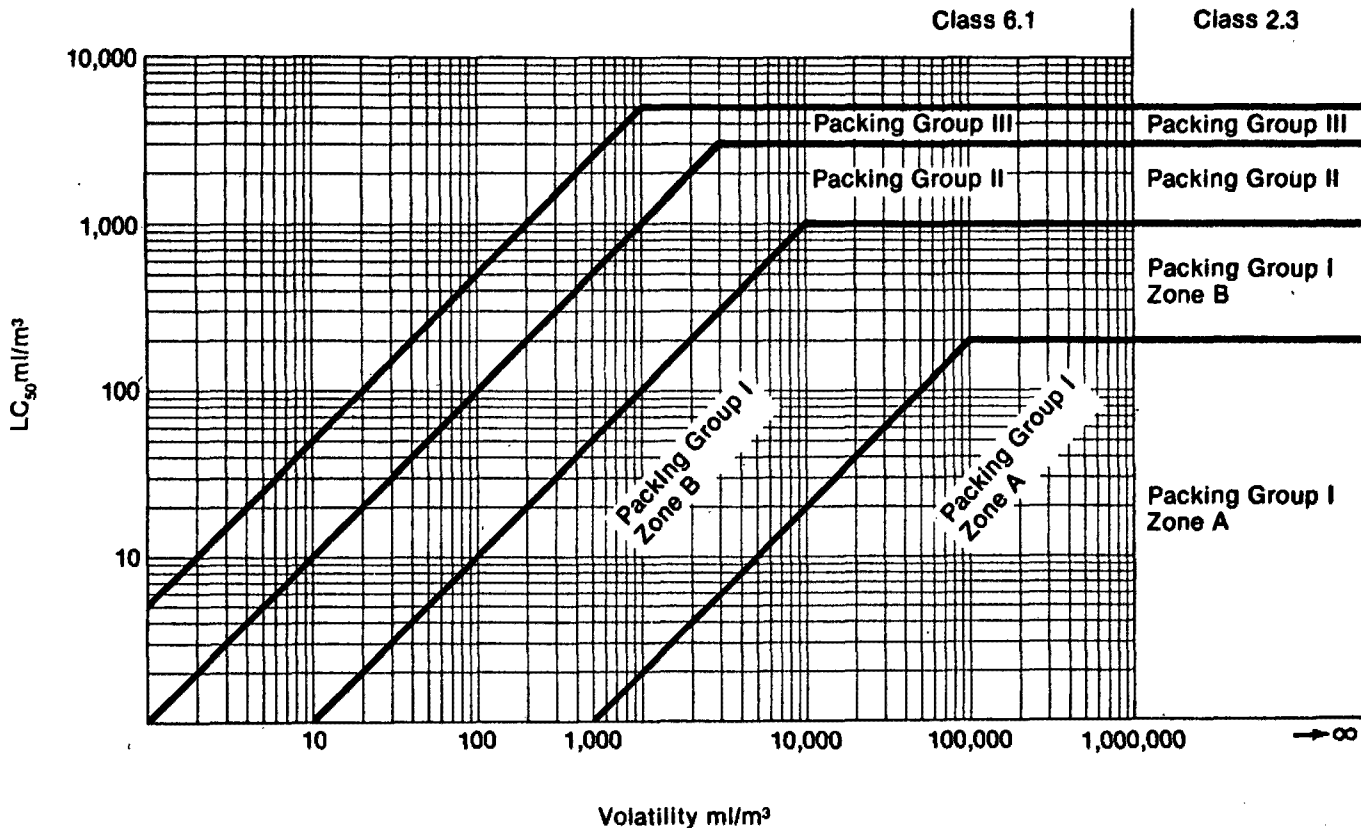
| Packing group | Vapor concentration and toxicity |
|---------------|--|
| I, Zone A... | V>500 LC ₅₀ and LC ₅₀ <200 mL/M ³ . |
| I, Zone B... | V>10 LC ₅₀ ; LC ₅₀ <1000 mL/m ³ ; and the criteria for Packing Group I, Zone A are not met. |
| II..... | V>LC ₅₀ ; LC ₅₀ <3000 mL/m ³ ; and the criteria for Packing Group I are not met. |
| III..... | V>.2 LC ₅₀ ; LC ₅₀ <5000 mL/m ³ ; and the criteria for Packing Groups I and II are not met. |

Note: V is the saturated vapor concentration in air of the material in mL/m³ at 20 °C and standard atmospheric pressure.

These criteria are represented graphically in Figure 1:

Figure 1

Inhalation Toxicity: Packing Group Borderlines



(3) When the packing group determined by applying these criteria is different for two or more (oral, dermal or inhalation) routes of administration, the packing group assigned to the material shall be that indicated for the highest degree of toxicity for any of the routes of administration.

(4) Notwithstanding the provisions of this paragraph, the packing group of a tear gas substance is as assigned in Column 5 of the § 172.101 Table.

§ 173.134 Class 6, Division 6.2—Definition.

(a) For the purpose of this subchapter—

(1) An "infectious substance" (Division 6.2) means a viable microorganism, or its toxin, which causes or may cause human disease, and is limited to those agents listed in 42 CFR 72.3 of the regulations of the

Department of Health and Human Services. The terms "infectious substance" and "etiologic agent" are synonymous.

(2) A "diagnostic specimen" means any human or animal material including, but not limited to, excreta, secretions, blood, and its components, tissue, and tissue fluids, being shipped for purposes of diagnosis.

(3) A "biological product" means a material prepared and manufactured in accordance with the provisions of 9 CFR Part 102 (Licensed veterinary biological products), 21 CFR Part 601 (Licensing), 21 CFR 312.1 (Conditions for exemption of new drugs for investigational use), 9 CFR Part 103 (Biological products for experimental treatment of animals), or 21 CFR 312.9 (New drugs for investigational use in laboratory research animals or in vitro tests), and

which in accordance with these provisions, may be shipped in interstate commerce.

(b) The requirements of this subpart supplement the requirements of the Department of Health and Human Services contained in 42 CFR Part 72.

(c) Packing groups are not assigned to Division 6.2 materials.

§ 173.136 Class 8—Definitions.

(a) For the purpose of this subchapter, "corrosive material" (Class 8) means a liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the site of contact, or a liquid that has a severe corrosion rate on steel or aluminum, in accordance with the following criteria:

(1) A material is considered to be destructive or to cause irreversible alteration in human skin tissue if, when

tested on the intact skin of an albino rabbit by the technique described in Appendix A to this part, the structure of the tissue at the site of contact is destroyed or changed irreversibly after an exposure period of 4 hours or less.

(2) A liquid is considered to have a severe corrosion rate if its corrosion rate exceeds 6.25 mm (0.246 inches) a year on steel (SAE 1020) or aluminum (nonclad 7075-T6) at a test temperature of 55 °C (131 °F). An acceptable test is described in NACE Standard TM-01-69.

(b) If human experience or other data indicate that the hazard of a material is greater or less than indicated by the results of the tests specified in paragraph (a) of this section, the Department may revise its classification or make the material subject to the requirements of this subchapter.

§ 173.137 Class 8—Assignment of packing group.

(a) The packing group of Class 8 material is as indicated in Column 5 of the § 172.101 Table. When the § 172.101 Table provides more than one packing group for a hazardous material, the packing group shall be determined by applying the following criteria:

(i) *Packing Group I.* Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 3 minutes.

(ii) *Packing Group II.* Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of more than 3 minutes but not more than 60 minutes.

(iii) *Packing Group III.* (1) Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 4 hours.

(2) Substances with a corrosion rate on steel or aluminum surfaces exceeding 6.25 mm (0.246 inches) a year at a test temperature of 55 °C (131 °F).

§ 173.140 Class 9—Definitions.

(a) For the purpose of this subchapter, "miscellaneous hazardous material" (Class 9) means a material which presents a hazard during transport, but which is not included in any other hazard class. Included in this class is any material which has an anesthetic, noxious or other similar property which could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties.

§ 173.141 Class 9—Assignment of packing group.

The packing group of a Class 9 material is as indicated in Column 5 of the § 172.101 Table.

§ 173.144 Other Regulated Materials (ORM)—Definitions.

(a) For the purpose of this subchapter, "ORM-D material" means a material such as a consumer commodity which, though otherwise subject to the regulations of this subchapter, presents a limited hazard during transportation due to its form, quantity and packaging. It must be a material for which exceptions are provided in the § 172.101 Table. Each ORM-D material or category of ORM-D material is listed in the § 172.101 Table.

(b) For the purpose of this subchapter, "ORM-E material" means a material that is not included in any other hazard class, but is subject to the requirements of this subchapter because it meets the definition in § 171.8 of this subchapter for a hazardous substance or a hazardous waste.

§ 173.145 Other Regulated Materials—Assignment of packing group.

(a) The packing group of an ORM-E material is as indicated in Column 5 of the § 172.101 Table.

(b) Packing groups are not assigned to ORM-D materials.

§ 173.150 Exceptions for Class 3 (flammable and combustible liquids).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter and the material does not meet the definition of another hazard class.

(b) *Limited quantities.* Limited quantities of flammable liquids (Class 8) are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. 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 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For flammable liquids in Packing Group I, inner packagings not over 0.5 liters (0.53 quarts) net capacity each, packed in strong outer packagings;

(2) For flammable liquids in Packing Group II, inner packagings not over 1.0

liters (1.06 quarts) net capacity each, packed in strong outer packaging; and

(3) For flammable liquids in Packing Group III, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassified as ORM-D material. In addition to the exceptions provided by paragraph (b), shipments of ORM-D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

(d) *Alcoholic beverages.* Alcoholic beverages (wine and distilled spirits as defined in 27 CFR 4.10 and 5.11) in packagings of four liters or less are not subject to the requirements of this subchapter.

(e) *Aqueous solutions of alcohol.* An aqueous solution containing 24 percent or less alcohol by volume may be considered to have a flash point no less than 38 °C (100 °F).

(f) *Combustible liquids.*

(1) Except for transportation by vessel or aircraft, a flammable liquid with a flash point at or above 38 °C (100 °F) may be reclassified as a combustible liquid.

(2) Unless otherwise stated for a specific material, the requirements in this subchapter do not apply to a material classed as a combustible liquid in a non-bulk packaging unless the combustible liquid is a hazardous substance or a hazardous waste.

(3) A combustible liquid that is a hazardous substance or a hazardous waste, in a non-bulk packaging, and a combustible liquid in a bulk packaging is not subject to the requirements of this subchapter except those pertaining to:

(i) Shipping papers, waybills, switching orders, and hazardous waste manifests;

(ii) Marking of packages;

(iii) Display of identification numbers on bulk packages;

(iv) Placarding of bulk packagings;

(v) Carriage aboard aircraft and vessels (for packaging requirements for transport by vessel see § 176.340 of this subchapter);

(vi) Reporting incidents as prescribed by §§ 171.15, 171.16 and 171.17 of this subchapter;

(vii) Packaging requirements of Subpart B of this part; and

(viii) The requirements of §§ 173.1, 173.24, 173.24a, 173.24b, 174.1, 177.804, 177.817, and 177.834 of this subchapter.

(4) A combustible liquid that is not a hazardous substance or a hazardous waste is not subject to the requirements of this subchapter if it is a mixture of one or more components that

(i) Have a flash point at or above 93.30 °C (200 °F),

(ii) Comprise at least 99 percent of the volume of the mixture, and

(iii) Is not offered for transportation or transported as a liquid at a temperature at or above its flash point.

§ 173.151 Exceptions for Division 4.1 (flammable solids).

(a) *General.* Exceptions for hazardous material shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities of Division 4.1 flammable solids.* Limited quantities of flammable solids (Division 4.1) in Packing Groups II and III are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. 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 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For flammable solids in Packing Group II, inner packagings not over 1.0 kilograms (2.20 pounds) net capacity each, packed in strong outer packagings; and

(2) For flammable solids in Packing Group III, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section, and charcoal briquettes in packagings not exceeding 30 kilograms (66.1 pounds) gross weight, may be renamed "Consumer commodity" and reclassified as ORM-D material, if the material is a "consumer commodity" as defined in § 171.8 of this subchapter. In addition to the exceptions provided by paragraph (b), shipments are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

§ 173.152 Exceptions for Division 5.1 (oxidizers) and Division 5.2 (organic peroxides).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities.* Limited quantities of oxidizers (Division 5.1) and organic peroxides (Division 5.2) in Packing Groups II and III are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these limited quantities are not subject to Subpart F of Part 172 (Placarding) of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For oxidizers in Packing Group II, inner packagings not over 1.0 liters (1.06 quarts) net capacity each for liquids or not over 1.0 kilograms (2.20 pounds) net capacity each for solids, packed in strong outer packagings.

(2) For oxidizers in Packing Group III, inner packagings not over 4.0 l. (1.06 gallons) net capacity each for liquids or not over 5.0 kilograms (11.02 pounds) net capacity each for solids, packed in strong outer packagings.

(3) For organic peroxides in Packing Groups II and III, inner packagings not over 30 milliliter (1.0 ounce) net capacity for liquids or 30 grams (1.1 ounces) net capacity for solids, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassified as ORM-D material. In addition to the exceptions provided by paragraph (b) of this section, shipments are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

§ 173.153 Exceptions for Division 6.1 (poisonous materials).

(a) *General.* Exceptions for hazardous material shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities of Division 6.1 materials.* Limited quantities of poisonous materials (Division 6.1) in Packing Group III are excepted from the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these limited quantities are not subject to Subpart F of Part 172 (Placarding) of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For poisonous liquids, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings; and

(2) For poisonous solids, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* The following provisions apply to consumer commodities:

(1) A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassified as ORM-D material.

(2) A poisonous material which is a drug or medicine and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassified as ORM-D material if packaged in a combination packaging not exceeding 30 kilograms (66.1 pounds) with inner packagings not over 250 milliliters (8.5 ounces) net capacity for liquids or 250 grams (8.8 ounces) net capacity for solids packed in strong outer packagings. Each package must conform to the packaging requirements of Subpart B of this part.

(3) Packages of ORM-D material are excepted from the specification packaging requirements of this subchapter and from the labeling requirements of Subpart E of Part 172. Shipments of ORM-D material are eligible for the exceptions provided in § 173.156 and in paragraph (b) of this section and are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft.

§ 173.154 Exceptions for Class 8 (corrosive materials).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific

hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities.* Limited quantities of corrosive materials (Class 8) in Packing Groups II and III are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these 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 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For corrosive materials in Packing Group II, in inner packagings not over 1.0 liters (1.06 quarts) net capacity each for liquids or not over 1.0 kilograms (2.2 pounds) net capacity each for solids, packed in strong outer packagings.

(2) For corrosive materials in Packing Group III, in inner packagings not over 4.0 liters (1.06 gallons) net capacity each for liquids or not over 5.0 kilograms (11.02 pounds) net capacity each for solids, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter may be renamed "Consumer commodity" and reclassified as ORM-D material. In addition to the exceptions provided by paragraph (b) of this section, shipments of ORM-D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

(d) *Materials corrosive to aluminum.* Except for a hazardous substance or a hazardous waste, a material classed as a Class 8, Packing Group III, material solely because of its corrosive effect on aluminum is not subject to the provisions of this subchapter when transported by motor vehicle or rail car.

§ 173.155 Exceptions for Class 9 (miscellaneous hazardous materials).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities.* Limited quantities of miscellaneous hazardous materials (Class 9) are excepted from the specification packaging

requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these 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 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For liquids, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings.

(2) For solids, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassified as ORM-D material. In addition to the exceptions provided by paragraph (b) of this section, shipments of ORM-D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

§ 173.156 Exceptions for ORM materials.

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table or in a packaging section in this part.

(b) *ORM-D.* Packagings for ORM-D materials are specified according to hazard class in §§ 173.150 through 173.155 and in § 173.306. In addition to other exceptions specified for ORM-D materials in this part, strong outer packagings as specified in this part and the marking requirements specified in § 172.316 of this subchapter are not required for materials classed as ORM-D when unitized in cages, carts or similar overpacks and when transported by a private or contract motor carrier from a distribution center to a retail outlet.

(c) *ORM-E.* Limited quantities of ORM-E materials are excepted from the specification packaging requirements of this subchapter when packaged according to this paragraph. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For liquids, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings; and

(2) For solids, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

Subpart E—Non-bulk Packaging for Hazardous Materials Other Than Class 1 and Class 7

§ 173.158 Nitric Acid.

(a) Nitric acid exceeding 40 percent concentration may not be packaged with any other material.

(b) Nitric acid in any concentration which does not contain sulfuric acid or hydrochloric acid as impurities, when offered for transportation by rail, highway, or water shall be packaged in specification containers as follows:

(1) 1A1 stainless steel drums are authorized, subject to the following limitations:

(i) Stainless steel used in drums must conform to the following thicknesses:

| Nominal (marked) capacity (in liters) of 1A1 Drum | Minimum thickness (in millimeters) of stainless steel |
|---|---|
| 55 | 0.9 |
| 115 | 1.2 |
| 210 | 1.5 |
| 450 | 2.0 |

(ii) Drums weighing less than 85 percent of their original tare weight may not be used.

(iii) Type 304 or other grades of equivalent corrosion-resistant steels in the as-welded condition are permissible for nitric acid concentrations up to and including 78 percent.

(iv) For all concentrations of nitric acid, the following are permissible:

(A) Type 304 heat-treated (quenched in water at 1900 °F), or

(B) Stabilized Type 347 in the as-welded condition, or

(C) Stabilized Type 347 stress-relieved (1550-1650 °F), or

(D) Stabilized Type 347 heat-treated (quenched in water at 1900 °F), or

(E) Other grades of equivalent corrosion resistance.

(v) All parts of drum exposed to lading must be capable of withstanding the corrosive effect of nitric acid to the extent that 65 percent boiling nitric acid does not penetrate the metal more than 0.0381 mm (0.0015 inches) per month. (ASTM A 262 may be used for a suitable corrosion test procedure.)

(vi) In addition to marking required by § 178.503 of this subchapter, the following marks, in lettering of at least

½ inch (12.7 mm) height, must be placed on drums used to transport nitric acid:

(A) The type of steel used in body and head sheets as identified by American Iron and Steel Institute type number, and, in addition, the letters HT following the steel designation on containers subject to stress relieving or heat treatment during manufacture.

(B) The thickness in millimeters of metal in thinnest part. When the thickness of metal in the body differs from that in the head, both must be indicated with slanting line between and with the gauge of the body indicated first.

(C) Original tare weight in kilograms, preceded by the letters "TW."

An example of the markings required by paragraphs (b)(1)(vi) (A), (B), and (C) of this section is "304HT/1.9/2.7/TW55."

(2) 4H1 expanded plastics outer packagings with glass inner receptacles of not greater than 2.5 liters (2.64 quarts) capacity each. No more than four 2.5 liter inner receptacles may be packed in one outer packaging.

(c) Nitric acid of 80 percent or greater concentration which does not contain sulfuric acid or hydrochloric acid as impurities, when offered for transportation by rail, highway, or water may be packaged in 1B1 aluminum drums.

(d) Nitric acid of 90 percent or greater concentration, when offered for transportation by rail, highway, or water may be packaged in 4C1, 4C2, 4D or 4F wooden boxes with inner packagings consisting of glass bottles further individually overpacked in tightly closed metal packagings. Glass bottles must be of 2.5 liters (2.64 quarts) or less capacity and cushioned within the metal packagings.

(e) Nitric acid of less than 90 percent concentration, when offered for transportation by rail, highway, or water may be packaged in 4C1, 4C2, 4D or 4F wooden boxes with inside glass packagings of not over 2.5 liters (2.64 quarts) capacity each.

(f) Nitric acid of 70 percent or less concentration, when offered for transportation by rail, highway, or water, may be packaged as follows:

(1) In composite packagings 6PA1, 6PA2, 6PB1, 6PB2, 6PC, 6PD1, 6PH1, or 6PH2.

(2) In 4H1 expanded plastic boxes with inner glass packagings of not over 2.5 liters (2.64 quarts) each. 1(g) Nitric acid of more than 70 percent concentration, when offered for transportation by cargo aircraft only, must be packaged in combination packagings with 1A2, 1B2, 1D, 1G, 1H2, 3H2, 4C1, 4C2, 4D, 4F or 4G outer packagings with glass or earthenware

inner packagings of not over one liter (2.11 pints) or glass ampoules of not over 0.5 liter (1.06 pints).

(h) Nitric acid of less than 70 percent concentration, when offered for transportation in cargo aircraft only must be packaged in combination packagings with 1A2, 1B2, 1D, 1G, 1H2, 3H2, 4C1, 4C2, 4D, 4F or 4G outer packagings with inner packagings of—

(1) Glass or earthenware not over 2.5 liter (2.64 quarts) capacity;

(2) Plastic not over 2.5 liter (2.64 quarts) capacity; or

(3) Glass ampoule not over 0.5 liter (1.06 pints) capacity.

§ 173.159 Batteries, wet.

(a) Electric storage batteries, containing electrolyte acid or alkaline corrosive battery fluid, must be completely protected so that short circuits will be prevented; they may not be packed with other materials except as provided in §§ 173.220 and 173.222 of this part and paragraphs (h) and (i) of this section.

(b) The following specification packagings are authorized for batteries packed without other materials:

(1) 4C1, 4C2, 4D, or 4F wooden boxes.

(2) 4G fiberboard boxes.

(c) The following non-specification packagings are authorized for batteries packed without other articles:

(1) Electric storage batteries protected against short circuits and firmly secured to skids or pallets capable of withstanding the shocks normally incident to transportation, are authorized for transportation by rail, highway, or water. The height of the completed unit must not exceed 1½ times the width of the skid or pallet. The unit must be capable of withstanding, without damage, a superimposed weight equal to two times the weight of the unit or, if the weight of the unit exceeds 2000 pounds (907.2 kg), a superimposed weight of 4000 pounds (1814.4 kg). Battery terminals must not be relied upon to support any part of the superimposed weight.

(2) Electric storage batteries weighing 500 pounds (226.8 kg) or more, consisting of carriers' equipment, may be shipped by rail when mounted on suitable skids and protected against short circuits. Such shipments must not be offered in interchange service.

(3) One to three batteries not over 25 pounds (11.3 kg) each packed in outer boxes. The maximum authorized gross weight is 75 pounds (34.0 kg).

(4) Not more than four batteries not over 15 pounds (6.8 kg) each, packed in strong outer fiberboard or wooden boxes. Batteries must be securely cushioned and packed to prevent short

circuits. The maximum authorized gross weight is 65 pounds (29.5 kg).

(5) Not more than five batteries not over 10 pounds (4.5 kg) each, packed in strong outer fiberboard or wooden boxes. Batteries must be securely cushioned and packed to prevent short circuits. The maximum authorized gross weight is 65 pounds (29.5 kg).

(6) Single batteries not exceeding 75 pounds (34.0 kg) each, packed in 5-sided slip covers or in completely closed fiberboard boxes. Slip covers and boxes must be of solid or double-faced corrugated fiberboard of at least 200 pounds (9.07 kg) Mullen test strength. The slip cover or fiberboard box must fit snugly and provide inside top clearance of at least ½ inch (1.27 cm) above battery terminals and filler caps with reinforcement in place. Assembled for shipment, the bottom edges of the slipcover must come to within one inch (2.54 cm) of the bottom of the battery. The completed package (battery and box or slip cover) must be capable of withstanding a top-to-bottom compression test of at least 500 pounds (226.8 kg) without damage to battery terminals, cell covers or filler caps.

(d) Nonspillable wet electric storage batteries capable of withstanding the following two tests without leakage of battery fluid are excepted from all other requirements of this subchapter when protected against short circuits and securely packaged:

(1) *Vibration test.* The battery must be rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (0.03 inches), with a 1.6 mm (0.06 mm) maximum total excursion must be applied. The frequency must be varied at the rate of 1 Hz/min between the limits of 10 Hz to 55 Hz. The entire range of frequencies and return must be traversed in 95±5 minutes for each mounting position (direction of vibrator) of the battery. The battery must be tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods.

(2) *Pressure differential test.* Following the vibration test, the battery must be stored for six hours at 24 °C + 4 °C (75.2 °F + 7.2 °F) while subjected to a pressure differential of at least 88 kPa (12.8 psi). The battery must be tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position.

(e) Electric storage batteries containing electrolyte or corrosive battery fluid are not subject to the requirements of this subchapter for

carriage by highway or rail if all of the following requirements are met:

(1) No other hazardous materials may be transported in the same vehicle,

(2) The batteries must be loaded or braced so as to prevent damage and short circuits in transit,

(3) Any other material loaded in the same vehicle must be blocked, braced, or otherwise secured to prevent contact with or damage to the batteries, and

(4) The transport vehicle may not carry material shipped by any person other than the shipper of the batteries.

