

# **Federal Register**

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## **Part II**

### **Department of Transportation**

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**Research and Special Programs  
Administration**

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**Performance-Oriented Packagings  
Standards; Advanced Notice of Proposed  
Rulemaking**

**DEPARTMENT OF TRANSPORTATION****Research and Special Programs Administration****49 CFR Parts 171, 172, 173, and 178**

[Docket No. HM-181, Advance Notice No. 82-3]

**Performance-Oriented Packagings Standards**

**AGENCY:** Materials Transportation Bureau, Research and Special Programs Administration, DOT.

**ACTION:** Advance notice of proposed rulemaking.

**SUMMARY:** This publication invites comments on the need for, and possible methods of establishing a set of performance-oriented packaging standards for hazardous materials packaged in containers having a capacity of 450 liters or 400 kilograms, or less, and a reorganization of bulk packaging requirements for hazardous materials. The need for such standards is examined in this advance notice in light of the complexities of the present design standards, and the fact that the United States may soon be out of step with other countries, including Canada, as they adopt performance-oriented packaging standards based on United Nations Recommendations for the Safe Transport of Dangerous Goods. A demonstration of one possible method of applying performance standards to flammable liquids and a possible method for reorganizing bulk packagings are presented in this advance notice.

Besides eliminating more than 90 detailed packaging specifications, MTB anticipates that the volume of the Department's Hazardous Materials Regulations would be reduced by more than 300 pages if it adopts final regulations for all hazardous materials (excluding radioactive materials, explosives and compressed gases) in the format demonstrated in this ANPRM.

**DATE:** Comments must be received on or before October 1, 1982.

**ADDRESS COMMENTS TO:** Dockets Branch, Materials Transportation Bureau, U.S. Department of Transportation, Washington, D.C. 20590. Comments should identify the docket and be submitted, if possible, in five copies. The Dockets Branch is located in Room 8426 of the Nassif Building, 400 Seventh Street, SW., Washington, D.C. Office hours are 8:30 a.m. to 5 p.m., Monday through Friday.

**FOR FURTHER INFORMATION CONTACT:** Thomas J. Charlton, Chief, Standards Division, Office of Hazardous Materials

Regulation, Materials Transportation Bureau, Department of Transportation, 400 Seventh Street, SW., Washington, D.C. 20590 (202-426-2075).

**SUPPLEMENTARY INFORMATION:****Background**

The Hazardous Materials Regulations (HMR), issued under authority of the Hazardous Materials Transportation Act, 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 one thousand and fifty pages of the CFR. The two largest parts of Subchapter C are Part 173, "SHIPPER'S—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS," of about three hundred pages, and Part 178, "SHIPPING CONTAINER SPECIFICATIONS," of about four hundred and fifty pages.

Basically, to use the HMR, a shipper locates in the Hazardous Materials Table (49 CFR 172.101) the hazardous material to be shipped. Column 5(b) of the Table refers to the appropriate packaging section of the shipper's requirements (49 CFR Part 173) for that material. Part 173, addressed primarily to shippers, lists the DOT packagings authorized for that material and includes a reference to the appropriate section of Part 178 (Packaging Specifications) where the specification for those packagings are found. Part 178, addressed primarily to container manufacturers, contains detailed construction specifications for a wide variety of packagings.

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 four hundred and fifty pages of the CFR. The specification packaging sections of Part 178 cover packagings required for various hazardous materials and range from small polyethylene bottles to cargo tanks. However, the major portion of Part 178 is devoted to specifications for non-bulk packagings, i.e., authorized capacities of 110 gallons or less, and includes approximately 93 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 93 specifications are those covering cylinders for compressed gases, and packagings designed solely for radioactive or explosive materials,

none of which is addressed in this proposal.

The detailed packaging specifications must be complied with by persons desiring to either manufacture packagings, or ship hazardous materials in authorized packagings. This includes requirements for: Material, thickness, fastenings, capacity, coatings, openings, joining, carrying devices, and miscellaneous other construction requirements. Much of the information is given in great detail and is repetitious. For example, there are fourteen specifications for wooden boxes. Most specifications list the acceptable types of wood from which lumber must be used to construct the box and this list may be repeated in the next specification for a similar, but slightly different box. In addition to the types of acceptable wood being specified, the thickness and width of the boards, the kind and dimension of nails, and the spacing of the nails in joining the box may also be specified.

In sharp contrast to this system of detailed specifications for container 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 do the DOT specifications. Typically, these standards have general requirements for materials, construction, and a maximum size. For example, the UN 1A1 steel drum must have welded seams if it is to be used to carry liquids, must have welded or mechanically seamed chimes, the diameter of the opening may not exceed 7 cm (2.75 inches), and the drum may not exceed 450 liters (118.88 gallons) capacity. There is an additional requirement for rolling hoops if the drum capacity is greater than 60 liters (15.85 gallons). Aside from these very general construction requirements, the strength and integrity of the drum is established by a series of performance tests which the drum must pass before it is authorized for the carriage of hazardous materials; hence the term "performance-oriented" packaging standards. For drums, the principal tests are a drop test, i.e., a drum, filled and prepared as if for shipment, is allowed to free fall on to a level unyielding surface without spilling its contents, and a stacking test. In addition, hydraulic and leakage tests are prescribed if the drum is intended to transport liquids. The height specified

for the drop test in the UN system is determined by the "Packing Group" of the hazardous materials to be transported. The UN system divides hazardous materials into three "Packing Groups" depending on their relative hazards. Packing Group I consists of very dangerous materials, Packing Group II involves materials considered to present a moderate degree of danger, and Packing Group III addresses materials presenting only minor danger. The steel drum, for example, would have to survive a drop from a height 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, and 0.8 meters (2.62 feet) for Group III materials (if the specific gravity of the hazardous materials to be shipped in the drum does not exceed 1.2). Within the broad general construction requirements given in the performance-oriented standard, the drum manufacturer is free to exercise its design and production ingenuity to produce a packaging which is both cost effective, as determined by the marketplace, and safe, as determined by the performance standards which it must meet.

#### Purpose of the ANPRM

The Materials Transportation Bureau (MTB) is considering adopting a set of performance-oriented packaging standards based on the U.N. Recommendations. The goals of this effort are: (1) Simplification of the Hazardous Materials Regulations for both bulk and non-bulk shipments; (2) a significant reduction in the volume of the regulations; (3) provision for greater flexibility in the requirements for the design and construction of hazardous materials packaging in order to recognize technological advancements in packaging; (4) the promotion of safety in transport through the use of better packaging; (5) a reduction in the need for exemptions; and, (6) the facilitation of international commerce, including commerce between the United States and Canada.

The simplification of the HMR is the 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 or "fixes" 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 businessman, 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 places a burden. A staff of eight hazardous materials specialists at MTB spend approximately half of their time giving explanations of the HMR either in writing or over the telephone. As already indicated, one of the principal reasons for this Advance Notice of Proposed Rulemaking (ANPRM) is to demonstrate how both shipper requirements and the container specifications can be greatly simplified by the adoption of a set of 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 packaging specifications are very detailed and are not readily adaptable to innovations in packaging technology. Consequently, the use of an improved packaging which does not meet a detailed specification would be prohibited until a specification is amended or an exemption is issued. This imposes a costly burden on both the industry and government with an uncertain benefit in increased safety.

In addition, international trade would be facilitated by removing as an obstacle to trade the selected shipping and packaging requirements of the HMR. 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 (Standards), 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 the 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.

Within the next five years, our trading partners in other countries are expected to adopt non-bulk packaging

requirements based on the UN Recommendations. Without a change in DOT's present regulations, non-bulk packages of hazardous materials shipped in conformance with the HMR would probably not be acceptable in those countries, and imported shipments prepared only in accordance with the U.N. Recommendations would not be acceptable here. Since the U.S. has a very favorable balance of trade in chemicals (many of which are hazardous materials), the U.S. may sustain a net loss from any reduction in trade caused by barriers such as non-reciprocal packaging and shipping requirements. In order to avoid such a reduction in trade, DOT will have to adopt the UN system, or maintain two systems—the existing regulations for domestic shipments and a UN based system for international shipments. The second alternative is highly undesirable since it would add to the volume of the HMR and require additional government resources to maintain the two systems.

The final goal of this project, the reorganization of the bulk packaging requirements of the HMR, would represent an attempt to simplify and rationalize those portions of the HMR applying to packagings and packages having a capacity greater than 450 liters.

#### Organization of the ANPRM

This ANPRM consists of three parts: a revised Hazardous Materials Table, performance-oriented packaging standards, and revised shipper requirements which assign those standards to particular hazardous materials. In other words, the packaging requirements for particular hazardous materials are given in the shipper's requirements (Part 173) by referencing the approved packaging in the Part 178 standards.

The performance-oriented non-bulk packaging standards in this ANPRM would be codified in Part 178 as Subpart L (§ 178.500 to § 178.525). Subpart M of Part 178 (§ 178.600 to § 178.608) would contain the performance tests for non-bulk packagings.

In addition to the performance-oriented packaging standards covering drums, barrels, jerricans, boxes, bags and composite receptacles, Subpart L would also contain definitions and terms, the alpha-numeric grouping used as identification codes, some general construction requirements, and the requirements for marking non-bulk packagings used in the U.N. system.

The requirements proposed in Subpart L are essentially the same as the general recommendations on packagings found in Chapter 9 of the U.N.

Recommendations. It should be noted that Chapter 9 is currently in the process of being updated by the Committee of Experts, and the provisions contained in this advance notice reflect the majority of the changes proposed to be incorporated into the UN

Recommendations as of March 1982. It is envisaged that, should a Notice of Proposed Rulemaking be published, the packaging standards proposed would reflect the most current text of Chapter 9 of the UN Recommendations. In addition, changes are proposed to make the text of the UN Recommendations mandatory ("should" has been changed to "shall") and, where the language is ambiguous or unclear, changes have been made for the sake of clarity.

Not addressed in this ANPRM are packagings used exclusively to transport explosives or radioactive materials, or the specifications for cylinders. Regulations applying to explosives, radioactive materials and compressed gases are undergoing separate reviews.

Part 173 of the HMR assigns packaging requirements, or exceptions from those requirements, for hazardous materials. If, for example, a shipper is interested in ascertaining the packaging requirements for a hazardous material, it is first necessary to find the appropriate proper shipping name in the Hazardous Materials Table (49 CFR 172.101), and then look to column 5 entitled "Packaging." Paragraph references in column 5 are in Part 173, where both the packaging requirements for the particular hazardous material as well as the applicable exceptions, if any, are found.

Because of the many entries in the Hazardous Materials Table (approximately 2700, divided into twenty-two hazard classes), it is not practical in this ANPRM to republish the entire Hazardous Materials Table (§ 172.101) and shipper requirements (Part 173) to reflect the incorporation of the performance-oriented packaging standards. Instead, a sample hazard class, "Flammable liquid," was chosen to demonstrate how the Hazardous Materials Table and the shipping requirements in Part 173 could be rewritten to accommodate the proposed new packaging standards for both bulk and non-bulk packagings.

The flammable liquid hazard class was chosen for this demonstration because it is a complex one, specifying many different packagings for a long list of materials with varying characteristics, and is probably the "worst case" among all of the hazard classes in its difficulty for reconstructing the HMR to accommodate performance-

oriented packaging standards and the revised bulk requirements.

For purposes of demonstration, this ANPRM includes a revised Hazardous Materials Table (§ 172.101) with all entries for the hazard class "Flammable liquid." The columns bear the same headings as the current Hazardous Materials Table. In general, proposed changes have been made only in entries in columns 5(b) (specific packagings requirements) and 6(a) and 6(b) (maximum net quantity in one package for carriage aboard passenger-carrying aircraft or railcar); however, a limited number of descriptions in column (2) would be revised, and two new descriptions would be added.

With two exceptions (mercaptan mixtures and methyl vinyl ketone), references in column 5(a) to "exceptions from specific packaging requirements," which do not refer to specification packaging, were not changed and the existing references to non-specification packaging remain the same. With the exceptions noted above, sections which deal with non-specification packaging are not included in the shipper's requirements of this demonstration because they will not change.

References in column 5(b) (specification packaging), refer to the proposed shipper requirements which in turn refer to the performance-oriented packaging standards for non-bulk packages proposed in Subpart L of Part 178 or bulk packaging requirements in Parts 178 and 179.

Columns 6(a) and 6(b) would contain the maximum quantities of flammable liquids, in liters, permitted aboard passenger-carrying and cargo-only aircraft, respectively. The quantities indicated in this proposal reflect, to the maximum extent possible, quantity limits established in the Technical Instructions for the Safe Transport of Dangerous Goods by Air, published by the International Civil Aviation Organization (ICAO). This would be a change from the existing Hazardous Materials Table.

The proposed sections on shipper requirements (Part 173) of this ANPRM consist essentially of: (1) Five non-bulk packing methods contained in paragraphs § 173.119 (a) through (e), (2) one general bulk packing method contained in paragraph § 173.119(f), (3) thirteen specific bulk packing methods contained in paragraphs § 173.119 (g) through (s), followed by (4) § 173.120 through § 173.129 which specify both bulk and non-bulk requirements for particular hazardous materials. Sections 173.130 through 173.149a would be

deleted and reserved for possible future use.

The general philosophy employed in the development of the five general non-bulk packing methods is that hazardous materials presenting a similar hazard in transport should be packaged in the same manner. For the purposes of the ANPRM, "similar" means materials of the same UN Packing Group. The general criteria applied by the UN Committee in assigning flammable liquids to particular Packing Groups are:

Packing Group I—Boiling point less than or equal to 35°C.

Packing Group II—Boiling point greater than 35°C and flashpoint less than 23°C.

Packing Group III—Boiling point greater than 35°C and flashpoint greater than or equal to 23°C.

However, in this connection, it should be noted that when assigning Packing Groups to specific materials, the UN Committee of Experts may deviate from these general criteria on the basis of actual transportation experience. This general philosophy of like packaging for materials of similar hazard has not been applied consistently in existing DOT's regulations. Numerous instances exist where the packaging for two materials of virtually identical hazard is different, as is the case of ethyl mercaptan and butyl mercaptan. This may result in the shipper being forced to use a less desirable (from the point of view of user preference rather than from inherent safety) packaging, or alternatively, requesting a DOT exemption.

A second, and somewhat related general principle, is incorporated into the proposed non-bulk packing methods. This general principle is that any packing which is considered suitable for the transport of a hazardous material by virtue of the hazards and physical properties of the material should be authorized for the material. This principle also has not been consistently applied in the existing DOT regulations. For example, a fiberboard box with glass or earthenware inner receptacles may be authorized for a particular material whereas a wooden box with glass or earthenware inner receptacles is not. Such omissions cannot be justified on the grounds of safety and are most often the result of the piecemeal fashion in which the regulations have evolved. In general, the packagings authorized in the regulations reflect what industry is currently using. However, as industry practice changes and packaging technology advances, the types of packagings suitable to transport hazardous materials have not been updated appropriately. MTB believes that authorizing all types of packaging

suitable for the transport of particular hazardous materials will vastly increase the flexibility of industry to utilize the most desirable packaging available while, at the same time, eliminating the burden of exemptions on both industry and MTB without adversely affecting safety.

With the exception of transportation by aircraft, the maximum capacities of inner receptacles of combination packagings will no longer be specified. MTB believes that the size of the inner receptacle should no longer be controlling factor since the entire non-bulk packaging will have to pass the prescribed performance tests. For transportation by aircraft, certain combination packagings would not be authorized and limitations would be prescribed for the capacities of inner receptacles. This would ensure the maximum possible consistency with the corresponding provisions in the ICAO Technical Instructions.

The following is a description of the five no-bulk Packing Methods found in § 173.119. Paragraph (a) of § 173.119 provides packagings authorized for the general class of flammable liquids corresponding to UN Packing Group I. Packages identified in this paragraph must meet Packing Group I performance tests—the most severe.

Paragraph (b) of § 173.119 is also for flammable liquids which fall under UN Packing Group I, but, because of certain incompatibilities or differences in quantities allowed aboard aircraft, they are not included in the general category (173.119(a)) and instead are treated separately. This paragraph contains a table of authorized packagings suitable for particular hazardous materials which are identified by their UN or NA identification number.

Paragraph (c) of § 173.119 like § 173.119(a) is a generalized category of flammable liquids, but in this instance they are less volatile and fall under Packing Group II. The packages for this group of materials need only meet Packing Group II performance tests.

As paragraph (c) of § 173.119 corresponds to § 173.119(a), for Group II materials, so paragraph (d) of § 173.119 corresponds to § 173.119(b), for Group II materials. In other words, § 173.119(d) is for flammable liquids falling under Packing Group II which have specific requirements or restrictions either in the material or design of the packaging, or the quantity allowed aboard aircraft. As in § 173.119(b), § 173.119(d) contains a list of suitable packagings in tabular form with the hazardous materials identified by their identification numbers.

Paragraph (e) of § 173.119 is for flammable liquids even less volatile than the two preceding categories, and classified in the UN system as falling under Packing Group III. There are no special requirements for this group of materials, so they are all able to be accommodated within a single paragraph. Packages specified in this paragraph need only pass the Packing Group III performance test requirements. This paragraph contains several provisions not found in the four preceding paragraphs. The first, in § 173.119(e)(3), provides for the use of maximum net quantity limits per package allowed on aircraft by the ICAO Technical Instructions, provided that packagings tested and marked as meeting Packing Group III performance standards are utilized. Should a shipper elect not to use Packing Group II performance tested packagings, the current DOT exception from specification packaging for materials with a flash point above 23°C (73°F) would be retained and appear in § 173.119(e)(4). However, in such cases the maximum net quantity of 4 liters per packing allowed aboard passenger carrying aircraft, as provided in the existing DOT regulations, would still apply.

