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## **Part II**

### **Department of Transportation**

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**Pipeline and Hazardous Materials Safety  
Administration**

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**49 CFR Parts 171, 172, 173, et al.  
Hazardous Material; Miscellaneous  
Packaging Amendments; Final Rule**

**DEPARTMENT OF TRANSPORTATION**

**Pipeline and Hazardous Materials Safety Administration**

**49 CFR Parts 171, 172, 173, 174, and 178**

[Docket No. PHMSA-06-25736 (HM-231)]

RIN 2137-AD89

**Hazardous Material; Miscellaneous Packaging Amendments**

**AGENCY:** Pipeline and Hazardous Materials Safety Administration (PHMSA), DOT.

**ACTION:** Final rule.

**SUMMARY:** In this final rule, PHMSA is amending packaging requirements in the Hazardous Materials Regulations to enhance compliance flexibility, improve clarity, and reduce regulatory burdens. Specifically, we are revising several packaging related definitions; adding provisions to allow more flexibility when preparing and transmitting closure instructions, including conditions under which closure instructions may be transmitted electronically; adding a requirement for shippers to retain packaging closure instructions; incorporating new language that will allow for a practicable means of stenciling the “UN” symbol on packagings; and clarifying a requirement to document the methodology used when determining whether a change in packaging configuration requires retesting as a new design or may be considered a variation of a previously tested design. This final rule also incorporates requirements for construction, maintenance, and use of Large Packagings.

**DATES:** *Effective Date:* October 1, 2010.

*Voluntary Compliance Date:* Compliance with the requirements adopted herein is authorized as of March 4, 2010. However, persons voluntarily complying with these regulations should be aware that

appeals may be received and as a result of PHMSA’s evaluation of these appeals, the amendments adopted in this final rule may be revised accordingly.

**FOR FURTHER INFORMATION CONTACT:** Eileen Edmonson, Office of Hazardous Materials Standards, (202) 366-8553, or Ben Moore, Office of Hazardous Materials Technology, (202) 366-4545; Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, 1200 New Jersey Avenue, SE., Washington, DC 20590-0001.

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**I. Background**

On September 1, 2006, we published a notice of proposed rulemaking

(NPRM) under Docket HM-231 (71 FR 52017) that proposed to: (1) Revise, remove, and add definitions specific to packaging requirements; (2) amend import and export provisions to require plastic single and composite non-bulk packagings containing Division 6.1 material to be marked “POISON” in conformance with § 172.313(b); (3) revise certain § 172.101 Table entries for packaging requirements; (4) add and revise certain special provisions to authorize the transportation of certain hazardous materials in Large Packagings; (5) clarify shippers’ responsibilities for complying with packaging standards; (6) clarify requirements for stacking of bulk packages; (7) correct an error in provisions applicable to intermediate bulk container (IBC) requirements related to gauge pressure; (8) authorize the transportation of bromine residue in cargo tanks; (9) clarify requirements applicable to closure instructions for specification packagings; (10) add exceptions for marking of steel drums; (11) add an exception to permit marking of the UN symbol on specification packagings with a stencil; (12) amend general requirements for the use of certain packaging variations; and (13) add standards and provisions for the manufacture and use of Large Packagings.

Twenty-four persons submitted comments on the NPRM. Most supported adoption of the proposals in the NPRM. Negative comments were generally focused on issues related to record retention of closure instructions, documenting methodologies utilized to determine whether packaging variations achieve an equivalent level of performance to already tested packaging configurations, and the definitions proposed for bulk and non-bulk packaging.

The comments may be reviewed at <http://www.regulations.gov>. For convenience, a list of the commenters is provided below.

Name/company	Date of letter or when received	Document No.
Kathryn W. Pacha .....	09/05/2006	PHMSA-2006-25736-2
Georgia Department of Public Safety .....	09/25/2006	PHMSA-2006-25736-3
Regulatory Resources, Inc. (RRI) .....	10/06/2006	PHMSA-2006-25736-4
Frits Wybenga .....	10/09/2006	PHMSA-2006-25736-5
European Chemical Industry Council (CEFIC) .....	10/24/2006	PHMSA-2006-25736-6
The Dangerous Goods Advisory Council (DGAC) .....	10/26/2006	PHMSA-2006-25736-7
North American Automotive Hazmat Action Committee (NAAHAC) .....	11/16/2006	PHMSA-2006-25736-8
Kurt Colborn .....	11/22/2006	PHMSA-2006-25736-9
National Association of Chemical Distributors (NACD) .....	11/22/2006	PHMSA-2006-25736-10
The Chlorine Institute, Inc .....	11/22/2006	PHMSA-2006-25736-11
HMT Associates L.L.C .....	11/21/2006	PHMSA-2006-25736-12
Air Products and Chemicals, Inc. (Air Products) .....	11/29/2006	PHMSA-2006-25736-13
American Trucking Associations (ATA) .....	11/30/2006	PHMSA-2006-25736-14

Name/company	Date of letter or when received	Document No.
U.S. Department of Energy (DOE)	11/30/2006	PHMSA-2006-25736-15
Crop Life America (CropLife)	11/27/2006	PHMSA-2006-25736-16
C. L. Smith Company	11/30/2006	PHMSA-2006-25736-17
Flexible Intermediate Bulk Container Association (FIBCA)	11/30/2006	PHMSA-2006-25736-18
Reusable Industrial Packaging Association (RIPA)	11/27/2006	PHMSA-2006-25736-19
Charles E. Tudor, CP-P/MH	11/28/2006	PHMSA-2006-25736-20
Steel Shipping Container Institute (SSCI)	11/29/2006	PHMSA-2006-25736-0022
American Promotional Events, Inc. (APE)	11/30/2006	PHMSA-2006-25736-23
Greg McCaless	10/12/2007	PHMSA-2006-25736-24

On December 1, 2006, we published a correction to the NPRM to correct mathematical calculations under the Paperwork Reduction Act section of the rulemaking. The revision changed the total number of annual respondents from 5,000 to 5,010, and the total number of annual responses from 15,000 to 15,500 for OMB Control No. 2137-0572.