(f) Electric storage batteries, containing electrolyte or corrosive battery fluid in a coil from which it is injected into the battery cells by a gas generator and initiator assembled with the battery, and which are nonspillable under the criteria of paragraph (d) of this section, are excepted from other requirements of this subchapter when examined by the Bureau of Explosives and approved by the Director, OHMT.

(g) Electrolyte, acid, or alkaline corrosive battery fluid, packed with storage batteries wet or dry, must be packed in one of the following specification packagings:

(1) In 4C1, 4C2, 4D, or 4F wooden boxes with inner receptacles of glass, not over 4.0 liters (1.06 gallons) each nor over 8.0 liters (2.11 gallons) total in each outside container. Inside containers must be well-cushioned and separated from batteries by a strong solid wooden partition. The completed package must conform to Packing Group III requirements.

(2) Electrolyte, acid, or alkaline corrosive battery fluid included with storage batteries and filling kits may be packed in strong plywood or wooden boxes when shipments are made by, for, or to the Departments of the Army, Navy, or Air Force of the United States. Packagings must conform to military specifications. The electrolyte, acid, or alkaline corrosive battery fluid must be packed in polyethylene bottles of not over 1.0 liter (1.06 quarts) capacity each. Not more than 24 bottles, securely separated from storage batteries and kits, may be shipped in each package.

(3) In 4G fiberboard boxes with not more than 12 inside packagings of polyethylene or other material resistant to the lading, each not over 2.0 liters (2.11 quarts) capacity each. Completed packages must conform to Packing Group III requirements. Inner packagings must be adequately separated from the storage battery. The maximum authorized gross weight is 65 pounds (29.5 kg). These packages are not authorized for transportation by aircraft.

(h) Dry storage batteries or battery charger devices may be packaged in 4G

fiberboard boxes with inner receptacles containing battery fluid. Completed packagings must conform to Packing Group III requirements. Not more than 12 inner receptacles may be packed in one outer box. The maximum authorized gross weight is 75 pounds (34.0 kg).

§ 173.160 Bombs, smoke, non-explosive (corrosive).

Bombs, smoke, non-explosive, may be shipped provided they are without ignition elements, bursting charges, detonating fuses or other explosive components. They must be packaged in wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes, or plywood drums (ID), which meet Packing Group II requirements.

§ 173.161 Chemical kits.

(a) Except as otherwise provided, chemical kits must be packed, marked, and labeled as prescribed by this subchapter for the specific corrosive materials contained therein.

(b) Chemical kits containing limited quantities of corrosive liquids in inner receptacles of not over 6 fluid ounces (177.4 mL) capacity each are excepted from labeling (except when offered for transportation by air) and the specification packaging requirements of this subchapter if all of the following requirements are met:

(1) The kit may contain only corrosive liquids for which packaging exceptions are provided in the § 172.101 Table.

(2) The kit must be a strong wooden or metal outer packaging, or must be packed in a strong wooden or metal packaging.

(3) The corrosive liquids must be cushioned with sufficient absorbent material to completely absorb the contents of the individual containers, and must be protected from damage by other materials in the kit.

(4) The contents of the kit must be of a nature and packed so there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.

In addition, these shipments are not subject to Subpart F of Part 172 of this subchapter (Placarding), to Part 174 (Carriage by rail) of this subchapter except § 174.24 (Shipping papers) and to Part 177 (Carriage by highway) of this subchapter except § 177.817 (Shipping papers).

(c) Except as provided in paragraph (b) of this section, chemical kits must be packed in 4G fiberboard boxes with inner glass receptacles of not over one liter (1.06 quart) capacity each, securely cushioned and separated from other inside containers. The contents of the kit must be of such a nature and so packed

that there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.

§ 173.162 Gallium.

Gallium metal must be packaged in packagings intended to contain liquids consisting of semi-rigid plastic inner packagings of not more than 2.5 kg (5.51 pounds) net capacity each, individually enclosed in a sealed leak-tight bag of strong puncture-resistant material. The sealed bags must be packed in wooden (4C1, 4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G) or plastic (4H1, 4H2) boxes or in fiber (1G) or steel (1A2) drums, which are lined with leak-tight, puncture-resistant material. Bags and liner material must be chemically resistant to gallium. If it is desired to maintain the gallium in a completely solid state, the above packaging may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. If a refrigerant is used, all of the above materials used in the packaging of gallium must be chemically and physically resistant to the refrigerant and must have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging must permit the release of carbon dioxide gas. Completed packaging must meet Packing Group I requirements for transportation by aircraft and Packing Group III requirements for transportation by vessel.

§ 173.163 Hydrogen fluoride.

Hydrogen fluoride (hydrofluoric acid, anhydrous) must be shipped in Specification 3, 3A, 3AA, 3B, 3C, 3E, 4, 4A, 25, or 38 cylinders; or Specification 4B, 4BA, 4BW or 4C cylinders, if they are not brazed. Filling density must not exceed 85 percent of the water weight capacity of the cylinder. Cylinders used exclusively in this service may, in lieu of the periodic hydrostatic retest required by § 173.34(e), be given a complete external visual inspection as described in CGA Pamphlet C-6, at the time such periodic retest becomes due. Such inspections shall be made on cylinders cleaned to bare metal. The results shall be recorded on a data sheet, completed copies of which shall be kept as prescribed in § 173.34(e)(5). Items which must be checked and recorded on these data sheets are: Date of inspection (month and year); DOT specification number; cylinder identification (registered symbol and serial number, date of manufacture, and if needed for adequate identification, ownership symbol); tare weight; physical condition

(record specifically any leakage, corrosion, gouges, dents or digs in shell or heads, broken or damaged footing or protective ring or fire damage); disposition of cylinders (returned to service, to cylinder manufacturer for repairs, or scrapped). A cylinder which passes the inspection prescribed shall have the data recorded in the manner presently prescribed for the recording of the retest date except that an "E" is to follow the date (month and year) indicating requalification by the external inspection method. Cylinders removed from this service for any reason must be rendered unfit for any other regulated service.

§ 173.164 Mercury (metallic and articles containing mercury).

(a) Metallic mercury must be packaged as follows:

(1) In earthenware or glass or suitable plastic inner packagings of not more than 250 mL (8.5 ounces) capacity each, packed in steel drums (1A2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D), fiberboard (4G) or reconstituted wood (4F) boxes, plywood drums (1D) or fiber drums (1G) with sufficient cushioning material to prevent breakage. Either the inner packagings or the outer packagings must have inner linings or bags of strong leakproof and puncture-resistant material impervious to mercury, completely surrounding the contents, which will prevent the escape of mercury from the package irrespective of its position.

(2) Iron or steel "quicksilver flasks" packaged in steel drums (1A2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D), fiberboard (4G) or reconstituted wood (4F) boxes, plywood drums (1D) or fiber drums (1G) with leakproof linings as in subparagraph (1) of this paragraph.

(3) In welded steel bottles with inner vaulted bottoms as single packagings. The closure must be a bolt with a conical thread, and the opening must not exceed 20 mm (0.8 inch). The maximum net mass must not exceed 35 Kg (77.2 pounds).

(b) Manufactured articles or apparatuses containing mercury are excepted from the specification packaging requirements of this subchapter, when packaged as follows:

(1) Manufactured articles or apparatuses of which metallic mercury is a component part, such as manometers, pumps, thermometers, switches, etc. (for electron tubes, mercury vapor tubes and similar tubes, see paragraph (b)(2) of this section), must be in strong outer packagings, having sealed inner liners or bags of strong leakproof and puncture-resistant

material impervious to mercury, which will prevent the escape of mercury from the package irrespective of its position. Mercury switches and relays are excepted from these requirements, if they are of the totally enclosed leakproof type in sealed metal or plastic units. Thermometers, switches and relays, each containing a total quantity of not more than 15 g (0.5 ounce) of mercury, are also excepted if installed as an integral part of a machine or apparatus and so fitted that shock of impact damage, leading to leakage of mercury, is unlikely to occur under conditions normally incident to transport;

(2) Electron tubes, mercury vapor tubes and similar tubes must be packaged as follows:

(i) Tubes which are packed in strong outer packagings with all seams and joints sealed with self-adhesive, pressure-sensitive tape which will prevent the escape of mercury from the package, are authorized up to a total net quantity of 450 g (15.9 ounces) of mercury per package;

(ii) Tubes with more than 450 g (15.9 ounces) of mercury are authorized only when packed in strong outer packagings, having sealed inner liners or bags of strong leakproof and puncture-resistant material impervious to mercury which will prevent escape of mercury from the package irrespective of its position;

(iii) Tubes which do not contain more than 5 g (0.2 ounce) of mercury each and which are packed in the manufacturer's original packagings, are authorized up to a total net quantity of 30 g (1.1 ounces) of mercury per package;

(iv) Tubes which are completely jacketed in sealed leakproof metal cases are authorized in the manufacturer's original packagings;

(3) For electron tubes, mercury vapor tubes, and similar tubes, the shipper must indicate the quantity of mercury on the shipping paper.

(4) Mercurial barometers conforming to subparagraph (1) of this paragraph, which are loaded and unloaded from an aircraft under the supervision of, and accompanied in flight by, a National Weather Service official or similar United States agency official, are excepted from any other requirements of this subchapter.

§ 173.171 Smokeless powder for small arms.

Smokeless powder for small arms may be classed as a flammable solid, for transportation by highway and rail only, subject to the following conditions:

(a) The smokeless powder must be examined for this classification by the

Bureau of Explosives and approved by the Director, OHMT;

(b) The total quantity of smokeless powder in one railcar or motor vehicle may not exceed 100 pounds (45.4 kg) net mass; and

(c) Only combination packagings with inner packagings not exceeding 8 pounds (3.6 kg) net mass are authorized. Inner packagings must be arranged and protected so as to prevent simultaneous ignition of the contents. The complete package must be a type examined by the Bureau of Explosives and approved by the Director, OHMT.

§ 173.172 Aircraft hydraulic power unit fuel tank.

(a) Aircraft hydraulic power unit fuel tanks containing a mixture of anhydrous hydrazine and monomethyl hydrazine (M88 fuel) and designed for installation as complete units in aircraft are excepted from the specification packaging requirements of this subchapter when they conform to either of the following conditions:

(1) The unit must consist of an aluminum pressure vessel made from tubing and having welded heads. Primary containment of the fuel within this vessel must consist of a welded aluminum bladder having a maximum internal volume of 46L (12.2 gallons). The outer vessel must have a minimum design gauge pressure of 1,275 kPa (184.9 psi) and a minimum burst gauge pressure of 2,755 kPa (399.48 psi). Each vessel must be leak-checked during manufacture and before shipment and must be found leakproof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per unit and package is 42L (11.1 gallons); or

(2) The unit must consist of an aluminum pressure vessel. Primary containment of the fuel within this vessel must consist of a welded hermetically sealed fuel compartment with an elastomeric bladder having a maximum internal volume of 46L (12.2 gallons). The pressure vessel must have a minimum design gauge pressure of 5,170 kPa (749.8 psi). Each vessel must be leak-checked during manufacture and before shipment and must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per unit and package is 42L (11.1 gallons).

§ 173.173 Paint, paint-related material, adhesives and ink.

(a) Except as otherwise provided in this part, the description "Paint" is the proper shipping name for paint, lacquer, enamel, stain, shellac, varnish, liquid aluminum, liquid bronze, liquid gold, liquid wood filler, and liquid lacquer base. The description "Paint-related material" is the proper shipping name for a paint thinning, reducing or removing compound. However, if a more specific description is listed in the § 172.101 Table of this subchapter, that description must be used.

(b) Paint, paint-related material, adhesives and ink must be packaged as follows:

(1) As prescribed in § 173.202 of this Part if it is a Packing Group II material or § 173.203 of this Part if it is a Packing Group III material.

(2) In inner glass packagings of not over one liter capacity each or inner metal packagings of not over 5 liters each, packed in a strong outer packaging. Packages must conform to the packaging requirements of Subpart B of this part but need not conform to the requirements of Part 178 of this subchapter.

§ 173.174 Refrigerating machines.

A refrigerating machine assembled for shipment and containing 15 pounds (6.8 kg) or less of a flammable liquid for its operation in a strong, tight receptacle is excepted from labeling (except when offered for transportation by air) and the specification packaging requirements of this subchapter. In addition, shipments are not subject to Subpart F of Part 172 of this subchapter (Placarding), to Part 174 of this subchapter (Carriage by rail) except § 174.24 (Shipping papers) and to Part 177 (Carriage by highway) of this subchapter except § 177.817 (Shipping papers).

§ 173.180 Aircraft thrust devices.

(a) Aircraft thrust devices for assisted take-off and their igniters must be of a type examined by the Bureau of Explosives and approved by the Director, OHMT. They must be properly marked and must be shipped in an inoperable condition, and must be packaged as authorized in paragraph (b) of this section.

(b) Devices must be packed in outer wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes with one of the following inner packaging provisions:

- (1) Aircraft thrust devices only;
- (2) Igniters for aircraft thrust devices only packed in sealed metal inner packagings; or,

(3) Aircraft thrust devices together with igniters in same outer packaging provided igniters are packed separately. Igniters must be packed in strong inner packagings and then in separate sealed metal packagings.

§ 173.181 Pyrophoric materials (liquids).

When the § 172.101 Table specifies that a hazardous material be packaged under this section, only the following non-bulk packagings are authorized:

(a) Specification steel or nickel cylinders prescribed for any compressed gas except acetylene having a minimum design pressure of 175 psi (1206.6 kPa). Cylinders with valves must be:

(1) Equipped with steel valve protection caps or collars, unless overpacked; or

(2) Overpacked in a wooden box (4C1, 4C2, 4D or 4F); fiberboard box (4G), or plastic box (4H1 or 4H2). Cylinders must be secured to prevent movement in the box and, when shipped, must be so loaded that pressure relief devices remain in the vapor space of the cylinder. (See §§ 173.34(d)(7), 174.300(d) and 177.837(d) of this subchapter.)

(b) Wooden boxes (4C1, 4C2, 4D or 4F) or fiberboard boxes (4G) enclosing not more than four strong, tight metal cans with inner receptacles of glass or metal, not over one liter (1.06 quarts) capacity each, having positive screwcap closures adequately gasketed. Inner packagings must be cushioned on all sides with dry, absorbent, incombustible material in a quantity sufficient to absorb the entire contents. The strong, tight metal cans must be closed by positive means, not by friction.

(c) Steel drums (1A2) not exceeding 220 liters (58.1 gallons) capacity each with inner metal cans not over 4.0 liters (1.06 gallons) capacity each, constructed of not less than 28 gauge (0.0149 inch (0.3785 mm) nominal thickness) electro-coated tin plate closed by positive means, not friction.

(1) Inner packagings must have no opening exceeding 26 mm (1.0 inch) diameter and must be surrounded with incombustible cushioning material.

(2) Net quantity of pyrophoric liquids may not exceed two-thirds of the rated capacity of the outer drum. For example, a 220-liter (58.1 gallons) outer drum may contain no more than 147 liters (38.8 gallons) of pyrophoric liquids.

(3) Each layer of inner containers must be separated by a tin plate separator in addition to cushioning material.

§ 173.182 Barium azide—50 percent or more water wet.

Barium azide—50 percent or more water wet, must be packed in wooden

boxes (4C1, 4C2, 4D, or 4F) or fiber drums (1G) with inner glass packagings not over 0.5 kg (1.1 pounds) capacity each. Packagings must have rubber stoppers wire tied for securement. If shipment is to take place at a time freezing weather is anticipated, a suitable antifreeze solution must be used to prevent freezing. Each packaging must conform to the requirements of Part 178 of this subchapter at the Packing Group I performance level.

§ 173.183 Nitrocellulose base film.

Films, nitrocellulose base, must be packaged in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group III performance level, as follows:

(a) In steel drums (1A2), aluminum drums (1B2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes or plywood drums (1D) with each reel in a tightly closed metal can or strong cardboard or fiberboard inner packaging with cover held in place by adhesive tape or paper; or

(b) In fiberboard (4G) boxes or fiber drums (1G) with a single tightly closed metal can or strong cardboard or fiberboard inner packaging with cover held in place by adhesive tape or paper; authorized only for not over 600 m (1968.5 ft.) of film.

§ 173.184 Highway or rail fusee.

(a) A fusee is a device designed to burn at a controlled rate and to produce visual effects for signaling purposes. The composition of the fusee must be such that the fusee will not ignite spontaneously or undergo marked decomposition when subjected to a temperature of 75° C (167° F) for 48 consecutive hours.

(b) Fusees (highway and railway) must be packaged in steel drums (1A2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes or in fiberboard boxes (4G), plywood (1D) or fiber (1G) drums. If the fusees are equipped with spikes, packagings must have reinforced ends to prevent penetration of spikes through the outer packagings; packages must be capable of passing drop test requirements (§ 178.603 of this subchapter), including at least one drop with spike in a downward position, and other requirements of Part 178 of this subchapter, at the Packing Group II performance level.

§ 173.185 Lithium batteries and cells.

(a) Except as provided in paragraphs (i) and (j) of this section, lithium cells and batteries, containing only metallic

lithium and vanadium pentoxide, manganese dioxide, monofluorographite, sulfur dioxide, lithium bromide salts, acetonitrile, propylene carbonate, thionyl chloride, sulphuryl chloride, chlorine poly-carbon monofluoride, lithium tetrachloroaluminate, lithium perchlorate, or lithium tetrafluoroborate, are authorized for transportation when packaged in accordance with paragraphs (b) through (g) of this section and tested in accordance with paragraph (h) of this section. Other types of lithium cells, batteries, and devices containing lithium batteries, must be transported by methods approved by the Director, OHMT.

(b) No cell may contain more than 12 grams (0.42 ounce) of lithium or lithium alloy.

(c) Each cell and battery must be equipped with an effective means of preventing external short circuits.

(d) Each cell and battery must incorporate a safety venting device or be designed in a manner that will preclude a violent rupture when subject to an incident in transportation, such as a dead short.

(e) Batteries containing cells or series of cells connected in parallel must be equipped with diodes to prevent reverse current flow.

(f) Except as provided in paragraph (j) of this section, cells or batteries may not be offered for transportation or transported if any cell has been discharged to the extent that the open circuit voltage is less than two volts or is less than $\frac{2}{3}$ of the voltage of the fully charged cell whichever is less.

(g) Lithium cells and batteries must be packaged in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group II performance level, as follows:

(1) In strong inner fiberboard packagings containing not more than 500 grams (1.10 pounds) of lithium per inner packaging.

(2) For shipment by water, rail or highway, inner packagings must be packed within a wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), fiber drum (1G), or metal drum (1A2 or 1B2).

(3) For shipment by cargo-only aircraft, the inner packaging must be packed in a steel drum (1A2) with a gas tight gasket. The maximum gross weight of the package must not exceed 35 kg (77.18 pounds).

(4) When the outer packaging is a metal drum, inner packagings must be separated from each other and from the outer packaging by at least 25 mm (one inch) of non-combustible cushioning material.

(h) Lithium batteries and cells must be tested as follows:

(1) The cell or battery must be subjected to a thermal stability test at 75° C (167.0° F) for 48 hours and must show no evidence of distortion, leakage or internal heating. This test must be performed on at least 10 cells and 1 battery of each type taken from each week's production, or as otherwise approved by the Director, OHMT.

(2) Under application of a direct short, the cell or battery must be rendered inert, preferably without venting (through the use of internal fusing devices). If venting does occur, an open flame must be applied to the venting fumes to prove that an explosive condition does not exist. This test must be performed on at least 3 cells and 1 battery of each type taken from each week's production, or as otherwise approved by the Director, OHMT.

(3) Cells containing no more than 12 grams of lithium metal and also containing lithium molybdenum disulfide and lithium hexafluoroarsenate or vanadium pentoxide, polycarbonmonofluoride, manganese dioxide, titanium disulfide, thionyl chloride and lithium tetrachloroaluminate, lithium tetrafluoroborate or acetonitrile and sulfur dioxide, or thionyl chloride/bromine complex or sulfuryl chloride and chlorine which are hermetically sealed, and batteries constructed of such cells, are excepted from the tests in paragraphs (h)(1) and (h)(2) of this section and the requirement to use a 1A2 steel drum for transportation by cargo aircraft only as an outer packaging provided that:

(i) The outer packaging conforms to paragraph (g)(2) of this section; and

(ii) Prior to the first shipment, 10 cells or 4 batteries of each type to be offered for transportation, or as otherwise approved by the Director, OHMT, must be tested as follows, without showing any evidence of out-gassing, leakage, loss of weight or distortion:

(A) The cells or batteries must be stored for 6 hours at an absolute pressure of 11.6 kPa (1.68 psi) and a temperature of 24° C \pm 4° C; (75.2° F \pm 7.2° F).

(B) The cells or batteries must then be subjected to the thermal stability test at 75° C (167° F) for 48 hours as required in paragraph (h)(1) of this section;

(C) The cells or batteries must be rigidly clamped to the platform of a vibration machine. A simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) must be applied. The frequency must be varied at the rate of 1 Hz/min between the limits of 10 Hz to 55 Hz. The entire range of frequencies and return must be traversed in 95 \pm 5 minutes for each of

three mutually perpendicular mounting positions of the battery and two perpendicular positions of the cells. One of the directions of vibration must be perpendicular to the terminal face of the battery or cell. Open circuit voltage must be observed for 30 seconds during the last quarter of each vibration period. Periodic retesting is not required;

(D) The battery must be secured to a shock testing machine by means of a rigid mount which will support all mounting surfaces of the battery. Each battery must be subjected to a total of three shocks of equal magnitude. The shocks must be applied in each of three mutually perpendicular directions. Each shock must be applied in a direction normal to a face of the battery. For each shock, the battery must be accelerated in such a manner that during the first 3 milliseconds the minimum average acceleration is 75 g (where g is the local acceleration due to gravity). The peak acceleration must be between 125 g and 175 g.

(i) Lithium batteries comprised of one or more cells are not subject to the requirements of this subchapter, if they meet the following requirements:

(1) Each cell may contain no more than 0.5 gram of lithium or lithium alloy.

(2) Each battery may contain an aggregate quantity of no more than 1 gram of lithium or lithium alloy.

(3) Each cell must be hermetically sealed.

(4) Cells must be separated so as to prevent short circuits.

(5) Batteries must be packed in strong outer packagers except when installed in electronic devices.

(6) If a battery contains more than 0.5 gram of lithium or lithium alloy, it may not contain a liquid or gas that is a hazardous material according to this subchapter unless the liquid or gas, if free, would be completely absorbed or neutralized by other materials in the battery.

(j) Lithium batteries, for disposal, comprised of one or more cells, may be offered for transportation to a permitted storage facility and disposal site by motor vehicle only, if the battery—

(1) When new, contained not more than 12.0 grams (0.42 ounce) of lithium per cell;

(2) Is equipped with an effective means of preventing external short circuits; and

(3) Is packed in a strong outer packaging conforming to the requirements of §§ 173.24 and 173.24a. The packaging need not conform to Part 178 performance requirements.

§ 173.186 Matches.

(a) Matches must be of a type which will not ignite spontaneously or undergo marked decomposition when subjected for 8 consecutive hours to a temperature of 93.3 °C (200 °F).

(b) *Definitions.* (1) "Fusee matches" are matches the heads of which are prepared with a friction sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat.

(2) "Safety matches" are matches combined with or attached to the box, book or card that can be ignited by friction only on a prepared surface.

(3) "Strike anywhere" matches are matches that can be ignited by friction on a solid surface.

(4) "Wax 'Vesta' matches" are matches that can be ignited by friction either on a prepared surface or on a solid surface.

(c) Safety matches and wax "Vesta" matches must be tightly packed in securely closed inner packagings to prevent accidental ignition under conditions normally incident to transportation, and further packed in outer fiberboard, wooden, or other equivalent-type packagings. These matches in outer packagings not exceeding 50 pounds (22.7 kg) gross weight are not subject to any other requirement (except marking) of this subchapter. These matches may be packed in the same outer packaging with materials not subject to this subchapter.

(d) Strike anywhere matches may not be packed in the same outer packaging with any material other than safety matches or wax "Vesta" matches, which must be packed in separate inner packagings.

(e) *Packagings.* Strike anywhere matches must be tightly packed in securely closed chipboard, fiberboard, wooden, or metal inner packagings to prevent accidental ignition under conditions normally incident to transportation. Each inner packaging may contain no more than 700 strike anywhere matches and must be packed in outer steel drums (1A2), aluminum drums (1B2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D), reconstituted wood (4F) or fiberboard (4G) boxes, plywood (1D) or fiber (1G) drums. Gross weight of fiberboard boxes (4G) must not exceed 60 pounds (27.2 kg). Gross weight of other outer packagings must not exceed 100 pounds (45.4 kg).

§ 173.187 Pyrophoric solids, metals or alloys, n.o.s.

Packagings for pyrophoric solids, metals, or alloys, n.o.s. must conform to the

requirements of Part 178 of this subchapter at the packing group performance level specified in the § 172.101 Table. These materials must be packaged as follows:

(a) In wooden boxes (4C1, 4C2, 4D, or 4F) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 15 kilograms (33.1 pounds) each.