Following the five paragraphs on non-bulk packaging (§ 173.119 (a) through (e)) is a single paragraph (§ 173.119(f)) consolidating the general bulk packaging requirements for flammable liquids. Paragraph § 173.119(f) is divided into four subparagraphs covering: (1) Tank cars, (2) cargo tanks, (3) intermodal portable tanks and (4) portable tanks other than intermodal. The remainder of § 173.119 consists of thirteen paragraphs (§ 173.119(g) through (s)) each covering the bulk packaging requirements of either a single material or a class of materials with similar properties (for example the mercaptans). The non-bulk packaging requirements of these thirteen materials or classes are sufficiently non-specific so that they may be covered by the general non-bulk packing methods found in paragraph § 173.119 (a) through (e), but their requirements for bulk shipments are sufficiently unique to require the separate bulk packaging paragraphs.

The remainder of the proposed Part 173 consists of § 173.120 through § 173.129 with each section devoted to particular materials. This is necessary because the unique nature of the material (such as automobiles) or particular hazardous properties (such as ethylene oxide) make it impossible to cover either their bulk or non-bulk shipping requirements under the general paragraphs in § 173.119. However, two

of these sections (§ 173.128 covering mercaptans and § 173.129 covering methyl vinyl ketone) only contain packaging exceptions, and thus general packaging methods would apply.

The rearrangement of the bulk packaging requirements would provide an opportunity for the transfer of operational and maintenance requirements for specific packagings from sections covering individual materials into sections covering operation and maintenance (§§ 173.31, 173.32 and 173.33) where they belong; for example, the dome placard requirements now contained in § 173.119(h) could be moved to § 173.31. This would remove many redundant entries. Although these changes do not appear in this ANPRM they could be included in a future notice if this project proceeds to that stage.

Viewed in its entirety, this ANPRM, proposes: (1) A revised Hazardous Materials Table (§ 172.101) for the "Flammable liquid" hazard class; (2) revised shipper requirements for flammable liquids (Part 173); (3) a new Subpart L to Part 178 containing performance-oriented non-bulk packaging standards based on the UN Recommendations; and, (4) a new Subpart M to Part 178 containing the required performance tests for the packagings specified in Subpart L. For example, column 5(b) of the proposed Hazardous Materials Table refers shippers of flammable liquids to either § 173.119 or to one of the sections in Part 173 dealing with particular flammable liquids. The non-bulk packaging requirements of the vast majority of flammable liquids would be covered by one of the five paragraphs in § 173.119 ((a) or (b) for Group I materials, (c) or (d) for Group II materials, and (e) for Group III materials) while the bulk requirements would be covered in § 173.119(f). The marking requirements and construction standards for the non-bulk packagings referred to in Part 173 are presented in Subpart L of Part 178 (§§ 178.500 through 178.525), and the performance tests that those packagings must meet are given in Subpart M of Part 178 (§§ 178.600 through 178.608).

If the concept set forth in this ANPRM is adopted as a final rule, this proposal would eventually eliminate the following 93 DOT specification packagings: Carboys, jugs in tubs, and rubber drums:

1A, 1D, 1X, 1EX, 1H, 1K, 35, 1M, 34; Inside containers, and linings: 2T, 2C, 2D, 2U, 2E, 2F, 2G, 2TL, 2J, 2K, 2L, 2M, 2N, 2R, 2S, 2SL; Metal barrels, drums, kegs, cases, trunks, and boxes: 5, 5A, 5B, 5C, 5K, 5L, 5M, 5P, 6B, 6C, 6J, 6D, 42B, 42D, 17C, 17E, 17F, 17H, 37K, 37A, 37B, 37P,

37M, 37C, 37D, 13A, 32A, 32B, 32C, 32D, 33A; Wooden barrels, kegs, boxes, kits, and drums: 10B, 14, 15A, 15B, 15C, 15D, 15E, 15X, 15P, 16A, 16B, 16D, 19A, 19B, 18B, 22A, 22B, 22C; Fiberboard boxes, drums, and mailing tubes: 12B, 12C, 12D, 12E, 12A, 12P, 12R, 21C, 21P, 29; and Bags, cloth, burlap, paper or plastic: 36A, 36B, 36C, 44B, 44C, 44D, 44E, 45B, 44P. In addition, MTB estimates that more than 300 pages of text in the Code of Federal Regulations would be eliminated.

It is important to emphasize that the proposed shift to performance-oriented non-bulk packagings does not represent a total change in philosophy from the standards imposed under existing DOT specifications. Although termed "specifications" and heavily oriented toward detailed construction requirements, most of the current DOT packaging standards are, in reality, a combination of construction specifications and performance standards. Many, and perhaps most, of the existing DOT specification non-bulk packagings would successfully pass the performance tests prescribed in this notice and could be marked with the appropriate proposed markings. Therefore, although the required markings on non-bulk packagings would change after a suitable transition period, existing types and designs of packagings could continue to be manufactured and used in the future if considered desirable.

#### Transition

In order to facilitate changeover from the present DOT specification system to the UN performance-oriented system, a transition period would be specified to allow packaging manufacturers to design, retool, and begin production of the new non-bulk packagings, and to allow packaging manufacturers and shippers to exhaust their existing stock. MTB solicits comments on the length of the transition period which would begin after issuance of a final rule and continue until only performance-oriented non-bulk packagings are permitted.

MTB envisions that, upon publication of a final rule, the DOT packaging specifications listed above would no longer appear in Title 49 even though their new construction and continued use would be authorized throughout the transition period. The performance-oriented non-bulk packaging standards would replace the existing packaging specifications in the CFR.

Likewise, the revised Part 173 would replace the existing shipper requirements. With fewer packagings authorized, Part 173 would also undergo

a significant reduction in the number of pages of the HMR. However, more important than the size of the reduction of the regulations is the fact that with a reduction of a number of authorized non-bulk packagings the shipper requirements will be greatly simplified. This should not only ease the burden on the regulated public in complying with the regulations, it should also reduce the burden on government through an expected decrease in the number of requests for interpretation and exemption received annually.

#### Industry contribution

The development of this proposed format for the presentation of packaging requirements in Part 173 benefitted greatly from the assistance rendered by a group of industry packaging experts working under the joint auspices of the Chemical Packaging Committee (CPC) of the Packaging Institute and the Chemical Manufacturers Association (CMA). This group developed a series of sample formats for the presentation of the packaging requirements in Part 173 which proved to be of considerable assistance to MTB in the preparation of this ANPRM. Although the format suggested in this document is a compilation of views expressed by both industry and government and intended to be responsive to the needs of both, the views presented by the joint CPC/CMA group were invaluable to MTB. The interest, dedication and foresightedness of this group is clearly recognized and very much appreciated by MTB.

#### Proposed revisions

In order that interested parties may better understand this proposal and have methodology on which to comment, the ANPRM contains, as a demonstration, the following proposed changes to the HMR:

Section 171.8 would be revised by adding definitions for "bulk" and "non-bulk" packagings.

In § 171.12, paragraph (c) would be revised to provide that hazardous materials being imported into, exported from, or transiting the U.S. may be transported in packagings tested and marked in compliance with the UN Recommendations or equivalent national international regulations of countries outside the U.S., provided the package is otherwise offered, accepted and transported in accordance with the DOT regulations. This means, for example, that a steel drum (1A1) tested and marked in compliance with the UN Recommendations or equivalent international (e.g., IMCO, ICAO, RID, ADR) or national regulations under the

conditions established by the Competent Authority of a foreign country, could be used in the transportation of an import, export, or transiting shipment in the U.S., provided a 1A1 steel drum is authorized in Part 173 for the transport of the particular hazardous material and the shipment is otherwise handled in accordance with the HMR.

The Hazardous Materials Table in § 172.101 would be extracted and amended for the hazard class "Flammable liquid" to reflect performance-oriented non-bulk packaging standards based on the UN Recommendations and revised bulk shipping requirements.

Subpart A (General) of Part 173 is not included for purposes of this demonstration. However, it is anticipated that in the event this ANPRM leads to a Notice of Proposed Rulemaking (NPRM), § 173.6 of Subpart A (Shipment by Air) would be revised to reflect the latest requirements of ICAO.

Subpart B (Preparation of Hazardous Materials for Transportation) of Part 173 would be amended to reflect general requirements in accordance with those contained in Chapter 9 of the UN Recommendations appropriate as shipper responsibilities, and to reflect specific packaging requirements for the flammable liquid hazard class of hazardous materials based on the performance-oriented packaging standards contained in the UN Recommendations and on the Packing Group for the specific materials.

Subpart D (Flammable, Combustible and Pyrophoric Liquids; Definitions and Preparation) of Part 173 would be amended, as a demonstration in this ANPRM, to reflect the packaging requirements and performance-oriented non-bulk packaging standards of the UN Recommendations.

A new Subpart L would be added to Part 178 contained definitions, markings, general packaging requirements and packaging standards for non-bulk packagings based on the U.N. Recommendations.

A new Subpart M would be added to Part 178 containing the performance tests prescribed for the packagings given in Subpart L.

MTB for the purpose of this ANPRM, proposes to amend Part 178 to include both the performance-oriented packaging standards and the required tests for packagings associated with those standards contained in Chapter 9 of the UN Recommendations.

#### List of Subjects

49 CFR Part 171—Hazardous materials transportation, Imports.



49 CFR Part 172—Hazardous materials transportation, Packaging and containers.

49 CFR Part 173—Hazardous materials transportation, Packaging and containers.

49 CFR Part 178—Hazardous materials transportation, Packaging and containers.

## PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

1. Section 171.8 would be amended by adding the following definitions in their proper alphabetical sequence:

### § 171.81 Definitions and abbreviations.

"Bulk packaging" means a packaging, including a transport vehicle, (1) having an internal volume greater than 450 liters as a containment unit for a liquid, (2) having a capacity greater than 400 kilograms as a containment unit for a solid, or (3) having a water capacity greater than 455 kilograms as a containment unit for a compressed gas.

"Non-bulk packaging" means a packaging (1) having an internal volume of 450 liters or less as a containment unit for a liquid, or (2) having a capacity of 400 kilograms or less as a containment unit for a solid.

2. In § 171.12, paragraph (c) would be revised to read as follows:

### § 171.12 Import and export shipments.

(c) The requirements of § 171.2 with respect to the manufacture, fabrication, marking or reconditioning of packagings notwithstanding, a nonbulk package of hazardous materials, other than a compressed gas cylinder, 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 the packaging identification markings required by Part 178 are, except as provided in this section, durably and clearly displayed and the package is otherwise offered, accepted

and transported in accordance with this subchapter.

(1) The letters "USA" required to be applied by § 178.504(a)(7) may be replaced by the letters designating the Competent Authority, as defined in § 107.3 of this chapter, of a foreign country (as indicated by the distinguishing sign of that country for motor vehicles in international traffic), who authorized application of the markings pursuant to the UN Recommendations, or equivalent national or international regulations.

(2) The name and address or symbol of the person marking the packaging as required by § 178.504(a)(8) may be replaced by other identification on the packaging as prescribed by the Competent Authority referred to in paragraph (c)(1) of this section.

## PART 172—HAZARDOUS MATERIALS TABLES AND HAZARDOUS MATERIALS COMMUNICATION REGULATIONS

3. In § 172.101, the Hazardous Materials Table would be revised to read as follows:

### § 172.101 Hazardous materials table

(1)	(2)	(3)	(3A)	(4)	(5)		(6)		(7)		
					Packaging		Maximum net quantity in one package		Water shipments		
					Excep-tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo vessel	Passenger vessel	Other requirements
+ EAW	Hazardous materials descriptions and proper shipping names	Hazard class	Identifica-tion No.	Label(s) required (if not excepted)	(a)	(b)	(a)	(b)	(a)	(b)	(c)
E	Acetal .....	Flammable liquid.	UN1088 .....	Flammable liquid.	173.118	173.119(c),(f)	5L .....	60L .....	1,3	4	
	Acetaldehyde ([ethyl aldehyde]) ([RQ-1000/454]).	Flammable liquid.	UN1089 .....	Flammable liquid.	None	173.119(b),(f)	Forbidden .....	30L .....	1,3	5	
	Acetone .....	Flammable liquid.	UN1090 .....	Flammable liquid.	173.118	173.119(c),(f)	5L .....	60L .....	1,3	4	
	Acetone oil .....	Flammable liquid.	UN1091 .....	Flammable liquid.	173.118	173.119(c),(f)	5L .....	60L .....	1,2	1	
E	Acetonitrile .....	Flammable liquid.	NA1648 .....	Flammable liquid.	173.118	173.119(c),(f)	1L .....	60L .....	1	4	Shade from radiant heat.
	Acetyl chloride ([RQ-5000/2270]).	Flammable liquid.	UN1717 .....	Flammable liquid.	173.244	173.119(d),(s)	1L .....	5L .....	1	1	Stow away from alcohols. Keep cool and dry. Separate longitudinally by an intervening complete compartment or hold from explosives.*
E	Acrolein, inhibited ([RQ-1/0.454]).	Flammable liquid.	UN1092 .....	Flammable liquid and Poison.	None	173.119(b),(h)	Forbidden .....	30L .....	1,2	5	Keep cool. Stow away from quarters.
E	Acrylonitrile ([RQ-100/45.4]).	Flammable liquid.	UN1093 .....	Flammable liquid and Poison.	None	173.119(a),(f)	Forbidden .....	30L .....	1,2	5	Keep cool.
E	Alcoholic beverage .....	Flammable liquid.	UN1170 .....	Flammable liquid.	173.118	173.119(c),(f)	5L .....	60L .....	1,2	1	
	Alcohol, n.o.s. ....	Flammable liquid.	UN1987 .....	Flammable liquid.	173.118	173.119(c),(f)	5L .....	60L .....	1,2	1	
	Allyl alcohol ([RQ-100/45.4]).	Flammable liquid.	UN1098 .....	Flammable liquid and Poison.	None	173.119(a),(f)	Forbidden .....	30L .....	1,2	1	
	Allyl bromide .....	Flammable liquid.	UN1099 .....	Flammable liquid.	173.118	173.119(a),(f)	Forbidden .....	30L .....	1,2	1	
E	Allyl chloride ([RQ-1000/454]).	Flammable liquid.	UN1100 .....	Flammable liquid.	None	173.119(a),(f)	Forbidden .....	30L .....	1,3	5	
E	Allyl chlorocarbonate .....	Flammable liquid.	UN1722 .....	Flammable liquid.	None	173.119(a)	Forbidden .....	2.5L .....	1	5	Keep dry. Separate longitudinally by an intervening complete hold on compartment from explosives. Segregation same as for corrosive materials.
	Ammonium sulfide solution ([RQ-5000/2270]).	Flammable liquid.	UN2683 .....	Flammable liquid.	173.118	173.119(c),(f)	1L .....	30L .....	1,2	1,2	

(1) + EAW	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(3A) Identification No.	(4) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					Excep- tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo ves- sel	Pas- senger vessel	Other requirements
					(a)	(b)	(a)	(b)	(a)	(b)	(c)
E	Amyl Acetate ([RQ-1000/454]).	Flammable liquid.	UN1104	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1,2	
	Amylamine	Flammable liquid.	UN1106	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Amyl chloride	Flammable liquid.	UN1107	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Amylene, [normal]	Flammable liquid.	UN1108	Flammable liquid.	173.118	173.119(a),(f)	1L	30L	1,3	1,3	
	Amyl formate	Flammable liquid.	UN1109	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Amyl mercaptan	Flammable liquid.	UN1111	Flammable liquid.	173.128	173.119(d),(q)	5L	60L	1,2	1	
	Amyl nitrite	Flammable liquid.	UN1113	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,3	4	
	Antifreeze compound, liquid	Flammable liquid.	NA1142	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Antifreeze preparation, liquid	Flammable liquid.	NA1142	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Aresenical pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2760	Flammable liquid.	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Asphalt, cut back	Flammable liquid.	NA1999	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Benzene ([benzol]) ([RQ-1000/454]).	Flammable liquid.	UN1114	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Benzine	Flammable liquid.	UN1115	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Benzoic derivative pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2770	Flammable liquid.	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Bipyridilium pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2782	Flammable liquid.	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Box toe gum	Flammable liquid.	UN2059	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Butyl acetate ([RQ-5000/2270]).	Flammable liquid.	UN1123	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Butyl alcohol	Flammable liquid.	NA1120	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Butylamine ([RQ-100/454]).	Flammable liquid.	UN1125	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Butyl bromide, [normal]	Flammable liquid.	UN1126	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Butyl chloride	Flammable liquid.	UN1127	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Butyl ether	Flammable liquid.	UN1149	Flammable liquid.	173.118	173.119(c),(f)	60L	220L	1,2	1,2	
	Butyl formate	Flammable liquid.	UN1128	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	n-Butyl isocyanate	Flammable liquid.	UN2485	Flammable liquid and Poison.	None	173.119(d),(f)	1L	60L	1,2	1	
	Butyl mercaptan	Flammable liquid.	UN2347	Flammable liquid.	173.128	173.119(d),(q)	5L	60L	1,3	5	
	Butyraldehyde	Flammable liquid.	UN1129	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Carbamate pesticide, liquid n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2758	Flammable liquid.	173.118	173.119(c),(f)	1L	60L	1,2	1	
E	Carbon bisulfide, [or] Carbon disulfide ([RQ-5000/2270]).	Flammable liquid.	UN1131	Flammable liquid.	None	173.119(a),(g)	Forbidden	Forbidden	1	5	Keep cool. Not permitted on any vessel transporting explosives.
	Carbon remover, liquid	Flammable liquid.	UN1132	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cement, container, inoleum, tile, [or] wallboard, liquid.	Flammable liquid.	NA1133	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cement, leather	Flammable liquid.	NA1133	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cement, liquid, n.o.s.	Flammable liquid.	NA1133	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cement, pyroxylin	Flammable liquid.	NA1133	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cement, roofing, liquid	Flammable liquid.	NA1133	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cement, rubber	Flammable liquid.	NA1133	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Chlordane, liquid ([RQ1/0.454]).	Flammable liquid.	NA2762	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Chlorobenzene ([RQ-100/45.4]).	Flammable liquid.	UN1134	Flammable liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1,2	
	Chloroprene, inhibited	Flammable liquid.	UN1991	Flammable liquid.	173.118	173.119(c),(f)	Forbidden	30L	1,2	1	
	2-Chloropropene	Flammable liquid.	UN2456	Flammable liquid.	None	173.119(b),(f)	Forbidden	30L	1,2	5	
	Cigarette lighter ([or other similar ignition device]).	Flammable liquid.	UN1226	Flammable liquid.	173.21 175.10	173.118(c),(f)	Forbidden	Forbidden	1	1	