This final rule is designed primarily to enhance safety, clarify specific packaging regulations and to ease and enhance compliance by incorporating changes into the HMR based on PHMSA's own initiative and petitions for rulemaking submitted in accordance with 49 CFR 106.95. We are also adding two new subparts to Part 178—Subpart P—Large Packaging Standards, and Subpart Q—Testing of Large Packagings—to facilitate the use of these packagings.

*In this final rule, we are amending the HMR to:*

1. Revise the definitions for “Bulk packaging” and “Large packaging” to allow intermediate forms of containment and add a definition for “Strong outer packaging” for consistency and clarity when shipping in non-specification packaging.
2. Revise § 172.101 Table entries to authorize the use of Large Packagings for certain explosives, and revise packaging requirements for “Azodicarbonamide” and “Isosorbide-5-mononitrate.”
3. Add and revise special provisions to facilitate the use of Large Packagings.
4. Clarify shippers’ responsibilities regarding package closure instructions and electronic transmission, and add new requirements regarding retention and other exceptions.
5. Clarify shippers’ responsibilities to comply with the HMR’s packaging

standards, and to document the method used when determining whether a change in packaging configuration requires retesting as a new design or may be considered a variation of a previously tested design.

6. Correct an error in general IBC requirements related to pressure limits.
7. Authorize the transportation of bromine residue in cargo tanks.
8. Revise requirements applicable to closure instructions to permit manufacturers additional flexibility when preparing and transmitting them.
9. Permit stenciling of the UN symbol on specification packagings.
10. Add new Subparts P and Q to Part 178 to authorize the manufacture, testing, and use of Large Packagings.

This final rule also implements several revisions proposed in the NPRM based on six petitions for rulemaking:

Name/company	Date of letter or when received	Document No.	Petition No.
Monsanto-The Agricultural Group	04/16/1993	PHMSA-RSPA-1993-12657-0001	P-1173
Steel Shipping Container Institute	05/20/1997	PHMSA-RSPA-2002-13401-0001	P-1337
The Association of Container Reconditioners	05/20/1998	PHMSA-RSPA-1998-12610-0001	P-1359
Steel Shipping Container Institute	01/26/1999	PHMSA-RSPA-2002-13401-0001	P-1371
Arch Chemicals, Inc	10/01/2002	PHMSA-RSPA-2002-14130-0002	P-1431
Dangerous Goods Advisory Council	04/19/2005	PHMSA-2005-21091-0001	P-1455

The petitions are discussed in more detail in the appropriate sections of this preamble. Each of these petitions may be viewed at <http://www.regulations.gov> in the docket for this rulemaking.

**II. Provisions Adopted in This Final Rule**

Following is a discussion of the comments we received in response to the 2006 NPRM and a detailed explanation of the provisions we are adopting in this final rule.

**A. Definitions**

Section 171.8 contains the general definitions and section references that apply to the HMR. In the NPRM, we proposed to revise the definitions in this section for bulk, non-bulk, and large

packaging; remove the definition for strong outside container; and add definitions for reconditioned, remanufactured, and strong outer packagings.

*Bulk and Non-bulk Packaging.* In the NPRM, we proposed to revise the definitions for “Bulk packaging” and “Non-bulk packaging” based on the particular packaging specification at issue and volumetric capacity. The proposed changes were prompted by a petition from Monsanto Company (P-1173) and designed to make the definitions easier to understand. In the NPRM, we proposed to remove the maximum net mass and water capacity limits from these definitions and replace them with requirements that emphasize packaging type and the performance-

oriented packaging standards of Subparts C, L, and M of 49 CFR Part 178, as applicable. We proposed these changes to clarify the current definitions, eliminate confusion, and enhance voluntary compliance. We did not intend to change the quantity thresholds in the HMR for bulk or non-bulk packagings.

The majority of commenters object to the proposed changes. The commenters have the following concerns:

1. *Applicability of the proposed definitions to cylinders.* Three commenters (the NACD, The Chlorine Institute, Inc., and Air Products) suggest that the proposed definition for “bulk packaging” could be interpreted to cover the DOT 3AX, 3AAX, and 3T bulk cylinders. In its comments, NACD states

that these containers have traditionally been considered non-bulk packagings and have been handled as such without safety problems. All three commenters are concerned that this “re-definition” will adversely affect the transportation of many compressed gases and could result in the application of regulatory requirements specific to the transportation of bulk packages to transporters of larger chlorine cylinders, essentially eliminating a common transportation method for transporting DOT 3AAX cylinders by highway. The commenters also contend that this change would place a substantial burden on shippers and users of chlorine with no safety justification because historically these packagings have had few problems in transportation.