(b) In steel drums (1A1 or 1A2) with a gross mass not exceeding 150 kg (330.7 pounds) per drum.

(c) In fiberboard boxes (4G) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 7.5 kilograms (16.53 pounds) each.

(d) In fiber drums (1G) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 15 kilograms (33.1 pounds) each.

(e) In plywood drums (1D) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 15 kilograms (33.1 pounds) each.

§ 173.188 White or yellow phosphorus.

Phosphorus, white or yellow, when offered for transportation by rail, highway, or water, must be packaged in water or dry in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group I performance level, as follows:

(a) When placed in water, it must be packaged in specification packagings as follows:

(1) Wooden boxes (4C1, 4C2, 4D, or 4F) with:

(i) inner hermetically sealed (soldered) metal cans, enclosed in other hermetically sealed (soldered) metal cans, or

(ii) inner water-tight metal cans containing not over 0.5 kg (1.0 pounds) of phosphorus with screw-top closures.

(2) Metal drums (1A1 or 1A2), not over 115 liters (30.4 gallons) capacity each.

(b) When dry, it must be cast solid and shipped in packagings as follows:

(1) Metal drums (1A2) not over 115 liters (30.4 gallons) capacity each.

(2) In projectiles or bombs when shipped by, for, or to the Departments of the Army, Navy, or Air Force of the United States Government, without bursting elements.

§ 173.192 Packaging for certain Packing Group I poisonous materials.

When § 172.101 of this subchapter specifies that a poisonous material be packaged under this section, only specification cylinders are authorized, as follows:

(a) Specification 3A1800, 3AA1800, 3AL1800, or 3E1800 cylinders.

(i) Specification 3A, 3AA and 3AL cylinders must not exceed 125 pounds (56.7 kg) water capacity (nominal).

(ii) Specification 3AL cylinders containing arsine or phosphine may only be transported by highway and rail.

(b) Packagings must conform to the requirements of § 173.40 of this part.

(c) For cylinders used for phosgene, the filling density may not exceed 125 percent and a cylinder may not contain more than 150 pounds (68.0 kg) of phosgene.

§ 173.193 Bromoacetone, methyl bromide, chloropicrin and methyl bromide or methyl chloride mixtures, etc.

(a) Bromoacetone must be packaged as follows in wooden boxes (4C1, 4C2, 4D or 4F) with inner glass receptacles or tubes in hermetically sealed metal receptacles in corrugated fiberboard cartons. Bottles must not contain over 500 grams (1.1 pounds) of liquid each and be cushioned in cans with at least ½ inch (12.7 mm) of absorbent material. Total amount of liquid in outer box must not exceed 11 kg (24.3 pounds). Packagings must conform to the requirements of Part 178 of this subchapter at the Packing Group I performance level.

(b) Bromoacetone, methyl bromide, chloropicrin and methyl bromide mixtures, chloropicrin and methyl chloride mixtures, and chloropicrin mixtures charged with non-flammable, non-liquefied compressed gas must be packed in Specification 3A, 3AA, 3B, 3C, 3E, 4A, 4B, 4BA, 4BW, or 4C cylinders having not over 250 pounds (113.4 kg) water capacity (nominal).

(c) Cylinders must conform to § 173.40.

§ 173.194 Gas identification sets.

Gas identification sets containing poisonous material must be packaged in packaging conforming to the requirements of Part 178 of this subchapter at the Packing Group I performance level, as follows:

(a) In glass inner receptacles, hermetically sealed, of not over 40 milliliters (1.35 fluid ounces) each. Each glass inner receptacle must in turn be placed in a sealed fiberboard receptacle, cushioned with absorbent material. Not more than 12 fiberboard receptacles must in turn be placed in a fiberboard box (4G). No more than four boxes, well-cushioned, must in turn be placed in a steel cylinder. The cylinder must have a wall thickness of at least 3.7 mm (0.146 inch) and must have a hermetically sealed steel closure.

(b) When the poisonous material is adsorbed in a medium such as activated charcoal or silical gel, gas identification sets may be shipped as follows:

(1) If the poisonous material does not exceed 5 milliliters (0.17 fluid ounce) if a liquid or 5 grams (0.18 ounce) if a solid, it may be packed in glass inner receptacles of not over 120 milliliters (4.1 fluid ounces) each. Each glass receptacle, cushioned with absorbent material must be packed in a hermetically sealed metal can of not less than 0.30 mm (0.0120 inch) wall thickness. Metal cans, surrounded on all sides by at least 25 mm (1 inch) of dry sawdust, must be packed in 4C1, 4C2, 4D or 4F wooden boxes. Not more than 100 milliliters (3.38 fluid ounces) or 100 grams (3.53 ounces) of poisonous materials may be packed in one outer wooden box.

(2) If the poisonous material does not exceed 5 milliliters (0.17 fluid ounce) if a liquid or 20 grams (0.7 ounce) if a solid, it may be packed in glass inner receptacles with screw-top closures of not less than 60 milliliters (2.02 fluid ounces), hermetically sealed. Twelve bottles containing poisonous material, not to exceed 100 milliliters, or grams, or both, may be placed in a plastic carrying case, each glass receptacle surrounded by absorbent cushioning and each separated from the other by sponge rubber partitions. The plastic carrying case must be placed in a tightly fitting fiberboard box which in turn must be placed in a tightly fitting 4C1, 4C2, 4D or 4F wooden box.

§ 173.195 Hydrocyanic acid, liquid (prussic acid) and hydrocyanic acid liquefied.

(a) Hydrocyanic acid, liquid (prussic acid) and hydrocyanic acid liquefied, must be packed in specification cylinders as follows:

(1) As prescribed in § 173.192, or
(2) Specification 3A480, 3AA480, or 3AL1800 metal cylinders of not over 126.08 kg (278 pounds) water capacity (nominal). Shipments in 3AL cylinders are authorized only when transported by highway and rail.

(b) Cylinders may not be charged with more than 0.27 kg (0.6 pound) of liquid per 0.45 kg (1 pound) water capacity of cylinder. Each filled cylinder must be tested for leakage before shipment and must show absolutely no leakage; this test must consist in passing a piece of Guignard's sodium picrate paper over the closure of the cylinder, without the protection cap attached, to detect any escape of hydrocyanic acid from the cylinder. Other equally efficient test methods may be used if approved by the Director, OHMT.

(c) Packagings for hydrocyanic acid must conform to § 173.40.

§ 173.196 Infectious substances (etiologic agents).

(a) Authorized packagings and components are as follows:

(1) Inner packagings comprising:
(i) A watertight primary receptacle;
(ii) A watertight secondary packaging; and
(iii) An absorbent material must be placed between the primary receptacle and the secondary packaging. If multiple-primary receptacles are placed in a single secondary packaging they must be wrapped individually to ensure that contact between them is prevented. The absorbent material, such as cotton wool, must be sufficient to absorb the entire contents of all primary receptacles.

(2) An outer packaging which is capable of withstanding the specification performance tests found in § 173.465 or § 173.466. Packages consigned as freight must be at least 100 mm (3.94 inches) in the smallest over all external dimension.

(b) For all packages containing infectious substances, an itemized list of contents must be enclosed between the secondary packaging and the outer packaging.

(c) Although exceptional cases, such as whole organs, may require special packaging, the great majority of infectious substances can and must be packaged according to the following guidelines.

(1) *Lyophilized substances.* Primary receptacles include flame-sealed glass ampoules or rubber-stopped glass vials fitted with metal seals.

(2) *Liquid or solid substances.* (i) *Substances shipped at ambient temperatures or higher.* Primary receptacles include those of glass, metal or plastic. Positive means of ensuring a leakproof, seal, such as heat seal, skirted stopper or metal crimp seal must be provided. If screw caps are used, they must be reinforced with adhesive tape.

(ii) *Substances shipped refrigerated or frozen (ice, pre-frozen packs, dry ice).* Primary receptacles closed by screw caps must not be used. Ice or dry ice must be placed outside the secondary packagings(s). Interior supports must be provided to secure the secondary packagings(s) in the original position after the ice or dry ice has dissipated. If ice is used, the packaging must be leakproof. If dry ice is used, the outer packaging must permit the release of carbon dioxide gas.

(iii) *Substances shipped in liquid nitrogen.* Primary receptacles must be

heat-sealed. Plastic capable of withstanding very low temperatures must be used instead of glass receptacles. Secondary packaging must also withstand very low temperatures and in most cases will need to be fitted over individual primary receptacles. Requirements for shipment of liquid nitrogen must also be observed.

(d) Whatever the intended temperature of shipment, the primary receptacle and secondary packaging used for infectious substances must be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than 95 kPa (13.8 psi) and temperatures in the range of -40°C to $+55^{\circ}\text{C}$ (-40°F to $+131^{\circ}\text{F}$).

(e) The requirements of this section supplement the requirements of the Department of Health and Human Services contained in 42 CFR Part 72.

(f) *Exceptions.* The following substances are not subject to any requirements of this subchapter if the items as packaged do not contain any material otherwise subject to the requirements of this subchapter.

(1) Diagnostic specimens.

(2) Biological products.

(3) Cultures of etiologic agents of 50 milliliters (1.67 fluid ounces) or less total quantity in one outside package.

§ 173.198 Nickel carbonyl.

(a) Nickel carbonyl must be packed in specification steel or nickel cylinders as prescribed for any compressed gas except acetylene. A cylinder used exclusively for nickel carbonyl may be given a complete external visual inspection in lieu of the interior hydrostatic pressure test required by § 173.34(e). Visual inspection must be in accordance with CGA Pamphlet C-6.

(b) Packagings for nickel carbonyl must conform to § 173.40.

§ 173.201 Non-bulk packagings for liquid hazardous materials in Packing Group I.

(a) When § 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2

Aluminum drum: 1B2
 Plywood drum: 1D
 Fiber drum: 1G
 Plastic drum: 1H2
 Steel jerrican: 3A2
 Plastic jerrican: 3H2
 Steel box: 4A1 or 4A2
 Aluminum box: 4B1 or 4B2
 Natural wood box: 4C1 or 4C2
 Plywood box: 4D
 Reconstituted, wood box: 4F
 Fiberboard box: 4G
 Expanded plastic box: 4H1
 Solid plastic box: 4H2

Inner packagings:
 Glass or earthenware receptacles
 Plastic receptacles
 Metal receptacles
 Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
 Aluminum drum: 1B1 or 1B2
 Metal drum other than steel or aluminum:
 1N1 or 1N2
 Plastic drum: 1H1 or 1H2
 Steel jerrican: 3A1 or 3A2
 Plastic jerrican: 3H1 or 3H2
 Plastic receptacle in steel, aluminum, fiber or plastic drum: 6HA1, 6HB1, 6HG1, 6HH
 Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
 Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1
 Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
 Glass, porcelain or stoneware in solid or expanded plastic packaging: 6PH1 or 6PH2
 Cylinders, specification, as prescribed for any compressed gas, except for Specifications 8 and 3HT

§ 173.202 Non-bulk packagings for liquid hazardous materials in Packing Group II.

(a) When § 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I or II performance level (unless otherwise excepted), and to the particular requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
 Steel drum: 1A2
 Aluminum drum: 1B2
 Plywood drum: 1D
 Fiber drum: 1G
 Plastic drum: 1H2
 Wooden barrel: 2C2
 Steel jerrican: 3A2
 Plastic jerrican: 3H2

Steel box: 4A1 or 4A2
 Aluminum box: 4B1 or 4B2
 Natural wood box: 4C1 or 4C2
 Plywood box: 4D
 Reconstituted wood box: 4F
 Fiberboard box: 4G
 Expanded plastic box: 4H1
 Solid plastic box: 4H2

Inner packagings:
 Glass or earthenware receptacles
 Plastic receptacles
 Metal receptacles
 Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
 Aluminum drum: 1B1 or 1B2
 Metal drum other than steel or aluminum:
 1N1 or 1N2
 Plastic drum: 1H1 or 1H2
 Wooden barrel: 2C1
 Steel jerrican: 3A1 or 3A2
 Plastic jerrican: 3H1 or 3H2
 Plastic receptacle in steel, aluminum, fiber or plastic drum: 6HA1, 6HB1, 6HG1 or 6HH
 Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
 Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1
 Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
 Glass, porcelain or stoneware in solid or expanded plastic packaging: 6PH1 or 6PH2
 Plastic receptacle in plywood drum: 6HD1
 Glass, porcelain or stoneware in plywood drum or wickerwork hamper: 6PD1 or 6PD2
 Cylinders, specification, as prescribed for any compressed gas, except for Specifications 8 and 3HT

§ 173.203 Non-bulk packagings for liquid hazardous materials in Packing Group III.

(a) When § 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I, II or III performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
 Steel drum: 1A2
 Aluminum drum: 1B2
 Plywood drum: 1D
 Fiber drum: 1G
 Plastic drum: 1H2
 Wooden barrel: 2C2
 Steel jerrican: 3A2
 Plastic jerrican: 3H2
 Steel box: 4A1 or 4A2
 Aluminum box: 4B1 or 4B2

Natural wood box: 4C1 or 4C2
 Plywood box: 4D
 Reconstituted wood box: 4F
 Fiberboard box: 4G
 Expanded plastic box: 4H1
 Solid plastic box: 4H2

Inner packagings:
 Glass or earthenware receptacles
 Plastic receptacles
 Metal receptacles
 Glass ampoules

(c) The following single packagings are authorized:

Steel drum: 1A1 or 1A2
 Aluminum drum: 1B1 or 1B2
 Metal drum other than steel or aluminum:
 1N1
 Plastic drum: 1H1 or 1H2
 Wooden barrel: 2C1
 Steel jerrican: 3A1 or 3A2
 Plastic jerrican: 3H1 or 3H2
 Plastic receptacle in steel, aluminum, fiber or plastic drum: 6HA1, 6HB1, 6HG1 or 6HH
 Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
 Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1
 Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
 Glass, porcelain or stoneware in solid or expanded plastic packaging: 6PH1 or 6PH2
 Plastic receptacle in plywood drum: 6HD1
 Glass, porcelain or stoneware in plywood drum or wickerwork hamper: 6PD1 or 6PD2
 Cylinders, as prescribed for any compressed gas, except for Specifications 8 and 3HT

§ 173.204 Non-bulk non-specification packagings for certain hazardous materials.

When § 172.101 of this subchapter specifies that a liquid or solid hazardous material be packaged under this section, any appropriate non-bulk packaging which conforms to the general packaging requirements of Subpart B of Part 173 may be used for its transportation. Packagings need not conform to the requirements of Part 178 of this subchapter.

§ 173.205 Specification cylinders for liquid hazardous materials.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, any specification cylinder, except those specified for acetylene, is authorized. Cylinders used for poisonous materials (Division 6.1 or 2.3) must conform to the requirements of § 173.40.

§ 173.211 Non-bulk packagings for solid hazardous materials in Packing Group I.

(a) When § 172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its

transportation. Each package must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:

Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Solid plastic box: 4H2

Inner packagings:

Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Metal drum other than steel or aluminum: 1N1 or 1N2
Plastic drum: 1H1 or 1H2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Steel box with liner: 4A2
Aluminum box with liner: 4B2
Natural wood box, sift proof: 4C2
Plastic receptacle in steel, aluminum, plywood, fiber or plastic drum: 6HA2, 6HB1, 6HD1, 6HG1 or 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA1, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum, plywood or fiber drum: 6PA1, 6PB1, 6PD1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC, or 6PG2
Glass, porcelain or stoneware in expanded or solid plastic packaging: 6PH1 or 6PH2

§ 173.212 Non-bulk packagings for solid hazardous materials in Packing Group II.

(a) When § 172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each package must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I or II performance level, and to the requirements of the special

provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:

Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Solid plastic box: 4H2

Inner packagings:

Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Plywood drum: 1D
Plastic drum: 1H1 or 1H2
Fiber drum: 1G
Metal drum other than steel or aluminum: 1N1 or 1N2
Wooden barrel: 2C1 or 2C2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Steel box: 4A1
Steel box with liner: 4A2
Aluminum box: 4B1
Aluminum box with liner: 4B2
Natural wood box: 4C1
Natural wood box, sift proof: 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H1
Solid plastic box: 4H2
Bag, woven plastic: 5H1, 5H2 or 5H3
Bag, textile: 5L1, 5L2 or 5L3
Bag, paper, multiwall, water resistant: 5M2
Plastic receptacle in steel, aluminum, plywood, fiber or plastic drum: 6HA1, 6HB1, 6HD1, 6HG1 or 6HH
Plastic receptacle in steel aluminum, wood, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum, plywood or fiber drum: 6PA1, 6PB1, 6PD1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden of fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in expanded or solid plastic packaging: 6PH1 or 6PH2

§ 173.213 Non-bulk packagings for solid hazardous materials in Packing Group III.

(a) When § 172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its

transportation. Each package must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I, II or III performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:

Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Solid plastic box: 4H2

Inner packagings:

Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) The following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H1 or 1H2
Metal drum other than steel or aluminum: 1N1 or 1N2
Wooden barrel: 2C1 or 2C2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Steel box with liner: 4A2
Steel box: 4B1
Aluminum box with liner: 4B2
Natural wood box: 4C1
Natural wood box, sift proof: 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H2
Solid plastic box: 4H2
Bag, woven plastic: 5H1, 5H2 or 5H3
Bag, textile: 5L1, 5L2 or 5L3
Bag, paper, multiwall, water resistant: 5M2
Plastic receptacle in steel, aluminum, plywood, fiber or plastic drum: 6HA1, 6HB1, 6HD1, 6HG1 or 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum, plywood or fiber drum: 6PA1, 6PB1, 6PD1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in expanded or solid plastic packaging: 6PH1 or 6PH2

§ 173.214 Packagings which require approval by the Director, OHMT.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, packagings and method of shipment must be approved by the Director, OHMT, prior to the first shipment.

§ 173.216 Asbestos, blue or white.

(a) Asbestos, blue or white, includes each of the following hydrated mineral silicates: Chrysolite, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, actinolite asbestos, and every product containing any of these materials.

(b) Commercial asbestos is any material or product containing asbestos that has commercial value because of its asbestos content.

(c) Asbestos which is immersed or fixed in a natural or artificial binder material (such as cement, plastic, asphalt, resins or mineral ore), waste asbestos, and manufactured products containing asbestos or any materials or products whose commercial value is not dependent on their asbestos content, are not subject to the requirements of this subchapter.

(d) Packagings for commercial asbestos must conform to the general packaging requirements of Subpart B of this part but need not conform to the requirements of Part 178 of this subchapter. Commercial asbestos must be offered for transportation and transported in—

(1) Rigid, leaktight packagings, such as metal or fiber drums, portable tanks, hopper-type rail cars, or hopper-type motor vehicles;

(2) Bags or other non-rigid packagings in closed freight containers, motor vehicles, or rail cars that are loaded by and for the exclusive use of the consignor and unloaded by the consignee;

(3) Bags or other non-rigid packagings which are dust and sift-proof. When transported by other than private carrier by highway, such packagings containing asbestos must be palletized and unitized by methods such as shrink-wrapping in plastic film or wrapping in fiberboard secured by strapping. Pallets need not be used during transportation by vessel for loads with slings that are unitized by methods such as shrink-wrapping, if the slings adequately and evenly support the loads and the unitizing method prevents shifting of the bags or other non-rigid packagings during conditions normally incident to transportation; or

(4) Bags or other non-rigid packagings which are dust and sift-proof in strong outside fiberboard or wooden boxes.

§ 173.217 Carbon dioxide, solid (dry ice).

(a) Carbon dioxide, solid (dry ice), when offered for transportation by aircraft or water, must be packed in packagings designed and constructed to permit the release of carbon dioxide gas to prevent a buildup of pressure that could rupture the packagings.

Packagings must conform to the general packaging requirements of Subpart B of this part but need not conform to the requirements of Part 178 of this subchapter. For each shipment by air exceeding five pounds per package, advance arrangements between the shipper and each carrier must be made.

(b) Railroad cars and motor vehicles containing solid carbon dioxide, when accepted for transportation on board ocean vessels, must be conspicuously marked on two sides "WARNING CO₂ SOLID (DRY ICE)."

(c) Other packagings, when accepted for transportation on board ocean vessels, must be marked "CARBON DIOXIDE, SOLID—DO NOT STOW BELOW DECKS."

(d) Not more than 200 kg (440.9 lbs) of solid carbon dioxide may be transported in any one cargo compartment or bin on any aircraft except by specific and special arrangement between the shipper and the aircraft operator.

(e) Carbon dioxide, solid (dry ice) is excepted from the shipping paper and certification requirements of this subchapter if the requirements of paragraphs (a) and (d) of this section are complied with and the package is marked "Carbon dioxide, solid" or "Dry ice" and marked with an indication that the material being refrigerated is used for diagnostic or treatment purposes (e.g., frozen medical specimens).

§ 173.218 Fish meal or fish scrap.

(a) Except as provided in paragraph (b) of this section, fish meal or fish scrap, containing at least 6 percent but not more than 12 percent water, is authorized for transportation by water only when packaged as follows:

- (1) Burlap (jute) bag;
- (2) Multi-wall paper bag;
- (3) Polyethylene-lined burlap or paper bag;
- (4) Cargo tank;
- (5) Portable tank;
- (6) Rail car; or
- (7) Freight container.

(b) Fish meal or fish scrap may not be offered for transportation if the temperature of the material exceeds 49° C (120.2 °F).

(c) When fish scrap or fish meal is offered for transportation by vessel in bulk in freight containers, the fish meal must contain at least 100 PPM of anti-

oxidant (ethoxyquin) at the time of shipment.

§ 173.219 Life rafts, aircraft survival kits, etc.

(a) A life raft or aircraft survival kit or aircraft evacuation slide containing small quantities of hazardous materials which are required as part of the life-saving appliance must conform to the requirements of this section. Packagings are excepted from the specification packaging requirements of this subchapter.

(b) Hazardous materials must be packaged as follows:

(1) Non-flammable compressed gases must be packaged in cylinders in accordance with the requirements of this subchapter;

(2) Smoke and illumination signal flares must be in plastic or fiberboard receptacles;

(3) Strike-anywhere matches must be cushioned to prevent movement or friction in a cylindrical metal or composition receptacle with a screw-type closure;

(4) Flammable liquids must be in strong inner packagings in a repair kit; and

(5) Limited quantities of other hazardous materials are permitted if packaged in accordance with the requirements of this subchapter.

(c) Materials not subject to the requirements of this subchapter which are an integral part of the life-saving appliance must be packaged in a strong fiberglass kit case which is overpacked in a waterproof fiberboard packaging, or be packaged in other strong outer packagings.

§ 173.220 Internal combustion engines, self-propelled vehicles, and mechanical equipment containing internal combustion engines or wet batteries.

(a) *Applicability.* An internal combustion engine, self-propelled vehicle, or mechanized equipment is subject to the requirements of this subchapter when transported as cargo on a transport vehicle if—

(1) The engine or fuel tank contains a flammable liquid or gaseous fuel;

(2) It is equipped with a wet electric storage battery other than a non-spillable battery; or

(3) It contains other hazardous materials subject to the requirements of this subchapter.

(b) *Flammable liquid fuel.* Except as provided in this paragraph, flammable liquid fuel tanks must be completely drained and securely closed. Up to 500 milliliters (16.9 ounces) of fuel may be left in engine components and fuel lines provided the lines are securely closed to

prevent leakage of fuel. Fuel may remain in engines and tanks installed in self-propelled vehicles and mechanical equipment under the following conditions:

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

(2) For transportation by vessel, the shipment must conform to § 176.905 of this subchapter; and

(3) For transportation by aircraft, the shipment must conform to § 175.305 of this subchapter.

(c) *Wet batteries.* Wet batteries must either be installed, securely fastened in an upright position, and protected against short circuits and leakage or be removed and packaged separately under § 173.159. In addition—

(1) For transportation by vessel, the shipment must conform to § 176.905 of this subchapter; and

(2) For transportation by passenger-carrying aircraft, a wheelchair equipped with a wet battery must conform to § 173.222.

(d) *Truck bodies or trailers on flat cars.* Truck bodies or trailers with automatic heating or refrigerating equipment of the flammable liquid type may be shipped with fuel tanks filled and equipment operating or inoperative, when used for the transportation of other freight and loaded on flat cars as part of a joint rail and highway movement, provided the equipment and fuel supply conform to the requirements of § 177.834(1) and are of a type examined by the Bureau of Explosives and approved by the Director, OHMT.

(e) *Gases.* Compressed gas tanks and cylinders, containing gases, which are component parts of vehicles or mechanical equipment must conform to § 173.306.

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

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

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

(2) Are not subject to the requirements of Subparts D, E, and F (marking, labeling, and placarding, respectively) of Part 172 of this subchapter, for transportation by vessel or aircraft.

§ 173.221 Polystyrene beads, expandable.