(1)	(2)	(3)	(3A)	(4)	(5)		(6)		(7)		
					Packaging		Maximum net quantity in one package		Water shipments		
					Excep- tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo ves- sel	Pass- enger vessel	Other requirements
	Hazardous materials descriptions and proper shipping names	Hazard class	Identifica- tion No.	Label(s) required (if not excepted)	(a)	(b)	(a)	(b)	(a)	(b)	(c)
+EAW	Coal tar distillate.....	Flammable liquid.	UN1136	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Coal tar light oil.....	Flammable liquid.	NA1136	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Coal tar naptha.....	Flammable liquid.	NA2553	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Coal tar oil.....	Flammable liquid.	NA1136	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1,2	
	Coating solution.....	Flammable liquid.	UN1139	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Collodion.....	Flammable liquid.	NA2059	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Cologne spirits (alcohol).....	Flammable liquid.	NA1170	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Columbian spirits (wood alcohol).....	Flammable liquid.	NA1230	Flammable liquid...	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Compound, cleaning, liquid.....	Flammable liquid.	NA1993	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Compound, enamel.....	Flammable liquid.	NA1263	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Compound, lacquer, paint, (or) varnish, removing, reducing, (or) thinning, liquid.....	Flammable liquid.	NA1142	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Compound, polishing, liquid.....	Flammable liquid.	NA1142	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Compound, tree (or) weed killing, liquid.....	Flammable liquid.	NA1993	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Compound, vulcanizing, liquid.....	Flammable liquid.	NA1142	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Copper, based pesticide, liquid, n.o.s. (compounds and preparations).....	Flammable liquid.	UN2778	Flammable liquid...	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Cosmetics, n.o.s.....	Flammable liquid.	NA1993	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	E Crotonaldehyde (IRQ100/45.41).....	Flammable liquid.	UN1143	Flammable liquid and Poison..	None	173.119(c),(f)	5L	60L	1,2	1	
	E Crotonylene.....	Flammable liquid.	UN1144	Flammable liquid...	173.118	173.119(c),(f)	1L	30L	1,3	4	
	Crude oil, petroleum.....	Flammable liquid.	UN1267	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Cyclohexane (IRQ-1000/454).....	Flammable liquid.	UN1145	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,3	4	
	Cyclohexylamine.....	Flammable liquid.	UN2357	Flammable liquid...	173.118	173.119(c),(f)	1L	30L	1,2	1	
E	Cyclopentane.....	Flammable liquid.	UN1146	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,3	4	
	Cyclopentane, methyl.....	Flammable liquid.	UN2298	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,3	4	
E	Denatured alcohol.....	Flammable liquid.	NA1986	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Diacetone alcohol.....	Flammable liquid.	UN1148	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Dacetyl.....	Flammable liquid.	UN2346	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Dichlorobutene.....	Flammable liquid.	NA2924	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Dichlorethylene.....	Flammable liquid.	UN1150	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Dichloropentane.....	Flammable liquid.	UN1152	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1,2	
E	Dichloropropene (IRQ-5000/2270).....	Flammable liquid.	UN2047	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Dichloropropene and propylene dichloride mixture.....	Flammable liquid.	NA2047	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Diethylamine (IRQ-1000/454).....	Flammable liquid.	UN1154	Flammable liquid...	173.118	173.119(d),(f)	Forbidden	60L	1,3	4	
	Diethyl dichlorosilane.....	Flammable liquid.	UN1767	Flammable liquid...	None	173.119(c),(k)	Forbidden	30L	1	1	Keep dry. Segregation same as for corrosives.
E	Diethyl ketone.....	Flammable liquid.	UN1156	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Dihydropyran.....	Flammable liquid.	UN2376	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	4	
E	Diisopropylamine.....	Flammable liquid.	UN1158	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Diisopropyl ether.....	Flammable liquid.	UN1159	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,3	4	
E	Dimethylamine, aqueous solution (IRQ-1000/454).....	Flammable liquid.	UN1160	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	2,3-Dimethylbutane.....	Flammable liquid.	UN2457	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,3	4	
E	Dimethyl carbonate.....	Flammable liquid.	UN1161	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	
	1,4-Dimethylcyclohexane.....	Flammable liquid.	UN2263	Flammable liquid...	173.118	173.119(c),(f)	5L	60L	1,2	1	

(1)	(2)	(3)	(3A)	(4)	(5)		(6)		(7)		
					Packaging		Maximum net quantity in one package		Water shipments		
					Excep- tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo ves- sel	Pass- enger vessel	Other requirements
+ EAW	Hazardous materials descriptions and proper shipping names	Hazard class	Identifica- tion No.	Label(s) required (if not excepted)	(a)	(b)	(a)	(b)	(a)	(b)	(c)
	Dimethyldichlorosilane .....	Flammable liquid.	UN1162 .....	Flammable liquid...	None	173.119(c),(k) ...	Forbidden .....	2.5L .....	1,2	1	Keep dry. Separate from corrosive and oxidizing materials, and organic peroxides.
	Dimethylhydrazine, unsym- metrical (UDMH) .....	Flammable liquid.	UN1163 .....	Flammable liquid and Poison.	None	173.119(b),(n) ...	Forbidden .....	2.5L .....	1,2	1	
	Dimethyl sulfide .....	Flammable liquid.	UN1164 .....	Flammable liquid...	None	173.119(a),(f) ...	Forbidden .....	30L .....	1,2	5	
	Dioxane .....	Flammable liquid.	UN1165 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Dioxolane .....	Flammable liquid.	UN1166 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Diisocyanate pesticide, liquid, n.o.s. ([compounds and preparations]) .....	Flammable liquid.	UN2772 .....	Flammable liquid...	173.118	173.119(c),(f) ...	1L .....	60L .....	1,2	1	
	Divinyl ether .....	Flammable liquid.	UN1167 .....	Flammable liquid...	None	173.119(d),(f) ...	Forbidden .....	60L .....	1,3	5	
	Dressing, leather .....	Flammable liquid.	NA1142 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Drugs, n.o.s. .....	Flammable liquid.	NA1993 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
E	Epichlorohydrin ([RQ-1000/454]) .....	Flammable liquid.	UN2023 .....	Flammable liquid...	173.118	173.119(e),(f) ...	5L .....	60L .....	1,2	1,2	
	Eradicator, paint [or] grease, liquid.	Flammable liquid.	UN1850 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl acetate .....	Flammable liquid.	UN1173 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl acrylate, inhibited .....	Flammable liquid.	UN1917 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl alcohol .....	Flammable liquid.	UN1170 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
E	Ethyl benzene ([RQ-1000/454]) .....	Flammable liquid.	UN1175 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl borate .....	Flammable liquid.	UN1176 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	Keep dry.
	Ethyl butyl ether .....	Flammable liquid.	UN1179 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl butyraldehyde .....	Flammable liquid.	UN1178 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl butyrate .....	Flammable liquid.	UN1180 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1,2	
	Ethyl chloride .....	Flammable liquid.	UN1037 .....	Flammable liquid...	None	173.123 .....	Forbidden .....	See 173.123 .....	1,2	1	Segregation same as for flammable gases.
	Ethyl chloroformate ([chloro-carbonate]) .....	Flammable liquid.	UN1182 .....	Flammable liquid and Poison.	None	173.119(b),(r) ...	Forbidden .....	2.5L .....	1,2	1	
	Ethyl crotonate .....	Flammable liquid.	UN1862 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl dichlorosilane .....	Flammable liquid.	UN1183 .....	Flammable liquid...	None	173.119(a),(k) ...	Forbidden .....	1L .....	1,2	1	
E	Ethylene dichloride ([5000/2270]) .....	Flammable liquid.	UN1184 .....	Flammable liquid...	173.118	173.119(c),(f) ...	1L .....	60L .....	1,2	1	
	Ethylene imine, inhibited .....	Flammable liquid.	UN1185 .....	Flammable liquid...	None	173.119(b),(f) ...	Forbidden .....	Forbidden .....	1,2	1	
	Ethylene oxide .....	Flammable liquid.	UN1040 .....	Flammable liquid...	None	173.124 .....	Forbidden .....	Forbidden .....	1,2	1	Segregation same as for flammable gases.
	Ethyl ether .....	Flammable liquid.	UN1155 .....	Flammable liquid...	None	173.119(a),(f) ...	Forbidden .....	30L .....	1,3	5	
	Ethyl formate .....	Flammable liquid.	UN1190 .....	Flammable liquid...	173.118	173.119(c),(f) ...	5L .....	60L .....	1,3	4	
	Ethyl mercaptan .....	Flammable liquid.	UN2363 .....	Flammable liquid...	173.128	173.119(c),(q) ...	Forbidden .....	60L .....	1,2	1	
	Ethyl methyl ether .....	Flammable liquid.	UN1039 .....	Flammable Liquid.	None	173.119(a),(f) ...	Forbidden .....	30L .....	1,3	1	Segregation same as for flammable gases.
	Ethyl methyl ketone .....	Flammable liquid.	UN1193.118 .....	Flammable Liquid.	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl nitrate ([nitric ether]) .....	Flammable liquid.	NA1993 .....	Flammable Liquid.	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl nitrite (nitrous ether) .....	Flammable liquid.	UN1194 .....	Flammable Liquid.	None	173.119(a),(f) ...	Forbidden .....	Forbidden .....	1,3	5	
	Ethyl propionate .....	Flammable liquid.	UN1195 .....	Flammable Liquid.	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Ethyl trichlorosilane .....	Flammable liquid.	UN1196 .....	Flammable Liquid.	None	173.119(b),(k) ...	Forbidden .....	2.5L .....	1,2	1	
	Extract, liquid, flavoring .....	Flammable liquid.	UN1197 .....	Flammable Liquid.	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	
	Flammable liquid, corrosive, n.o.s. (boiling point 35°C or less) .....	Flammable liquid.	UN2924 .....	Flammable Liquid and Corrosive.	None	173.119(a),(f) ...	0.5L .....	2.5L .....	1,2	1	
	Flammable liquid, n.o.s. (boiling point 35°C or less) .....	Flammable liquid.	UN1993 .....	Flammable Liquid.	None	173.119(a),(f) ...	1L .....	30L .....	1,2	1	
	Flammable liquid, poisonous, n.o.s. (boiling point 35°C or less) .....	Flammable liquid.	UN1992 .....	Flammable Liquid and Poison.	None	173.119(a),(f) ...	Forbidden .....	30L .....	1,2	1	
	Fuel, aviation, turbine engine .....	Flammable liquid.	UN1863 .....	Flammable Liquid.	173.118	173.119(c),(f) ...	5L .....	60L .....	1,2	1	

(1) + EAW	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(3A) Identifica- tion No.	(4) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					Excep- tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo ves- sel	Pas- senger vessel	Other requirements
					(a)	(b)	(a)	(b)	(a)	(b)	(c)
	Furan.....	Flammable liquid.	UN2389.....	Flammable Liquid.	173.118	173.119(a),(f)	1L.....	30L.....	1,2	1	
	Gas drips, hydrocarbon.....	Flammable liquid.	UN1864.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Gasoline (including ca- singhead and natural).	Flammable liquid.	UN1203.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	4	
	Heater for refrigerator car, liquid fuel type (contain- ing fuel).	Flammable liquid.	NA1993.....	Flammable Liquid.	173.120		Forbidden.....	Forbidden.....	1,2	1	
	Heptane.....	Flammable liquid.	UN1206.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Hexadiene.....	Flammable liquid.	UN2458.....	Flammable Liquid.	None	173.119(c),(f)	Forbidden.....	60L.....	1,2	5	
	Hexaldehyde.....	Flammable liquid.	UN1207.....	Flammable Liquid.	173.118	173.119(c),(f)	60L.....	220L.....	1,2	1,2	
	Hexane.....	Flammable liquid.	UN1208.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,3	4	
	Hydrazine, anhydrous.....	Flammable liquid.	UN2029.....	Flammable Liquid.	None	173.121	Forbidden.....	2.5L.....	1	5	Segregation same as for corrosives.
	Ink.....	Flammable liquid.	UN1210.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Insecticide, liquid, n.o.s.....	Flammable liquid.	NA1993.....	Flammable Liquid.	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Isobutyl acetate (RQ-5000/ 22701).	Flammable liquid.	UN1213.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Isobutylamine (RQ-1000/ 4541).	Flammable liquid.	UN1214.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Isooctene.....	Flammable liquid.	UN1262.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Isocetene.....	Flammable liquid.	UN1216.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,3	4	
	Isopentane.....	Flammable liquid.	UN1265.....	Flammable Liquid.	173.118	173.119(a),(f)	Forbidden.....	30L.....	1,3	4	
	Isoprene (RQ-1000/4541).....	Flammable liquid.	UN1218.....	Flammable Liquid.	173.118	173.119(a),(f)	Forbidden.....	30L.....	1,3	4	
	Isopropanol.....	Flammable liquid.	UN1219.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Isopropyl acetate.....	Flammable liquid.	UN1220.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Isopropylamine.....	Flammable liquid.	UN1221.....	Flammable Liquid.	None	173.119(a),(f)	Forbidden.....	30L.....	1,3	5	
	Isopropyl mercaptan.....	Flammable liquid.	UN2703.....	Flammable Liquid.	173.128	173.119(c),(q)	5L.....	60L.....	1,3	5	
	Isopropyl nitrate.....	Flammable liquid.	UN1222.....	Flammable Liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Lacquer base [or] Lacquer chips, plastic (wet with alcohol or solvent).	Flammable liquid.	UN1263.....	Flammable liquid.	173.118	173.119(c),(p)	5L.....	60L.....	1,2	1	
	Leather bleach [or] dress- ing.	Flammable liquid.	NA1142.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Lighter fluid.....	Flammable liquid.	UN1226.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Lithium aluminum hydride, etheral.	Flammable liquid.	UN1411.....	Flammable liquid.	None	173.119(c)	Forbidden.....	1L.....	1	5	Segregation same as for flammable solids labeled Dangerous When Wet.
	Medicines, n.o.s.....	Flammable liquid.	UN1851.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Mercaptan mixture, aliphatic.....	Flammable liquid.	NA1228.....	Flammable liquid.	173.128	173.119(d),(q)	Forbidden.....	60L.....	1,3	5	
	Mercury based pesticide, liquid n.o.s. (compounds and preparations).	Flammable liquid.	UN2778.....	Flammable liquid.	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Mesityl oxide.....	Flammable liquid.	UN1229.....	Flammable liquid.	None	173.119(c),(f)	5L.....	60L.....	1,2	1,2	
	Metal alkyl, solution, n.o.s.....	Flammable liquid.	NA8195.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Methyl acetate.....	Flammable liquid.	UN1231.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Methyl acetone.....	Flammable liquid.	UN1232.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Methyl acrylate, inhibited.....	Flammable liquid.	UN1919.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Methylal.....	Flammable liquid.	UN1234.....	Flammable liquid.	None	173.119(c),(f)	Forbidden.....	60L.....	1,3	5	
	Methyl alcohol.....	Flammable liquid.	UN1230.....	Flammable liquid.	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Methylamine, aqueous solu- tion (RQ-1000/4541).	Flammable liquid.	UN1235.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,3	4	Stow away from mercury and its compounds.
	Methylamyl acetate.....	Flammable liquid.	UN1233.....	Flammable liquid.	173.118	173.119(e),(f)	60L.....	220L.....	1,2	1,2	
	Methyl butene.....	Flammable liquid.	UN2460.....	Flammable liquid.	None	173.119(c),(f)	5L.....	60L.....	1,2	5	
	Methyl butyrate.....	Flammable liquid.	UN1237.....	Flammable liquid.	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Methyl chloroformate.....	Flammable liquid.	UN1238.....	Flammable liquid and Poison.	None	173.119(b),(f)	Forbidden.....	2.5L.....	1,2	1	