2. *Applicability of the proposed definitions to RAM.* The U.S. Department of Energy (DOE) is strongly opposed to a bulk/non-bulk distinction with regard to radioactive materials (RAM) packaging. DOE states that packaging requirements for RAM have historically been based on risk and containment only, without consideration for volume. DOE also cites a previously issued interpretation that stated that RAM packagings are generally considered non-bulk (Reference Number: 01–0153). DOE is specifically concerned with the implications of bulk venting requirements and the removal of the restriction on intermediate forms of containment in bulk packagings. DOE is further concerned that current requirements restricting the venting of bulk packagings would prevent necessary venting of certain RAM packagings if they are classed as “bulk.”

3. *Volumetric capacity limits and Harmonization with United Nations (UN) Model Regulations.* Nine commenters state that the non-bulk packaging definition should be based on UN Model Regulations (*i.e.*, no volumetric limit for solids). These commenters assert that use of the UN Model Regulations allows non-bulk packagings with volumetric capacities greater than 450 liters (119 gallons) provided the weight does not exceed 400 kg (882 pounds). Generally, the commenters assert that the lack of harmonized definitions places U.S. companies at a competitive disadvantage and appears to provide no safety benefits, while a harmonized standard would promote flexibility and cost-effectiveness. The RIPA agrees it

may be beneficial to harmonize with the international requirements, but believes all the consequences of such a change should be considered more fully in a separate rulemaking.

4. *Necessity of definitions.* Two commenters (DGAC and APE) state the definitions for bulk and non-bulk packaging should be removed from the HMR. In its comments, DGAC states that the delineation is arbitrary and that the terms no longer serve a useful purpose in regulation. APE states these terms are not used in international regulations, and in its experience using these terms is detrimental to U.S. industry and offers no safety benefits.

On the other hand, Kathryn W. Pacha states “Removal of the volumetric requirement from the definition could make the application of markings, labels, and placards more confusing and not less.” Ms. Pacha supports the volumetric limit in the current version of the HMR and stated in her comments: “From the perspective of emergency responders, if a package looks big, it should be communicated as “big” since communication requirements are for emergency responders.” RIPA also opposes removing the volumetric limits in the HMR for bulk and non-bulk packagings because it finds the proposed definitions more confusing than the originals, and believes without these volumetric definitions the distinction between IBCs and drums could disappear.

Based on the overwhelming opposition to the proposed definitions for “bulk packaging” and “non-bulk packaging,” we are not adopting the proposed definitions in this final rule. Packaging manufacturers and shippers should be aware that packagings with a volumetric capacity greater than 450 liters (119 gallons) as a receptacle for a liquid, both a maximum net capacity greater than 450 L (119 gallons) and a maximum net mass greater than 400 kg (882 pounds) as a receptacle for a solid, and a water capacity greater than 454 kg (1,000 pounds) as a receptacle for a gas are bulk packagings under the HMR regardless of the weight or volume of the hazardous material contained therein. See § 171.8. We want to emphasize for packaging manufacturers and shippers that the bulk packaging definition is based on the capacity of a packaging, not on the actual amount contained in the packaging at shipment. Thus, packagings with the bulk volumetric capacity mentioned earlier in this paragraph are bulk packagings

for purposes of the HMR regardless of the weight or volume of the hazardous material contained therein.

In this final rule, we are removing the phrase “with no intermediate form of containment” from the definition of a “bulk packaging.” Modifying the definition in this way clarifies that Large Packagings, which contain inner packagings, are considered bulk packagings for purposes of the HMR. Commenters did not oppose this change.

In conjunction with our proposal to revise the definitions for “bulk packaging” and “non-bulk packaging,” we proposed to define standards for each specific non-bulk specification packaging type. We proposed to amend §§ 178.512 through 178.521 to specify volumetric capacity may not exceed 450 L (119 gallons) for the following packaging design types: aluminum boxes, natural wood boxes, plywood boxes, reconstituted wood boxes, fiberboard boxes, plastic boxes, woven plastic bags, plastic film bags, textile bags, and paper bags. The purpose was to eliminate uncertainty in determining if a package is a bulk package or a non-bulk package.

Commenters strongly oppose the revised definitions and the revisions to §§ 178.512 through 178.521. As discussed above, we are not adopting the proposed definitions for non-bulk and bulk packagings in this final rule. Similarly, we are not adopting the revisions proposed for §§ 178.512 through 178.521. However, packaging manufacturers and shippers should be aware that packagings with a volumetric capacity greater than 450 liters (119 gallons) are bulk packagings regardless of the weight of the hazardous material contained in the packaging.