Polystyrene beads or granules, expandable, impregnated with flammable gas or liquid as a blowing agent and plastic moulding materials in

dough, sheet or extruded rope form must be packed in wooden (4C1 or 4C2), plywood (4D), fiberboard (4G) or reconstituted wood (4F) boxes with sealed inner plastic liners, plywood drums (1D), fiber drums (1G) with sealed inner plastic liner or in metal (1A1, 1A2, 1B1 or 1B2) packagings.

§ 173.222 Wheelchairs equipped with wet electric storage batteries.

(a) For transportation by highway, rail, water, or cargo aircraft only, wheelchairs equipped with wet electric storage batteries must conform to the provisions in § 173.220(c) of this part.

(b) For transportation by passenger-carrying aircraft, wheelchairs equipped with wet electric storage batteries are not subject to requirements of this subchapter other than the following:

(1) Wheelchairs equipped with non-spillable batteries as defined in § 173.159(d) of this subchapter may be shipped as checked luggage provided the battery is disconnected, the battery terminals are insulated to prevent accidental short circuits, and the battery is securely attached to the wheelchair.

(2) Wheelchairs equipped with spillable batteries may be shipped as checked baggage, provided that the wheelchair can be loaded, stowed, secured, and unloaded while always in an upright position. The battery must be disconnected, the terminals insulated to prevent accidental short circuits, and the battery securely attached to the wheelchair. The pilot-in-command must be advised, either orally or in writing, prior to departure, of the location of the wheelchair aboard the aircraft. If the wheelchair cannot be loaded, stowed, secured and unloaded always in an upright position, the battery must be removed and the wheelchair may then be carried without restriction. The removed battery must be carried in strong, rigid, outside packagings as follows:

(i) Outside packagings must be leaktight, impervious to battery fluid, loaded aboard the aircraft in accordance with the required orientation markings and be protected against upset by being secured to pallets or by being secured in cargo compartments using appropriate means (other than by bracing with freight or baggage) such as by use of restraining straps, brackets or holders;

(ii) Batteries must be protected against short circuits, secured upright in their outside packagings, and surrounded by compatible absorbent material sufficient to absorb their total liquid contents; and

(iii) Outside packagings must be marked to indicate proper orientation,

and with the words "Battery, wet, with wheelchair", and be labeled with a CORROSIVE label.

§ 173.225 Packagings for organic peroxides.

(a) When the 172.101 Table specifies that an organic peroxide be packaged under this section, only non-bulk packagings which conform to the provisions of this section may be used for its transportation. Organic peroxides which require temperature control for stabilization are subject to the provisions of § 173.21(f) of this part.

(b) *Organic peroxides table.*

(1) The first column of the table gives the identification numbers for organic peroxides as specified in Column 4 of the § 172.101 Table.

(2) The second column gives the packing group as specified in Column 5 of the § 172.101 Table. Each packaging used for an organic peroxide must be capable of meeting the test requirements of Subpart M of Part 178 at the specified level of performance.

(3) The third column specifies the packaging method or methods which must be used to pack an organic peroxide. The table of packaging methods in paragraph (c) of this section defines the packaging methods.

(4) The fourth column indicates, by the letters "TC", that an organic peroxide may require temperature control for stabilization. See § 173.21(f) of this part for provisions applicable to such materials.

ORGANIC PEROXIDES TABLE

| Identification number (UN or NA) | Packing group | Packaging methods | Temperature control |
|----------------------------------|---------------|---|---------------------|
| (1) | (2) | (3) | (4) |
| 2080 | II | P1a, P8..... | TC |
| 2081 | II | P1a, P8..... | |
| 2082 | I | P1f, P13b..... | |
| 2083 | II | P1b, P2d, P8..... | |
| 2084 | I | P1b, P8..... | |
| 2085 | I | P1g, P1h, P13a, P14. | |
| 2087 | II | P1a, P2c, P3b, P6a, P16, P20a, P20b, P30. | |
| 2088 | I | P1d, P13b..... | |
| 2089 | II | P1a, P3b, P6a, P20b, P20d. | |
| 2090 | II | P1b, P2f, P6b..... | |
| 2091 | II | P1a, P2c, P8, P10, P22a, P25b. | |
| 2092 | I | P1a, P8, P10, P22a, P24. | |

| ORGANIC PEROXIDES TABLE— Continued | | | | ORGANIC PEROXIDES TABLE— Continued | | | | ORGANIC PEROXIDES TABLE— Continued | | | |
|--|-----------------------|---|-----------------------------|--|-----------------------|--|-----------------------------|--|-----------------------|--|-----------------------------|
| Identifi- cation number (UN or NA) | Pack- ing group | Packaging methods | Tem- perature control | Identifi- cation number (UN or NA) | Pack- ing group | Packaging methods | Tem- perature control | Identifi- cation number (UN or NA) | Pack- ing group | Packaging methods | Tem- perature control |
| (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) | (1) | (2) | (3) | (4) |
| 2093 | I | P1a, P8, P10, P22a, P24. | | 2127 | I | P1a, P8..... | | 2171 | I | P1a, P2c, P8, P22b, P25c. | |
| 2094 | I | P1a, P8, P10, P22a. | | 2128 | II | P1b, P2d, P8, P18, P24, P25a. | TC | 2172 | II | P1d, P3b, P6a, P20c, P20d, P21. | |
| 2095 | II | P1c, P8..... | | 2129 | II | P1a, P2c, P3b, P6a, P24, P25a. | TC | 2173 | II | P1d, P3b, P6a, P20c, P20d, P21. | |
| 2096 | II | P1a, P2d, P8..... | | 2130 | II | P1a, P2c, P3b, P6a. | TC | 2174 | I | P1d, P12..... | |
| 2097 | II | P1e, P8, P13b, P18. | | 2131 | I | P1c, P3a..... | | 2175 | II | P1b..... | TC |
| 2098 | II | P1a, P2c, P8, P10, P22a, P25b. | | 2132 | II | P1b, P2d, P8, P24, P25a. | TC | 2176 | I | P1d..... | TC |
| 2099 | II | P15..... | | 2133 | II | P1h, P7, P9, P13b. | | 2177 | II | P1e..... | |
| 2100 | II | P1a, P8..... | | 2134 | II | P1b, P2d, P8..... | | 2178 | II | P20d..... | |
| 2101 | II | P1a, P2a, P3b, P6a, P8, P16, P20c, P20d, P22a, P25b, P30. | | 2135 | II | P1d, P13b, P14, P15. | | 2179 | II | P1e..... | |
| 2102 | II | P1a, P2c, P8, P22b, P25b. | | 2136 | II | P1a, P2c, P22a, P25b. | | 2180 | II | P1e..... | |
| 2103 | II | P1e, P13b..... | | 2137 | II | P1b, P6b..... | | 2182 | II | P1f..... | TC |
| 2104 | II | P1a, P2d, P8..... | | 2138 | II | P1a, P2c, P3b, P6a, P16, P20b, P20d, P30. | | 2183 | II | P2d, P8, P9..... | |
| 2105 | II | P1f, P3b, P6a, P20c, P20d, P21. | | 2139 | II | P1b, P2d, P8..... | | 2184 | II | P1e, P8..... | |
| 2106 | II | P1a, P8..... | | 2140 | II | P1e, P8, P18..... | | 2185 | II | P1e, P8..... | |
| 2107 | II | P1a, P2c, P8, P22a, P25b., | | 2141 | II | P16..... | | 2255 | I | P1i..... | |
| 2108 | II | P1a, P2c, P3b, P6a, P16, P20c, P20d, P22a, P25b. | | 2142 | II | P1e, P18..... | TC | 2550 | I | P1a, P8..... | |
| 2110 | II | P1b, P8..... | TC | 2143 | II | P1b, P8, P18..... | TC | 2551 | II | P1b, P2d, P8..... | |
| 2111 | II | P1a, P2d, P8..... | | 2144 | II | P1e..... | | 2562 | II | P1e, P18..... | |
| 2112 | II | P1a, P3b, P6a, P20c, P20d, P24. | | 2145 | II | P1e, P18..... | | 2592 | II | P1a..... | |
| 2113 | II | P1b, P2f, P6b..... | | 2146 | II | P1a, P8..... | | 2593 | I | P1b..... | TC |
| 2114 | II | P1a, P2c, P3b, P6a, P16, P20c, P20d. | | 2147 | II | P1a..... | | 2594 | II | P1e..... | |
| 2115 | II | P1b, P2d, P8..... | | 2148 | II | P1a, P3b, P6a, P14, P20c, P20d. | | 2595 | II | P1a..... | TC |
| 2116 | I | P1a, P2c, P8, P22b, P25b. | | 2149 | I | P1f, P14, P20d..... | TC | 2596 | II | P1a..... | |
| 2117 | I | P1c, P12, P13b..... | | 2150 | I | P1d..... | TC | 2597 | II | P1a..... | TC |
| 2118 | I | P1a, P2c, P3b, P6a, P8, P16, P20b, P20d, P22a, P25b. | | 2151 | II | P1b..... | TC | 2598 | II | P1e..... | TC |
| 2119 | I | P1b, P2d, P8..... | | 2152 | I | P1d, P14, P20d..... | TC | 2599 | II | P1b, P2f, P6b..... | |
| 2120 | II | P1a, P2c, P3b, P6a, P17, P20b, P24, P25a. | TC | 2153 | I | P1b..... | TC | 2891 | II | P1e..... | TC |
| 2121 | II | P1a, P2a, P24..... | | 2154 | II | P1a, P3b, P6a, P20c, P20d. | TC | 2892 | II | P1a, P20a, P24..... | TC |
| 2122 | II | P1b..... | | 2155 | II | P1a, P8, P18..... | | 2893 | II | P1a, P20a, P24..... | TC |
| 2123 | II | P1b, P2d, P8..... | TC | 2156 | II | P1a..... | | 2894 | II | P1a, P20a, P24..... | TC |
| 2124 | II | P1a, P3b, P6a, P13a, P14, P20b. | | 2157 | II | P1b, P18..... | | 2895 | II | P1a, P20a, P24..... | TC |
| 2125 | I | P1a, P2c, P8, P22b, P25c. | | 2158 | II | P1a, P18..... | | 2896 | II | P1a, P20a, P24..... | TC |
| 2126 | I | P1a, P2d, P8..... | | 2159 | II | P1a..... | | 2897 | II | P1a, P2c, P3b, P6a, P16, P22a, P25b, P30. | |
| | | | | 2160 | II | P1e..... | | 2898 | II | P1a..... | TC |
| | | | | 2161 | I | P1e, P18..... | | 2899 | I | P1a, P30..... | |
| | | | | 2162 | I | P1a, P2c, P8, P22b, P24, P25c. | | 2957 | II | P1e..... | TC |
| | | | | 2163 | I | P1b..... | TC | 2958 | II | P1a..... | |
| | | | | 2164 | II | P1a, P2c..... | TC | 2959 | II | P1e..... | |
| | | | | 2165 | I | P1d..... | | 2960 | II | P1a..... | TC |
| | | | | 2166 | II | P1d..... | | 2961 | II | P1a..... | TC |
| | | | | 2167 | II | P1a, P8..... | | 2962 | I | P1a, P13b, P14, P15. | TC |
| | | | | 2168 | II | P1a..... | | 2963 | II | P1b, P3b..... | TC |
| | | | | 2169 | II | P1b..... | TC | 2964 | II | P1e..... | TC |
| | | | | 2170 | II | P1b, P8, P24, P25a. | | 3044 | II | P1a..... | |
| | | | | | | | | 3045 | I | P1a, P2a, P24..... | |

**ORGANIC PEROXIDES TABLE—
Continued**

| Identification number (UN or NA) | Packaging group | Packaging methods | Temperature control |
|----------------------------------|-----------------|-------------------|---------------------|
| (1) | (2) | (3) | (4) |
| 3046 | I | P1a..... | |
| 3047 | II | P1b, P2d, P8..... | TC |

(e) Table of packaging methods.

(1) The first column lists in alphanumeric sequence, the packaging methods for organic peroxides.

(2) The second column specifies the maximum net contents permitted in each inner packaging or receptacle. If no combination packagings are authorized, this column is blank.

(3) The third column specifies the maximum net contents permitted in an outer packaging, including a single, combination or composite packaging.

(4) The fourth column specifies inner packagings which are permitted for use, when applicable. If no combination packagings are authorized, this column is blank.

(5) The fifth column specifies outer packagings which are permitted for use. If inner packagings are specified in the fourth column, then the packaging specified in the fifth column must be used as the outer packaging of a combination packaging; otherwise, it may be used as a single packaging.

(6) The sixth column specifies composite packagings which are permitted for use, when applicable. If no composite packagings are authorized, this column is blank.

(7) The Table of Packaging Methods is as follows:

| Packaging method | Maximum net contents of each inner packaging or receptacle | Maximum net contents of outer packaging | Description of packagings | | |
|---------------------------------|--|---|---|---|--------------------------------|
| | | | Inner packagings | Outer packagings | Composite packagings |
| (1) | (2) | (3) | (4) | (5) | (6) |
| P1a..... | 50 kg..... | 50 kg..... | | Fiberboard box (4G); or | |
| P1b..... | 25 kg..... | 50 kg..... | Plastic bottles, jars, bags or boxes | | |
| P1c..... | 10 kg..... | 50 kg..... | | fiber drum (1G); or..... | 6HC; or |
| P1d..... | 5 kg..... | 50 kg..... | | plywood drum (1D); or..... | 6HD1; or |
| P1e..... | 25 kg..... | 25 kg..... | | | 6HG1; or, |
| P1f..... | 6 kg..... | 25 kg..... | | wooden box (4C1) | 6HG2 |
| P1g..... | 5 kg..... | 5 kg..... | | | |
| P1h..... | 1 kg..... | 10 kg..... | | | |
| P1i..... | 500 g..... | 1 kg..... | | | |
| P2a..... | 100 kg..... | 100 kg..... | Plastic bottles, jars, bags or boxes..... | Steel drum, removable head (1A2); or..... | 6HA1; or |
| P2c..... | 50 kg..... | 50 kg..... | | aluminum drum, removable head (1B2); or. | 6HA2 (steel box only); or |
| P2d..... | 25 kg..... | 50 kg..... | | steel box (4A1); or..... | 6HB1; or |
| P2f..... | 10 kg..... | 50 kg..... | | aluminum box (4B1)..... | 6HB2 (aluminum box only) |
| P3a..... | | 60 kg | | | |
| P3b..... | | 30 kg | | | 6HA2, (steel crate only); or |
| | | | | | 6HB2 (aluminum crate only); or |
| | | | | | 6HD1 or 6HG1. |
| P6a..... | 10 kg..... | 90 kg..... | Metal Cans, or..... | Fiberboard box (4G); or | |
| P6b..... | 10 kg..... | 50 kg..... | glass bottles in metal cans, or plastic bags in metal cans, or plastic bottles in metal cans..... | fiber drum (1G); or | |
| | | | | plywood drum (1D); or | |
| | | | | wooden box (4C1) | |
| P7..... | 3 kg..... | 12 kg..... | Fiberboard box (4G); or Aluminum bottles or jars with plastic closures. | fiber drum (1G); or | |
| | | | | plywood drum (1D); or | |
| | | | | wooden box (4C11) | |
| Fiberboard box (4G); or P8..... | 2 L..... | 50 L..... | Glass bottles..... | fiber drum (1G); or | 6PC; or |
| | | | | plywood drum (1D); or..... | 6PD1; or; |
| P9..... | 7.5 L..... | 7.5 L..... | Glass or earthenware bottles; or metal cans. | wooden box (4C1)..... | 6PG1; or |
| | | | | | 6PG2. |
| | | | | Steel drum, removable head (1A2); or | |

| Packaging method (1) | Maximum net contents of each inner packaging or receptacle (2) | Maximum net contents of outer packaging (3) | Description of packagings | | |
|--|---|--|---|--|-----------------------------|
| | | | Inner packagings (4) | Outer packagings (5) | Composite packagings (6) |
| P10..... | 0.5 L..... | 50 L..... | Glass bottles | aluminum drum, removable head (1B2); or steel box (4A1); or aluminum box: 4B1 | |
| P12..... | 1 kg..... | 50 kg..... | Waxed fiberboard boxes..... | Fiberboard box (4G); or fiber drum (1G); or plywood drum (1D); or wooden box (4C1) | |
| P13a..... P13b..... | 500 g..... 500 g..... | 25 kg 14 kg..... | plastic boxes or bottles..... | wooden box (4C1), compartmented | |
| P14..... | 500 g..... | 25 kg..... | Paper bags with inner ply of plastic | Fiberboard box (4G), with fire-retardant liner and partitions of fire-retardant corrugated fiberboard. | |
| P15..... | 500 g..... | 500 g..... | Paper bag with inner ply of plastic, packed singly. | Fiberboard box (4G) | |
| P16..... | 250 g..... | 50 kg..... | Metal or plastic flexible tubes | Fiberboard box (4G), compartmented; or plywood box (4D), compartmented | |
| P17..... | 500 g..... | 500 g..... | Fiber jar with sealed cap closure, packed singly. | Wooden box (4C1) | |
| P18..... | 500 ml..... | 500 ml..... | Plastic bottle, packed singly..... | Fiberboard box (4G) | |
| P20a..... P20b..... P20c..... P20d..... | | 200 kg 100 kg 50 kg 30 kg | | Fiber drum (1G), with plastic liner or internal coating of polyethylene. | 6HG1 |
| P21..... | | 50 kg..... | | Plywood drum (1D), with plastic liner..... | 6HD1 |
| P22a..... P22b..... | | 50 kg 220 L | | Steel drum, (1A1) or (1A2) | |
| P24..... | | 220 L | | Steel drum, nonremovable head (1A1), with plastic liner; or steel drum, removable head: 1A2 with plastic liner | 6HA1 |
| P25a..... P25b..... P25c..... | | 200 kg 50 kg 220 L | | Aluminum drum, (1B1) or (1B2) | |
| P28..... | 500 g..... | 2 kg..... | Plastic bag individually packed in round cardboard carton of 2 litres capacity. Four cartons per package. | Fiberboard box (4G); or fiber drum (1G) | |
| P30..... | | 25 kg..... | | Plastic drum (1H1) or (1H2) | |

§ 173.226 Liquids toxic by inhalation, Division 6.1, Packing Group I, Zone A.

Division 6.1, Packing Group I, materials that are toxic by inhalation and that fall within the boundaries of Zone A in the graph found in § 173.133 shall be packed in non-bulk packagings in accordance with the following paragraphs:

(a) In specification cylinders, as authorized in § 173.40.

(b) In 1A1, 1B1 or 1N1 drums further packed in a 1A2 or 1H2 drum. Both inner and outer drums must conform to the performance test requirements of Subpart M of Part 178 of this subchapter at the Packing Group I performance

level. The outer drum must have a minimum thickness of 1.50 mm (0.059 inch) for a 1A2 outer drum or 6.30 mm (0.248 inch) for a 1H2 outer drum. Capacity of the inner drum may not exceed 220 L (58.1 gallons). In addition, the inner drum must—

(1) Be capable of satisfactorily withstanding the hydrostatic pressure test in § 178.605 of this subchapter at a test pressure of 550 kPa (79.8 psig);

(2) Satisfactorily withstand the leakproofness test in § 178.604 of this subchapter using an internal air pressure of at least twice the vapor pressure at 55 °C (131 °F) of the material to be packaged;

(3) Have screw closures that are—

(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a device that is capable of measuring torque;

(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and

(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (14.5 psig).

(4) Have a minimum thickness as follows:

(i) If the capacity of the inner drum is less than or equal to 120 L (31.7 gallons), the minimum thickness of the inner drum is—

(A) For a 1A1 or 1N1 drum, 1.3 mm (0.051 inch); and

(B) For a 1B1 drum, 3.9 mm (0.154 inch).

(ii) If the capacity of the inner drum is greater than 120 L (31.7 gallons), the thickness of the inner drum is—

(A) For a 1A1 or 1N1 drum, 1.7 mm (0.067 inch); and

(B) For a 1B1 drum, 4.7 mm (0.185 inch); and

(5) Be isolated from the outer drum by a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (1.97 inches) of cushioning material around the body of the inner drum, and at least 7.6 cm (2.99 inches) on the top and bottom, between the inner and outer drum.

(c) In combination packagings, consisting of an inner packaging system and an outer packaging, as follows:

(1) *Outer packagings:*

Steel drum: 1A2
 Aluminum drum: 1B2
 Plywood drum: 1D
 Fiber drum: 1G
 Plastic drum: 1H2
 Wooden barrel: 2C2
 Steel jerrican: 3A2
 Plastic jerrican: 3H2
 Steel box: 4A1 or 4A2
 Aluminum box: 4B1 or 4B2
 Natural wood box: 4C1 or 4C2
 Plywood box: 4D
 Reconstituted wood box: 4F
 Fiberboard box: 4G
 Expanded plastic box: 4H2
 Solid plastic box: 4H2

(2) *Inner packaging system.* The inner packaging system consists of two packagings: an impact resistant receptacle of glass, earthenware, plastic or metal securely cushioned with a non-reactive, absorbent material and packed within a leak-tight packaging of metal or plastic. This combination packaging in turn is packed within the outer packaging. Capacity of each inner receptacle may not exceed 4 L (1.06 gallons). An inner receptacle that has a closure must have a screw type closure which is physically held in place by any means capable of preventing back-off of loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer packaging must conform to the performance test requirements of Subpart M of Part 178 of this subchapter, at the Packaging Group I performance level. The inner packaging system must meet these tests *without the benefit of the outer packaging*. The total amount of

liquid contained in the outer packaging may not exceed 16 L (4.24 gallons).

§ 173.227 Liquids toxic by inhalation, Division 6.1, Packing Group I, Zone B.

Division 6.1, Packing Group I, materials that are toxic by inhalation and that fall within the boundaries of Zone B in the graph found in § 173.133 shall be packed in non-bulk packagings which conform to the performance test requirements of Subpart M of Part 178 of this subchapter, at the Packing Group I performance level. The following packagings are authorized:

(a) In packagings as authorized in § 173.226; or

(b) In 1A1, 1B1, or 1N1 drums further packed in a 1A2 or 1H2 drum. Both the inner and outer drums must conform to the performance test requirements of Subpart M of Part 178 of this subchapter at the Packing Group I performance level. The outer drum must have a minimum thickness of 1.50 mm (0.059 inch) for a 1A2 outer drum or 6.30 mm (0.248 inch) for a 1H2 outer drum. In addition, the inner drum must—

(1) Satisfactorily withstand the leakproofness test in § 178.604 of this subchapter using an internal air pressure of at least two times the vapor pressure at 55 °C (131 °F) of the material to be packaged;

(2) Have screw closures that are—

(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a device that is capable of measuring torque;

(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and

(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (14.5 psig).

(3) Have a minimum thickness as follows:

(i) If the capacity of the inner drum is less than or equal to 120 L (31.7 gallons), the minimum thickness of the inner drum is—

(A) For a 1A1 drum, 1.3 mm (0.051 inch); and

(B) For a 1B1 drum, 3.9 mm (0.154 inch).

(ii) If the capacity of the inner drum is greater than 120 L (31.7 gallons), the thickness of the inner drum is

(A) For a 1A1 or 1N1 drum, 1.7 mm (0.067 inch); and

(B) For a 1B1 drum, 4.7 mm (0.185 inch); and

(4) Be isolated from the outer drum by a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (1.97

inches) of cushioning material around the body of the inner drum, and at least 7.6 cm (2.99 inches) on the top and bottom, between the inner and outer drum; and

(5) Have a capacity not greater than 220L (58.1 gallons).

(c) 1A1, 1B1 or 1N1 drums described in paragraph (b) of this section may be used without being further packed in a 1A2 or 1H2 drum if the shipper loads the material, blocks and braces the drums within the transport vehicle and seals the transport vehicle used. Drums may not be stacked (double decked) within the transport vehicle. Shipments must be from one origin to one destination only without any intermediate pickup or delivery.

§ 173.228 Bromine pentafluoride or bromine trifluoride.

(a) When the § 172.101 Table specifies that a hazardous material be packaged under this section, only non-bulk packagings prescribed in paragraph (b) of this section are authorized for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of this part, to the specification requirements of Part 178 and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) Specification 3A150, 3AA150, 3B240, 3BN150, 4B240, 4BA240, 4BW240 and 3E1800 cylinders are authorized. Each valve outlet must be sealed by a threaded cap or threaded plug. Cylinder valves must be protected as specified for corrosive gases in § 173.301(g). No cylinder may be equipped with any pressure relief device. Specification 3E1800 cylinders must be packaged in accordance with the requirements of § 173.301(k).

§ 173.229 Chloric acid solution or chlorine dioxide hydrate, frozen.