(1)	(2)	(3)	(3A)	(4)	(5)		(6)		(7)		
					Packaging		Maximum net quantity in one package		Water shipments		
					Excep- tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo ves- sel	Pass- enger vessel	Other requirements
+EAW	Hazardous materials descriptions and proper shipping names	Hazard class	Identifica- tion No.	Label(s) required (if not excepted)	(a)	(b)	(a)	(b)	(a)	(b)	(c)
	Methylchloromethyl ether, anhydrous.	Flammable liquid.	UN1239	Flammable liquid and Poison.	None	173.119(c)	Forbidden	Forbidden	1	5	Shade from radiant heat.
	Methylcyclohexane	Flammable liquid.	UN2296	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methylcyclopentane	Flammable liquid.	UN2296	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,3	4	
	Methyl dichlorosilane	Flammable liquid.	UN1242	Flammable liquid	None	173.119(a),(k)	Forbidden	1L	1,2	1	
	Methyl ethyl ketone	Flammable liquid.	UN1193	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methyl formate	Flammable liquid.	UN1243	Flammable liquid	173.118	173.119(a),(f)	Forbidden	30L	1,3	4	
	Methylfuran	Flammable liquid.	UN2301	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,3	4	
	Methylhydrazine	Flammable liquid.	UN1244	Flammable liquid and Poison.	None	173.119(b),(m)	Forbidden	2.5L	1,2	1	Stow separate from oxidizing materials and corrosives.
	Methyl isopropenyl ketone, inhibited.	Flammable liquid.	UN1248	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methyl magnesium bromide in ethyl ether [not over 40% concentration].	Flammable liquid.	UN1928	Flammable liquid	None	173.122	Forbidden	Forbidden	1	1	Segregation same as for flammable solids. Sepa- rate from flammable gases or liquids, oxidizing materials or organic per- oxides.
E	Methyl methacrylate mon- omer, inhibited ([RQ- 5000/2270]).	Flammable liquid.	UN 1247	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Methyl methacrylate mon- omer, uninhibited ([high- purity, if acceptable under 173.21 of this sub- chapter]) ([RQ-5000/ 2270]).	Flammable liquid.	NA1247	Flammable liquid	173.118	173.119(c),(f)	Forbidden	Forbidden	1,2	1	
	Methylpentadiene	Flammable liquid.	UN2461	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methyl pentane	Flammable liquid.	UN2462	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methyl propionate	Flammable liquid.	UN1248	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methyl propyl ketone	Flammable liquid.	UN1249	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Methyltrichlorosilane	Flammable liquid.	UN1250	Flammable liquid	None	173.119(b),(k)	Forbidden	2.5L	1,2	1	
	Methyl vinyl ketone, inhibited	Flammable liquid.	UN1251	Flammable liquid	173.129	173.119(c),(f)	5L	60L	1,2	1	
E	Monoethylamine ([RQ- 1000/454]).	Flammable liquid.	UN1036	Flammable liquid	None	173.119(a),(o)	Forbidden	62.5L	1,2	5	Segregation same as for flammable gas.
	Morpholine	Flammable liquid.	UN2054	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Morpholine, aqueous mixture.	Flammable liquid.	NA2054	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Mortar stain, liquid	Flammable liquid.	UN1263	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Motor fuel, n.o.s.	Flammable liquid.	NA1203	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Naphtha	Flammable liquid.	UN2553	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Naphtha distillate	Flammable liquid.	NA1268	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Naphtha, solvent	Flammable liquid.	UN1256	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Neohexane	Flammable liquid.	UN1208	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,3	4	
	Nickel carbonyl	Flammable liquid.	UN1259	Flammable liquid	None	173.126	Forbidden	Forbidden	1	5	Not permitted on a vessel carrying explosives, Shade from radiant heat. Segre- gation same as for flam- mable liquids.
	Nitrocellulose, colloided, granular [or] flake, wet with not less than 20% alcohol [or] block, wet with not less than 25% alcohol.	Flammable liquid.	NA2055	Flammable liquid	173.118	173.119(c),(p)	5L	60L	1,3	1	
	Nitrocellulose, wet with not less than 30% alcohol [or] solvent.	Flammable liquid.	NA2558	Flammable liquid	173.118	173.119(c),(p)	5L	60L	1,3	1	
	Nitromethane	Flammable liquid.	UN1261	Flammable liquid	173.118	173.119(e)	Forbidden	60L	1,2	1,2	
	Nitrostarch, wet with not less than 30% alcohol [or] solvent.	Flammable liquid.	NA1337	Flammable liquid	173.118	173.119(c),(p)	Forbidden	Forbidden	1,2	1	
	Octane	Flammable liquid.	UN1262	Flammable liquid	173.118	173.119(c),(f)	5L	60L	1,2	1	

(1) + EAW	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(3A) Identifica- tion No.	(4) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					Excep- tions	Specific requirements	Passenger carrying aircraft or railer	Cargo only aircraft	Cargo ves- sel	Pas- senger vessel	(c) Other requirements
					(a)	(b)	(a)	(b)	(a)	(b)	
	Oil, [described as oil], Oil, n.o.s., Petroleum oil, [or] petroleum oil, n.o.s.	Flammable liquid.	NA1270.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	Stow separate from combus- tible materials, explosives or acids.
	Organic peroxide, liquid [or] solution, n.o.s.	Flammable liquid.	NA1993.....	Flammable liquid...	None	173.119(c)	Forbidden.....	1L.....	1,2	5	
	Organochlorine pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2762.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Organophosphorus pesti- cide, liquid, n.o.s. ([com- pounds and preparations]).	Flammable liquid.	UN2784.....	Flammable liquid...	None	173.119(c),(f)	1L.....	60L.....	1,2	5	
	Organotin pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2787.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Paint drier, liquid.....	Flammable liquid.	UN1168.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	Segregation same as for flammable solids. Sepa- rate from flammable gases or liquids, oxidizing materials, or organic per- oxides.
	Paint, Enamel, Lacquer, Stain, Shellac [or] Var- nish; Aluminum, Bronze, Gold, Wood filler, liquid [or] Lacquer base, liquid.	Flammable liquid.	UN1263.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Paraldehyde.....	Flammable liquid.	UN1284.....	Flammable liquid...	173.118	173.119(e),(f)	60L.....	220L.....	1,2	1	
	Pentaborane.....	Flammable liquid.	UN1380.....	Flammable liquid and Poison.	None	173.127	Forbidden.....	Forbidden.....	1	5	
	Pentane.....	Flammable liquid.	UN1285.....	Flammable liquid...	173.118	173.119(a),(f)	Forbidden.....	30L.....	1,3	4	
	Petroleum distillate.....	Flammable liquid.	UN1266.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,3	4	
	Petroleum ether.....	Flammable liquid.	UN1271.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,3	4	
	Petroleum naphtha.....	Flammable liquid.	UN1255.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Phenoxy pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2766.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Phenylurea pesticide, liquid, n.o.s. ([compounds and preparations]).	Flammable liquid.	UN2768.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Phthalimide derivative pesti- cide, liquid, n.o.s. ([com- pounds and preparations]).	Flammable liquid.	UN2774.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	Shade from radiant heat Separate from flammable gases or liquids, oxidizing materials, or organic per- oxides.
	Pinene.....	Flammable liquid.	UN2368.....	Flammable liquid...	173.118	173.119(e),(f)	60L.....	220L.....	1,2	1	
	Plastic solvent, n.o.s.....	Flammable liquid.	NA1993.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Polish, metal, stove, furni- ture [or] wood, liquid.	Flammable liquid.	NA1142.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Propargyl alcohol.....	Flammable liquid.	NA1986.....	Flammable liquid and Poison.	None	173.119(c),(f)	Forbidden.....	30L.....	1,2	5	
	Propionaldehyde.....	Flammable liquid.	UN1275.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Propyl acetate.....	Flammable liquid.	UN1276.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Propyl alcohol.....	Flammable liquid.	UN1274.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1,2	
	Propylamine.....	Flammable liquid.	UN1277.....	Flammable liquid...	None	173.119(d),(f)	Forbidden.....	60L.....	1,3	5	
	Propyl chloride.....	Flammable liquid.	UN1278.....	Flammable liquid...	None	173.119(d),(f)	Forbidden.....	60L.....	1,3	5	
	Propylenediamine.....	Flammable liquid.	UN2258.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	30L.....	1,2	1	
	Propylene dichloride ([RQ- 5000/2270]).	Flammable liquid.	UN1279.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Propyleneimine, inhibited.....	Flammable liquid.	UN1921.....	Flammable liquid...	None	173.119(b)	Forbidden.....	30L.....	1,2	1	
E	Propylene oxide ([RQ- 5000/2270]).	Flammable liquid.	UN1280.....	Flammable liquid...	173.118	173.119(b),(f)	Forbidden.....	30L.....	1,3	4	
	Propyl formate.....	Flammable liquid.	UN1281.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	
	Propyl mercaptan.....	Flammable liquid.	UN2704.....	Flammable liquid...	173.128	173.119(c),(q)	5L.....	60L.....	1,2	5	
	Pyridine.....	Flammable liquid.	UN1282.....	Flammable liquid...	173.118	173.119(c),(f)	1L.....	60L.....	1,2	1	
	Pyrophoric liquid, n.o.s. [or] Pyrophoric liquid, n.o.s.	Flammable liquid.	UN2845.....	Flammable liquid...	None	173.122	Forbidden.....	Forbidden.....	1	5	
	Pyroxylin solution.....	Flammable liquid.	NA2059.....	Flammable liquid...	173.118	173.119(c),(f)	5L.....	60L.....	1,2	1	

(1)	(2)	(3)	(3A)	(4)	(5)		(6)		(7)		
					Packaging		Maximum net quantity in one package		Water shipments		
+EAW	Hazardous materials descriptions and proper shipping names	Hazard class	Identification No.	Label(s) required (if not excepted)	Excep-tions	Specific requirements	Passenger carrying aircraft or railcar	Cargo only aircraft	Cargo ves-sel	Passenger vessel	Other requirements
					(a)	(b)	(a)	(b)	(a)	(b)	(c)
	Pyroxylin solvent, n.o.s.	Flammable Liquid.	NA2059	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Pymoldine	Flammable Liquid.	UN1922	Flammable Liquid.	173.118	173.119(c),(f)	Forbidden	60L	1,2	1	
	Refrigerating machine	Flammable Liquid.	NA1993	Flammable Liquid.	173.125 173.306		No limit	No limit	1,2	1	
	Resin solution (resin compound, liquid)	Flammable Liquid.	UN1866	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Rum, denatured	Flammable Liquid.	NA1986	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Sodium methylate, alcohol mixture (IRQ-1000/454)	Flammable Liquid.	NA1289	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Solvent, n.o.s.	Flammable Liquid.	NA1993	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Spirits of nitroglycerin, (1 to 10%)	Flammable Liquid.	NA2410	Flammable Liquid.	None	173.119(d)	Forbidden	Forbidden	1,2	5	Segregation same as for explosives.
	Spirits of nitroglycerin, not exceeding 1% nitroglycerin by weight.	Flammable Liquid.	NA2410	Flammable Liquid.	173.118	173.119(d)	5L	60L	1,2	1	
E	Styrene monomer, inhibited (IRQ-1000/454)	Flammable Liquid.	UN2055	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1,2	
	Substituted nitrophenol pesticide, liquid, n.o.s. (compounds and preparations)	Flammable Liquid.	UN2760	Flammable Liquid.	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Tar, liquid	Flammable Liquid.	UN1999	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Tetrahydrofuran	Flammable Liquid.	UN2056	Flammable Liquid.	None	173.119(c),(f)	Forbidden	60L	1,3	5	
E	Toluene (Toluol) (IRQ-1000/454)	Flammable Liquid.	UN1294	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Triazine pesticide, liquid, n.o.s. (compounds and preparations)	Flammable Liquid.	UN2764	Flammable Liquid.	173.118	173.119(c),(f)	1L	60L	1,2	1	
	Trichlorosilane	Flammable Liquid.	UN1295	Flammable Liquid.	None	173.119(a),(f)	Forbidden	Forbidden	1	5	Segregation same as for flammable solids labeled Dangerous When Wet.
E	Triethylamine (IRQ-5000/2270)	Flammable Liquid.	UN1296	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Trimethylamine, aqueous solution (IRQ-1000/454)	Flammable Liquid.	UN1297	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	Stow away from mercury and mercury compounds.
	Trimethylchlorosilane	Flammable Liquid.	UN1298	Flammable Liquid.	None	173.119(b),(k)	Forbidden	2.5L	1,2	1	
	Turpentine	Flammable Liquid.	UN1299	Flammable Liquid.	173.118	173.119(e),(f)	60L	220L	1,2	1,2	
	Turpentine substitute	Flammable Liquid.	UN1300	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
E	Vinyl acetate (IRQ-1000/454)	Flammable Liquid.	UN1301	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Vinyl ethyl ether, inhibited	Flammable Liquid.	UN1302	Flammable Liquid.	None	173.119(b),(f)	5L	60L	1,3	5	
E	Vinylidene chloride, inhibited (IRQ-5000/2270)	Flammable Liquid.	UN1303	Flammable Liquid.	173.118	173.119(a),(f)	1L	30L	1,3	4	
	Vinyl isobutyl ether	Flammable Liquid.	UN1304	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Vinyl trichlorosilane	Flammable Liquid.	UN1305	Flammable Liquid.	None	173.119(b),(f)	Forbidden	2.5L	1,2	1	
E	Xylene (Xyloil) (IRQ-1000/454)	Flammable Liquid.	UN1307	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Zirconium, metal, liquid, suspensions.	Flammable Liquid.	UN1308	Flammable Liquid.	None	173.119(c)	Forbidden	60L	1	5	
	Flammable liquid, corrosive, n.o.s., (boiling point above 35°C)	Flammable Liquid.	UN2924	Flammable Liquid and corrosive.	None	173.119(c),(f)	1L	5L	1,2	1	
	Flammable liquid, n.o.s., (boiling point above 35°C)	Flammable Liquid.	UN1993	Flammable Liquid.	173.118	173.119(c),(f)	5L	60L	1,2	1	
	Flammable liquid, poisonous, n.o.s., (boiling point above 35°C)	Flammable Liquid.	UN1992	Flammable Liquid and Poison.	None	173.119(c),(f)	1L	60L	1,2	1	

#### PART 173—SHIPPERS-GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

4. Section 173.24 would be revised to read as follows:

##### § 173.24 Standard requirements for packagings and packages.

(a) A packaging containing a hazardous material may not be offered

for transportation unless it is designed, constructed, and its contents so limited that, under normal conditions of transportation—

(1) There will be no release for the hazardous material to the environment, and

(2) The effectiveness of the packaging will not be reduced by—

(i) Ambient temperatures and changes in temperature,

(ii) Humidity,

(iii) Exposure to sunlight,

(iv) The vapor pressure of the hazardous material, and

(v) Chemical action (including corrosion and embrittlement) of the hazardous material.



(b) A package containing a hazardous material may not be offered for transportation unless—

(1) When required by this subchapter, the packaging conforms to a standard or specification in Part 178 of this subchapter required for the hazardous material,

(2) For a non-bulk package containing a liquid or a liquefied compressed gas, sufficient ullage (outage) is provided so that the packaging would not be liquid full at or below 55°C (131°F),

(3) Inner packagings are secured against movement within the package and so as to prevent damage to other inner packagings,

(4) Closures are securely in place and will not partially or completely open during transportation, and

(5) The exterior of the package is free of a hazardous quantity of the hazardous material.

(c) A hazardous material may not be placed in a packaging and subsequently offered for transportation if that packaging—

(1) Contains any material (including water) that will react dangerously with the hazardous material or reduce the effectiveness of the packaging when combined with the hazardous material; or

(2) Is marked NRC as required by Part 178 of this subchapter.

(d) Paragraph (c)(2) does not apply to a packaging for a hazardous waste if—

(1) The waste is 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) The package is not offered for transportation less than 24 hours after it is finally closed for transportation, and is inspected for leakage immediately prior to being offered for transportation,

(4) The package is loaded by the shipper and unloaded by the consignee, unless the motor carrier is a private or contract carrier, and

(5) The packaging is used only once under this provision of this subparagraph.

(e) A non-bulk packaging (other than a cylinder) may not be reused for the transportation of any hazardous material unless—

(1) Its use is authorized, or not prohibited, by this subchapter;

(2) It is in such condition, or is so reconditioned, that it conforms to all applicable requirements of this subchapter including the standards and specifications in Part 178 of this subchapter;

(3) It has been subjected to, and has successfully passed, all tests required of

it by Part 178 of this subchapter other than destructive tests;

(4) When pressure tested, it does not contain any material, such as the residue of the material it previously contained, that would render the test invalid (e.g., by blockage of leaks);

(5) It is marked as required by Part 178 of this subchapter; and

(6) It is free of any—

(i) Hazardous absorbed contaminant such as a liquid explosive or a poisonous material,

(ii) Poisonous residue if it is to be reused for a different material, and

(iii) Residue that will react dangerously with the hazardous material.

#### § 173.28 [Removed]

5. Section 173.28 would be removed and reserved.

6. Section 173.119 would be revised to read as follows:

#### § 173.119 Flammable liquids not specifically provided for.

(a) When § 172.101 of this subchapter specifies that a flammable liquid be packaged under this paragraph, only non-bulk packagings prescribed in this paragraph may be used for its transportation. Each packaging must be marked under, and conform to, the regulations of Part 178 of this subchapter, at the Packing Group I performance level.

(ii) Except for transportation by passenger carrying aircraft, single-unit packagings as specified in paragraph (a)(2) of this section are also authorized.

(b) When § 172.101 of this subchapter specifies that a flammable liquid be packaged under this paragraph, only the non-bulk packagings prescribed in this paragraph may be used for its transportation. Each packaging must be marked under, and conform to, the requirements of Part 178 of this subchapter, at the Packing Group I performance level.

(1) Except for transportation by aircraft and if not prohibited in

(1) Except for transportation by aircraft, combination packagings having inner receptacles of glass, porcelain, stoneware, earthenware, plastic or metal placed in any of the following outer packagings:

Wooden box—4C  
Plywood box—4D  
Fiberboard box—4G  
Expanded plastic box—4H  
Reconstituted wood box—4F  
Steel drum—1A2, 1A4  
Plywood drum—1D  
Fiber drum—1G1, 1G2, 1G3  
Aluminum drum—1B2  
Plastic drum—1H2

(2) Except for transportation by aircraft, the following single unit packagings:

Steel drum—1A1  
Aluminum drum—1B1  
Steel jerrican—3A1  
Steel drum with plastic liner—6HA1 or  
Cylinders, as prescribed for any compressed gas, except for specification 8 and 3HT.