*Strong outside container and strong outer packaging.* In the NPRM, we proposed to remove the definition for “strong outside container” and add a new definition for “strong outer packaging.” Currently, the HMR use the terms “strong outside container,” “strong outside packaging,” and “strong outer packaging” interchangeably; however, there is no definition for “strong outer packaging” or “strong outside packaging” in § 171.8. Therefore, we proposed to remove the wording “strong outside container” and “strong outside packaging,” add the language from the “strong outside container” definition to a new definition for “strong outer packaging,” and add additional language to the new definition as follows:

Strong outside container vs. strong outer packaging	Current	Proposed
	<p><i>Strong outside container</i> means the outermost enclosure which provides protection against the unintentional release of its contents under conditions normally incident to transportation.</p>	<p><i>Strong outer packaging</i> means the outermost enclosure which provides protection against the unintentional release of its contents. It is a packaging, which is sturdy, durable, and constructed so that it will retain its contents under normal conditions of transportation, including rough handling. In addition, a strong outer packaging must meet the general packaging requirements of subpart B of part 173 of this subchapter but need not comply with the specification packaging requirements in Part 178 of the subchapter. For transport by aircraft, a strong outer packaging is subject to § 173.27 of this subchapter.</p>

Three commenters, RRI, the DGAC, and the NAAHAC, submitted comments in support of the proposed new definition. RRI and NAAHAC strongly support the new definition; however, they disagree with the use of the phrase “including rough handling” following the long-used phrase “normal conditions of transport” because it implies that rough handling is “normal.” In the course of transportation, packages are handled in a manner that can be characterized as “rough.” Rough handling is common and may occur any time a package is loaded or unloaded in a hurried manner, shifts while in a transport vehicle, or is dropped from a height of more than a few inches (*e.g.*, three inches). After further consideration, we have concluded that adding the phrase “including rough handling” is redundant and inconsistent with other HMR provisions that include the phrase “normal conditions of transportation.” Therefore, in this final rule we are removing the phrase “including rough handling” from the definition proposed in the NPRM.

DGAC supports the new definition for “strong outer packaging” but questions the need to reference Subpart B of Part 173 and § 173.27. DGAC contends that most strong outer packagings are used to transport limited quantities, the regulatory requirements for which already reference Subpart B. The commenter is correct that the regulatory requirements applicable to limited quantity shipments already reference Subpart B. However, there are a number of instances in the HMR authorizing the transportation of certain classes and quantities of hazardous materials, other than limited quantities, in strong outer packagings. Including the references to Subpart B of Part 173 and § 173.27 in the definition for “strong outer packaging” will contribute to an increased level of regulatory compliance by cross-referencing the requirements that apply.

PHMSA notes none of the commenters objected to the interchangeable manner in which “strong outside container,” “strong outside packaging,” and “strong outer packaging” are currently used in the HMR. Although “strong outer packaging” is used the most in the HMR, to PHMSA’s knowledge, the interchangeable use of this wording with strong outside container and strong outside packaging has resulted in little or no confusion to the shipper. Further, we believe that removing “strong outside container” and “strong outside packaging” from the HMR may cause confusion for the regulated community that may compromise safety, whereas adding the definition for “strong outer packaging” and a sentence at its end that states the three terms are interchangeable may clarify their meaning. Therefore, in this final rule we are adding a sentence to the end of the new definition for “strong outer packaging” in § 171.8 to clarify that “strong outside container” and “strong outside packaging” are synonymous in meaning with “strong outer packaging.”

*Remanufactured packaging, Reused packaging, and Reconditioned Packaging.* Currently, the HMR define “remanufactured packaging,” “reused packaging,” and “reconditioned packaging” in § 173.28. In the NPRM, we proposed to add a reader’s aid to § 171.8 to refer to the definitions for “remanufactured packaging” and “reconditioned packaging” in § 173.28. We did not propose a reference to “reused packaging” in the NPRM. RIPA supports the addition of the reader’s aids for “remanufactured packaging” and “reconditioned packaging” in § 171.8, and suggests that PHMSA should also add a reference for “reused packaging” in § 171.8. We agree. In this final rule, we are adding a reference for “reused packaging” in § 171.8.

#### *B. Plastic Packagings Used To Transport Poison Materials*

Section 171.23 establishes conditions under which shippers may use the international standards as authorized by the HMR for shipments transported to, from, or within the United States. Arch Chemicals, Inc. (“Arch”) petitioned PHMSA (P–1431) to amend this section to reference the marking requirement in § 172.313(b). Paragraph (b) of § 172.313 requires plastic single and composite non-bulk packagings containing Division 6.1 material to be marked “POISON.” The purpose of this marking is to inform persons who may wish to re-use a packaging that previously contained a poisonous material that the packaging should not be used for foodstuffs because the poison may have permeated the packaging material. In its petition, Arch states that, because § 171.23 does not require compliance with § 172.313, import shipments need not have this marking, creating an inconsistency in the HMR. Thus, in the NPRM we proposed to require import and export shipments to be marked in accordance with § 172.313(b).

Several commenters, including Arch, oppose this proposal. Instead, they suggest that we eliminate the domestic marking requirement. Two commenters, Air Products and CropLife, state the term “poison” is not used in international regulations. CropLife further states it believes the United States should not require that “poison” be marked on foreign plastics that contain these types of materials without evidence the requirement will achieve measureable safety improvements. Commenters also state that the current requirements are outdated because newer plastics have been developed since § 172.313(b) was originally incorporated into the HMR. The newer plastics are designed so that they could be filled with a poison material, cleaned, and filled with a foodstuff safely.

In this final rule we are not adopting the proposed change due to overwhelming opposition to the proposal, including opposition from the original petitioner. Comments concerning elimination of the domestic marking requirement are beyond the scope of this rulemaking. PHMSA may consider revisions to the import-export requirements or a proposal to the UN as a future initiative.