(a) When the § 172.101 Table specifies that a hazardous material be packaged in accordance with this section, only 4G fiberboard boxes, with inner packagings of polyethylene or other suitable material, are authorized. Fiberboard boxes must be reinforced and insulated and sufficient dry ice must be used to maintain the hydrate or acid in a frozen state during transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, and to the requirements of Part 178 at the Packing Group I performance level. Shipments are authorized by private or contract carrier by motor vehicle only.

§ 173.230 Non-bulk packagings for ORM-D materials.

(a) *General.* Exceptions in the following paragraphs are permitted only if this section, or § 473.306 of this part, is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Small arms ammunition.* (1) Small arms ammunition which has been classed as a Class C explosive may be reclassified and offered for transportation as ORM-D material when packaged in accordance with paragraph (b)(2) of this section. Shipments are excepted from the requirements of Subparts E (Labeling) and F (Placarding) of Part 172 of this subchapter. Small arms ammunition that may be shipped as ORM-D material is limited to:

- (i) Ammunition for rifle, pistol or shotgun;
 - (ii) Ammunition with inert projectiles or blank ammunition;
 - (iii) Ammunition having no tear gas, incendiary, or detonating explosive projectiles; and
 - (iv) Ammunition not exceeding 50 caliber (½ inch) for rifle or pistol cartridges or 8 gauge for shotshells.
- (2) Packaging for small arms ammunition as ORM-D material must be as follows:

- (i) Ammunition must be packed in inside boxes, or in partitions which fit snugly in the outside packaging, or in metal clips;
 - (ii) Primers must be protected from accidental initiation;
 - (iii) Inside boxes, partitions or metal clips must be packed in securely closed strong outside packagings; and
 - (iv) Maximum gross weight is limited to 65 (29.5 kg) pounds per package.
- (c) *Compressed gases.* A compressed gas which conforms to the provisions of paragraph (a)(1), (a)(3) except (a)(3)(vi), or (b) except (b)(1)(iii) of § 173.306 of this subchapter and is a "Consumer commodity" as defined in § 171.8 of this subchapter may be renamed "Consumer commodity" and reclassified as ORM-D material. Each completed package must conform to the requirements of Subpart B of this part and may not exceed 65 pounds (29.5 kg) gross weight. Shipments are excepted from the requirements of Subparts E (Labeling) and F (Placarding).

(d) Other consumer commodity exceptions are provided for Class (or Division) 3, 4.1, 5.1, 5.2, 6.2, 8 or 9 materials, if the § 172.101 Table entry for the specific material refers to, and the material meets the provisions in §§ 173.150, 173.151, 173.152, 173.153, 173.154 or 173.155, as appropriate.

Subpart F—Bulk Packaging for Hazardous Materials Other Than Classes 1 and 7**§ 173.240 Bulk packaging for certain flammable solids (Division 4.1), solid oxidizers (Division 5.1), corrosive solids (Class 8) and other similar low hazard materials.**

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 and 115 tank cars; Class 106 and 110 tank car tanks; AAR Class 203W, 206W and 211W tank cars; and metal non-DOT specification, sift proof tank cars and sift proof closed cars.

(b) *Motor vehicles:* Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles; metal non-DOT specification, sift proof cargo tank motor vehicles; and sift proof closed vehicles.

(c) *Portable tanks and bins:* DOT 51, 52, 53, 56, 57 and 60 portable tanks; marine portable tanks conforming to 46 CFR 64; non-DOT specification sift proof portable tanks and closed bins.

§ 173.241 Bulk packaging for certain combustible liquids (Class 3), flammable solids (Divisions 4.2 and 4.3), and other similar hazardous materials.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 and 115 tank cars; Class 106 and 110 tank car tanks; AAR Class 203W, 206W and 211W tank cars.

(b) *Cargo tanks:* DOT specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles; and metal non-DOT specification cargo tank motor vehicles suitable for transport of liquids.

(c) *Portable tanks:* DOT 51, 52, 53, 56, 57 and 60 portable tanks; marine portable tanks conforming to 46 CFR 64; and metal non-DOT specification

portable tanks suitable for transport of liquids.

§ 173.242 Bulk packaging for certain medium hazard liquids and solids, including solids with dual hazards.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 or 115 tank cars; Class 106 or 110 tank car tanks; AAR Class 203W, 206W or 211W tank cars.

(b) *Cargo tanks:* Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles.

(c) *Portable tanks:* DOT 51, 52, 53, 56, 57 and 60 portable tanks; and marine portable tanks conforming to 46 CFR Part 64.

§ 173.243 Bulk packaging for certain high hazard liquids and dual hazard liquids which pose a moderate hazard.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 and 115 tank cars; and Class 106 and 110 tank car tanks. Gauging devices are required on DOT 103, 104 and 111 tank cars. Riveted tank cars are not authorized.

(b) *Cargo tanks:* Specification MC 304, MC 307, MC 330, MC 331 and MC 338 cargo tank motor vehicles; and MC 310, MC 311 or MC 312 cargo tank motor vehicles with tank design pressure of at least 25 psig (172.4 kPa).

(c) *Portable tanks:* DOT 51 portable tanks; and DOT 60 and marine portable tanks conforming to 46 CFR Part 64 with design pressure of at least 25 psig (172.4 kPa).

§ 173.244 Bulk packaging for certain pyrophoric liquids (Division 4.2), poisonous liquids with inhalation hazards, (Division 6.1) and gases (Class 2).

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements

of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Classes 105, 107A, 109, 112, 113, and 114 tank cars; and Class 106 and 110 tank car tanks. Riveted tank cars are not authorized.

(b) Specification MC 330, MC 331 and MC 338 cargo tank motor vehicles.

(c) DOT 51 portable tanks.

§ 173.245 Bulk packaging for extremely hazardous materials such as poisonous gases (Division 2.3).

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Class 105S500W and 112S500W tank cars lagged with at least 4 inches of cork or equivalent; Class 106 or 110 tank car tanks; and Classes 105J500W and 112J500W tank cars. Bottom outlets are prohibited.

(b) Cargo tank motor vehicles and portable tanks, when approved by the Director, OHMT.

§ 173.248 Ethylene oxide.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Class 105A100W and 111A100W tank cars conforming with paragraphs (c) thru (h) of this section; and Class 105J100W tank cars conforming with paragraphs (c) thru (g) of this section.

(b) Specification MC 330 and MC 331 cargo tank motor vehicles and DOT 51 portable tanks conforming with paragraphs (c) thru (h) of this section.

(c) The pressure relief devices must be set to function at 75 psig (517.1 Kpa). Portable tanks fitted with non-reclosing devices made and in use prior to December 31, 1987, may continue to be used in ethylene oxide service.

(d) Outage must be sufficient to prevent the tank from becoming liquid full at 105 °F (40.6 °C). Consideration must be given to the lading temperature and solubility of inert gas padding in ethylene oxide as well as the partial pressure exerted by the gas padding.

(e) Each tank, loaded or empty, must be padded with dry nitrogen or other

suitable inert gas of sufficient quantity to render the vapor pressure of the tank nonflammable up to 105 °F (40.6 °C). The gas used for padding must be free of impurities which may cause the ethylene oxide to polymerize, decompose or undergo other violent chemical reaction.

(f) Copper, silver, mercury, magnesium or their alloys may not be used in any part of the tank or appurtenances that are normally in contact with the lading.

(g) Neoprene, natural rubber and asbestos gaskets are prohibited. All packing and gaskets must be made of materials which do not react with or lower the autoignition temperature of the lading.

(h) Each tank must be insulated with cork (at least 4 inches (10.2cm) thick), or mineral wool, fiberglass or other suitable insulation material of sufficient thickness so that the thermal conductance at 60 °F (15.6 °C) is not more than 0.075 Btu per hour per square foot per degree F. temperature differential. Portable tanks made and in use prior to December 31, 1987 equipped with fusible plugs instead of a safety relief valve or frangible disc, must have sufficient insulation so that the tank as filled for shipment will not rupture in a fire. The insulation on portable tanks or cargo tank motor vehicles must be protected with a steel jacket at least 0.100 (2.54mm) inch thick, or as required by the specification.

§ 173.249 Bromine.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Class 105A300W or 105A500W tank cars. Class 105A500W tank cars may be equipped with manway cover plates, pressure relief valves, vent valves, and loading/unloading valves that are required on Class 105A-300W tank cars. Tank cars must conform with paragraphs (d) thru (f) of this section.

(b) Specification MC 310, MC 311, MC 312 cargo tank motor vehicles conforming with paragraphs (d) thru (f) of this section.

(c) Specification IM 101 intermodal portable tanks conforming with paragraphs (d) thru (f) of this section.

(d) The tank must be made from nickel-clad or lead-lined steel plate. Nickel cladding or lead lining must be on the inside of the tank. Nickel cladding must comprise at least 20 percent of the required minimum total

thickness. Nickel cladding must conform to ASTM Specification B 162-89. Lead lining must be at least 0.1875 inch (4.7625mm) thick. All tank equipment and appurtenances in contact with the lading must be lined or made from metal not subject to deterioration by contact with lading.

(e) Maximum filling density is 300 percent of the tank's water capacity. Minimum filling density is 287 percent of the tank's water capacity. Maximum water capacity is 9,262 kilograms (20,400 pounds) for DOT 105A300W tank cars. Maximum quantity of lading in DOT 105A300W tank cars is 27,240 kilograms (60,000 pounds). Maximum water capacity is 16,980 kilograms (37,400 pounds) for DOT 105A500W tank cars and DOT 105A500W tank cars equipped as described in paragraph (a) of this section. Maximum quantity of lading in DOT 105A500W tank cars is 49,940 kilograms (110,000 pounds).

(f) Tank shell and head thickness for cargo tank motor vehicles and portable tanks must be at least 0.375 inch (9.525mm) excluding lead lining.

The title to Subpart G would be revised to read as follows:

Subpart G—Gases; Preparation and Packaging

§ 173.300 [Removed]

Section 173.300 would be removed.

In § 173.306, the phrase "Subpart N of this part" would be revised to read "paragraph (h) of this section" in the last sentence of paragraph (a)(1), the introductory text of paragraph (a)(3) and the last sentence of the introductory text of paragraph (b), and paragraph (h) would be added to read as follows:

§ 173.306 Limited quantities of compressed gases.

* * * * *

(h) A limited quantity which conforms to the provisions of paragraph (a)(1) or (a)(3) or paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "consumer commodity" and reclassified as ORM-D material. In addition to the exceptions provided by paragraphs (a) and (b) of this section—

(1) Outside packagings are not required to be marked "INSIDE CONTAINERS COMPLY WITH PRESCRIBED REGULATIONS";

(2) Shipments of ORM-D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft; and

(3) Strong outer packagings as specified in this section and the marking requirements specified in § 172.312 are not required for ORM-D materials when unitized in cages, carts or similar overpacks and when shipped by a private or contract motor carrier from a distribution center to a retail outlet.

§ 173.308 [Amended]

In paragraph (a) of § 173.308, the section reference "§ 173.21(e)" would be changed to "§ 173.21(j)".

In § 173.314, paragraph (a) and the introductory text of paragraph (f)(1) would be revised, and in paragraph (f) entries in the "MAXIMUM PERMITTED FILLING DENSITY" table would be revised for specific gravities of 0.609 and greater, as follows:

§ 173.314 Requirements for compressed gases in tank cars.

(a) *Definitions.* For definitions of compressed gases, see § 173.115.

(f) *Special requirements for liquefied petroleum gas and butadiene tank cars.*

(1) *Single unit tanks cars.* Maximum filling density for the following single unit tank cars is as shown in the "Insulated cars" column of the table following paragraph (f)(2) of this paragraph:

- (i) DOT Class 105 tank cars;
- (ii) DOT Class 112 and 114 tank cars equipped with insulation in accordance with § 179.100-4 of this subchapter and stencilled in accordance with footnote 13 of § 179.101-1 of this subchapter; and
- (iii) DOT Class 111 tank cars equipped with insulation in accordance with § 179.200-4 of this subchapter and stencilled in accordance with footnote 3 of § 179.201-1 of this subchapter.

(2) Maximum filling density for other single unit tank cars is as shown in the "Uninsulated cars" column of the following table.

MAXIMUM PERMITTED FILLING DENSITY

| Specific gravity at 60 °F. | Insulated cars | | Uninsulated cars | |
|----------------------------|-----------------------|-------------------------------------|-----------------------|-------------------------------------|
| | April through October | November through March (see note 1) | April through October | November through March (see note 1) |
| Revise: | | | | |
| 0.609..... | 57.710 | 58.88 | 57.64 | 58.88 |
| 0.610..... | 57.800 | 59.00 | 57.76 | 59.00 |
| 0.611..... | 57.890 | 59.10 | 57.87 | 59.10 |
| 0.612..... | 57.980 | 59.20 | 57.98 | 59.20 |
| 0.613..... | 58.09 | 59.30 | 58.09 | 59.30 |
| 0.614..... | 58.21 | 59.40 | 58.21 | 59.40 |
| 0.615..... | 58.32 | 59.50 | 58.32 | 59.50 |
| 0.616..... | 58.43 | 59.63 | 58.43 | 59.63 |
| 0.617..... | 58.55 | 59.75 | 58.55 | 59.75 |
| 0.618..... | 58.66 | 59.88 | 58.66 | 59.88 |
| 0.619..... | 58.77 | 59.97 | 58.77 | 59.97 |

**MAXIMUM PERMITTED FILLING DENSITY—
Continued**

| Specific gravity at 60 °F. | Insulated cars | | Uninsulated cars | |
|----------------------------|-----------------------|-------------------------------------|-----------------------|-------------------------------------|
| | April through October | November through March (see note 1) | April through October | November through March (see note 1) |
| 0.620..... | 58.89 | 60.07 | 58.89 | 60.07 |
| 0.621..... | 59.00 | 60.18 | 59.00 | 60.18 |
| 0.622..... | 59.12 | 60.28 | 59.12 | 60.28 |
| 0.623..... | 59.23 | 60.38 | 59.23 | 60.38 |
| 0.624..... | 59.34 | 60.49 | 59.34 | 60.49 |
| 0.625..... | 59.46 | 60.59 | 59.46 | 60.59 |
| 0.626..... | 59.57 | 60.70 | 59.57 | 60.70 |
| 0.627..... | 59.68 | 60.80 | 59.68 | 60.80 |
| 0.628..... | 59.80 | 60.90 | 59.80 | 60.90 |
| 0.629..... | 59.91 | 61.01 | 59.91 | 61.01 |
| 0.630..... | 60.02 | 61.11 | 60.02 | 61.11 |
| 0.631..... | 60.13 | 61.18 | 60.13 | 61.18 |
| 0.632..... | 60.23 | 61.28 | 60.23 | 61.28 |
| 0.633..... | 60.34 | 61.38 | 60.34 | 61.38 |
| 0.634..... | 60.44 | 61.47 | 60.44 | 61.47 |
| 0.635..... | 60.55 | 61.57 | 60.55 | 61.57 |

* * * * *
In § 173.315, paragraph (a)(2) would be added to read as follows:

§ 173.315 Compressed gases in cargo tanks and portable tanks.

(a) * * *
(2) Other gases not listed by name in the above table shall be shipped in portable tanks or cargo tanks subject to the following conditions:

(i) Minimum packaging design pressure must not be less than—
(A) For a non-flammable and non-toxic gas lading, (Division 2.2), the vapor pressure at the reference temperature of the lading.

(B) For a gas which is toxic or flammable, (Division 2.1 or 2.3), or both, the vapor pressure at the reference temperature of the lading plus one percent or 25 psig (172.4 kPa), whichever is less, for each additional hazard.

(ii) Maximum permitted filling density may not exceed that specified in paragraph (c) of this section.

* * * * *
In Subpart G, §§ 173.321, 173.322, 173.323, 173.324, 173.335, 173.338, and 173.340 would be added and §§ 173.334, 173.336, and 173.337 would be revised to read as follows:

§ 173.321 Ethylamine.

Ethylamine must be packaged as follows:
(a) In 1A1 drums which meet Packing Group I performance level requirements.
(b) In specification cylinders as prescribed for any compressed gas except acetylene.

§ 173.322 Ethyl chloride.

Ethyl chloride must be packaged in single or combination non-bulk packagings which meet Packing Group I

performance level requirements, as follows:

(a) In 4C1, 4C2, 4D or 4F wooden boxes with glass, earthenware, or metal inner receptacles not over 500 grams (1.1 pounds) capacity each.

(b) In 4G fiberboard boxes with glass, earthenware, or metal inner receptacles not over 500 grams (1.1 pounds) capacity each. Outer packagings may not exceed 30 kilograms (66.2 pounds) gross weight.

(c) In 1A1 drums of not over 100 liters (37.9 gallons) capacity each.

§ 173.323 Ethylene oxide.

(a) For packaging ethylene oxide in non-bulk packagings, copper, silver mercury and their alloys shall not be used in any part of a packaging, valve, or other packaging appurtenance if that part is normally in contact with ethylene oxide liquid or vapor. All packaging and gaskets must be constructed of materials which do not react spontaneously with or lower the autoignition temperature of ethylene oxide.

(b) Ethylene oxide must be packaged as follows:

(1) In 4G fiberboard boxes with one inner glass ampoule or vial of no more than 100 grams (3.5 ounces) capacity cushioned with incombustible material. The completed package must be capable of passing Packing Group I performance tests.

(2) In 4G fiberboard boxes constructed with top and bottom pads and perimeter liner. Inner packagings must be aluminum receptacles of no more than 135 grams (4.8 ounces) capacity cushioned with incombustible material. No more than 12 receptacles allowed in one box and no more than 10 boxes may be overpacked under the provisions of § 173.25 of this Part. Each completed package must be capable of passing Packing Group I performance tests.

(3) In 4C1, 4C2, 4D or 4F wooden boxes or 4G fiberboard boxes with inner metal receptacles of no more than 340 grams (12 ounces) capacity. The metal receptacle must be capable of withstanding no less than a 180 psig (1241.1 kPa) burst pressure. No more than 12 receptacles may be packed in one box and each receptacle may not be liquid full below 180 °F (82.2 °C). Each inner receptacle must be insulated and equipped with a relief device of the fusible plug type with yield temperature of 157 °F to 170 °F (69.4 °C to 76.7 °C). The capacity of relief device and insulation must be such that the charged receptacle will not explode when tested by CGA Pamphlet C-14 method or other equivalent method. Each completed package must be capable of passing Packing Group I performance tests.

(4) In specification cylinders, as authorized for any compressed gas except acetylene. Cylinders must be seamless or welded steel (not brazed) with a nominal capacity of no more than 30 gallons (113.6 L) and may not be liquid full below 180 °F (82.2 °C). Cylinders over 3.79 liters (1 gallon) capacity must be equipped with eductor tubes and be insulated. Before each refilling, each cylinder must be tested for leakage at no less than 15 psig (103.4 kPa) pressure. In addition, each cylinder must be equipped with a fusible type relief device with yield temperature of 157 °F to 170 °F (69.4 °C to 76.7 °C). The capacity of the relief device and the effectiveness of the insulation must be such that the charged cylinder will not explode when tested by CGA Pamphlet C-14 method or other equivalent method.

(5) In 1A1 steel drums of no more than 61 gallons (230.9 L) and meeting Packing Group I performance standards. The drum must be lagged, of all welded construction with the inner shell having a minimum thickness of 2.0 mm (0.0787 inch) and the outer shell having a minimum thickness of 2.6 mm (0.1024 inch). Drums must be capable of withstanding a hydrostatic test pressure of 100 psig (689.5 kPa). Lagging must be of sufficient thickness so that the drum will not rupture when exposed to fire when filled with ethylene oxide and equipped with the required pressure relief device. The drum may not be liquid full below 185 °F (85 °C), and must be marked "THIS END UP" on the top head. Before each refilling, each drum must be tested for leakage at no less than 15 psig (103.4 kPa) pressure. Each drum must be equipped with a fusible type relief device with yield temperature of 157 °F to 170 °F (69.4 °C to 76.7 °C), and the capacity of the relief device must be such that the filled drum will not explode when tested by the method described in CGA Pamphlet C-14 or other equivalent method.

§ 173.324 Ethyl methyl ether.

Ethyl methyl ether must be packed as follows:

(a) In specification cylinders, as authorized for any compressed gas except acetylene; or

(b) In packagings as specified in § 173.201 which meet Packing Group I performance level requirements.

§ 173.334 Organic phosphates mixed with compressed gas.

Hexaethyl tetraphosphate, parathion, tetraethyl dithio pyrophosphate, tetraethyl pyrophosphate, or other Division 6.1 organic phosphates (including a compound or mixture), may

be mixed with a compressed gas which must be nonflammable. This mixture must not contain more than 20 percent by weight of organic phosphate and must be packaged in specification 3A240, 3AA240, 3B240, 4A240, 4B240, 4BA240, or 4BW240 cylinders meeting the following requirements.

(a) Each cylinder may be charged with not more than 5 kg (11.0 pounds) of the mixture, to a maximum filling density of not more than 80 percent of the water capacity;

(b) Each cylinder must be charged in compliance with § 173.301 (e) and (f);

(c) No cylinder may be equipped with an eduction tube or a fusible plug;

(d) No cylinder may be equipped with any valve unless the valve is a type approved by the Director, OHMT;

(e) Cylinders must be overpacked in a box so arranged to protect each valve or other closing device from damage. Except as provided in paragraph (f) of this section, no more than four cylinders may be packed in a box. Each box with its closing device protection must be sufficiently strong to protect all parts of each inside cylinder from deformation or breakage if the completed package were dropped 1.8 meters (5.91 feet) onto solid concrete, impacting at the weakest point.

(f) Cylinders may be packed in strong wooden boxes with valves or other closing devices protected from injury, with not more than twelve cylinders in one outside wooden box. An outer fiberboard box may be used when not more than four such cylinders are to be shipped in one packaging. Valves must be adequately protected. Box and valve protection must be of strength sufficient to protect all parts of inner packagings and valves from deformation or breakage resulting from a drop of at least 1.8 meters (5.91 feet) onto a concrete floor, impacting at the weakest point.

§ 173.335 Gas generator assemblies.

Gas generator assemblies (aircraft) containing liquefied nonflammable, nontoxic gas and a solid propellant cartridge shall be packaged as follows:

(a) The gas shall be packaged in specification steel cylinders authorized for any compressed gas except acetylene not exceeding 10.5 L (2.77 gallons) internal volume and having a minimum design burst pressure of 19,700 kPa (2,857 psi);

(b) Fittings must be protected against damage under conditions normally incident to transport, any trigger shall be fitted with a safety locking pin, and a non-propulsive plug shall be installed on the discharge tube; and

(c) Each complete unit must be individually and tightly packed to prevent movement in wooden boxes (4C1 or 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fiberboard boxes (4G), or plastic boxes, (4H1 and 4H2) of Packing Group II performance level, or in the original manufacturer's transit box.

§ 173.336 Nitrogen dioxide, liquid; nitrogen peroxide, liquid; and nitrogen tetroxide, liquid.

Nitrogen dioxide, liquid, nitrogen peroxide, liquid, and nitrogen tetroxide, liquid must be packed in specification cylinders as follows:

(a) As prescribed in § 173.192.

(b) Specification 3A480, 3AA480, 3AL1800, or 3E1800 metal cylinders, with valves removed, are authorized. Each valve opening must be closed by means of a solid metal plug with tapered thread properly luted to prevent leakages; valve protection cap must be used and be at least 4.76 mm (0.187 inches) thick gas-tight, with 4.76 mm (0.187 inches) faced seat for gasket and with United States standard form thread. Shipments in 3AL cylinders are authorized only when transported by highway or rail. Each cylinder must be cleaned in compliance with the requirements of Federal Specification RR-C-901b, paragraphs 3.7.2 and 3.8.2. Cleaning agents equivalent to those specified in RR-C-901b may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or less cleaned at the same time must be tested for oil contamination in accordance with Specification RR-C901b paragraph 4.4.2.3 and meet the standard of cleanliness specified.

§ 173.337 Nitric oxide.

Nitric oxide must be packed in Specification 3A1800, 3AA1800, 3E1800, or 3AL1800 cylinders charged to a pressure of not more than 5,170 kPa (749.7 psi) at 21.1 °C (70 °F). Cylinders must be equipped with a valve of stainless steel and valve seat of material which will not be deteriorated by contact with nitric oxide or nitrogen dioxide. Cylinders or valves may not be equipped with pressure relief devices of any type. Valve outlets must be sealed by a solid threaded cap or plug and an inert gasketing material. In addition—

(a) Specification 3E1800 cylinders must be overpacked in strong wooden boxes of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Each overpack must conform to § 173.25.

(b) Specification 3A, 3AA, and 3AL cylinders must have their valves protected by metal caps or other equally protective guards securely attached to the cylinders and be of sufficient strength to protect the valves from injury during transit, or by overpacking in strong wooden boxes of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Each overpack must conform to § 173.25. Shipments in 3AL cylinders are authorized only when transported by highway or rail.