(3) For transportation by aircraft, only the following packagings:

(i) Combination packagings with inner receptacles having a maximum capacity, in liters, no greater than that provided in the following chart (the maximum permissible capacity for inner receptacles for packages offered for transport by cargo only aircraft are shown in parentheses when they exceed the maximum allowable capacity for passenger carrying aircraft):

Outer	Inner	Glass or earthenware IR.1	Plastic IR.2	Metal IR.3	Glass ampoule IR.8
Wooden box.....	4C.....	(L) 0.5(1)	(L) 1(5)	(L) 1(5)	(L) 0.5
Plywood box.....	4D.....	0.5(1)	1(5)	1(5)	0.5
Fiberboard box.....	4G.....	0.5(1)	1(5)	1(5)	0.5
Reconstituted wood box.....	4F1.....	0.5(1)	1(5)	1(5)	0.5
Steel drum.....	1A2.....	0.5(1)	1(5)	1(5)	0.5
Aluminum drum.....	1B2.....	0.5(1)	1(5)	1(5)	0.5

paragraph (b)(4) of this section, combination packagings specified in paragraph (a)(1) of this section.

(2) Except for transportation by aircraft and if not prohibited in paragraph (b)(4) of this section, single-unit packagings specified in paragraph (a)(2) of this section.

(3) For transportation by aircraft, only the following packagings authorized are:

(i) Combination packagings with outer packagings specified in paragraph (a)(3)(i) of this section and with inner receptacles having a maximum capacity in liters no greater than that in the following chart:

ID No.	Glass or earthenware IR.1	Plastic IR.2	Metal IR.3	Aluminum IR.3	Glass ampoule IR.8	Notes
UN 1089	(L) 0.5	(L) NA	(L) 2.5	(L) 2.5	(L) 0.5	1
UN 1092	1	NA	1	1	0.5	2
UN 1163	1	NA	1	1	0.5	1, 2, 3
UN 1182	0.5	0.5	1	NA	0.5	1
UN 1185	0.5	NA	1	NA	0.5	2
UN 1196	0.5	1	1	NA	0.5	1, 2, 3
UN 1238	0.5	0.5	1	NA	0.5	2
UN 1244	1	NA	1	NA	0.5	2
UN 1250	1	2.5	2.5	NA	0.5	1, 2
UN 1280	NA	2	NA	0.5	1	1
UN 1298	1	NA	1	NA	0.5	2
UN 1302	1	NA	2.5	2.5	0.5	1
UN 1305	1	NA	1	NA	0.5	2
UN 1921	0.5	NA	1	NA	0.5	1, 2, 3, 4
UN 2029	0.5	0.5	2.5	2.5	0.5	1
UN 2456	0.5	NA	2.5	2.5	0.5	

Note 1: Glass inner receptacles must be packaged with absorbent material in a sealed metal receptacle before packing in outer packagings.

Note 2: Metal inner receptacle must be constructed of corrosion-resistant steel or steel with protection against corrosion.

Note 3: Plastic inner receptacles must be packaged in sealed metal receptacle before packing in outer container.

Note 4: Aluminum inner receptacle must be constructed of pure aluminum or aluminum alloys resistant to corrosion.

Note 5: The letters "NA" mean that the particular inner receptacle is not authorized.

(ii) Except for transportation by passenger carrying aircraft and, if not prohibited in paragraph (b)(4) of this section, single unit packagings specified in paragraph (a)(2) of this section.

(4) The materials of construction listed in this subparagraph are not authorized for any part of a packaging which is normally in contact with the hazardous materials indicated:

(i) Plastic—UN 1089, UN 1092, UN 1163, UN 1185, UN 1244, UN 1280, UN 1298, UN 1302, UN 1305, UN 1921, and UN 2456.

(ii) Aluminum—UN 1182, UN 1185, UN 1196, UN 1238, UN 1244, UN 1250, UN 1280, UN 1298, UN 1305, and UN 1921.

(c) When § 172.101 of this subchapter specifies that a flammable liquid be packaged under this paragraph, only the non-bulk packagings prescribed in this paragraph may be used for its transportation. Each packaging must be

marked under, and conform to, the requirements of Part 178 of this subchapter, at the Packing Group I or II performance level.

(1) Except for transportation by aircraft, combination packagings with inner receptacles of glass, earthenware, porcelain, stoneware, plastic or metal placed in any of the following outer packagings:

Wooden box—4C  
Plywood box—4D  
Fiberboard box—4G  
Expanded plastic box—4H  
Reconstituted wood box—4F  
Steel drum—1A2  
Plywood drum—1D  
Fiber drum—1G1, 1G2, 1G3  
Aluminum drum—1B2  
Plastic drum—1H2

(2) Except for transportation by aircraft, the following single-unit packagings:

Steel drum—1A1

Steel drum—1A2 (not authorized for liquids with a flashpoint below -66.7°C (20°F))

Aluminum drum—1B1

Steel jerrican—3A1

Steel drum with plastic liner—6HA1

Plastic drum—1H1

Plastic jerrican—3H1

Fiber drum with liner—6HG1

Cylinders as prescribed for any compressed gas, except for specifications 8 and 3Ht.

(3) For transportation by aircraft, only the following packagings:

(i) Combination packagings with inner receptacles having a maximum capacity, in liters, no greater than that provided in the following chart (the maximum permissible capacity for inner receptacles for packages offered for transport by cargo only aircraft are shown in parentheses when they exceed the maximum allowable capacity for passenger-carrying aircraft):

Outer	Inner	Glass or earthenware IR.1	Plastic IR.2	Metal IR.3	Glass ampoule IR.8
Wooden box	4C	(L) 1(2.5)	(L) 5	(L) 5(10)	(L) 0.5
Plywood box	4D	1(2.5)	5	5(10)	0.5
Fiberboard box	4G	1(2.5)	5	5(10)	0.5
Reconstituted wood box	4F1	1(2.5)	5	5(10)	0.5
Steel drum	1A2	1(2.5)	5	5(10)	0.5
Aluminum drum	1B2	1(2.5)	5	5(10)	0.5

(ii) Except for transportation by passenger carrying aircraft, the following single-unit packagings:

Steel drum—1A1  
Aluminum drum—1B1  
Steel jerricans—3A1  
Steel drum with plastic liner—6HA1  
Plastic drum—1H1  
Plastic jerrican—3H1

(4) A flammable liquid having a flashpoint of 23°C (73°F) or higher that does not meet the definition of another hazard class may also be packaged as specified in paragraph (e) of this section.

(d) When § 172.101 of this subchapter specifies that a flammable liquid be packaged under this paragraph, only non-bulk packagings prescribed in this

paragraph may be used for transportation of the material. Each packaging must be marked under and conform to the requirements of Part 178 of this subchapter, at the Packing Group I or II performance level.

(1) Except for transportation by aircraft, if not prohibited in paragraph (d)(4) of this section, combination

packagings specified in paragraph (c)(1) of this section.

(2) Except for transportation by aircraft, if not prohibited in paragraph (d)(4) of this section, single-unit packagings specified in paragraph (c)(2) of this section.

(3) For transportation by aircraft, the only packagings authorized are:

(i) Combination packagings with outer packagings specified in paragraph (c)(3)(i) of this section and with inner receptacles having a maximum capacity, in liters, no greater than that provided in

the following chart: (The maximum permissible capacity of inner receptacles for packages offered for transport by cargo only aircraft are shown in parentheses when they exceed the maximum allowable capacity for passenger-carrying aircraft):

ID No.	Glass or earthenware IR.1	Plastic IR.2	Metal IR.3	Aluminum IR.3	Glass ampoule IR.8	Notes
UN 1111.....	(L) 1(2.5)	(L) NA	(L) 1(2.5)	(L) 1(2.5)	(L) 0.5	1
UN 1154.....	NA(2.5)	NA(5)	NA(5)	NA(5)	NA(0.5)	
UN 1167.....	NA(2.5)	NA	NA(2.5)	NA(2.5)	NA(0.5)	
UN 1204.....	1	1	1	NA	0.5	
UN 1228.....	NA(2.5)	NA	NA(2.5)	NA(2.5)	NA(0.5)	1
UN 1277.....	NA(2.5)	NA(2.5)	NA(5)	NA	NA(0.5)	
UN 1278.....	NA(2.5)	NA(2.5)	NA(5)	NA	NA(0.5)	
UN 1717.....	1(2.5)	1(2.5)	1(2.5)	NA	0.5	1, 2, 3
UN 2347.....	1(2.5)	NA	1(2.5)	1(2.5)	0.5	1
UN 2485.....	1(2.5)	1	1(2.5)	1(2.5)	0.5	1, 2

Note 1: Glass inner receptacles must be packaged with absorbent material in a sealed metal receptacle before packing in outer packagings.

Note 2: Metal inner receptacle must be constructed of corrosion-resistant steel or steel with protection against corrosion.

Note 3: Plastic inner receptacles must be packaged in a sealed metal receptacle before packing in outer packagings.

Note 4: The letters "NA" mean that the particular inner receptacle is not authorized.

(ii) Except for transportation by passenger carrying aircraft and, if not prohibited in paragraph (d)(4) of this section, single-unit packagings specified in paragraph (c)(3)(ii) of this section.

(4) The materials of construction listed in this subparagraph are not authorized for any part of a packaging which is normally in contact with the hazardous materials indicated:

(i) Plastic—UN 1111, UN 1167, NA 1228, UN 2347.

(ii) Metal (other than aluminum)—UN 2493.

(iii) Aluminum—UN 1154, UN 1204, UN 1277, UN 1278, UN 1717, UN 2493.

(e) When § 172.101 of this subchapter requires a hazardous material to be packaged under this paragraph, only non-bulk packagings prescribed in this paragraph may be used. Each packaging, other than cylinders, must be marked under and conform to, the standards

associated with its identification code, as specified in Part 178 of this subchapter, at the Packing Group I, II or III performance level.

(1) Except for transportation by aircraft, combination packagings having inner receptacles of glass, earthenware, plastic or metal placed in any of the following outer packagings:

Wooden box—4C  
Plywood box—4D  
Fiberboard box—4G  
Expanded plastic box—4H  
Reconstituted wood box—4F  
Steel Drum—1A2  
Plywood drum—1D  
Fiber drum—1G1, 1G2, 1G3  
Aluminum drum—1B2  
Plastic drum—1H2

(2) Except for transportation by aircraft, the following single-unit packagings:

Steel drum—1A1, 1A2

Aluminum drum—1B1, 1B2

Steel jerrican—A1

Steel drum with plastic liner—6HA1

Plastic drum—1H1

Plastic jerrican—3H1

Plywood drum with plastic liner—6HD1

Fiber drum with plastic liner—6HG1

Cylinders, as prescribed for any compressed gas, except specifications 8 and 3HT.

(3) For transportation by aircraft, the only packagings authorized are:

(i) Combination packagings with inner receptacles having a maximum capacity, in liters, no greater than that provided in the following chart (the maximum permissible capacity for inner receptacles for packages offered for transport by cargo only aircraft are shown in parentheses when they exceed the maximum allowable capacity for passenger carrying aircraft):

Outer	Inner	Glass or earthenware IR.1(L)	Plastic IR.2(L)	Metal IR.3(L)	Glass ampoule IR.8(L)
Wooden box.....	4C.....	2.5(5)	10	10(25)	0.5
Plywood box.....	4D.....	2.5(5)	10	10(25)	0.5
Fiberboard box.....	4G.....	2.5(5)	10	10(25)	0.5
Reconstituted wood box.....	4F1.....	2.5(5)	10	10(25)	0.5
Steel drum.....	1A2.....	2.5(5)	10	10(25)	0.5
Aluminum drum.....	1B2.....	2.5(5)	10	10(25)	0.5

(ii) Except for transportation by passenger-carrying aircraft, single-unit packagings as specified by paragraph (e)(2) of this section.

(iii) Notwithstanding § 172.101 of this subchapter, a flammable liquid with a flashpoint of 23°C (73°F) or higher not meeting the definition of another hazard class and packaged in accordance with paragraph (d)(3) of this section may be

transported on passenger-carrying aircraft in quantities not exceeding 60 liters per package, and on cargo only aircraft in quantities not exceeding 220 liters per package.

(4) A flammable liquid having a flashpoint of 23°C (73°F) or higher is excepted from the packaging requirements of subparagraphs (1), (2) and (3) of this paragraph if:

(i) It does not meet the definition of another hazard class; and

(ii) The actual flashpoint is marked on the outside of the package, or an indication that the flashpoint is 23°C (73°F) or higher is marked on the outside of the package.

(5) Notwithstanding, § 172.101 of this subchapter, the maximum net quantity limit for flammable liquids meeting the

conditions of subparagraph (4) of this paragraph is 4 liters per package for carriage aboard passenger-carrying aircraft and 220 liters for carriage aboard cargo-only aircraft.

(f) *Flammable liquids in bulk packagings.* When §172.101 of this subchapter specifies that a flammable liquid be packaged in accordance with this paragraph, only the bulk packagings prescribed in this paragraph may be used for its transportation.

(1) *Tank Cars.* (i) Flammable liquids with vapor pressures not exceeding 40 psia at 100°F., and not meeting the definition of another hazard class may be packaged in Class 103, 105, 106, 109, 110, 111, 112, 114 or 115 or specification AAR206W tank cars. Each Class 103, 111, and 115 tank car must have its manway closure equipped with safeguards to preclude the inadvertent removal of the closure from the manway opening while the car interior is subjected to pressure.

(A) The use of specification 103AL special riveted aluminum tank cars is authorized only for the transportation of gasoline, ethyl acetate, acetone, methanol, or butyraldehyde as provided in special orders of November 5, 1937, and February 1, 1939.

(ii) Flammable liquids which are also oxidizers, corrosive liquids, or poison B liquids may be packaged in Class 103, 105, 111, 112, 114 or 115 tank cars or specification AAR206W tank cars of welded construction.

(2) *Cargo Tanks.* (i) Each cargo tank used to transport flammable liquids must be in accordance with the following:

(A) Bottom outlets on each specification MC 303, MC 304, and MC 305 cargo tank must be equipped with valves complying with §178.342-5(a) of this subchapter.

(B) Bottom outlets on each specification MC 310, MC 311 and MC 312 cargo tank must be equipped with valves complying with §§ 178.342-5(a) and 178.343-5 of this subchapter.

(C) Bottom outlets on each specification-MC 330 and MC 331 cargo tank must be equipped with valves complying with § 178.337-11(c) of this subchapter.

(ii) Flammable liquids that are also oxidizers, corrosive liquids or poison B liquids or that have vapor pressures greater than 16 psia may be packaged in specification MC 304, MC 307, MC 310, MC 311, MC 312, MC 330 or MC 331 cargo tanks only.

(A) Emergency venting capacity on specification MC 304, MC 310, MC 311, and MC 312 cargo tanks must be equivalent to that of an MC 307 cargo tank.

(B) Each safety relief device must have a start-to-discharge pressure of not less than 25 psig.

(iii) Flammable liquid with vapor pressures not exceeding 16 psia at 100°F., and not meeting the definition of another hazard class may be packaged in 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 or MC 331 cargo tanks.

(3) *Intermodal Portable Tanks.* Flammable liquids may be packaged in IM101 and IM102 portable tanks as prescribed in §§ 173.32c and § 173.32d.

(4) *Portable Tanks other than Intermodal Portable Tanks.* (i) Flammable liquids that are also oxidizers, corrosive liquids or poison B liquids or that have vapor pressures greater than 16 psia may be packaged in specification 51 or 60 portable tanks only.

(ii) Flammable liquids with vapor pressures not exceeding 16 psia at 100°F., may be packaged in specification 51, 57 or 60 portable tanks and Marine Portable Tanks (46 CFR Part 64) only.

(A) Specification 57 steel portable tanks having a minimum design pressure of 9 psig and equipped in accordance with § 178.253-4 of this subchapter are authorized for transportation by vessel, except that frangible devices are not permitted. For transportation by vessel, no pressure relief device may open at less than 5 psig. Authorized only for liquids with flash points above 20°F.

(B) Marine portable tanks are authorized for highway and cargo vessel transportation only when shipped in support of off-shore drilling and production activities. Tanks must meet the mounting and tie-down requirements of § 178.245-4 of this subchapter when transported by highway.

(iii) Except for transportation by vessel, paints and related materials may be packaged in specification 52 portable tanks.

(g) Carbon bisulfide (disulfide) may only be transported in bulk packagings as specified in §173.119(f)(1)(i).

(h) Acrolein, inhibited, may only be transported in bulk packagings as follows:

(1) Specification 105A300W tank cars.

(i) each tank car must be stenciled DOT-105A200W, and must be equipped with the 150 psig safety relief valve required for that specification.

(ii) Each tank car must be marked "ACROLEIN" in accordance with the requirements of § 172.330 of this subchapter.

(2) Specification 51 portable tanks.

(i) Acrylonitrile may only be transported in bulk packagings as follows:

(1) Specification 105A200W or 112A200W tank cars.

(2) Cargo tanks as specified in § 173.119(f)(2)(ii).

(j) Propylene oxide may only be transported in bulk packagings as follows:

(1) Specification 105A100W, 112A200W or 114A340W tank cars.

(2) Cargo tanks as specified in § 173.119(f)(2)(ii).

(k) Chlorosilanes and substituted chlorosilanes may only be transported in bulk packagings as follows:

(1) Specification 103, 103W, 105A100, 105A100W, 111A60F1, 111A60W1 and 111A100W4 tank cars and Class 112 and 114 tank cars. Bottom outlets are prohibited.

(2) Specification MC 300, MC 303, MC 304, MC 306, MC 307, MC 330 or MC 331 cargo tanks. Methyl dichlorosilane and trichlorosilane may be packaged in specification MC 330 or MC 331 cargo tanks only.

(3) Specification 51 portable tanks.

(l) Ethylene imine, inhibited, may only be transported in bulk packagings as follows:

(1) Specification 105A100W, 112T200W, 112J200W, 114T340W or 114J340W tank cars.

(2) Specification 111A60W1 tank cars insulated in accordance with § 179.200-4 of this subchapter.

(m) Methylhydrazine may only be transported in bulk packagings as follows:

(1) Specification 105A200W tank cars. Each tank car must be restenciled 105A100W and be equipped with safety valves of the type and size used on specification 105A100W tank cars.