The Dangerous Goods Advisory Council (DGAC) notes that PHMSA permits the use of the word "TOXIC" in the place of "POISON." We agree that TOXIC can be used in place of POISON throughout the HMR. Therefore, we are not revising § 172.313 in this final rule to clarify further that the HMR permit the word "TOXIC" to be used as an alternative to the word "POISON."

#### C. Revisions to the Hazardous Materials Table

The Hazardous Materials Table (HMT) in § 172.101 lists the proper shipping name, hazard class, and identification number that must be used to describe a hazardous material in transportation. In the NPRM, we proposed several minor amendments to the HMT related to packaging provisions. We received no comments on these proposals; therefore, we are adopting them as proposed in this final rule.

We are amending the entries for "Azodicarbonamide" and "Isosorbide-5-mononitrate." Because these materials pose similar hazards, they are best packaged in the same manner as Musk xylene (5-tert-Butyl-2,4,6-trinitro-m-xylene). We are changing their references for non-bulk packaging to § 173.223. To authorize the transportation of certain explosives in Large Packagings consistent with the UN Recommendations, several entries for explosives are revised to read "62" rather than "none" in Column (8c). We are also making editorial changes to the special provisions and vessel stowage requirements for these entries in the HMT.

As proposed in the NPRM, we are revising § 173.223 for consistency with the revised HMT entries for "Azodicarbonamide" and "Isosorbide-5-mononitrate." PHMSA received no comments on the language change proposed in the NPRM, and will adopt these provisions as proposed.

#### D. Exceptions for Shipments of Waste Materials

Section 173.12 establishes conditions for reuse of previously used packagings for the transportation of hazardous waste. The Association of Container Reconditioners (ACR) (P-1328)

petitioned PHMSA to amend § 173.12(c). ACR states the minimum thickness criteria specified in § 173.28(b)(4) for the reuse of metal and plastic drums and jerricans should be applied to packagings reused for waste materials under the exception in § 173.12(c). ACR contends that hazardous waste packagings currently excepted under § 173.12(c) should be subject to minimum thickness criteria, and that the inclusion of § 173.12(c) is an oversight and was inadvertently incorporated into the HMR as part of Docket HM-181 (December 21, 1990; 55 FR 52401).

The exception in § 173.12(c) is not authorized for a packaging intended to be used more than two times (initial use and the return shipment of the waste product). A package may only be shipped under this exception once and must meet the following conditions: (1) It may only be transported by highway; (2) it must be loaded by the shipper and unloaded by the consignee or shipped by a private motor carrier; (3) the packaging may not be offered for transportation less than twenty-four hours after it is finally closed for transportation and; (4) each package must be inspected for leakage and found to be free from leaks immediately prior to being offered for transportation. If the packaging is subsequently reused, it will be subject to the minimum thickness requirements in § 173.28(b)(4). The significant restrictions of § 173.12(c) and the fact that the exception may only be used once per packaging make it unnecessary to require a shipper to comply with the minimum thickness criteria in § 173.28(b)(4). Therefore, we do not believe that the packages that comply with the restrictions in § 173.12(c) need to comply with the minimum thickness criteria in § 173.28(b)(4). We also do not believe that the costs associated with the impacts of both petitioners' requests are commensurate with the benefits and, therefore, in this final rule we are denying their petitions.

Citing safety as their concern, RIPA supports maintaining minimum thickness criteria for steel and plastic drums reused for one-time shipments of hazardous wastes under the waste exceptions in § 173.12. RIPA suggests that the uncertainty in characterizing these wastes warrants more stringent requirements for their packaging. We disagree. As we previously stated, based on the additional provisions that must be met in § 173.12(c), we concluded that there will be minimal, if any, additional safety benefit as a result of an additional minimum thickness requirement for this exception and there would be

significant additional cost associated with the addition of such a requirement.

#### E. Packaging Closure Instructions

In accordance with § 178.2(c), a packaging manufacturer and subsequent distributors of the packaging must provide written instructions for assembling and closing the packaging so that it will maintain its integrity during transportation. However, this section does not specify how detailed the closure instructions must be or what they must include. Generally, we expect that the closure instructions will provide for a consistent and repeatable means of closure. For example, the manufacturer's closure instructions could specify a range of torque values applicable to the closure or a detailed closure method (e.g., tighten the cap until the bottle contacts the cap gasket and then tighten an additional 3/4 turn). Alternatively, the packaging and closure could be designed with a stop feature of other indexing to indicate how the cap should be tightened. The closure instructions should be consistent with the language in the packaging test report and written so the user is able to duplicate the closure method. In the NPRM, we proposed to add language to § 178.2(c) to clarify closure instruction requirements. The new language clarifies that any closure method is authorized provided that it is measurable and repeatable.

Several commenters express concern with this new language, suggesting that it is a significant, unnecessary, and potentially costly new requirement (RIPA); that it will be ineffective because closure failures, when they occur, are more likely the result of human error and not closing the package in accordance with the closure instructions (DGAC); and that it may not always be possible to employ a closure method that is "measurable" (FIBCA) or "repeatable" (RIPA).

Comments are not correct that the proposed language requiring packagings to be closed "in the same manner" as when the package design type was tested is a new requirement; this is a longstanding regulatory requirement. The proposed revision to this section was intended to clarify that packaging closure methods must be consistent and repeatable, but need not necessarily require instruments such as a torque wrench.