(c) Each cylinder must be cleaned in compliance with the requirements of Federal Specification RR-C-901b, paragraphs 3.7.2 and 3.8.2. Cleaning agents equivalent to those specified in RR-C-901b may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or less cleaned at the same time must be tested for oil contamination in accordance with Specification RR-C-901b paragraph 4.4.2.3 and meet the standard of cleanliness specified.

§ 173.338 Tungsten hexafluoride.

Tungsten hexafluoride must be packed in specification 3A, 3AA, 3BN, or 3E (§§ 178.36, 178.37, 178.39, 178.42 of this subchapter) cylinders. Cylinders shall be equipped with a valve protection cap or be packed in a strong outside container complying with the provisions of § 173.40. Outlets of any valves must be capped or plugged. As an alternative, the cylinder opening may be closed by the use of a metal plug. Specification 3E cylinders must be shipped in an overpack that complies with the provisions of § 173.40.

§ 173.340 Tear gas devices.

(a) Packagings for tear gas devices must be approved prior to first shipment by the Director, OHMT.

(b) Tear gas devices may not be assembled with or packed in the same packaging with mechanically or manually operated firing, igniting, bursting, or other functioning elements unless of a type and design approved by the Director, OHMT.

(c) Tear gas grenades, tear gas candles, and similar devices must be packaged in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group II performance level, as follows:

(1) In UN 4C1, 4C2, 4D, or 4F metal-strapped wooden boxes. Functioning elements not assembled in grenades or devices must be in a separate compartment of these boxes, or in inner or separate outer boxes, UN 4C1 4C2, 4D,

or 4F, and must be so packed and cushioned that they may not come in contact with each other or with the walls of the box during transportation. Not more than 50 tear gas devices and 50 functioning elements shall be packed in one box and the gross weight of the outer box may not exceed 35 kilograms (77.2 pounds).

(2) In a UN 1A2 metal drum. Functioning elements must be packed in a separate inner packaging or compartment. Not more than 24 tear gas devices and 24 functioning elements shall be packed in one outer drum and the gross weight of the drum may not exceed 35 kg. (77.2 pounds).

(3) In a UN 4G fiberboard box with inside tear gas devices meeting Specifications 2P or 2Q. Each inside packaging must be placed in fiberboard tubes fitted with metal ends or a fiber box with suitable padding. Not more than 30 inner packagings shall be packed in one outer box and the gross weight of the outer box may not exceed 16 kg (35.3 pounds).

(4) In other packagings of a type or design which is approved by the Director, OHMT.

(d) Tear gas devices may be shipped completely assembled when offered by or consigned to the U.S. Department of Defense, provided the functioning elements are so packed that they cannot accidentally function. Outer packagings must be UN 4C1, 4C2, 4D, or 4F metal-strapped wooden boxes.

Subpart H—[Removed and reserved]

Subpart H would be removed and reserved.

Subpart I—Radioactive Materials

§ 173.416 [Amended]

In § 173.416, the reference "§ 178.34" would be revised to read "§ 178.360" in paragraphs (e) and (g), the reference "§ 178.104" would be revised to read "§ 178.354" in paragraph (d), the reference "§ 178.194" would be revised to read "§ 178.362" in paragraphs (e) and (f), and the reference "§ 178.195" would be revised to read "§ 178.364" in paragraph (g).

In § 173.417, the reference "§ 178.34" would be revised to read "§ 178.360" in paragraphs (b)(1) and (b)(2); the reference "§ 178.103" or "§ 178.103-5(a)", as appropriate, would be revised to read "§ 178.352" in paragraphs (a)(1), (a)(6)(iii) and (b)(1); the reference "§ 178.104" would be revised to read "§ 178.354" in paragraphs (a)(2) and (b)(2); the references "§ 178.120" and "§ 178.121" would be revised to read "§ 178.356" and "§ 178.358",

respectively, in paragraphs (a)(8) and (b)(5); and the introductory text of paragraph (a)(6) would be revised to read as follows:

§ 173.417. Authorized packaging—flissile materials.

(a) * * *

(6) A 55-gallon 1A2 steel drum, subject to the following conditions:

* * *

Subparts J through O—[Removed]

Subparts J, K, L, M, N, and O would be removed.

Appendix B—[Amended]

In Appendix B:

1. The title would be amended by changing the word "POLYETHYLENE" to "PLASTIC".

2. In the first and second paragraphs, the word "polyethylene" would be revised to read "plastic" wherever it appears.

3. In the second sentence of the first paragraph, the section reference "§ 173.24(d)(3)" would be revised to read "§ 173.24(e)(3)(iii)".

4. In paragraph (6), the phrase "a height of 1.2 meters (3.94 feet) on to solid concrete" would be revised to read "a height determined in accordance with § 178.603(d) of this subchapter onto a rigid nonresilient, flat and horizontal surface."

Appendix C would be added as follows:

Appendix C—Procedure for Base Level Vibration Testing

Base level vibration testing shall be conducted as follows:

1. Three sample packagings, selected at random, shall be filled and closed as for shipment. A non-hazardous material may be used in place of the hazardous material if it has essentially the same physical characteristics.

2. The three packages shall be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The packages should be constrained horizontally to prevent them from falling off the platform, but shall be left free to move vertically, bounce and rotate.

3. The test shall be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1/8-inch (1.6 mm) thickness (such as steel strapping or paperboard) can be passed between the bottom of any package and the platform.

4. Immediately following the period of vibration, each package shall be removed from the platform, turned on its side and observed for any evidence of leakage.

5. Rupture or leakage from any of the packages constitutes failure of the test.

PART 176—CARRIAGE BY VESSEL

The authority citation for Part 176 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808(b), 1808; 49 CFR Part 1, unless otherwise noted.

Paragraph (d) of § 176.5 would be revised as follows:

§ 176.5 Application to vessels.

(d) Except for transportation in bulk packagings (as defined in § 171.8 of this subchapter), the bulk carriage of hazardous materials by water is governed by 46 CFR Subchapters D, I, O and N.

In § 176.83, paragraph (c)(6) would be added as follows:

§ 176.83 Segregation requirements for cargo vessels and passenger vessels.

(c) ***
(6) *Clear of living quarters.* "Clear of living quarters" means that the hazardous material must be located so that in the event of release of the material, leakage or vapors will not penetrate accommodations, machinery spaces or other work areas by means of entrances or other openings in bulkheads or ventilation ducts.

Section 176.84 would be added as follows:

§ 176.84 Other requirements for stowage and segregation for cargo vessels and passenger vessels.

(a) *General.* When Column 10c of the § 172.101 Table refers to a numbered stowage provision for water shipments, the meaning and requirements of that provision are as set forth in this section. Terms in quotation marks are defined in § 176.83.

(b) *Table of provisions:*

| Code | Provisions |
|------|--|
| 1 | (Reserved) |
| 2 | Temperature controlled material. |
| 3 | Do not stow with high explosives. |
| 4 | (Reserved) |
| 5 | (Reserved) |
| 6 | Emergency temperature material. |
| 7 | (Reserved) |
| 8 | Glass carboys not permitted on passenger vessels. |
| 9 | Glass carboys not permitted under deck. |
| 10 | Glass bottles not permitted under deck. |
| 11 | Keep away from heat and open flame. |
| 12 | Keep cool. |
| 13 | Keep dry. |
| 14 | Metal drums only permitted under deck. |
| 15 | May be stowed in portable magazine or metal locker. |
| 16 | No other cargo may be stowed in the same hold with this material. |
| 17 | (Reserved) |
| 18 | Prohibited on any vessel carrying explosives (except explosives in Division 1.4, Compatibility group S). |
| 19 | Protect from sparks and open flames. |
| 20 | Segregation same as for corrosives. |

| Code | Provisions |
|------|---|
| 21 | Segregation same as for flammable liquids. |
| 22 | Segregation same as for flammable liquids if flash-point below 61 °C (141 °F). |
| 23 | Segregation same as for flammable liquids if flash-point between 23 °C (73 °F) and 61 °C (141 °F). |
| 24 | Segregation same as for flammable solids. |
| 25 | Shade from radiant heat. |
| 26 | Stow "away from" acids. |
| 27 | Stow "away from" alkaline compounds. |
| 28 | (Reserved) |
| 29 | Stow "away from" ammonium compounds. |
| 30 | Stow "away from" animal or vegetable oils. |
| 31 | Stow "away from" combustible materials. |
| 32 | Stow "away from" copper, its alloys and its salts. |
| 33 | Stow "away from" fluorides. |
| 34 | Stow "away from" foodstuffs. |
| 35 | Stow "away from" all odor-absorbing cargo. |
| 36 | Stow "away from" heavy metals and their compounds. |
| 37 | Stow "away from" hydrazine. |
| 38 | Stow "away from" all other corrosives. |
| 39 | Stow "away from" liquid halogenated hydrocarbons. |
| 40 | Stow "clear of living quarters". |
| 41 | Stow "away from" mercury and its compounds. |
| 42 | Stow "away from" nitric acids and perchloric acids not exceeding 50% acid by weight. |
| 43 | Stow "away from" organic materials. |
| 44 | Stow "away from" oxidizers. |
| 45 | Stow "away from" permanganates. |
| 46 | Stow "away from" powdered metals. |
| 47 | Stow "away from" sodium compounds. |
| 48 | Stow "away from" sources of heat. |
| 49 | Stow "away from" corrosives. |
| 50 | Stow "away from" sources of heat where temperatures in excess of 55 °C (131 °F) for a period of 24 hours or more will be encountered. |
| 51 | Stow "separated from" acetylene. |
| 52 | Stow "separated from" acids. |
| 53 | Stow "separated from" alkaline compounds. |
| 54 | Stow "separated from" animal or vegetable oils. |
| 55 | Stow "separated from" ammonia. |
| 56 | Stow "separated from" ammonium compounds. |
| 57 | Stow "separated from" chlorine. |
| 58 | Stow "separated from" cyanides. |
| 59 | Stow "separated from" combustible materials. |
| 60 | Stow "separated from" chlorates, chlorites, hypochlorites, nitrites, perchlorates, permanganates, and metallic powders. |
| 61 | Stow "separated from" corrosive materials. |
| 62 | Stow "separated from" diborane. |
| 63 | Stow "separated from" diethylene triamine. |
| 64 | Stow "separated from" explosives. |
| 65 | Stow "separated from" flammable substances. |
| 66 | Stow "separated from" flammable solids. |
| 67 | Stow "separated from" halides. |
| 68 | Stow "separated from" hydrogen. |
| 69 | Stow "separated from" hydrogen peroxide. |
| 70 | Stow "separated from" mercury salts. |
| 71 | Stow "separated from" nitric acid. |
| 72 | Stow "separated from" nitrogen compounds. |
| 73 | Stow "separated from" nitrogen compounds and chlorates. |
| 74 | Stow "separated from" oxidizers. |
| 75 | Stow "separated from" permanganates. |
| 76 | Stow "separated by a complete compartment or hold from" organic peroxides. |
| 77 | Stow "separated longitudinally by a complete compartment or hold from" explosives. |
| 78 | Stow "separated longitudinally by an intervening complete compartment or hold from" explosives. |
| 79 | The maximum net quantity in one package for this material shipped aboard a passenger vessel is limited to 50 pounds (22.7 kg). |
| 80 | Toy torpedoes must not be packed with other special fireworks. |
| 81 | Under deck stowage permitted only if an indicating substance such as chloropicrin has been added. |
| 82 | Under deck stowage is permitted only if containing not more than 35% by weight of hydrazine. |
| 83 | (Reserved) |
| 84 | Under deck stowage must be in well-ventilated space. |
| 85 | Under deck stowage must be in mechanically ventilated space. |
| 86 | Stow "separated by a complete compartment or hold from" explosives Class 1.3. |
| 87 | Stow "separated from" explosives except Class 1.4. |
| 88 | Stow "separated by a complete compartment or hold from" explosives except Class 1.4. |
| 89 | Segregation same as for oxidizers. |
| 90 | Stow "separated from" radioactive materials. |
| 91 | Stow "separated from" flammable solids. |
| 92 | Stow "separated from" powdered materials. |

| Code | Provisions |
|------|---|
| 93 | Stow not accessible to unauthorized persons on passenger vessels. |
| 94 | Plastic jerrycans and plastic drums not permitted under deck. |
| 95 | Stow "separated from" foodstuffs. |
| 96 | Glass carboys not permitted under deck on passenger vessels. |
| 97 | Stow "away from" azides. |
| 98 | Stow "away from" all flammable materials. |
| 99 | Only new metal drums permitted on passenger vessels. |

PART 178—[AMENDED]

The authority citation for Part 178 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806, 1808; 49 CFR Part 1, unless otherwise noted.

The title to Part 178 would be revised to read:

PART 178—SPECIFICATIONS FOR PACKAGINGS

The table of contents for Part 178 is revised to read as follows:

- Sec. 178.0 Purpose, scope and applicability.
- Subpart A—[Reserved]**
- Subpart B—Specifications for Inner Receptacles**
 - 178.33 Specification 2P; inner nonrefillable metal receptacles.
 - 178.33a Specification 2Q; inner nonrefillable metal receptacles.
- Subpart C—Specifications for Cylinders**
 - 178.36 Specification 3A; seamless steel cylinders or 3AX; seamless steel cylinders of capacity over 1,000 pounds water volume.
 - 178.37 Specification 3AA; seamless steel cylinders made of definitely prescribed steels or 3AAX; seamless steel cylinders made of definitely prescribed steels of capacity over 1,000 pounds water volume.
 - 178.38 Specification 3B; seamless steel cylinders.
 - 178.39 Specification 3BN; seamless nickel cylinders.
 - 178.42 Specification 3E; seamless steel cylinders.
 - 178.44 Specification 3HT; inside containers, seamless steel cylinders for aircraft use made of definitely prescribed steel.
 - 178.45 Specification 3T; seamless steel cylinders.
 - 178.46 Specification 3AL; seamless cylinders made of definitely prescribed aluminum alloys.
 - 178.47 Specification 4DS; inside containers, welded stainless steel for aircraft use.
 - 178.50 Specification 4B; welded and brazed steel cylinders.
 - 178.51 Specification 4BA; welded or brazed steel cylinders made of definitely prescribed steels.
 - 178.53 Specification 4D; inside containers, welded steel for aircraft use.

- 178.54 Specification 4B240-FLW; welded or welded and brazed cylinders with fusion-welded longitudinal seam.
- 178.55 Specification 4B240ET; welded and brazed cylinders made from electric resistance welded tubing.
- 178.56 Specification 4AA480; welded steel cylinders made of definitely prescribed steels.
- 178.57 Specification 4L; welded cylinders insulated.
- 178.58 Specification 4DA; inside containers, welded steel for aircraft use.
- 178.59 Specification 8; steel cylinders with approved porous filling for acetylene.
- 178.60 Specification 8AL; steel cylinders with approved porous filling for acetylene.
- 178.61 Specification 4BW; welded steel cylinders made of definitely prescribed steels with electric-arc welded longitudinal seam.
- 178.65 Specification 39; non-reusable (non-refillable) cylinder.
- 178.68 Specification 4E; welded aluminum cylinders.

Subparts D-G—[Reserved]

Subpart H—Specifications for Portable Tanks

- 178.245 Specification 51; steel portable tanks.
- 178.251 General design and construction requirements applicable to specifications 56 (§ 178.252) and 57 portable tanks (§ 178.253).
- 178.252 Specification 56; metal portable tanks.
- 178.253 Specification 57; metal portable tanks.
- 178.255 Specification 60; steel portable tanks.
- 178.270 Specification IM 101 and IM 102 steel portable tanks; general design and construction requirements.
- 178.271 Specification IM 101 steel portable tanks.
- 178.272 Specification IM 102 steel portable tanks.

Subpart I—[Reserved]

Subpart J—Specifications for Containers for Motor Vehicle Transportation

- 178.315 Specification MC 200; containers for liquid nitroglycerin, desensitized liquid nitroglycerin or diethylene glycol dinitrate.
- 178.318 Specification MC 201; container for detonators and percussion caps.
- 178.337 Specification MC 331; cargo tanks constructed of steel, primarily for transportation of compressed gases as defined in the Compressed Gas Section.
- 178.338 Specification MC 338; insulated cargo tank.
- 178.340 General design and construction requirements applicable to specifications MC 306 (§ 178.341), MC 307 (§ 178.342), and MC 312 (§ 178.343) cargo tanks.
- 178.341 Specification MC 306; cargo tanks.
- 178.342 Specification MC 307; cargo tanks.
- 178.343 Specification MC 312; cargo tanks.

Subpart K—Specifications for Packagings for Radioactive Materials

- 178.350 Specification 7A; general packaging, Type A.
- 178.352 Specification 6L; metal packaging.
- 178.354 Specification 6M; metal packaging.
- 178.356 Specification 20PF; phenolic-foam insulated, metal overpack.
- 178.358 Specification 21PF; fire and shock resistant, phenolic-foam insulated, metal overpack.
- 178.360 Specification 2R; inside containment vessel.
- 178.362 Specification 20WC; wooden protective jacket.
- 178.364 Specification 21WC; wooden-steel protective overpack.

Subpart L—Non-bulk Performance-oriented Packaging Standards

- 178.500 Purpose, scope and definitions.
- 178.502 Identification codes for packagings.
- 178.503 Marking of packagings.
- 178.504 Standards for steel drums.
- 178.505 Standards for aluminum drums.
- 178.506 Standards for metal drums other than steel or aluminum.
- 178.507 Standards for plywood drums.
- 178.508 Standards for fiber drums.
- 178.509 Standards for plastic drums and jerricans.
- 178.510 Standards for wooden barrels.
- 178.511 Standards for steel jerricans.
- 178.512 Standards for steel or aluminum boxes.
- 178.513 Standards for boxes of natural wood.
- 178.514 Standards for plywood boxes.
- 178.515 Standards for reconstituted wood boxes.
- 178.516 Standards for fiberboard boxes.
- 178.517 Standards for plastic boxes.
- 178.518 Standards for woven plastic bags.
- 178.519 Standards for plastic film bags.
- 178.520 Standards for textile bags.
- 178.521 Standards for paper bags.
- 178.522 Standards for composite packagings with inner plastic receptacles.
- 178.523 Standards for composite packagings with inner glass, porcelain, or stoneware receptacles.

Subpart M—Testing of Non-bulk Packagings and Packages

- 178.600 Purpose and scope.
- 178.601 General requirements.
- 178.602 Preparation of packagings and packages for testing.
- 178.603 Drop test.
- 178.604 Leakproofness test.
- 178.605 Hydrostatic pressure test.
- 178.606 Stacking test.
- 178.607 Cooperage test for bung-type wooden barrels.
- 178.608 Chemical compatibility test for plastic receptacles.

Section 178.0-2 would be revised to read as follows:

§ 178.0-2 Applicability and manufacturers' responsibility.

(a) *Applicability.* Any person who performs a function prescribed in this part shall perform that function in accordance with this part:

(b) *Specification markings.* When this part requires that a packaging be marked with a DOT specification or UN standard marking (for example, DOT-3AL 1800-1234-XY, UN 1A1/Y1.4/150/85) compliance with that requirement is the responsibility of the manufacturer (see § 171.8 of this subchapter for definition of "manufacturer") of the packaging. Except as otherwise provided in this section, marking of the packaging by the manufacturer with the appropriate DOT or UN markings is the certification by the manufacturer that—

(1) All requirements of the DOT specification or the UN standard, including performance tests, are met; and

(2) All functions performed by the manufacturer conform to requirements specified in this part.

(c) *General requirements for packagings.* Manufacturers of packagings shall comply with general requirements for packagings prescribed in Subpart B of Part 173 (particularly, § 173.24) of this subchapter to the extent that those requirements apply to the design, construction and suitability for use of the specification or standard to which the packaging is manufactured.

(d) *Notification.* Except as specifically provided in §§ 178.337-18 and 178.340-10, the manufacturer of a packaging shall inform in writing each person to whom that packaging is transferred of all requirements of this part not met at the time of transfer, and all actions which need to be taken for the packaging to conform to the requirements of this part. This notice must also include the type and dimensions of any closures needed to satisfy performance test requirements. Copies of these written statements shall be retained by the manufacturer for at least one year from date of issuance and must be open to inspection by a representative of the Department.

(e) Except as provided in paragraph (d) of this section, packagings which do not conform to the applicable specifications or standards in this part may not be marked to indicate such conformance.

Section 178.0-3 would be revised to read as follows:

§ 178.0-3 Marking of Packagings.

(a) Each packaging manufactured to a DOT specification or a UN standard shall be marked as follows:

(1) In an unobstructed area, with letters, and numerals identifying the standards or specification (e.g. UN 1A1, DOT 4B240ET, etc.).

(2) With the name and address or symbol of the person making the mark.

Symbols, if used, must be registered with the Director, OHMT.

(3) The markings must be stamped, embossed, burned, printed or otherwise marked on the packaging to provide adequate accessibility, permanency, contrast, and legibility so as to be readily apparent and understood.

(4) Unless otherwise specified, letters and numerals must be at least 12.0mm (0.47 inches) in height except that for packagings of less than or equal to 30 liters (7.9 gallons) capacity for liquids or 30 kilograms (66.1 pounds) capacity for solids the height must be at least 6.0mm (0.24 inches).

(b) Packagings may be marked with the United Nations symbol and packaging identification code as provided in this subchapter, in the ICAO Technical Instructions or in Annex 1 to the IMDG Code, provided the person applying these marks has established that the packaging conforms to the applicable provisions of this subchapter, the ICAO Technical Instructions or Annex 1 to the IMDG Code, respectively.

(1) If an indication of the State in whose territory the specified tests have been carried out, or of the State authorizing the allocation of the mark, is required, the letters "USA" shall be used.

(2) If an indication of the name of the manufacturer or other identification of the packaging as specified by the competent authority is required, the name and address or symbol of the person making the mark shall be entered. Symbols, if used, must be registered with the Director, OHMT. Duplicate symbols are not authorized.

(3) Packagings manufactured to UN standards in accordance with this subchapter shall be marked as prescribed in § 178.503.

Subpart A—[Removed and Reserved]

Subpart A of Part 178 would be removed and reserved.

Subpart B—[Amended]

In Subpart B, § 178.34 would be redesignated as § 178.360 and moved to Subpart K. With the exception of §§ 178.33 and 178.33a, the remaining sections in Subpart B would be removed.

The title of § 178.33 would be revised to read as follows:

§ 178.33 Specification 2P; Inner nonrefillable metal receptacles.

* * * * *

The title to § 178.33a would be revised to read as follows:

§ 178.33a Specification 2Q; Inner nonrefillable metal receptacles.

* * * * *

Subpart D—[Amended]

In Subpart D, §§ 178.103, 178.104, 178.120 and 178.121 would be moved to Subpart K and be redesignated as §§ 178.352, 178.354, 178.356 and 178.358, respectively. Then Subpart D would be removed and reserved.

Subpart E—[Amended]

In Subpart E, §§ 178.194 and 178.195 would be moved to Subpart K and be redesignated as §§ 178.362 and 178.364, respectively. Then Subpart E would be removed and reserved.

Subparts F and G—[Removed and Reserved]

Subparts F and G would be removed and reserved.

Subpart H—Specifications for Portable Tanks

In § 178.270-11, paragraphs (c) (1) and (2) would be revised to read as follows:

§ 178.270-11 Pressure and vacuum relief devices.

* * * * *

(c) *Pressure settings of relief devices*—(1) *Primary pressure relief devices*. The primary relief device required by paragraph (a) of this section must be set to function in the range of—

(i) No less than 67 percent and no greater than 83 percent of test pressure for tanks hydrostatically tested under § 178.270-13(a) at a pressure below 66 psig (455.1 kPa). Spring-loaded pressure relief valves must close after discharge at a pressure not less than 80 percent of start-to-discharge pressure.

(ii) No less than 67 percent and no greater than 74 percent of test pressure for tanks hydrostatically tested under § 178.270-13(a) at a pressure of 66 psig (455.1 kPa) or higher. Spring-loaded pressure relief valves must close after discharge at a pressure not less than 90 percent of start to discharge pressure.

(2) *Emergency pressure relief devices*. Each frangible disc, other than one used as a primary relief device in accordance with paragraph (b)(2) of this section, must be designed to burst at a pressure greater than 83 percent of and less than or equal to tank hydrostatic test pressure. Each spring-loaded pressure relief valve used as an emergency pressure relief device must be set to operate at no less than 83 percent of hydrostatic test pressure and be fully open at test pressure.

* * * * *

The title to Subpart K would be revised to read as follows:

Subpart K—Specifications for Packagings for Radioactive Materials

A new Subpart L would be added to read as follows:

Subpart L—Non-Bulk Performance-Oriented Packaging Standards

§ 178.500 Purpose, scope and definitions.

(a) This subpart prescribes certain requirements for non-bulk packagings for hazardous materials. Standards for these packagings are based on the UN Recommendations.

(b) Terms used in this subpart are defined in § 171.8 of this subchapter.

§ 178.502 Identification codes for packagings.