(2) Cargo tanks as specified in § 173.119(f)(2)(iii). Bottom outlets are prohibited.

(n) Dimethylhydrazine, unsymmetrical, may only be transported in bulk packagings as follows:

(1) Specification 103W, 103CW, 105A100W, 111A60W1, 111A60W7 or 111A100W4 tank cars. Bottom outlets are prohibited.

(2) Cargo tanks as specified in § 173.119(f)(2)(iii). Bottom outlets are prohibited.

(o) Monoethylamine may only be transported in bulk packagings as follows:

(1) Specification 105A100, 105A100W, 105A100ALW, 109A100ALW, 109A300W, 111A100W4, 112A200W, 112A400F and 114A340W tank cars and 106A500X, 106A800XNC, 106A800NCI and 110A500W tank cars.

(2) Specification MC 304, MC 307, MC 330 or MC 331 cargo tanks.

(3) Specification 51 portable tanks with no more than one bottom opening plugged for maintenance purposes. The bottom opening may not exceed 3 inches in diameter.

(p) Nitrocellulose, fibrous, wet with alcohol or solvent, must contain at least 25 percent by weight of alcohol or a solvent with flash point not lower than 30°F.; collodion cotton, fibrous and nitrostarch, wet with alcohol or solvent, must contain at least 30 percent by weight of alcohol or a solvent with flash point not lower than 30°F.; nitrocellulose flakes; colloided nitrocellulose, granular or flake; lacquer base or lacquer chips, wet with alcohol or a solvent, must contain at least 20 percent by weight of alcohol or a solvent with flash point not lower than 30°F.; and nitrocellulose blocks wet with alcohol must contain at least 25 percent by weight of alcohol may only be transported in bulk packagings as follows:

(1) Intermodal portable tanks.

(2) Specification 51, 57 or 60 portable tanks.

(q) Amyl, butyl, ethyl, isopropyl and propyl mercaptan and aliphatic mercaptan mixtures may only be transported in bulk packagings as follows:

(1) Specification 103W, 105A100, 105A100W, 106A500X, 110A500W, 111A60F1, 111A60W1, 112A200W, 112A400F or 114A340W tank cars with no bottom outlets. Specification 105A200ALW tank cars are only authorized for ethyl mercaptan and are not authorized for transportation by vessel.

(2) Specification MC 330 or MC 331 cargo tanks.

(3) Specification 51 portable tanks.

(r) Ethyl chloroformate and methyl chloroformate may only be transported in specification 111A100W2, 111A100W4, 112A200W or 112A400F tank cars.

(s) Acetyl chloride may only be transported in bulk packagings as follows:

(1) Specification 103A, 103AW, 105A300W, 111A60W2, or 111A100F2 tank cars.

(2) Specification MC 310, MC 311, MC 312, MC 330 or MC 331 cargo tanks.

(3) Specification 60 portable tanks.

7. Sections 173.120 through 173.129 would be revised to read as follows:

**§ 173.120 Automobiles, motorcycles, tractors, or other self-propelled vehicles.**

(a) Automobiles, motorcycles, tractors, or other self-propelled vehicles, equipped with flammable liquid fuel tanks that are securely closed, are not subject to any other requirements for transportation by rail or highway. For

transportation by air see paragraph (d) of this section.

(b) *Engines or motors (internal combustion).* Except as provided in paragraph (a) of this section, engines or motors (internal combustion) employing liquid fuel classed as flammable liquid in this chapter, whether shipped separately or as a part of other apparatus, must have their fuel tanks completely drained. Fuel may be left in the carburetor, fuel pump, and fuel lines provided the total flammable fuel content does not exceed .47 liters (16 ounces) and provided the lines are tightly closed to prevent leakage of the fuel.

(c) *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 the joint rail highway movement, provided the equipment and fuel supply are of a type examined and approved by the Associate Director for HMR, Materials Transportation Bureau, Washington, D.C. 20590. The heating or refrigerating equipment is not subject to any other requirements of this subchapter.

(d) Except as provided in § 175.305 of this subchapter, each automobile, motorcycle, tractor, or other self-propelled vehicle, powered by an internal combustion engine fueled by a flammable or combustible liquid when offered for transportation by air, must have the fuel tank drained of all fuel and have the tank opening tightly closed.

**§ 173.121 Hydrazine, anhydrous.**

(a) Hydrazine, anhydrous must be packed in specification non-bulk packagings as follows:

(1) As specified in § 173.119(b) except steel packagings shall be constructed using type 304 or 347 stainless steel only.

(b) For transportation in bulk packagings only the following may be used.

(1) Specification 103CW, 111A60W7, or 111A100W6 tank cars having tanks of type 304L or 347 stainless steel with molybdenum content not exceeding one-half of one percent. The safety relief valve on specification 103CW tank cars must have a start-to-discharge pressure of not more than 45 psig. Bottom outlets are prohibited, bottom washout is permitted. The vapor space in tanks must be filled with nitrogen gas at atmospheric pressure.

(2) Specification 103A-ALW or 111A60ALW2 tank cars. The safety

relief value on tanks may not have a start-to-discharge pressure of more than 45 psig. Vapor space in tanks must be filled with nitrogen gas at atmospheric pressure.

(3) Specification MC 310, MC 311, or MC 312 cargo tanks of type 304L or 347 stainless steel with molybdenum content not exceeding one-half of one percent. Bottom outlets permitted. Vapor space in tank must be filled with nitrogen gas at not less than atmospheric pressure.

**§ 173.122 Pyroforic liquids, n.o.s. and methyl magnesium bromide in ethyl ether.**

(a) Pyroforic liquids, n.o.s., and methyl magnesium bromide in ethyl ether may only be packed in specification non-bulk packagings as follows:

(1) Cylinders as prescribed for any compressed gas except acetylene and having a minimum design pressure of 12.30 kilograms per square centimeter (175 pounds per square inch). Except for cylinders shipped loose, the package must be capable of passing Packaging Group I performance tests. Cylinders with values must be:

(i) Equipped with steel valve protection caps or collars when shipped loose;

(ii) Overpacked in a 4C wooden box, 4D plywood box or 4F reconstituted wood box; or

(iii) Overpacked in a 4H expanded plastic box. When overpacked, cylinders must be secured to protect all valves. Unless packed in a box or case, any pressure relief device must be in the vapor space of any loaded cylinder. (See §§ 174.300(d) and 177.837(d) of this subchapter.)

(2) 4C wooden box, 4D plywood box, 4F reconstituted wood box, or 4G fiberboard box enclosing not more than four, strong, tight metal cans with inside containers of glass or metal, not over 1 liter capacity each, having positive screwcap closures adequately gasketed ahead of the threads. Inside containers must be cushioned on all sides with dry, absorbent, incombustible material in a quantity sufficient to absorb the entire content. The strong, tight metal cans must be closed by positive means, not by friction. The package must be capable of passing Packing Group I performance tests.

(3) 1A2 steel drums with inside metal cans not over 4 liters capacity each, constructed of not less than 28-gauge electro-coated tin plate and closed by positive means, not friction. Inside containers shall have no opening exceeding 25.4 millimeters (1 inch), and they must be surrounded on all sides with incombustible cushioning material.

The package shall be capable of passing Packing Group I performance tests.

(b) Pyroforic liquids, n.o.s. and methyl magnesium bromide in ethyl ether may only be packed in bulk packagings as follows:

- (1) Specification 105A300W tank cars;
- (2) Specification MC 330 or MC 331 cargo tanks having a minimum design pressure of 175 psig; or,
- (3) Specification 51 portable tanks having a minimum design pressure of 175 psig.

#### § 173.123 Ethyl chloride.

(a) Ethyl chloride may only be packed in specification non-bulk packagings as follows:

(1) IR.1 glass or earthenware or IR.3 metal inner receptacles not over 0.5 kilogram capacity each, in a 4C wooden or 4G fiberboard box;

(2) 1A1 steel drum; or

(3) Any cylinder authorized for any compressed gas except acetylene.

(b) For transportation by aircraft, only cylinders as prescribed in paragraph (a)(3) of this section with a gross weight not exceeding 150 kilograms are authorized.

(c) Non-bulk packagings, except for cylinders, must comply with Packing Group I performance standards and must be marked as specified in Part 178 of this subchapter.

(d) Ethyl chloride may only be transported in bulk packagings as follows:

(1) Specification 105A100, 105A100W, 111A100W4, 112A200W, 112A400F or 114A340W tank cars with no bottom outlets;

(2) Specification MC 330 or MC 331 cargo tanks; or

(3) Specification 51 portable tanks.

(e) Outage for all packagings except tank cars must be at least 7.5 percent at 21°C (70°F). Outage for tank cars must be at least 4.2 percent at 21°C (70°F.)

#### § 173.124 Ethylene oxide.

(a) Ethylene oxide may only be packed in specification non-bulk packaging as follows and copper, silver mercury and their alloys shall not be used in any part of a container, container valve or other container 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.

(1) 4G fiberboard box with one inside IR.8 glass ampule or vial of no more than 100 grams (3.53 oz.) capacity

cushioned with incombustible material. The completed package must be capable of passing Packing Group I performance tests.

(2) 4G fiberboard box constructed with top and bottom pads and perimeter liner. Inside packaging must be IR.3 aluminum cartridge of no more than 135 grams (4.76 ounces) capacity cushioned with incombustible material. No more than 12 receptacles allowed in one box and no more than 10 boxes may be overpacked in a master carton (§ 173.25(a)). The completed package must be capable of passing Packing Group I performance tests.

(3) 4C or 4D wooden boxes and 4G fiberboard box with inside IR.3 metal container of no more than 340 grams (12 ounces) capacity and no less than 12.66 kilograms per square centimeters (180 psig) burst pressure. No more than 12 receptacles in one box and each receptacle may not be liquid full below 82.2°C (180°F). Each inside receptacle must be insulated and equipped with a relief device of fusible plug type with yield temperature of 69.4°C to 76.7°C (157°F to 170°F). The capacity of the 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. The completed package must be capable to passing Packing Group I performance tests.

(4) Cylinders authorized for any compressed gas except acetylene. Cylinders must be seamless or steel welded with nominal capacity of no more than 113.55 liters (30 gallons) and may not be liquid full below 82.2°C (180°F). 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 1.05 kilograms per square centimeter (15 psig) pressure. In addition, each cylinder must be equipped with a fusible type relief device with yield temperature of 69.4°C to 76.7°C (157°F to 170°F). The capacity of the relief device and 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) 1A1 steel drum of no more than 230.89 liters (61 gallons) and meeting Packing Group I performance standards. The drum may not be liquid full below 85°C (185°F). 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 105 kilogram per square centimeter (15 psig) pressure. Each drum must be equipped with a

fusible type relief device type with yield temperature of 69.4°C to 76.7°C (157°F to 170°F), 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.

(b) Ethylene oxide may only be packed in specification bulk packagings as follows:

(1) Specification 105A100W or 111A100W4 tank car. Each 105A \* \* \* W series tank car must be equipped with a 75 psig safety valve and must be stenciled 105A100W. Outage of each tank must be sufficient to prevent the tank from becoming liquid full at 105°F. Each tank loaded or empty, must be padded with dry nitrogen or other suitable dry inert gas in sufficient quantity to render the vapor phase in the tank nonflammable at a temperature of up to 105°F. Consideration must be given to the lading temperature and the solubility of the gas in ethylene as well as the partial pressure required of the padding gas used to provide this protection. The gas must be free of impurities which may cause the ethylene oxide to rearrange chemically or to polymerize, decompose, or undergo other chemical reaction. See §§ 179.102-12 and 179.202-18 of this subchapter for special requirements for tank cars authorized for ethylene oxide. Openings in tank heads to facilitate application of nickel lining are authorized on tank cars constructed before January 1, 1975.

(i) Each tank car must be marked "ETHYLENE OXIDE" in accordance with the requirements of § 172.330 of this subchapter.

(2) Specification 51 portable tank. Each tank, loaded or empty, must be padded with dry nitrogen or other suitable dry inert gas in sufficient quantity to render the vapor phase in the tank nonflammable at a temperature of up to 105°F. Consideration must be given to the lading temperature and the solubility of the gas in ethylene oxide as well as the partial pressure required of the padding gas used to provide this protection. The gas must be free of impurities which may cause the ethylene oxide to rearrange chemically or to polymerize, decompose, or undergo other chemical reaction. Each tank must be constructed to be in compliance with the following requirements:

(i) The tank must be insulated with mineral wool or glass fiber of sufficient thickness so that the thermal conductance at 60°F is not more than 0.075 British thermal units per hour, per



squar foot, per degree fahrenheit temperature differential. When a tank is equipped with fusible plugs instead of a safety relief valve or frangible disc, insulation must meet the requirements of paragraph (b)(2)(iii) of this section.

(ii) The insulating material of the tank must be protected by a steel jacket having a minimum thickness of 12 gauge. This jacket must be applied to prevent moisture from coming in contact with the insulation.

(iii) Each tank must be equipped with a safety relief valve or frangible disc, meeting the requirements of § 173.315, set to relieve at 75 psig. Instead of a safety relief valve or frangible disc, a tank may be equipped with safety devices of the fusible plug type with threaded straight base orifice, with yield temperature of 157°F to 170°F., having a minimum vent area of 0.0012 square inch per pound of water capacity of the container. When a fusible plug is used instead of a safety relief valve or frangible disc, the tank must be insulated with mineral wool or glass fiber of such insulating properties and required additional thickness that the tank filled as for shipment will not rupture in a fire.

(iv) Filling must be such that the tank will not be liquid full below 185°F.

(v) Copper, silver, mercury, magnesium, or their alloys may not be used in any part of the tank or appurtenances if that part or appurtenance is normally in contact with ethylene oxide liquid or vapor.

(vi) Neoprene, natural rubber, and asbestos gaskets are prohibited. All packagings and gaskets must be constructed of materials which do not react spontaneously with or lower the autoignition temperature of ethylene oxide.

#### § 173.125 Refrigerating machines.

Refrigerating machines assembled for shipment and containing limited quantities of 15 pounds or less of a flammable liquid for their operation are excepted from labeling and the specification packaging requirements of this subchapter (except when offered for transportation by air). In addition, shipments are not subject to Subpart F of Part 172 of this subchapter, to Part 174 of this subchapter except § 174.24 and to Part 177 of this subchapter except § 177.817.

#### § 173.126 Nickel carbonyl.

Nickel carbonyl may only be packed in specification steel or nickel cylinders as prescribed for any compressed gas, except acetylene. Cylinders used exclusively for nickel carbonyl may be given a complete external visual

inspection at the time periodic retest becomes due in lieu of the interior hydrostatic pressure test required by § 173.34(e). Visual inspection must be in accordance with CGA Pamphlet C-6. All cylinder valves must be protected by one of the methods described in § 173.301(g)(1), (2) or (3).

#### § 173.127 Pentaborane.

Pentaborane may only be packed in specification steel or nickel cylinders as prescribed for any compressed gas, except acetylene. Each cylinder must be protected with a valve protection cap or must be packed in a strong wooden box and blocked therein so as to protect the valve from injury under conditions normally incident to transportation. Cylinders not exceeding 5.08 centimeters (2 inches) in diameter nor 15.24 centimeters (6 inches) in length, excluding the length of the valve, may also be packed in strong solid fiberboard boxes, having no outside dimension less than 10.16 centimeters (4 inches), completely filled with layers of strong corrugated fiberboard, the center of which shall be cut out to fit the cylinder valve, and otherwise so designed that neither the cylinder nor the valve will be in contact with any wall of the box under conditions normally incident to transportation.

#### § 173.128 Amyl mercaptan, butyl mercaptan, ethyl mercaptan, isopropyl mercaptan, propyl mercaptan, and aliphatic mercaptan mixtures.

Warning or odorizing devices containing not more than 28.35 grams (1 ounce) of a mercaptan or an aliphatic mercaptan mixture in a hermetically sealed container or in a hermetically sealed portion of the device are not subject to the regulations in Parts 170-189 and 397 of this title.

#### § 173.129 Methyl vinyl ketone, inhibited.

Limited quantities of inhibited methyl vinyl ketone, in a glass or metal inside container having a capacity of no more than 4 fluid ounces with no more than one such container securely closed and efficiently cushioned in a strong outside packaging, is excepted from labeling (except when offered for transportation by air) and the specification packaging requirements of this subpart. In addition, shipments are not subject to Subpart F of Part 172 of this subchapter, to Part 174 of this subchapter except § 174.24 and to Part 177 of this subchapter except § 177.817.

8. The following sections would be removed and reserved:

§§ 173.130, 173.131, 173.132, 173.133, 173.134, 173.135, 173.136, 173.137, 173.138, 173.139, 173.140, 173.141, 173.143, 173.144, 173.145, 173.146, 173.147, 173.148, 173.149, 173.149a, [Removed and reserved]

### PART 178—SHIPPING CONTAINER SPECIFICATIONS

9. In § 178.0-2, paragraphs (b) and (c) would be revised and a new paragraph (d) would be added to read as follows:

#### § 178.0-2 Applicability.

\* \* \* \* \*

(b) When this Part requires a packaging or container to be marked with a DOT specification or a UN standard (for example, DOT-1A, DOT-17E-304HT, DOT-23G40, UN 1A1/Y1.4/150/83), compliance with that requirement is the responsibility of the packaging or container manufacturer. Marking the packaging or container with the appropriate DOT specification or UN standard shall be understood to certify compliance by the manufacturer, that the functions performed by the manufacturer, as prescribed in this part, have been performed in compliance with this part.

(c) Except as specifically provided in §§ 178.337-18 and 178.340-10, the manufacturer of a packaging or container shall inform in writing each person to whom that packaging is transferred of any requirements of this Part which have not been met at the time of transfer.