We are confident that manufacturers will be able to develop closure methods for all packagings that are both repeatable and measurable. The meaning of the term "measurable" will differ depending on the type of packaging. For example, on a bottle

“measurable” could be the torque setting on a torque wrench or the number of turns (or fraction thereof) past contact with a gasket. In the case of a flexible packaging, it could be the setting on a sewing device, type and grade of thread, the type of glue, the location where the tie-off is to be placed, or pressure settings on a sealing device. We agree that certain closure methods are not measurable in the sense that they cannot be quantified with a number and a unit of measure (e.g., 25 inch-pounds).

In this final rule, we are revising § 178.2(c)(1)(ii) to clarify that closure instructions must provide for a repeatable means of closure consistent with the means of closure used for performance testing. This change is intended to provide additional flexibility to packaging manufacturers and allow for packagings with a simpler means of closure.

In addition, in this final rule we are amending § 178.2(c) to clarify that a packaging manufacturer may transmit the information required in this section, including closure instructions, using electronic means instead of or in addition to making a written notification. Such electronic means of notification may include emailed transmissions or transmission on a CD or other similar device. Permitting the use of electronic means to meet the notification requirements in this section provides manufacturers with additional flexibility and will reduce compliance costs. Note that if a manufacturer elects to utilize electronic measures to make the required notifications, he must make a positive notification—that is, he must email or transmit the information specific to the packaging in question and the transmission must be in a form that can be printed in hard copy by the person receiving the notification. Referring the person receiving the notification to a website for the required information is not acceptable.

In the NPRM, we proposed to revise the shipper’s responsibilities in § 173.22(a)(4) to include a requirement to retain a copy of the packaging closure instructions provided by the packaging manufacturer. As proposed, a shipper would be required to retain closure instructions for at least 375 days. Current requirements specify that the person transferring the packaging to the shipper or distributor must furnish a copy of the closure instructions; however, there is no requirement for the shipper to retain the documentation.

A number of commenters (RIPA, DGAC, Mr. Frits Wybenga, Air Products, FIBCA, CropLife, and SSCI) oppose a requirement for shippers to retain packaging closure instructions. These

commenters state the proposed requirement imposes a significant new record retention requirement without adequate justification or underlying data. RIPA states it “is unaware of any data or other evidence developed by DOT to support its proposal. In fact, it is quite probable that leaks from closures are more often the result of human error rather than the unavailability of adequate closure instructions.” RIPA suggests that if the proposal is adopted, the record retention period should be limited to 365 days and shippers should be required to retain only one current copy of a manufacturer’s closure notification. Several commenters questioned the safety benefit of retaining packaging closure instructions for 375 days.

Two commenters (DOE and NAAHAC) support the proposal to ensure that the necessary closure instructions and supporting test documents are available and used, but DOE’s request that PHMSA clarify how this proposed requirement would apply to gas cylinders, cargo tanks, and portable tanks. DOE also requests that PHMSA simplify the retention requirement for variation packagings to keep document retention costs at a minimum. Air Products states precautionary labels exist on compressed gas cylinders that include closure instructions, and questions what benefit additional closure instructions would provide. NAAHAC requests that only the initial shipper be required to provide closure instructions and supportive documentation, if applicable, to the second user of the package. NAAHAC states “to require that all of this information be provided to and maintained by [each] subsequent shipper who has opened the package and is reusing it would place a significant burden on the industry.” The NACD suggested, if a sufficient need can be demonstrated for retaining the closure instructions, that PHMSA require each shipper to retain an on-site master list of closure instructions and variations instead of those for each individual packaging to reduce the amount of paperwork.

Underlying our NPRM proposal to require shippers to retain packaging closure instructions was our belief that, in the absence of a regulatory requirement, most shippers retain closure instructions as a responsible business practice to ensure that employees know how to properly close a package. We, therefore, assumed that imposition of a regulatory requirement would result in only a minimally increased paperwork burden. However, the commenters indicate that retention

of closure instructions is not a common practice.

We continue to believe that shippers should retain and utilize the closure instructions provided by packaging manufacturers to ensure these packagings, including those with variations, are properly prepared and closed for transportation. As we stated in the NPRM, a packaging may be filled and closed by a hazmat employee other than the individual who receives the manufacturer’s packaging closure instructions. Moreover, a packaging may not be filled and closed for weeks or months after it has been sold or otherwise transferred to the shipper. In the absence of closure instructions, the shipper and its employees may not know how to properly close the package. Indeed, in its comments on proposed revisions to § 178.2(c) (discussed elsewhere in this preamble), DGAC states that closure failures, when they occur, are likely the result of not closing the package in an accordance with the closure instructions. Our incident data shows that the primary cause of incidents involving leakage from packages in transportation is improperly closed packages.

We agree that human error often results in leaks from closures, and we believe that use of accurate closure instructions will result in fewer instances of human error. A hazmat employee’s ability to properly close a hazardous materials packaging is significantly compromised without the manufacturer’s closure instructions. Retention of and adherence to the closure instructions will help to ensure hazardous materials packages are closed as the manufacturer intended, thereby reducing the possibility that these packages will leak or be breached during transportation. This will also provide consistency for training. There are many employees that do not perform hazardous material related functions daily, so on the occasion when they are requested to do so, having instructions to use as a guide will assist them with performing these tasks in conformance with the regulations. Therefore, we are retaining this requirement and, in response to the comments, are slightly reducing the number of days of retention to 365 and adjusting our estimates of the compliance burden, including the paperwork burden, to account for the fact that most shippers do not currently retain closure instructions.