(a) Identification codes for designating types of packagings consist of the following:

(1) A numeral indicating the type of packaging, as follows:

- (i) "1" means a drum.
- (ii) "2" means a wooden barrel.
- (iii) "3" means a jerrican.
- (iv) "4" means a box.
- (v) "5" means a bag.
- (vi) "6" means a composite packaging.
- (vii) "7" means a pressure receptacle.

(2) A capital letter indicating the material of construction, as follows:

- (i) "A" means steel (all types and surface treatments).
- (ii) "B" means aluminum.
- (iii) "C" means natural wood.
- (iv) "D" means plywood.
- (v) "F" means reconstituted wood.
- (vi) "G" means fiberboard.
- (vii) "H" means plastic.
- (viii) "L" means textile.
- (ix) "M" means paper, multiwall.
- (x) "N" means metal (other than steel or aluminum).

(xi) "P" means glass, porcelain or stoneware.

(3) A numeral indicating the category of packaging within the type to which the packaging belongs. For example, for steel drums ("1A"), "1" indicates a non-removable head drum (i.e., "1A1") and "2" indicates a removable head drum (i.e., "1A2").

(b) For composite packagings, two capital letters are used in sequence in the second position of the code, the first indicating the material of the inner receptacle and the second, that of the outer packaging. For example, a plastic receptacle in a steel drum is designated "6HA1".

(c) For combination packagings, only the code number for the outer packaging is used.

(d) Identification codes are set forth in the standards for packagings in §§ 178.504 through 178.523.

§ 178.503 Marking of packagings.

(a) The manufacturer shall mark every package that is required to conform to a UN standard of this subpart in a durable and clearly visible manner, with the following information and in the sequence presented:

(1) The United Nations symbol as illustrated in paragraph (d) of this section (for metal receptacles, the letters UN may be applied in place of the symbol);

(2) A packaging identification code designating the type of packaging, the material of construction and, when appropriate, the category of packaging under §§ 178.504 through 178.523 within the type to which the packaging belongs;

(3) A letter identifying the performance standard under which the packaging has been successfully tested, as follows:

(i) X—for packagings meeting Packing Group I, II and III tests;

(ii) Y—for packagings meeting Packing Group II and III tests; or

(iii) Z—for packagings only meeting Packing Group III tests;

(4) A designation of the specific gravity or mass for which the packaging has been tested, as follows:

(i) For packaging without inner packagings intended to contain liquids (except viscous liquids), the designation shall be the specific gravity rounded down to the first decimal but may be omitted when the specific gravity does not exceed 1.2; and

(ii) For packagings intended to contain viscous liquids, solids, or inner packagings, the designation must be the maximum gross mass in kilograms;

(5) Either a letter "S" designating that the packaging is intended only for the transport of solids or inner packagings, or the test pressure in kilopascals rounded off to the nearest 10 kilopascals of the hydrostatic pressure test that the packaging has successfully passed;

(6) The last two digits of the year of manufacture. Packagings of types 1H and 3H shall also be marked with the month of manufacture in any appropriate manner; this may be marked on the packaging in a different place from the remainder of the markings;

(7) The letters "USA" (indicating that the packaging was marked pursuant to the provisions of this subchapter);

(8) The name and address or symbol of the person applying the marks required by this section. Symbols, if used, must be registered in advance with the Director, OHMT;

(9) For metal or plastic drums or jerricans intended for reuse the minimum thickness of the packaging material, expressed in millimeters and abbreviated "mm", and

(10) For drums intended as packagings for nitric acid, the tare weight in kilograms preceded by the letters TW.

(b) For a reusable packaging likely to undergo a reconditioning process, the markings required in paragraphs (a)(1) through (a)(6) and (a)(9) of this section shall be applied in a permanent manner (e.g., by embossment) able to withstand the reconditioning process. For a packaging with a removable head, the markings may not be applied to the removable head.

(c) If a package is reconditioned, it shall be marked by the reconditioner near the marks required in paragraphs (a) (1) through (a)(6) of this section with the following additional information:

(1) The name of the country in which the reconditioning was performed (in the United States, use the letters "USA");

(2) The name and address or symbol of the reconditioner. Symbols, if used, shall be registered in advance with the Director, OHMT;

(3) The month and last two digits of the year of reconditioning;

(4) The letter "R"; and

(5) For every packaging successfully passing a leakproofness test, the additional letter "L".

(d) The following are examples of symbols and required markings:

(1) The United Nations symbol is:

(2) Examples of markings for a new packaging are as follows:

(i) For a fiberboard box designed to contain an inner receptacle:

4G/Y145/S/83—(as in § 178.503(a) (1),

(2), (3), (4), (5) and (6))

USA/RA—(as in § 178.503(a) (7) and (8))

(ii) For a steel drum designed to contain liquids:

UN 1A1/Y1.4/150/83—(as in

§ 178.503(a) (1), (2), (3), (4), (5) and (6))

USA/VL824—(as in § 178.503 1mm(a)

(7), (8) and (9))

(iii) For a steel drum to transport solids, viscous liquids or inner packagings:

UN 1A2/Y150/S/83—(as in § 178.503(a)

(1), (2), (3), (4), (5) and (6))

USA/VL825—(as in § 178.503(a) (7) and

(8))

(3) Examples of markings for reconditioned packagings are as follows:

USA/RB/10-85RL—(as in § 178.503(c)

(1), (2), (3) and (4))

§ 178.504 Standards for steel drums.

(a) The following are identification codes for steel drums:

(1) 1A1 for a non-removable head steel drum; and,

(2) 1A2 for a removable head steel drum.

(b) Construction requirements for steel drums are as follows:

(1) Body and heads shall be constructed of steel sheet of suitable type and adequate thickness in relation to the capacity and intended use of the drum.

(2) Body seams shall be welded on drums designed to contain more than 40 liters (10.6 gallons) of liquids. Body seams shall be mechanically seamed or welded on drums intended to contain only solids or 40 liters (10.6 gallons) or less of liquids.

(3) Chimes shall be mechanically seamed or welded. Separate reinforcing rings may be applied.

(4) The body of a drum of a capacity greater than 60 liters (15.9 gallons) must, in general, have at least two expanded rolling hoops, or alternatively, at least two separate rolling hoops. If there are separate rolling hoops, they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops may not be spot welded.

(5) Openings for filling, emptying and venting in the bodies or heads of non-removable head (1A1) drums may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1A2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be mechanically seamed or welded in place. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(6) Closure devices for removable head drums shall be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with all removable heads.

(7) If materials used for body, heads, closures, and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of transport.

(8) Maximum capacity of drum: 450 liters (118.9 gallons).

(9) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.505 Standards for aluminum drums.

(a) The following are the identification codes for aluminum drums:

(1) 1B1 for a non-removable head aluminum drum; and

(2) 1B2 for a removable head aluminum drum.

(b) Construction requirements for aluminum drums are as follows:

(1) Body and heads shall be constructed of aluminum at least 99 percent pure or an aluminum base alloy. Material shall be of suitable type and adequate thickness in relation to the capacity and the intended use of the drum.

(2) All seams shall be welded. Chime seams, if any, shall be reinforced by the application of separate reinforcing rings.

(3) The body of a drum of a capacity greater than 60 liters (15.9 gallons) must, in general, have at least two expanded rolling hoops, or alternatively, at least two separate rolling hoops. If there are separate rolling hoops, the hoops shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

(4) Openings for filling, emptying, or venting in the bodies or heads of non-removable head (1B1) drums may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1B2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(5) Closure devices for removable head drums shall be so designed and applied that they remain secure and drums remain leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with all removable heads.

(6) Maximum capacity of drum: 450 liters (118.9 gallons).

(7) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.506 Standards for metal drums other than steel or aluminum.

(a) The following are the identification codes for metal drums other than steel or aluminum:

(1) 1N1 for a non-removable head metal drum.

(2) 1N2 for a removable head metal drum.

(b) Construction requirements for metal drums other than steel or aluminum are as follows:

(1) Body and heads shall be constructed of metal (other than steel or aluminum) of suitable type and adequate thickness in relation to the capacity and the intended use of the drum.

(2) All seams shall be welded. Chime seams, if any, shall be reinforced by the application of separate reinforcing rings.

(3) The body of a drum of a capacity greater than 60 liters (15.85 gallons) must, in general, have at least two expanded rolling hoops, or alternatively, at least two separate rolling hoops. If there are separate rolling hoops, the hoops shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

(4) Openings for filling, emptying, or venting in the bodies or heads of non-removable head (1N1) drums may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1N2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(5) Closure devices for removable head drums shall be so designed and applied that they remain secure and drums remain leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with all removable heads.

(6) Maximum capacity of drum: 450 liters (118.9 gallons).

(7) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.507 Standards for plywood drums.

(a) The identification code for a plywood drum is 1D.

(b) Construction requirements for plywood drums are as follows:

(1) The wood used must be well-seasoned, commercially dry and free from any defect likely to lessen the effectiveness of the drum for the purpose intended. A material other than plywood may be used for the manufacture of the heads, if it is of strength and durability at least equivalent to the plywood.

(2) At least two-ply plywood shall be used for the body and at least three-ply plywood for the heads; the plies shall be firmly glued together, with their grains crosswise.

(3) The body and heads of the drum and their joints must be of a design appropriate to the capacity of the drum and its intended use.

(4) In order to prevent sifting of the contents, lids shall be lined with kraft paper or some other equivalent material which shall be securely fastened to the lid and extend to the outside along its full circumference.

(5) Maximum capacity of drum: 250 liters (66.0 gallons).

(6) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.508 Standards for fiber drums.

(a) The identification code for a fiber drum is 1G.

(b) Construction requirements for fiber drums are as follows:

(1) The body of the drum shall be constructed of multiple plies of heavy paper or fiberboard (without corrugations) firmly glued or laminated together and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastic material, or similar materials.

(2) Heads must be of natural wood, fiberboard, metal, plywood or plastic material and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastic material, or similar material.

(3) The body and heads of the drum and their joints must be of a design appropriate to the capacity and intended use of the drum.

(4) The assembled packaging must be sufficiently water-resistant so as not to delaminate under normal conditions of transport.

(5) Maximum capacity of drum: 450 liters (118.9 gallons).

(6) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.509 Standards for plastic drums and jerricans.

(a) The following are identification codes for plastic drums and jerricans:

(1) 1H1 for a non-removable head plastic drum;

(2) 1H2 for a removable head plastic drum;

(3) 3H1 for a non-removable head jerrican; and

(4) 3H2 for a removable head jerrican.

(b) Construction requirements for plastic drums and jerricans are as follows:

(1) The packaging shall be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and intended use. No used material other than production residues or regrind from the same manufacturing process may be used. The packaging must be adequately resistant to aging and to degradation caused either by the substance contained or by ultra-violet radiation. Any permeation of

the substance contained must not constitute a danger under normal conditions of transport.

(2) If protection against ultra-violet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the life of the packaging. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the design type, retesting may be waived if the carbon black content does not exceed 2 percent by mass or if the pigment content does not exceed 3 percent by mass; the content of inhibitors of ultra-violet radiation is not limited.

(3) Additives serving purposes other than protection against ultraviolet radiation may be included in the composition of the plastic material provided they do not adversely affect the chemical and physical properties of the packaging material.

(4) The wall thickness at every point of the packaging must be appropriate to its capacity and its intended use, taking into account the stresses to which each point is liable to be exposed.

(5) Openings for filling, emptying and venting in the bodies or heads of non-removable head (1H1) drums and jerricans (3H1) may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums and jerricans with larger openings are considered to be of the removable head type (1H2 and 3H2). Closures for openings in the bodies or heads of drums and jerricans shall be so designed and applied that they remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(6) Closure devices for removable head drums and jerricans shall be so designed and applied that they remain secure and leakproof under normal conditions of transport. Gaskets shall be used with all removable heads unless the drum or jerrican design is such that when the removable head is properly secured, the drum or jerrican is inherently leakproof.

(7) Maximum capacity of drums and jerricans: 1H1, 1H2: 450 liters (118.9 gallons); 3H1, 3H2: 60 liters (15.9 gallons).

(8) Maximum net mass: 1H1, 1H2: 400 kg (881.8 pounds); 3H1, 3H2: 120 kg (264.6 pounds).

§ 178.510 Standards for wooden barrels.

(a) The following are identification codes for wooden barrels:

(1) 2C1 for a bung type wooden barrel; and

(2) 2C2 for a slack type (removable head) wooden barrel.

(b) Construction requirements for wooden barrels are as follows:

(1) The wood used must be of good quality, straight-grained, well-seasoned and free from knots, bark, rotten wood, sapwood or other defects likely to lessen the effectiveness of the barrel for the purpose intended.

(2) The body and heads must be of a design appropriate to the capacity and intended use of the barrel.

(3) Staves and heads shall be sawn or cleft with the grain so that no annual ring extends over more than half the thickness of a stave or head.

(4) Barrel hoops must be of steel or iron of good quality. The hoops of 2C2 barrels may be of a suitable hardwood.

(5) For wooden barrels 2C1, the diameter of the bung-hole may not exceed half the width of the stave in which it is placed.

(6) For wooden barrels 2C2, heads must fit tightly into crozes.

(7) Maximum capacity of barrel: 250 liters (66.0 gallons)

(8) Maximum net mass: 400 kilograms (881.8 pounds)

§ 178.511 Standards for steel jerricans.

(a) The following are identification codes for steel jerricans:

(1) 3A1 for a non-removable head jerrican; and

(2) 3A2 for a removable head jerrican.

(b) Construction requirements for steel jerricans are as follows:

(1) Body and heads shall be constructed of steel sheet of suitable type and adequate thickness in relation to the capacity of the jerrican and intended use.

(2) Chimes of all jerricans shall be mechanically seamed or welded. Body seams of jerricans intended to carry more than 40 liters (10.6 gallons) of liquid shall be welded. Body seams of jerricans intended to carry 40 liters (10.6 gallons) or less shall be mechanically seamed or welded.

(3) Openings in jerricans (3A1) may not exceed 7.0 centimeters (2.76 inches) in diameter. Jerricans with larger openings are considered to be of the removable head type. Closures shall be so designed that they remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.

(4) If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal

protective coatings or treatments shall be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

(5) Maximum capacity of jerrican: 60 liters (15.9 gallons).

(6) Maximum net mass: 120 kilograms (264.6 pounds).

§ 178.512 Standards for steel or aluminum boxes.

(a) The following are identification codes for steel or aluminum boxes:

(1) 4A1 for an unlined and uncoated steel box;

(2) 4A2 for a steel box with inner liner or coating;

(3) 4B1 for an unlined and uncoated aluminum box; and

(4) 4B2 for an aluminum box with inner liner or coating.

(b) Construction requirements for steel or aluminum boxes are as follows:

(1) The strength of the metal and the construction of the box must be appropriate to the capacity and intended use of the box.

(2) Boxes 4A2 and 4B2 shall be lined with fiberboard or felt packing pieces, as required, or shall have an inner liner or coating of suitable material. If a double seamed metal liner is used, steps shall be taken to prevent the ingress of substances, particularly explosives, into the recesses of the seams.

(3) Closures may be of any suitable type, and must remain secure under normal conditions of transport.

(4) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.513 Standards for boxes of natural wood.

(a) The following are the identification codes for boxes of natural wood:

(1) 4C1 for an ordinary box; and

(2) 4C2 for a box with sift-proof walls.

(b) Construction requirements for boxes of natural wood are as follows:

(1) The wood used must be well-seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box. The tops and bottoms may be made of water-resistant reconstituted wood such as hard board, particle board or other suitable type.

(2) Each part of the 4C2 box must be one piece or equivalent. Parts are considered equivalent to one piece when one of the following methods of glued assembly is used: Linderman joint, tongue and groove joint, ship lap or rabbet joint, or butt joint with at least

two corrugated metal fasteners at each joint.

(3) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.514 Standards for plywood boxes.

(a) The identification code for a plywood box is 4D.

(b) Construction requirements for plywood boxes are as follows:

(1) Plywood used must be at least 3 ply. It shall be made from well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box. All adjacent plies shall be glued with water-resistant adhesive. Other suitable materials may be used together with plywood in the construction of boxes. Boxes shall be nailed or secured to corner posts or ends or assembled with other equally suitable devices.

(2) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.515 Standards for reconstituted wood boxes.

(a) The identification code for a reconstituted wood box is 4F.

(b) Construction requirements for reconstituted wood boxes are as follows:

(1) The walls of boxes shall be made of water-resistant, reconstituted wood such as hardboard, particle board, or other suitable type. The strength of the material used and the method of construction must be appropriate to the capacity of the boxes and their intended use.

(2) Other parts of the box may be made of other suitable materials.

(3) Boxes shall be securely assembled by means of suitable devices.

(4) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.516 Standards for fiberboard boxes.

(a) The identification code for a fiberboard box is 4G.

(b) Construction requirements for fiberboard boxes are as follows:

(1) Strong, solid or double-faced corrugated fiberboard (single or multiwall) shall be used, appropriate to the capacity and intended use of the box. The water resistance of the outer surface must be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 grams per square meter (0.0318 pounds per square foot) - see ISO International Standard 535-1976 (E). It must have

proper bending qualities. Fiberboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks, or undue bending. The fluting of corrugated fiberboard shall be firmly glued to the facings.

(2) The ends of boxes may have a wooden frame or be entirely of wood. Reinforcements of wooden battens may be used.

(3) Manufacturing joints in the body of boxes shall be taped, lapped and glued, or lapped and stitched with metal staples. Lapped joints shall have an appropriate overlap. Where closing is effected by gluing or taping, a water-resistant adhesive shall be used.

(4) Boxes shall be designed so as to provide a snug fit to the contents.

(5) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.517 Standards for plastic boxes.

(a) The following are identification codes for plastic boxes:

(1) 4H1 for an expanded plastic box; and

(2) 4H2 for a solid plastic box.

(b) Construction requirements for plastic boxes are as follows:

(1) The box shall be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and intended use. The box must be adequately resistant to ageing and to degradation caused either by the substance contained or by ultraviolet radiation.

(2) An expanded plastic box must consist of two parts made of a moulded expanded plastic material: a bottom section containing cavities for the inner receptacles, and a top section covering and interlocking with the bottom section. The top and bottom sections shall be so designed that the inner receptacles fit snugly. The closure cap for any inner receptacle may not be in contact with the inside of the top section of the box.

(3) For transportation, an expanded plastic box shall be closed with a self-adhesive tape having sufficient tensile strength to prevent the box from opening. The adhesive tape must be weather resistant and its adhesive compatible with the expanded plastic material of the box. Other closing devices at least equally effective may be used.

(4) For solid plastic boxes, protection against ultra-violet radiation, if required, shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the life of the box. Where use is made of carbon

black pigment or inhibitors other than those used in the manufacture of the tested design type, retesting may be waived if the carbon black content does not exceed 2 percent by mass or if the pigment content does not exceed 3 percent by mass; the content of inhibitors of ultraviolet radiation is not limited.

(5) Additives serving purposes other than protection against ultraviolet radiation may be included in the composition of the plastic material if they do not adversely affect the material of the box. Addition of these additives does not change the design type.

(6) Solid plastic boxes must have closure devices made of a suitable material of adequate strength and so designed as to prevent the box from unintentional opening.

(7) Maximum net mass 4H1: 60 kg (132.3 pounds); 4H2: 400 kg (881.8 pounds).

§ 178.518 Standards for woven plastic bags.

(a) The following are identification codes for woven plastic bags:

(1) 5H1 for an unlined or non-coated woven plastic bag;

(2) 5H2 for a sift proof woven plastic bag; and

(3) 5H3 for a water-resistant woven plastic bag.

(b) Construction requirements for woven plastic fabric bags are as follows:

(1) Bags shall be made from stretched tapes or monofilaments of a suitable plastic material. The strength of the material used and the construction of the bag must be appropriate to the capacity and intended use of the bag.

(2) If the fabric is woven flat, the bags shall be made by sewing or some other method ensuring closure of the bottom and one side. If the fabric is tubular, the bag shall be closed by sewing, weaving, or some other equally strong method of closure.

(3) Bags, sift-proof, 5H2 shall be made sift-proof by appropriate means such as use of paper or a plastic film bonded to the inner surface of the bag or one or more separate inner liners made of paper or plastic material.

(4) Bags, water-resistant, 5H3: To prevent the entry of moisture, the bag shall be made waterproof by appropriate means, such as separate inner liners of water-resistant paper (e.g., waxed kraft paper, double-tarred kraft paper or plastic-coated kraft paper), or plastic film bonded to the inner or outer surface of the bag, or one or more inner plastic liners.

(5) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.519 Standards for plastic film bags.

(a) The identification code for a plastic film bag is 5H4.

(b) Construction requirements for plastic film bags are as follows:

(1) Bags shall be made of a suitable plastic material. The strength of the material used and the construction of the bag must be appropriate to the capacity and the intended use of the bag. Joints and closures must be capable of withstanding pressures and impacts liable to occur under normal conditions of transportation.

(2) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.520 Standards for textile bags.

(a) The following are identification codes for textile bags:

(1) 5L1 for an unlined or non-coated textile bag;

(2) 5L2 for a sift-proof textile bag; and

(3) 5L3 for a water-resistant textile bag.

(b) Construction requirements for textile bags are as follows:

(1) The textiles used must be of good quality. The strength of the fabric and the construction of the bag must be appropriate to the capacity and intended use of the bag.

(2) Bags, sift-proof, 5L2: The bag shall be made sift-proof, by appropriate means, such as by the use of paper bonded to the inner surface of the bag by a water-resistant adhesive such as bitumen, plastic film bonded to the inner surface of the bag, or one or more inner liners made of paper or plastic material.

(3) Bags, water-resistant, 5L3: To prevent entry of moisture, the bag shall be made waterproof by appropriate means, such as by the use of separate inner liners of water-resistant paper (e.g., waxed kraft, paper, tarred paper, or plastic-coated kraft paper), or plastic film bonded to the inner surface of the bag, or one or more inner liners made of plastic material.

(4) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.521 Standards for paper bags.

(a) The following are identification codes for paper bags:

(1) 5M1 for a multiwall paper bag; and

(2) 5M2 for a multiwall water-resistant paper bag.

(b) Construction requirements for paper bags are as follows:

(1) Bags shall be made of a suitable kraft paper, or of an equivalent paper with at least three plies. The strength of the paper and the construction of the bag must be appropriate to the capacity and intended use of the bag. Seams and closures must be sift-proof.

(2) Paper bags 5M2: To prevent the entry of moisture, a bag of four plies or more shall be made water-proof by the use of either a water-resistant ply as one of the two outermost plies or a waterresistant barrier made of a suitable protective material between the two outermost plies. A 5M2 bag of three plies shall be made waterproof by the use of a water-resistant ply as the outermost ply. When there is danger of the lading reacting with moisture, or when it is packed damp, a water-resistant ply or barrier shall be placed next to the substance. Seams and closures must be waterproof.

(3) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.522 Standards for composite packagings with inner plastic receptacles.

(a) The following are the identification codes for composite packagings with inner plastic receptacles:

(1) 6HA1 for a plastic receptacle within a protective steel drum;

(2) 6HA2 for a plastic receptacle within a protective steel crate or box;

(3) 6HB1 for a plastic receptacle within a protective aluminum drum.

(4) 6HB2 for a plastic receptacle within a protective aluminum crate or box.

(5) 6HC for a plastic receptacle within a protective wooden box.

(6) 6HD1 for a plastic receptacle within a protective plywood drum;

(7) 6HD2 for a plastic receptacle within a protective plywood box;

(8) 6HG1 for a plastic receptacle within a protective fiber drum;

(9) 6HG2 for a plastic receptacle within a protective fiberboard box; and

(10) 6HH for a plastic receptacle within a protective plastic drum.

(b) Construction requirements for composite packagings with inner receptacles of plastic are as follows:

(1) Inner receptacles shall be constructed under the applicable construction requirements prescribed in § 178.509(b) (1) through (7).

(2) The inner plastic receptacle must fit snugly inside the outer packaging which must be free of any projections which may abrade the plastic material.

(3) Outer packagings shall be constructed as follows:

(i) 6HA1 or 6HB1: Protective packaging must conform to the requirements for steel drums in § 178.504(b), or aluminum drums in § 178.505(b).

(ii) 6HA2 or 6HB2: Protective packagings with steel or aluminum crate must conform to the requirements for steel or aluminum boxes found in § 178.512(b).

(iii) 6HC protective packaging must conform to the requirements for wooden boxes in § 178.513(b).

(iv) 6HD1: Protective packaging must conform to the requirements for plywood drums, in § 178.507(b).

(v) 6HD2: Protective packaging must conform to the requirements of plywood boxes, in § 178.514(b).

(vi) 6HG1: Protective packaging must conform to the requirements for fiber drums, in § 178.508(b).

(vii) 6HG2: protective packaging must conform to the requirements for fiberboard boxes, in § 178.516(b).