(d) Packagings which do not comply with the applicable specifications or standards listed in this Part or Part 179 of this subchapter may not be marked to indicate such compliance.

10. A new Subpart L would be added to read as follows:

#### Subpart L—Performance-Oriented Packaging Standards

Sec.	Purpose and scope.
178.500	Purpose and scope.
178.501	Terms and definitions.
178.502	Identification codes for packagings.
178.503	General requirements.
178.504	Marking of packagings.
178.505	Standards for steel drums.
178.506	Standards for aluminum drums.
178.507	Standards for plywood drums.
178.508	Standards for fiber drums.
178.509	Standards for plastic drums.
178.510	Standards for wooden barrels.
178.511	Standards for steel jerricans.
178.512	Standards for plastic jerricans.
178.513	Standards for steel boxes.
178.514	Standards for aluminum boxes.
178.515	Standards for boxes of natural wood.
178.516	Standards for plywood boxes.
178.517	Standards for reconstituted wood boxes.
178.518	Standards for fiberboard boxes.

- 178.519 Standards for expanded plastic boxes.
- 178.520 Standards for woven plastic bags.
- 178.521 Standards for plastic film bags.
- 178.522 Standards for textile bags.
- 178.523 Standards for paper bags.
- 178.524 Standards for composite packagings with inner plastic receptacles.
- 178.525 Standards for composite packagings with inner glass, porcelain, or stoneware receptacles.
- 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 with air.
- 178.605 Hydrostatic pressure test.
- 178.606 Sacking test.
- 178.607 Cooperage test for bung type wooden barrels.
- 178.608 Chemical compatibility test for plastic receptacles.

#### Subpart L—Performance-Oriented Packaging Standards

##### § 178.500 Purpose and scope.

This subpart prescribes certain requirements for packagings used in the transportation of hazardous materials in commerce.

##### § 178.501 Terms and definitions.

In this subchapter:

*Bags* are flexible packagings made of paper, plastic film, textiles, woven material or other similar materials.

*Boxes* are packagings with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material.

*Closures* are devices which close an opening in a packaging.

*Combination packagings* are a combination of packagings for transport purposes, consisting of one or more inner packagings secured in an outer packaging in accordance with § 173.24(c)(5).

*Composite packagings* are packagings 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 thereafter an integrated single unit, and is filled, stored, shipped and emptied as such.

*Drums* are flat-ended or convex-ended cylindrical receptacles made of metal, fiber, plastic, plywood, or other suitable materials. This definition also includes receptacles of other shapes when made of metal or plastic (e.g., round tapered-necked receptacles, or pail-shaped receptacles), but does not include wooden barrels and jerricans.

*Inner packagings* are packagings for which an outer packaging is also required.

*Inner receptacles* are receptacles which require an outer protection in order to perform their containment function.

*Jerricans* are metal or plastic receptacles of rectangular or polygonal cross-section with non-removable heads and one or more openings.

*Outer packaging* is the outer protection 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.

*Packages* are the complete product of the packing operation, consisting of the packaging and its contents prepared for transportation.

*Packagings* are receptacles and any other components or materials necessary for the receptacle to perform its containment function.

*Receptacles* are containment vessels for receiving and holding materials including any means of closing.

*Wooden barrels* are receptacles made of natural wood, or round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

##### § 178.502 Identification codes for packagings.

(a) The following numerals designate types of packagings:

1. Drum
2. Wooden barrel
3. Jerrican
4. Box
5. Bag
6. Composite packaging

(b) The following letters designate the material of construction employed in the manufacture of the packaging:

- A. Steel (all types and surface treatments)
- B. Aluminum
- C. Natural wood
- D. Plywood
- F. Reconstituted wood
- G. Fiberboard
- H. Plastic material
- L. Textile
- M. Paper, multiwall
- N. Metal (other than steel or aluminum)
- P. Glass, porcelain or stoneware

(c) The following are *packing groups*, ranked according to the degree of danger presented by the materials:

- (1) Packing Group I: great danger;
- (2) Packing Group II: medium danger; and
- (3) Packing Group III: minor danger.

##### § 178.503 General requirements.

(a) Coatings of packagings required by this subchapter, shall retain their protective properties after the required performance tests have been completed.

(b) Nails and other closure devices made of metal shall not penetrate to the

inside of an outer packaging unless provision is made to protect the contents from harmful contact with the metal.

##### § 178.504 Marking of packagings.

(a) Every package required to comply with this subpart shall be marked, in a durable and clearly visible manner, with the following information 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 lieu 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 §§ 178.505 through 178.525 within the type to which the packaging belongs;

(3) A letter identifying the performance standard under which the design type 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, where a hydraulic pressure test has been successfully passed, the test pressure in kilopascals rounded down to the nearest 10 kilopascals;

(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; this may be marked on the packaging in a different place from the remainder of the marking;

(7) The letters "USA" (indicating that the packaging was marked pursuant to the provisions of this subchapter); and

(8) The name and address or symbol of the person applying the marks required by this section (symbols, if used, must be registered with the Associate Director for HMR).

(b) For a reusable packaging liable to undergo a reconditioning process, the

markings required in paragraph (a)(1) through (a)(6) of this section shall be applied in a permanent manner (e.g., by embossment) able to withstand the reconditioning process;

(c) If a package is reconditioned, it must be marked by the reconditioner near the marks required in paragraphs (a) (1) through (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, the letters "USA" shall be used);

(2) The name or symbol of the reconditioner (symbols, if used, shall be registered with the Associate Director for HMR);

(3) The 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.

(i) For a fiberboard box designed to contain an inner receptacle:



4G/Y145/S/83 (as in § 178.504(a) (1), (2), (3), (4), (5) and (6).)

USA/RA (as in § 178.504(a) (7) and (8).)

(ii) For a steel drum designed to contain liquids:

UN 1A1/Y1.4/150/83 (as in § 178.504(a) (1), (2), (3), (4), (5) and (6).)

USA/VL824 (as in § 178.504(a) (7) and (8).)

(iii) For a steel drum to transport solids, viscous liquids or inner packagings:

UN 1A2/Y150/S/83 (as in § 178.504(a) (1), (2), (4), (5) and (6).)

USA/VL825 (as in § 178.504(a) (7) and (8).)

(3) Examples of markings for reconditioned packagings:

UN 1A1/Y1.4/150/83 (as in § 178.504(a) (1), (2), (3), (4), (5) and (6).)

USA/RB/85RL (as in § 178.504(b) (1), (2), (3), and (4).)

#### § 178.505 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 requirement for steel drums:

(1) Body and heads shall be constructed of steel sheet of suitable type and adequate thickness in relation to the capacity of the drum and the service it is intended to perform.

(2) Body seams shall be welded on drums designed to contain liquids. Body seams shall be mechanically seamed or welded on drums intended to contain only solids.

(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 (15.85 gallons) shall 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.

(5) Openings for filling, emptying and venting in the bodies or heads of non-removable head (1A1) drums shall not exceed 7 centimeters (2.75 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. Coatings or treatments shall retain their protective properties under normal conditions of transport.

(8) Maximum capacity of drum: 450 liters (118.88 gallons).

(9) Maximum net mass: 400 kilograms (881.84 pounds).

#### § 178.506 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:

(1) Body and heads shall be constructed of aluminum at least 99 percent pure or an aluminum base alloy. Materials shall be of suitable type and adequate thickness in relation to the capacity of the drum and the service it is intended to perform.

(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) shall 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 shall not exceed 7 centimeters (2.75 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 (118.88 gallons).

(7) Maximum net mass: 400 kilograms (881.84 pounds).

#### § 178.507 Standards for plywood drums.

(a) The identification code for a plywood drum is 1D.

(b) Construction requirements for plywood drums:

(1) The wood used shall be well seasoned, commercially dry and free

from any defect likely to lessen the effectiveness of the drum for the purpose intended. If a material other than plywood is used for the manufacture of the heads, it shall be of a quality 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 grain crosswise, by a water resistant adhesive.

(3) The body and heads of the drum and their joints shall 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 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 (66.06 gallons).

(6) Maximum net mass: 400 kilograms (881.84 pounds).

#### § 178.508 Standards for fiber drums.

(a) The identification code for a fiber drum is 1G.

(b) Construction requirements for fiber drums:

(1) The body of the drum shall consist 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 equivalent material.

(2) Heads shall 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 equivalent material.

(3) The body and heads of the drum and their joints shall be of a design appropriate to the capacity of the drum and the service it is intended to perform.

(4) The assembled packaging shall be sufficiently water-resistant so as not to delaminate under normal conditions of transport.

(5) Maximum capacity of drum 450 liters (118.88 gallons).

(6) Maximum net mass: 400 kilograms (881.84 pounds).

#### § 178.509 Standards for plastic drums.

(a) The following are identification codes for plastic drums:

(1) 1H1 for a non-removable head plastic drum; and

(2) 1H2 for a removable head plastic drum.

(b) Construction requirements for plastic drums:

(1) The drum 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 residue or regrind from the same manufacturing process shall be used. The drum shall be adequately resistant to aging and to degradation caused either by the material contained or by ultra-violet radiation. Any permeation of the material contained shall not be severe enough to 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 shall be compatible with the contents and remain effective throughout the life of the drum. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the design type, retesting may be omitted if the carbon black content does not vary by more than 2 percent by weight or the pigment content does not vary by more than 3 percent by weight. The content of inhibitors of ultra-violet radiation is not limited.

(3) Additives serving purposes other than protection against ultra-violet radiation may be included in the composition of the plastic material provided they do not adversely affect the chemical and physical properties of the material of the drum.

(4) The wall thickness at every point of the drum shall be appropriate to the capacity of the drum and its intended use, taking into account, the stresses to which each point is likely to be exposed.

(5) Openings for filling, emptying and venting in the bodies or heads of non-removable head (1H1) drums shall not exceed 7 centimeters (2.75 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1H2). Closures for openings in the bodies or heads of drums 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 shall be so designed and applied that they remain secure and drums remain leakproof under normal conditions of transport. Gaskets shall be used with all removable heads unless the drum design is such that where the removable head is properly secured, the drum is inherently leakproof.

(7) Maximum capacity of drums: 450 liters (118.88 gallons).

(8) Maximum net mass: 400 kilograms (881.84 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:

(1) The wood used shall 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.

(2) The body and heads shall be of a design appropriate to the capacity of the barrel and its intended use.

(3) Staves and heads shall be sawn or cleft with the grain so that no annual ring shall extend over more than half the thickness of a stave or head.

(4) Barrel hoops shall be of steel or iron of good quality. The hoops of 2C2 barrels may be of suitable hardwood.

(5) For wooden barrels 2C1, the diameter of the bung-hole shall in no case exceed half the width of the stave in which it is placed.

(6) For wooden barrels 2C2, heads shall fit tightly into crozes.

(7) Maximum capacity of barrel: 250 liters (66.05 gallons)

(8) Maximum net mass: 400 kilograms (881.84 pounds)

#### § 178.511 Standards for steel jerricans.

(a) The identification code for steel jerricans is 3A.

(b) Construction requirements for steel jerricans:

(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 the service it is designed to perform.

(2) Body seams shall be welded and chime seams shall be mechanically seamed or welded.

(3) Openings in jerricans shall not exceed 7 centimeters (2.75 inches) in diameter. 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 shall retain their protective properties under normal conditions of transport.

(5) Maximum capacity of jerrican: 60 liters (15.85 gallons).

(6) Maximum net mass: 120 kilograms (264.55 pounds).

**§ 178.512 Standards for plastic jerricans.**

(a) The identification code for a plastic jerrican is 3H.

(b) Construction requirements for plastic jerricans:

(1) The jerrican shall be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and to the service it is designed to perform. No used material other than production residues or regrind from the same manufacturing process shall be used. The jerrican shall be adequately resistant to aging and to degradation caused either by the material contained or by ultra-violet radiation. Any permeation by the material contained shall not be severe enough to 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 shall be compatible with the contents and remain effective throughout the life of the jerrican. Where use is made of carbon black, pigments, or inhibitors other than those used in the manufacture of the tested design type, retesting may be omitted if the carbon black content does not vary by more than 2 percent by weight or the pigment content does not vary by more than 3 percent by weight. The content of inhibitors of ultra-violet radiation is not limited.

(3) Additives serving purposes other than protection against ultra-violet radiation may be included in the composition of the plastic material provided they do not adversely affect the chemical and physical properties of the material of the jerrican.

(4) The wall thickness at every point of the jerrican shall be appropriate to the capacity of the jerrican and its intended use, taking into account, however, the stresses to which each point is likely to be exposed.

(5) Openings in jerricans for filling, emptying and venting shall not exceed 7 centimeters (2.75 inches) diameter. Closures for openings in 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) Maximum capacity of jerrican: 60 liters (15.85 gallons).

(7) Maximum net mass: 120 kilograms (264.55 pounds).

**§ 178.513 Standards for steel boxes.**

(a) The following are identification codes for steel boxes:

(1) 4A1 for an unlined steel box; and

(2) 4A2 for a steel box with liner.

(b) Construction requirements for steel boxes:

(1) The strength of the steel and the construction of the box shall be in relation to the capacity of the box and to the service it is intended to perform.

(2) Boxes shall be welded, double seamed, or riveted. If double seaming is used, steps shall be taken to prevent the ingress of substances into recesses of the seams.

(3) Boxes 4A2 may be lined with fiberboard or felt packing pieces, or an inner liner or coating of another suitable material. If a double-seamed metal liner is used, steps shall be taken to prevent the ingress of substances into recesses of the seams.

(4) Closures may be of any suitable type, and shall remain secure under normal conditions of transport.

(5) Maximum net mass: 400 kilograms (881.84 pounds).

**§ 178.514 Standards for aluminum boxes.**

(a) The following are the identification codes for aluminum boxes:

(1) 4B1 for an aluminum box without liner; and,

(2) 4B2 for an aluminum box with liner.

(b) Construction requirements for aluminum boxes:

(1) The strength of the aluminum and the construction of the box shall be in relation to the capacity of the box and to the service it is designed to perform.

(2) Boxes shall be welded, double seamed, or riveted. If double seaming is used, steps shall be taken to prevent the ingress of substances into recesses of the seams.

(3) Boxes 4B2 may be lined with fiberboard or felt packing pieces, or an inner or coating liner of another suitable material. If a double seamed metal liner is used, steps shall be taken to prevent the ingress of substances into recesses of the seams.

(4) Closures may be of any suitable type, and shall remain secure under normal conditions of transport.

(5) Maximum net mass: 400 kilograms (881.84 pounds).

**§ 178.515 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:

(1) The wood used shall be well-seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the

box. The tops and bottoms may be made of hard board.

(2) Each part of the 4C2 box shall 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 (881.84 pounds).

**§ 178.516 Standards for plywood boxes.**

(a) The identification code for a plywood box is 4D.

(b) Construction requirements for plywood boxes:

(1) Plywood used shall 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. 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 fastened to corner posts or ends or assembled with other equally suitable fastening devices.

(2) Maximum net mass: 400 kilograms (881.84 pounds).

**§ 178.517 Standards for reconstituted wood boxes.**

(a) The identification code for a reconstituted wood box is 4F.

(b) Construction requirements for reconstituted wood boxes:

(1) The box walls shall be made of water resistant particle board or hardboard.

(2) Other parts of the box may be made of other suitable material.

(3) Boxes shall be securely assembled by means of suitable devices.

(4) Maximum net mass: 400 kilograms (881.84 pounds).

**§ 178.518 Standards for fiberboard boxes.**

(a) The identification code for a fiberboard box is 4G.

(b) Construction requirements for fiberboard boxes:

(1) Strong and good-quality solid or double-faced corrugated fiberboard (single or multiwall) shall be used, appropriate to the capacity of the box and to the service it is intended to perform. The water-resistance of the outer surface shall be such that the increase in weight, 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



(0.0316 pounds per square foot)—see ISO International Standard 535-1976 (E). It shall 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 so designed as to provide a good fit to the contents.

(5) Maximum net mass: 400 kilograms (881.84 pounds).

**§ 178.519 Standards for expanded plastic boxes.**

(a) The identification code for an expanded plastic box is 4H.

(b) Construction requirements for expanded plastic boxes:

(1) The strength of the material and the construction of the box shall be appropriate to the capacity and its intended use.

(2) The box shall 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 the interlocking with the bottom section.

(3) The top and bottom sections shall be so designed that the inner receptacles fit snugly.

(4) The closure cap for any inner receptacle may not be in contact with the inside of the top section of the box.

(5) For shipment, the box shall be closed with a pressure sensitive adhesive tape having sufficient tensile strength to prevent the box from opening. Other closing devices at least equally effective may be used.

(6) The adhesive tape shall be weather-resistant and its adhesives compatible with the expanded plastic material of the box.

(7) Maximum net mass: 60 kilograms (132.28 pounds).

**§ 178.520 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.

(1) Bags shall be made from stretched tapes or monofilaments of suitable plastic material. The strength of the material used and the construction of the bag shall be appropriate to the capacity of the bag and its intended use.

(2) Bags may be fitted with an inner liner, or given an inner coating, which is made of plastic or other suitable material.

(3) 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. Seals and seams shall resist pressures and impacts occurring under normal conditions of transport.

(4) Bags, sift-proof, 5H2 shall be made sift-proof by means 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 or other equivalent means.

(5) Bags, water-resistant, 5H3 shall be made waterproof by means of: Separate inner liners of water-resistant paper (e.g., waxed kraft paper, double-tarred kraft paper or plastic-coated kraft paper), plastic film bonded to the inner or outer surface of the bag, one or more inner plastic liners, or other equivalent means.

(6) Maximum net mass: 50 kilograms (110.23 pounds).

**§ 178.521 Standards for plastic film bags.**

(a) The identification code for a plastic film bag is 5H4.