We note that a shipper may retain closure instructions in a variety of ways that may prove cost effective. For example, a shipper may maintain closure instructions in an electronic

format or as part of a package of guidance material for hazmat employees who are responsible for filling and closing packagings. Further, the closure instructions need not be maintained in the precise format or wording provided by the manufacturer. If a shipper identifies a more effective way to communicate closure instructions to its hazmat employees—such as through graphical or pictorial depictions, step-by-step instructions, simplified wording, or similar methods—a shipper may do so provided the substance of the closure instructions is retained. The closure instructions should be retained in a format that will ensure that each hazmat employee responsible for closing the packaging to which the instructions apply understands the instructions and can apply them consistently. Therefore, in this final rule, we are adopting a requirement for shippers to retain packaging closure instructions provided by the packaging manufacturer for at least 365 days after offering the package for transportation. We are also adopting an exception from this requirement for closure instructions that are permanently embossed or printed on the packaging.

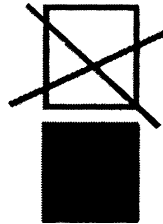
#### F. General Requirements for Bulk Packagings

In the NPRM, we proposed a new paragraph § 173.24b(e) to clarify that bulk packagings not designated and tested for stacking may not be stacked during transportation. In addition, we proposed adding language to clarify that bulk packagings intended for stacking may not have weight superimposed upon them than what is marked on the packaging. Currently, the requirements in § 173.24b(e) apply to IBCs and Large Packagings only. See existing § 178.703(a)(1)(vii) and new § 178.903(a)(1)(vii) in this rule. The HMR require bulk packagings designed or intended to be stacked to meet stacking test requirements, either through performance testing specifically prescribed in the HMR or industry standards incorporated-by-reference into the HMR (see § 171.7). However, the HMR do not always require the maximum load that can be stacked on the packaging to be marked or indicated on the packaging in the same manner as it requires this information on IBC and Large Packagings. Adopting the language proposed in the NPRM for § 173.24b(e) may add additional testing, marking, and paperwork activities for some bulk packagings that were not previously considered under this rulemaking action or that may already be addressed under some other type of informational marking. Therefore, we

are not revising existing § 173.24b(e) in this final rule. We will continue to examine this issue to determine if additional rulemaking action is necessary. The comments we received on this subject in response to this rulemaking will be taken under consideration if we develop a future rulemaking.

Air Products, ATA, CropLife, RIPA, and DGAC supported aligning the stacking requirements for IBC and Large Packagings with those the UN Subcommittee on the Transport of Dangerous Goods was considering at the time this NPRM was published, which included incorporating specific symbols to indicate if these packages could or could not be stacked during transportation. In December 2006, the UN Subcommittee adopted these symbols in the 15th edition of the UN Recommendations as a stacking mark for IBCs packagings only that are manufactured, repaired, or remanufactured on or after 1/1/2011. We've repeated the symbols here for your convenience. They are also located in the ATA's comments (PHMSA–2006–25736–0014).

#### IBCs not capable of being stacked



IBCs capable of being stacked (must include the maximum stacking weight):



In a final rule PHMSA issued on January 14, 2009, PHMSA incorporated these symbols for IBCs into § 178.703 of the HMR (see Docket Nos. PHMSA–2007–0065 (HM–224D) and PHMSA–2008–0005 (HM–215J); 74 FR 2200). This section requires manufacturers of IBC packagings that are manufactured, repaired, or remanufactured after 1/1/2011 to mark IBCs with the appropriate symbol, and for those that successfully pass the stacking test prescribed in § 178.815 to include the weight of material that may be safely stacked on the packaging as part of the stacking symbol and specification marking. A packaging not subjected to a stacking

test must be marked to indicate that it may not be stacked. For example, the “0” in the second from last position of the following UN standard marking “UN51H/Z/06 04/USA/+ZT1235/0/500” indicates that the packaging must not be stacked. If a number greater than zero is in this same position in the marking, such as the number “250” in the following example “UN51H/Z/06 04/USA/+ZT1235/250/500,” the package may be stacked provided the gross weight stacked upon it does not exceed this number in kilograms. Commenters on this provision in the Docket No. HM–215J rules stated the new stacking symbol is easier for carriers to recognize and understand.

The ATA strongly encourages PHMSA to communicate this stacking requirement to carriers, who often are responsible for loading hazardous materials packages. We have already begun incorporating information about these IBC stacking requirements in our training programs and materials. However, we have not determined at this time whether to require the IBC stacking capability symbols for Large Packagings. PHMSA may consider such action in a future rulemaking.

#### G. Reuse, Reconditioning, and Remanufacture of Packagings

In the NPRM, we proposed to clarify that packagings not meeting minimum thickness criteria may not be reconditioned or remanufactured. DGAC and RIPA strongly oppose this proposal. Both commenters state remanufactured packagings, such as drums and jerricans, should be treated as “new” packagings under the HMR. Since newly manufactured packagings are not subject to minimum thickness criteria, these commenters assert that remanufactured packagings also should not be subject to such criteria.