(viii) 6HH: Protective packaging must conform to the requirements for plastic drums, § 178.509(b).

(4) Maximum capacity of inner receptacles is as follows: 6HA1, 6HB1, 6HD1, 6HG1, 6HH—250 liters (66.0 gallons); 6HA2, 6HB2, 6HC, 6HD2, 6HG2—60 liters (15.9 gallons).

(5) Maximum net mass is as follows: 6HA1, 6HB1, 6HD1, 6HG1, 6HH—400 kg (881.8 pounds); 6HB2, 6HC, 6HD2, 6HG2—75 kg (165.4 pounds).

§ 178.523 Standards for composite packagings with inner glass, porcelain, or stoneware receptacles.

(a) The following are identification codes for composite packagings with inner receptacles of glass, porcelain, or stoneware:

(1) 6PA1 for glass, porcelain or stoneware receptacles within a protective steel drum;

(2) 6PA2 for glass, porcelain or stoneware receptacles within a protective steel crate or box;

(3) 6PB1 for glass, porcelain or stoneware receptacles within a protective aluminum drum;

(4) 6PB2 for glass, porcelain, or stoneware receptacles within a protective aluminum crate or box;

(5) 6PC for glass, porcelain, or stoneware receptacles within a protective wooden box;

(6) 6PD1 for glass, porcelain or stoneware receptacles within a protective plywood drum;

(7) 6PD2 for glass, porcelain, or stoneware receptacles within a protective wickerwork hamper;

(8) 6PG1 for glass, porcelain or stoneware receptacles within a protective fiber drum;

(9) 6PG2 for glass, porcelain, or stoneware receptacles within a protective fiberboard box;

(10) 6PH1 for glass, porcelain or stoneware receptacles within a protective expanded plastic packaging; and

(11) 6PH2 for glass, porcelain, or stoneware receptacles within a protective solid plastic packaging.

(b) Construction requirements for composite packagings with inner receptacles of glass, porcelain, or stoneware are as follows:

(1) Inner receptacles must conform to the following requirements:

(i) Receptacles must be of suitable form (cylindrical or pear-shaped), be made of good quality materials free from any defect that could impair their strength, and be firmly secured in the outer packaging.

(ii) Any part of a closure likely to come into contact with the contents of the receptacle must be resistant to those contents. Closures shall be fitted so as to be leakproof and secured to prevent any loosening during transportation. Vented closures must conform to § 173.24(f) of this subchapter.

(2) Protective packagings must conform to the following requirements:

(i) For receptacles with protective steel drum 6PA1, the drum must comply with § 178.504(b). However, the removable lid required for this type of packaging may be in the form of a cap.

(ii) For receptacles with protective packaging of steel crate or steel box 6PA2, the protective packaging must conform to the following:

(A) § 178.512(b);

(B) In the case of cylindrical receptacles, the protective packaging shall, when upright, rise above the receptacle and its closure; and

(C) If the protective crate surrounds a pear-shaped receptacle and is of matching shape, the protective packaging shall be fitted with a protective cover (cap).

(iii) For receptacles with protective aluminum drum 6PB1, the requirements of § 178.505(b) apply to the protective packaging.

(iv) For receptacles with protective aluminum box or crate 6PB2, the requirements of § 178.512(b) apply to the protective packaging.

(v) For receptacles with protective wooden box 6PC, the requirements of § 178.513(b) apply to the protective packaging.

(vi) For receptacles with protective plywood drum 6PD1, the requirements of § 178.507(b) apply to the protective packaging.

(vii) For receptacles with protective wickerwork hamper 6PD2, the wickerwork hamper shall be properly made with material of good quality. The hamper shall be fitted with a protective cover (cap) so as to prevent damage to the receptacle.

(viii) For receptacles with protective fiber drum 6PG1, the drum must conform to the requirements of § 178.508(b).

(ix) For receptacles with protective fiberboard box 6PG2, the requirements of § 178.516(b) apply to the protective packaging.

(x) For receptacles with protective solid plastic or expanded plastic packaging 6PH1 or 6PH2, the requirements of § 178.517(b) apply to the protective packaging. Solid protective plastic packaging shall be manufactured from highdensity polyethylene or from some other comparable plastic material. The removable lid required for this type of packaging may be a cap.

(3) Quantity limitations are as follows:

(i) Maximum net capacity for packagings for liquids: 60 liters (15.9 gallons).

(ii) Maximum net mass for packagings for solids: 75 kilograms (165.4 pounds).

A new Subpart M would be added to read as follows:

Subpart M—Testing of Non-bulk of Packagings and Packages

§ 178.600 Purpose and scope.

This subpart prescribes certain testing requirements for performance-oriented packagings identified in Subpart L of this part.

§ 178.601 General requirements.

(a) The test procedures prescribed in this subpart are intended to ensure that packages containing hazardous materials can withstand normal conditions of transportation and are considered minimum requirements. Each packaging shall be so manufactured and assembled as to be capable of successfully passing the prescribed tests and of conforming to the requirements of § 173.24 of this subchapter at all times while in transportation.

(b) It is the responsibility of the packaging manufacturer and the shipper, to the extent that assembly functions including final closure are performed by the latter, to assure that each package is capable of passing the prescribed tests.

(c) The packaging manufacturer shall achieve successful test results for each new or different packaging at the start of production of that packaging and at intervals established by the manufacturer of sufficient frequency to ensure that all packagings are capable of passing the prescribed tests. With the exception of the chemical compatibility test for plastic receptacles (§ 178.606 of this subchapter) production tests must be conducted at least once in each 12 month period. For the purpose of this subpart, a different packaging is one that differs from a previously produced

packaging in structural design, size, material of construction, wall thickness or manner of construction but does not include—

(1) A packaging which differs only in reduced design height (The cross-sectional shape and area must remain the same.);

(2) A packaging which differs only in surface treatment;

(3) A combination packaging which differs only in that the outer packaging has been successfully tested with different inner packagings (A variety of such different inner packagings may be assembled in this outer packaging without further testing); or

(4) A plastic packaging which differs only with regard to additives which conform to § 178.509(b)(3) or § 178.517(b)(4) or (5).

(d) The manufacturer shall conduct the tests prescribed in this subpart using random samples of production packagings, in the numbers specified in the appropriate test section. In addition, the leakproofness test shall be performed on every new packaging by the manufacturer or reconditioned packaging by the shipper or reconditioner, to which it applies.

(e) The Director, OHMT, may approve the selective testing of packagings that differ only in minor respects from a tested type, including packagings containing a lesser number or smaller sizes of inner packagings or with inner packagings of lower net mass; and packagings such as drums, bags, and boxes which are produced with small reductions in external dimension.

(f) Notwithstanding the retest intervals specified in paragraph (c) of this section, the Director, OHMT, may at any time require proof, through testing in accordance with this subpart, that packagings meet the requirements of this subpart. As required by the Director, OHMT, the manufacturer shall either—

(1) Conduct performance tests in accordance with this subpart; or

(2) Supply packagings, in quantities sufficient to conduct tests in accordance with this subpart, to the Director, OHMT, or a designated representative.

(g) If an inner treatment or coating of a packaging is required for safety reasons, the manufacturer shall design the packaging so that the treatment or coating retains its protective properties even after withstanding the tests prescribed by this subpart.

(h) The manufacturer shall keep records of test results for at least one year and make them available for inspection by a representative of the Department upon request.

§ 178.602 Preparation of packagings and packages for testing.

(a) Tests shall be carried out on packagings and packages as prepared for transportation, including inner receptacles in the case of combination packagings.

(b) For the drop and stacking test, inner and single-unit receptacles shall be filled to not less than 95 percent of their capacity in the case of solids and not less than 98 percent in the case of liquids. The materials to be transported in the packagings may be replaced by non-hazardous materials, except for chemical compatibility testing or where this would invalidate the results of the tests.

(c) If the materials to be transported are replaced for test purposes by nonhazardous materials, the materials used must be of the same or higher specific gravity as the materials to be carried and their other physical properties (grain, size, viscosity) which might influence the results of the required tests must correspond as closely as possible to those of the hazardous materials to be transported.

(d) Paper or fiberboard packagings shall be conditioned for at least 24 hours in an atmosphere maintained—

(1) At 50 percent \pm 2 percent relative humidity, and at a temperature of 23 °C \pm 2 °C (73 °F \pm 4 °F); or

(2) At 65 percent \pm 2 percent relative humidity, and at a temperature of 20 °C \pm 2 °C (68 °F \pm 4 °F), or 27 °C \pm 2 °C (80 °F \pm 4 °F); or

(3) For testing at periodic intervals only (i.e., other than initial design qualification testing), at ambient conditions.

(e) Each packaging shall be closed in preparation for testing in the same manner as if prepared for actual shipment. All closures shall be installed using proper techniques and torques.

(f) Bung-type barrels made of natural wood shall be left filled with water for at least 24 hours before the tests.

(g) Except as provided in § 173.24(e)(3)(iii) of this subchapter, plastic receptacles shall be subjected to the chemical compatibility test provided in § 178.608 before undergoing the drop, stacking and, where applicable, internal pressure and leakproofness tests.

§ 178.603 Drop Test

(a) The number of drops required and the packages' orientation are as follows:

| Packaging | No. of test samples | Drop orientation |
|--|------------------------------|--|
| Steel drums, Aluminum drums, Metal drums (other than steel or aluminum), Steel jerricans, Plywood drums, Wooden barrels, Fibre drums, Plastics drums and jerricans, Composite packagings which are in the shape of a drum. | Six (three for each drop). | First drop (using three samples): the package must strike the target diagonally on the chime or, if the packaging has no chime, on a circumferential seam or an edge. Second drop (using the other three samples): the package must strike the target on the weakest part not tested by the first drop, for example a closure or, for some cylindrical drums, the welded longitudinal seam of the drum body. |
| Boxes of natural wood, Plywood boxes, Reconstituted wood boxes, Fiberboard boxes, Plastic boxes, Steel or aluminum boxes, Composite packagings, which are in the shape of a box. | Five (one for each drop). | First drop: flat on the bottom (using the first sample). Second drop: flat on the top (using the second sample). Third drop: flat on the long side (using the third sample). Fourth drop: flat on the short side (using the fourth sample). Fifth drop: on a corner (using the fifth sample). |
| Bags—single-ply with a side seam. | Three (three drops per bag). | First drop: flat on a wide face (using all three samples). Second drop: flat on a narrow face (using all three samples). Third drop: on an end of the bag (using all three samples). |
| Bag—single-ply without a side seam, or multi-ply. | Three (two drops per bag). | First drop: flat on a wide face (using all three samples). Second drop: on an end of the bag (using all three samples). |

(b) *Special preparation of test samples for the drop test.* Testing of plastic drums, jerricans, and boxes, composite packagings with inner plastic receptacles, and of combination packagings with inner plastic receptacles, other than expanded plastic boxes and bags, shall be carried out when the temperature of the test sample and its contents has been reduced to -18 °C (0 °F) or lower. Test liquids shall be kept in the liquid state, if necessary, by the addition of anti-freeze.

(c) *Target.* The target must be a rigid, non-resilient, flat and horizontal surface.

(d) *Drop height.* Drop heights, measured as the vertical distance from the target to the lowest point on the package, are determined as follows:

(1) For solids and liquids, if the test is performed with the solid or liquid to be transported or with a non-hazardous material having essentially the same

physical characteristic, the drop height is determined according to Packing Group, as follows:

(i) Packing Group I: 1.8 meters (5.91 feet).

(ii) Packing Group II: 1.2 meters (3.94 feet).

(iii) Packing Group III: 0.8 meter (2.62 feet).

(2) For liquids, if the test is performed with water—

(i) Where the materials to be carried have a specific gravity not exceeding 1.2, drop height is determined according to Packing Group, as follows:

(A) Packing Group I: 1.8 meters (5.91 feet).

(B) Packing Group II: 1.2 meters (3.94 feet).

(C) Packing Group III: 0.8 meter (2.62 feet).

(ii) Where the materials to be transported have a specific gravity exceeding 1.2, the drop height shall be calculated on the basis of the specific gravity (SG) of the material to be carried, rounded up to the first decimal, as follows:

(A) Packing Group I: SG X 1.5 meters (4.92 feet).

(B) Packing Group II: SG X 1.0 meter (3.28 feet).

(C) Packing Group III: SG X 0.67 meters (2.25 feet).

(e) *Criteria for passing the test.* A package is considered to successfully pass the drop tests if for each sample tested—

(1) For receptacles containing liquid, each receptacle does not leak when equilibrium has been reached between the internal and external pressures;

(2) For removable head drums for solids, the entire contents are retained by an inner packaging (e.g., a plastic bag) even if the closure on the top head of the drum is no longer sift-proof;

(3) For a bag, neither the outermost ply nor an outer packaging exhibits any damage likely to adversely affect safety during transport;

(4) For a composite or combination packaging, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging;

(5) For a drum, jerrican or bag, any discharge from a closure is slight and ceases immediately after impact with no further leakage; and

(6) For packagings for explosives, no rupture of the packaging occurs.

§ 178.604 Leakproofness test.

(a) *General.* The leakproofness test shall be performed with compressed air or other suitable gases on all packagings

intended to contain liquids; however, this test is not required for inner packagings of combination packagings.

(b) *Number of packagings to be tested.*

(1) *Production testing.* All packagings subject to the provisions of this section shall be tested and must pass the leakproofness test:

(i) Before they are first used in transportation; and

(ii) Prior to reuse, when authorized for reuse by § 173.28 of this subchapter.

(2) *Design qualification testing.* Three samples of each different packaging shall be tested and must pass the leakproofness test.

(c) *Special preparation.* (1) For design qualification testing, packagings must be tested with closures in place. For production testing, packagings need not have their closures in place.

(2) For testing with closures in place, vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

(d) *Test method.* The packaging shall be restrained under water while an internal air pressure is applied; the method of restraint must not affect the results of the test. The test must be conducted for a period of time sufficient to pressurize the interior of the packaging to the specified air pressure, and to determine if there is leakage of air from the packaging. Other methods, at least equally effective, may be used, if approved by the Director, OHMT.

(e) *Pressure applied.* An internal air pressure (gauge) must be applied to the packaging as indicated for the following packing groups:

(1) Packing Group I: Not less than 30 kilopascals (4.4 psi).

(2) Packing Group II: Not less than 20 kilopascals (2.9 psi).

(3) Packing Group III: Not less than 20 kilopascals (2.9 psi).

(f) *Criteria for passing the test.* A packaging passes the test if there is no leakage of air from the packaging.

§ 178.605 Hydrostatic pressure test.

(a) *Packagings to be tested.* The hydrostatic pressure test shall be performed on samples of all metal, plastic, and composite packagings intended to contain liquids. This test is also required for inner packagings of combination packagings intended for transportation by aircraft.

(b) *Number of test samples.* Three test samples are required for each different packaging.

(c) *Special preparation of receptacles for testings.* Vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

(d) *Test method and pressure to be applied.* Metal packagings and

composite packagings other than plastic (e.g., glass, porcelain or stoneware), including their closures, shall be subjected to the test pressure for 5 minutes. Plastic packagings and composite packagings (plastic material), including their closures, shall be subjected to the test pressure for 30 minutes. This pressure is the one to be marked as required in § 178.503(a)(5). The receptacles shall be supported in a manner that does not invalidate the test. The test pressure shall be applied continuously and evenly and it shall be kept constant throughout the test period. The hydraulic pressure (gauge) applied, taken at the top of the receptacle, and determined by any one of the following methods shall be:

(1) Not less than the total gauge pressure measured in the packaging (i.e., the vapor pressure of the filling material and the partial pressure of the air or other inert gas minus 100 kilopascals (14.5 psi) at 55 °C (131 °F) and multiplied by a safety factor of 1.5. This total gauge pressure shall be determined on the basis of a maximum degree of filling in accordance with § 173.24a(b)(3) of this subchapter and a filling temperature of 15 °C (59 °F);

(2) Not less than 1.75 times the vapor pressure at 50 °C (122 °F) of the material to be transported minus 100 kilopascals (14.5 psi) but with a minimum test pressure of 100 kilopascals (14.5 psi); or

(3) Not less than 1.5 times the vapor pressure at 55 °C (131 °F) of the material to be transported minus 100 kilopascals (14.5 psi), but with a minimum test pressure of 100 kilopascals (14.5 psi).

Packagings intended to contain hazardous materials of Packing Group I shall be tested to a minimum test pressure of 250 kilopascals (36.3 psi).

(e) *Pressure test requirements for air transport.* Additional pressure test requirements for air transport, contained in § 173.27(c) of this subchapter, may exceed the pressure test required by paragraph (d) of this section.

(f) *Criteria for passing the test.* A package passes the hydrostatic test if, for each test sample, there is no leakage of liquid from the package.

§ 178.606 Stacking test.

(a) *General.* All packages other than bags shall be subjected to a stacking test.

(b) *Number of test samples.* Three test samples are required for each different packaging.

(c) *Test method.* The test sample shall be subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical packages which might be stacked on it during transport. The minimum height of the

stack, including the test sample, must be 3.0 meters (9.84 ft.). The duration of the test must be 24 hours, except that plastic drums, jerricans, and composite packaging 6HH, intended for liquids, shall be subjected to the stacking test for a period of 28 days at a temperature of not less than 40 °C (104 °F).

Alternative test methods which yield equivalent results may be used if approved by the Director, OHMT.

(d) *Criteria for passing the test.* No test sample may leak. In composite packagings or combination packagings, there must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration which could adversely affect transport safety or any distortion likely to reduce its strength or cause instability in stacks of packages. Stacking stability is considered sufficient when, after the stacking test, and, in the case of plastic receptacles after cooling to ambient temperature, two receptacles of the same type filled with water placed on each test sample maintain their positions for one hour.

§ 178.607 Cooperage test for bung-type wooden barrels.

(a) *Number of samples.* One barrel is required for each different packaging.

(b) *Method of testing.* Remove all hoops above the bilge of an empty barrel at least two days old.

(c) *Criteria for passing the test.* A packaging passes the cooperage test only if the diameter of the cross-section of the upper part of the barrel does not increase by more than 10 percent.

§ 178.608 Chemical compatibility test for plastic receptacles.

(a) This chemical compatibility test must be performed on samples of all packagings where plastic comes in contact with liquid hazardous material.

(b) Three test samples of each different packaging must withstand without failure the procedure specified in Appendix B of Part 173, entitled "Procedure for Testing Chemical Compatibility and Rate of Permeation in Polyethylene Packagings and Receptacles".

(c) In addition to the test requirement of this section, plastic packagings and receptacles must conform to the compatibility requirements of § 173.24(e) of this subchapter.

PART 179—SPECIFICATIONS FOR TANK CARS

The authority citation for Part 179 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806, 1808; 49 CFR Part 1, unless otherwise noted.

Section 179.14 would be revised to read as follows:

§ 179.14 Coupler vertical restraint system.

(a) *Performance standard.* Each tank car shall be equipped with couplers capable of sustaining, without disengagement or material failure, vertical loads of at least 200,000 pounds (90,718.5 kg) applied in upward and downward directions in combination with buff loads of 2,000 pounds (907.2 kg), when coupled to cars equipped with couplers that do have this vertical restraint capability, and cars equipped with couplers, that do not have this vertical restraint capability.

(b) *Test verification and approval.* Except as provided in paragraph (d) of this section, compliance with the requirements of paragraph (a) of this section shall be achieved by verification testing of the coupler vertical restraint system in accordance with paragraph (c) of this section, and approval of the Federal Railroad Administrator.

(c) *Coupler vertical restraint tests.* A coupler vertical restraint system shall be tested under the following conditions:

(1) The test coupler shall be tested with a mating coupler (or simulated coupler) having only frictional vertical force resistance at the mating interface; or a mating coupler (or simulated coupler) having the capabilities described in paragraph (a) of this section.

(2) The testing apparatus shall simulate the vertical coupler performance at the mating interface and may not interfere with coupler failure or otherwise inhibit failure due to force applications and reactions.

(3) The test shall be conducted as follows:

(i) A minimum of 200,000 pounds (90,718.5 kg) vertical downward load shall be applied continuously for at least five minutes to the test coupler head simultaneously with the application of a nominal 2,000-pound (907.2 kg) buff load;

(ii) The procedures prescribed in paragraph (c)(3)(i) of this section shall be repeated with a minimum vertical upward load of 200,000 pounds (90,718.5 kg); and

(iii) A minimum of three consecutive successful tests shall be performed for each load combination prescribed in paragraphs (c)(3) (i) and (ii) of this section. A test is successful when a vertical disengagement or material failure does not occur during any of the prescribed load combinations.

(d) *Listing of approved couplers.* The following classes of couplers have been approved by the Federal Railroad Administrator and need not be verified

by the testing requirements of paragraph (c) of this section:

(1) E top bottom shelf couplers designated by the Association of American Railroads' Catalog Nos. SE60CHT, SE60CHTE, SE67BHT, SE67BHTE, SE68BHT or SE68BHTE; and

(2) F top shelf couplers designated by the Association of American Railroads' Catalog Nos. SF70CHT, SF70CHTE, SF73AHT, SF73AHTE, SF79CHT or SF79CHTE.

§ 179.101-1 [Amended]

In § 179.101-1, the table of individual specification requirements would be revised as follows:

a. The column for DOT Specification 112A400 F is removed.

b. The "Insulation" requirement entry for 112A200W, 112A340W, 112A400W, 112A500W, 114A340W, and 114A400W is changed from "4 None" to "4 Optional".

c. Footnote 13 is added to read: "13 Tank cars equipped with insulation per § 179.100-18 of this subchapter may be stenciled "EQUIPPED WITH INSULATION PER 49 CFR 179.100-18".

d. The DOT specification entry "112A400W¹²" is revised to read "112A400W^{11, 12}".

§ 179.102 [Removed and reserved].

Section 179.102 would be removed and reserved.

The title to § 179.105 would be revised to read as follows:

§ 179.105 Special requirements for Specification 105S, 105J, 111J, 112S, 112J, 112T, 114S, 114J and 114T tank cars.

* * * * *

Section 179.105-1 would be revised to read as follows:

§ 179.105-1 General.

(a) In addition to the requirements of this section, each Specification 105S, 105J, 111J, 112S, 112J, 112T, 114S, 114J and 114T tank car must meet the applicable requirements of § 179.100, 179.101, 179.103, and 179.104.

(b) Notwithstanding the provisions of §§ 179.3, 179.4 and 179.6, AAR approval is not required for changes in or additions to tank cars necessary to comply with this section.

(c) Each Specification 105S, 105J, 111J, 112S, 112J, 112T, 114S, 114J, and 114T tank car shall be equipped with a tank head puncture resistance system that meets the requirements of § 179.105-5.

(d) Each Specification 105J, 111J, 112J, 112T, 114J, and 114T tank car shall be equipped with:

(1) A thermal protection system that meets the requirements of § 179.105-4; and

(2) A safety valve that meets the requirements of § 179.105-7.

§§ 179.105-2 and 179.105-3 [Removed and reserved]

Section 179.105-2 and 179.105-3 would be removed and reserved.

§ 179.105-4 [Amended]

In paragraph (a) of § 179.105-4, the phrase "Each specification 112T, 112J, 114T, and 114J tank car" would be changed to read "Each Specification 105J, 111J, 112J, 112T, 114J, and 114T tank car".

§ 179.105-6 [Removed and reserved]

Section 179.105-6, would be removed and reserved.

§ 179.107-7 [Amended]

In paragraph (a) of § 179.105-7, the phrase "each 112 and 114 tank car" would be changed to read "each Specification 105J, 111J, 112J, 112T, 114J, and 114T tank car".

In § 179.105-8, paragraphs (d) and (e) would be added to read as follows:

§ 179.105-8 Stenciling.

* * * * *

(d) Each Specification 105 tank car that is equipped as prescribed in § 179.105-1(c) shall be stenciled with the letter "S" substituted for the letter "A" in the specification marking.

(e) Each Specification 105 tank car that is equipped as prescribed in § 179.105-1(d) shall be stenciled with the letter "J" substituted for the letter "A" in the specification marking.

§ 179.106 [Removed and reserved]

Section 179.106 would be removed and reserved.

§ 179.201-1 [Amended]

In § 179.201-1, the column heading "111A100W4" would be revised to read "111A100W4³" and a footnote 3 would be added to the footnotes of the Table to read: "3 Tank cars equipped with insulation per § 179.100-18 of this subchapter may be stenciled "EQUIPPED WITH INSULATION PER 49 CFR 179.100-18".

§ 179.202 [Removed and reserved]

Section 179.202 would be removed and reserved.

§ 179.203 [Amended]

In § 179.203, paragraphs (c) and (d) would be removed in § 179.203-1 and

paragraph (a)(1) would be removed from
§ 179.203-2.

§ 179.302 [Removed and reserved]

Section 179.302 would be removed
and reserved.

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Alan I. Roberts,

*Director, Office of Hazardous Materials
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