(b) Construction requirements for plastic film bags:

(1) Bags shall be made of a suitable plastic material. The strength of the material used and the construction of the bag shall be appropriate to the capacity of the bag and its intended use. Joints and closures shall be capable of withstanding pressures and impacts likely to occur under normal conditions of transport.

(2) Maximum net mass: 50 kilograms (110.23 pounds).

**§ 178.522 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:

(1) The textiles used shall be of good quality. The strength of the fabric and the construction of the bag shall be

appropriate to the capacity of the bag and its intended use.

(2) Bags, sift-proof, 5L2 shall be made sift-proof 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, or other equivalent means.

(3) Bags, water-resistant, 5L3 shall be made waterproof by the use of separate inner liners of water-resistant paper (e.g., waxed kraft, paper, tarred paper, or plastic-coated kraft paper); plastic film bonded to the inner surface of the bag; one or more inner liners made of plastic material; or other equivalent means.

(4) Maximum net mass: 50 kilograms (110.23 pounds).

**§ 178.523 Standards for paper bags.**

(a) The following are identification codes for paper bags:

(1) 5M1 for a multiwall paper bag not waterproofed; and

(2) 5M2 for a multiwall water-resistant paper bag.

(b) Construction requirements for paper bags:

(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 bags shall be appropriate to the bag's capacity and intended use. Seams and closures shall be sift-proof.

(2) Paper bags 5M2, constructed of four plies or greater, shall be made water-resistant by the use of either a water-resistant ply as one of the two outermost plies or a water-resistant 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. Where there is danger of the packaged material reacting with moisture or where it is packed damp, a water-resistant ply or barrier shall be placed next to the substance. Seams and closures shall be waterproofed.

(3) Maximum net mass: 50 kilograms (110.23 pounds).

**§ 178.524 Standards for composite packagings with inner plastic receptacles.**

(a) The following are the identification codes for composite packagings with inner receptacles of plastic:

(1) 6HA1 for a plastic receptacle within a protective steel drum;

(2) 6HA2 for a plastic receptacle within a protective steel crate;

(3) 6HD1 for a plastic receptacle within a protective plywood drum;



(4) 6HD2 for a plastic receptacle within a protective plywood box;

(5) 6HG1 for a plastic receptacle within a protective fiber drum;

(6) 6HG2 for a plastic receptacle within a protective fiberbox; and

(7) 6HH1 for a plastic receptacle within a protective plastic drum;

(b) Construction requirements for composite packaging within inner receptacles of plastic:

(1) Inner receptacles shall be constructed under the applicable construction requirements prescribed in § 178.509(b)(1) through (7).

(2) Plastic receptacles shall fit snugly inside the other protection which shall be free of any projections which may abrade the plastic material.

(3) Protective packaging:

(i) 6HA1: Protective packaging shall comply with the requirements for steel drums in § 178.505(b).

(ii) 6HA2: Protective packaging with steel wire, if used, shall be free of any projection that might abrade the inner receptacle.

(iii) 6HD1: Protective packaging shall comply with the requirements for plywood drums, in § 178.507(b).

(iv) 6HD2: Protective packaging shall comply with the requirements of plywood boxes, in § 178.516(b).

(v) 6HG1: Protective packaging shall comply with the requirements for fiber drums, in § 178.508(b).

(vi) 6HG2: Protective packaging shall comply with the requirements for fiberboard boxes, in § 178.518(b).

(vii) 6HH1: Protective packaging shall comply with the requirements for plastic drums, in § 178.509(b).

(4) Maximum capacity of inner receptacles:

(i) 6HA1, 6HD1, 6HG1, 6HH1—250 liters (66.05 gallons).

(ii) 6HA2, 6HD2, 6HG2—60 liters (15.85 gallons).

**§ 178.525 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;

(3) 6PD1 for glass, porcelain or stoneware receptacles within a protective plywood drum;

(4) 6PD2 for glass, porcelain or stoneware receptacles within a protective wickerwork hamper;

(5) 6PG1 for glass, porcelain or stoneware receptacles within a protective fiber drum; and

(6) 6PH1 for glass, porcelain or stoneware receptacles within a protective plastic or expanded plastic packaging.

(b) Construction requirements for composite packagings with inner receptacles of glass, porcelain, or stoneware:

(1) Inner receptacles:

(i) Receptacles shall be of suitable form (cylindrical or pear-shaped) and be made of good quality material free from any defect that could impair their strength. The walls shall be sufficiently thick at every point.

(ii) Screw-threaded plastic closures, ground glass stoppers, or closures at least equally effective shall be used as closures for receptacles. Any part of the closure likely to come into contact with the contents of the receptacle shall be resistant to those contents.

(iii) Closures shall be fitted so as to be leakproof and suitably secured to prevent any loosening during transportation.

(iv) If vented closures are necessary, they shall be leakproof.

(v) The receptacles shall be firmly secured in the outer packaging by means of cushioning and/or absorbent materials.

(2) Protective packaging:

(i) For receptacles with protective steel drum 6PA1, the drum shall comply with the requirements of § 178.505(b). The removable lid required for this type of packaging may, nevertheless, be in the form of a cap.

(ii) For receptacles with protective packaging of steel, steel-wire or steel-band crate 6PA2, the protective packaging shall comply with the following:

(A) In the case of cylindrical receptacles, the protective packaging shall, when upright, rise above the receptacle and its closure.

(B) 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 plywood drum 6PD1 the requirements of § 178.507(b) apply to the protective packaging. The body and head seams shall be leakproof.

(iv) 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.

(v) For receptacles with protective fiber drum 6PG1, the drum shall comply with requirements of § 178.508(b). The ends shall be of leakproof material.

(vi) For receptacles with protective plastic or expanded plastic packaging 6PH1, the protective packaging shall be manufactured from high-density polyethylene or from some other comparable plastic material whose quality and stability correspond to those of plastic drums meeting the requirements of § 178.509(b). Protective expanded plastic packaging shall meet the construction requirements of § 178.519(b). The removable lid required for this type of packaging may be a cap.

(3) Maximum capacity of receptacles:

(i) Liquid capacity: 60 liters (15.85 gallons).

(ii) Maximum net mass: 75 kilograms (165.35 pounds).

11. A new Subpart M would be added to read as follows:

**Subpart M—Testing of Packagings and Packages**

Sec.

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 with air.

178.605 Hydrostatic pressure test.

178.606 Stacking test.

178.607 Cooperage test for bung type wooden barrels.

178.608 Chemical compability test for plastic receptacles.

**Subpart M—Testing 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 minimum requirements; each packaging must be capable of successfully passing the prescribed tests.

(b) It is the responsibility of both the packaging manufacturer and the shipper (if the shipper performs any assembly functions on the package including final closure) to assure that packages are capable of passing the prescribed tests.

(c) Successful test results shall be achieved on each type of package before being offered for transportation. A package type is defined by the design, size, material, manner of construction and packing, and may include various surface treatments. It also includes receptacles of the same structural

design, wall thickness, material, and cross-section which differ only in their lesser design heights from the design type.

(d) Tests shall also be repeated on production samples at intervals established by the manufacturer, that will ensure that packagings are capable of passing the prescribed tests.

(e) Tests shall be repeated after each modification which alters the design, material, or manner of construction of a packaging.

(f) The Associate Director for HMR may approve the selective testing of packages that differ only in minor respects from a testing 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 dimension.

(g) Where several types of combination packaging, having different types of inner packaging, have been tested, the various inner packagings may also be assembled in a single outer packaging if the shipper certifies that this package meets the test requirements.

(h) The Associate Director for OE may, at any time in accordance with Subpart D of Part 107 of this chapter require proof through tests in accordance with this section that serially-produced packagings meet the requirements of the design-type tests.

(i) If an inner treatment or coating is required for safety reasons, it shall retain its protective properties even after the tests.

#### § 178.602 Preparation of packagings and packages for testing.

(a) Tests shall be carried out on packagings and packages as prepared for transport, 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 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 test or where this would invalidate the results of the tests.

(c) If the materials to be transported are replaced for test purposes by non-hazardous materials, the materials used shall be of the same specific gravity as the materials to be carried and their other physical properties (grain, size, viscosity) shall correspond as closely as possible to those of the materials being shipped.

(d) Paper or fiberboard packagings shall be conditioned for at least 24 hours in an atmosphere maintained at 50 percent relative humidity,  $\pm 2$  percent and at a temperature of  $23^{\circ}\text{C}$ ,  $\pm 2^{\circ}\text{C}$  ( $73^{\circ}\text{F}$   $\pm 4^{\circ}\text{F}$ ). They may, alternatively, be conditioned for at least 24 hours in an atmosphere maintained at 65 percent relative humidity,  $\pm 2$  percent and at a temperature of  $20^{\circ}\text{C}$ ,  $\pm 2^{\circ}\text{C}$  ( $68^{\circ}\text{F}$   $\pm 4^{\circ}\text{F}$ ), or  $27^{\circ}\text{C}$   $\pm 2^{\circ}\text{C}$  ( $80^{\circ}\text{F}$   $\pm 4^{\circ}\text{F}$ ). Preparation at ambient conditions is considered equivalent for production testing.

(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) 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 is as follows:

Packaging	Number of test samples	Drop orientation
Steel drums, aluminum drums, steel jerricans, plywood drums, wooden barrels, fiber drums, plastic drums and jerricans, composite packagings (plastic material) (6HA1, 6HD1, 6HG1, 6HH1), composite packagings (glass, porcelain, stoneware), tinplate and light-metal receptacles.	Six (three for each drop)	First drop (using three samples): the packaging 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 packaging 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, expanded plastic boxes, steel or aluminum boxes, composite packagings (plastic material) (6HA2, 6HD2, 6HG2).	Five (one for each drop)	First drop: flat on the bottom. Second drop: flat on the top. Third drop: flat on the long side. Fourth drop: flat on the short side. Fifth drop: on a corner.
Textile bags, paper bags	Three (two drops per bag)	First drop: flat on a face of the bag. Second drop: on the end of the bag.
Woven plastic bags, plastics film bags	Three (three drops per bag)	First drop: flat on a wide face. Second drop: flat on a narrow face.

(b) *Special preparation of test samples for the drop test.* Testing of plastic drums and jerricans, composite packagings with inner plastic receptacles, and of combination packagings 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  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or lower. Liquids shall maintain their liquid state by the addition of anti-freeze, if necessary.

(c) *Target.* The target shall be a rigid, non-resilient, flat and horizontal surface.

(d) *Drop height* (measured as the vertical distance from the target to the lowest point on the package).

(1) For solids and liquids, if the test is performed with the solid or liquid to be carried or with a non-hazardous material having essentially the same physical characteristic the drop height must be:

(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 meters (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 the distance must be:

(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 meters (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 (S.G.) of the material to be carried, rounded up to the first decimal, as follows:

(A) Packing Group I,  $\text{SG} \times 1.5$  meters (4.92 feet).

(B) Packing Group II,  $\text{SG} \times 1.0$  meter (3.2 feet).

(C) Packing Group III,  $\text{SG} \times 0.67$  meters (2.25 feet).

(e) *Criteria for passing the test.* A package is considered to successfully pass the drop tests if:

(1) For receptacles containing liquid, they are leakproof 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 shall exhibit 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) A slight discharge from the closure upon impact shall not be considered to be a failure of the packaging provided that no further leakage occurs.

#### § 178.604 Leakproofness test with air.

(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 the inner receptacles of combination packagings or composite packagings (glass, porcelain, or stoneware), nor for removable head receptacles intended for solids or for viscous liquids.

(b) *Number of test samples.* Three test samples are required per design type and manufacturer.

(c) *Special preparation of test samples for the test.* Vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

(d) *Test method.* The test samples shall be completely immersed in water and shall be kept under water in such a way as not to distort the result of the test. The seams or any part of the receptacle where leakage might occur may also be covered with soap solution, heavy oil, or other suitable liquid. Other methods at least equally effective, such as the air-pressure differential test ("air-pocket test") may also be used.

(e) *Pressure applied.* Air pressure must be applied to the container as indicated for the following packing groups:

(1) Packing Group I, Not less than 30 kilopascals (4.35psi).

(2) Packing Group II, Not less than 20 kilopascals (2.90psi).

(3) Packing Group III, Not less than 20 kilopascals (2.90psi).

(f) *Criteria for passing the test.* There shall be no leakage of air from the packaging.

#### § 178.605 Hydrostatic pressure test.

(a) *Packagings to be tested.* The hydrostatic pressure test shall be carried out on all metal, plastic, and composite receptacles intended to contain liquids. Except for air transport, this test is not required for inner packagings of combination packagings.

(b) *Number of test samples.* Three test samples are required per design type and manufacture.

(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 receptacles and their closures shall be subjected to the test pressure for 5 minutes. Plastic receptacles and composite packagings with inner plastic receptacles and their closures shall be subjected to the test pressure for 30 minutes. In addition, packagings intended to contain hazardous materials of Packing Group I shall be tested to a minimum test pressure of 250 kilopascals (36.28psi) for a test period of 5 minutes for metal containers or 30 minutes for plastic containers. Closures of less than 7 centimeters (2.75 inches) in diameter may be replaced during this additional test. 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 receptacle (i.e., the vapor pressure of the filling material and the partial pressure of the air or other inert gases minus 100 kilopascals (14.50 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 degree of filling in accordance with § 173.24(b)(2) 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 (14.50 psi) but with a minimum test pressure of 100 kilopascals (14.50 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 (14.50 psi), but with a minimum test pressure of 100 kilopascals (14.50 psi).

(e) *Pressure test requirements for air transport.* Additional pressure test requirements for air transport may exceed the pressure test required by paragraph (d) of this section.

(f) *Criteria for passing the test.* A package is considered to successfully pass the hydrostatic test only when there is no detectable leak.

#### § 178.606 Stacking test.

(a) *General.* All packagings, other than bags, shall be subjected to a stacking test.

(b) *Number of test samples.* Three test samples are required per design type and manufacturer.

(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, shall be 3 meters (9.84 feet). The duration of the test shall be 24 hours, except that plastic drums and jerricans 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).

(d) *Criteria for passing the test.* No test sample shall 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 position for one hour. No test sample shall leak. In composite packagings or combination packagings, there shall be no leakage of the filling substance from the inner receptacle, or inner packaging.

#### § 178.607 Cooperage test for bung type wooden barrels.

(a) *Number of samples.* One barrel is required per design type and manufacturer.

(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 is considered to successfully pass the cooperage test only if the diameter of the cross section of the upper part of the barrel shall not increase by more than 10 percent.

#### § 178.608 Chemical compatibility test for plastic receptacles.

(a) *General.* All packages where plastic comes in contact with liquid hazardous materials shall be subjected to the chemical compatibility test. This test is conducted by filling the receptacle to be tested with the hazardous material to be transported and storing the receptacle for 180 days at ambient temperature. At the end of that time, the receptacles shall be examined for signs of deterioration, swelling, crazing, cracking, excessive corrosion, or other defects likely to cause premature failure.

(b) *Number of samples.* Three test samples are required per design type and manufacture.

(c) *Alternative methods.* Historical evidence of compatibility or alternative

test methods may be used if authorized by the Associate Director, for HMR.

(d) *Test preparation.* Each step must be accomplished in the following order:

(1) The empty (tare) mass of each of the test receptacles shall be determined to an accuracy of 0.01%.

(2) The test receptacles shall be filled with the hazardous material and at the actual concentration to be transported, and closed according to the procedures in § 178.601.

(3) The filled (gross) mass of each of the test receptacles shall be determined to an accuracy of 0.01%.

(4) The test receptacles shall be placed in a suitable storage area.

(5) Inner receptacles may be placed in outer packagings or supported to the extent that they would be supported when placed in outer packagings.

(6) For the first and last 24 hours of storage, the test samples shall be placed with the closure downwards. Receptacles fitted with a vent shall be so placed on each occasion for 5 minutes only.

(f) *Test procedure.* Each step must be accomplished in the following order:

(1) The test receptacles must be stored for 180 days at a temperature not lower than 18° C (64° F). Materials which become unstable under certain conditions of temperature shall be stored at 4° C (7° F) below that temperature for the 180 days.

(2) At the end of the storage period, an examination of the exterior of each receptacle for evidence of leakage or excessive deformation must be performed.

(3) The filled (gross) mass of each of the test receptacles shall be determined to an accuracy of 0.01%.

(4) The receptacles must be emptied and cleared to remove any exterior or interior contamination.

(5) The empty (tare) mass of each of the test receptacles shall be determined to an accuracy of 0.01%.

(6) An examination of each test receptacle to detect evidence of deterioration must be performed.

(g) *Criteria for passing test.* A packaging shall be considered to have successfully passed the chemical compatibility test for plastic receptacles only if:

(1) The receptacles show no signs of leakage, deterioration, swelling, crazing, cracking, excessive corrosion or other defects likely to cause or indicate premature failure.

(2) The loss of contents, expressed as a percentage of the original net mass, does not exceed:

(i) 0.25% for hazardous materials having an oral toxicity of less than 20 mg/kg (LD<sub>50</sub>, oral rat) or a dermal toxicity of less than 80 mg/kg (LD<sub>50</sub>, dermal rat), or

(ii) 1.0% for all other hazardous materials.

(3) The change in tare mass of the receptacle, expressed as a percentage of the original tare mass, does not exceed 0.2%.

(h) The drop test for plastic packagings specified in § 178.603 shall be performed after the packagings have passed the chemical compatibility test.

This ANPRM is a preliminary document and solicits information on the impacts of adopting a regulatory system based on the UN Recommendations. Because DOT lacks data on these impacts, it is unable to make a determination as to whether or not the adoption of such a regulatory system would result in a "major rule" under the terms of Executive Order 12291 and DOT Implementing procedure (44 FR 11034) or to determine beyond a preliminary assessment that an environmental impact statement will be required under the National Environmental Policy Act (49 USC 4321 et seq.). These determinations will be made should this project advance to the Notice of Proposed Rulemaking stage.

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