The commenters are correct that remanufactured packagings are filled and transported in the same manner as new packagings. For this reason, however, we believe it is critical for transportation safety that the packaging remanufacturer confirm that they are suitable for transportation. The minimum thickness criteria currently prescribed in § 173.28 are designed to prevent packagings with wall thicknesses that are too thin to safely perform their containment function from being reused, reconditioned, or remanufactured. The proposed revisions were intended to clarify that when a packaging no longer meets the minimum thickness criteria, it is no longer suitable for reconditioning or remanufacturing. However, we note that this provision applies to packagings



intended for reuse as well. Therefore, we are adopting the revisions as proposed and adding reused packagings to clarify that the minimum thickness provision applies to reused, reconditioned, and remanufactured packagings.

In § 173.35(h)(2), we are correcting an error in the pressure limitation for metal IBCs. Currently, paragraph (h)(2) prohibits the gauge pressure in a metal IBC from exceeding 110 kPa (16 psig) at 50 °C (122 °F), or 130 kPa (18.9 psig) at 55 °C (131 °F). Use of the term “gauge pressure” is an error. We are correcting this by changing the phrase “gauge pressure” to read “vapor pressure.” We received no comments on this issue.

#### H. Packaging Marking Requirements for Drums

Under the HMR, DOT specification and UN standard packagings must be marked with their package specification markings as specified in §§ 178.3 and 178.503. Section 178.3(a) requires that the marking must appear on a non-removable component of the packaging. Section 178.3(a)(5) requires that packagings with a gross mass of 30 kg (66 pounds) or more must have their original or duplicate specification markings appear on the top or side of the packaging. Section 178.3(c) states a packaging that conforms to more than one DOT specification or UN standard may display each specification marking in its entirety at each location the markings appear provided the packaging meets the requirements for each standard or specification. Further, under § 178.503(a)(1), UN standard markings described in paragraphs (a)(1) through (a)(6) (*i.e.*, UN symbol, identification code, performance standard, specific gravity or mass, hydrostatic pressure, and year of manufacture) and (a)(9)(i) (*i.e.*, nominal thickness of packagings intended for reuse or reconditioning) must appear in a permanent form on the bottom of each new metal drum with a capacity greater than 100 L (26 gallons); however, the markings on the top, head or side of these drums need not be permanent.

SSCI petitioned PHMSA (P–1371) to modify the marking requirements under §§ 178.3(a)(5) and 178.503(a)(10) for packagings with a gross mass of more than 30 kg (66 pounds). In its petition, SSCI requests PHMSA change the HMR to allow the duplicate marking to be a lesser design standard than that marked on the bottom of the packaging. For example, a packaging would be tested and marked on the bottom as meeting the Packing Group I performance standard and the duplicate marking on the side would indicate that the

packaging is certified to the Packing Group II performance standard. SSCI states some shippers will not accept a drum marked for PG I materials if they are shipping PG II or III materials. SSCI says the requested change would reduce the need to test drums differently for different customers, thereby reducing potential inventory problems and increasing flexibility for both manufacturers and shippers. PHMSA proposed the change in the NPRM to this rulemaking.

Several commenters, including RRI, DOE, and RIPA, opposed the proposal. These commenters state potential confusion could result from the presence of different performance standard markings that do not appear together in the same location on the same drum. RIPA notes that dual marking of drums in this manner would be confusing, particularly because RIPA states the “official” certification mark for drums is the top or side mark, not the bottom mark. Once a drum is filled and in transportation, RIPA states the only mark that need be accessed to determine compliance would be the side marking. Thus, the test data for the drum marked to the PG I standard on the bottom and the PG II or PG III standard on the side would be required to show that the drum passed the PG II or PG III performance tests, not the PG I test. Also, if the top and/or side marking is removed during reconditioning, RIPA suggests there is no way to accurately trace the standard to which the drum was originally manufactured.

A DOT specification or UN standard packaging must be marked as specified in §§ 178.3 and 178.503. Section 178.3(a) specifies that the marking of DOT specification or UN standard packagings shall be placed on a non-removable component of the packaging in an unobstructed area, and shall provide adequate accessibility. The HMR do not require markings to be placed in a specific location for non-bulk packages with a gross weight less than 30 kg (66 pounds). For packages with a gross mass of more than 30 kg (66 pounds), as prescribed in § 178.3(a)(5), the markings or a duplicate marking must appear on the top or side of the packaging. In accordance with § 178.503(a)(1), every new metal drum having a capacity of 100 L must bear the marks described in paragraphs (a)(1) through (a)(6) and (a)(9)(i) in a permanent form on the bottom. The markings on the top, head or side of these packagings need not be permanent. In addition, as specified in § 173.28(b)(4), metal and plastic drums and jerricans used as single packagings or the outer packagings of composite

packaging more than once must be marked in a permanent manner (able to withstand the reconditioning process) with the minimum thickness of the packaging material.

In this final rule, we are not revising §§ 178.3(a)(5) and 178.503(a)(10) to allow a lesser design standard to be marked on the side or top than that required on the bottom. We agree with the objecting commenters that this change may result in confusion and this resulting confusion could impact safety, especially if the correct marking becomes separated from the container (*e.g.*, if a lid with the correct marking becomes separated from the container, the container is filled with a hazardous material that has a higher packing group rating than that marked on the side or top, or if a filled container is too heavy to read its highest performance rating marking on its bottom surface). Further, as stated earlier in this preamble, the HMR already permits DOT specification and UN standard packagings to bear more than one specification marking if the packaging meets the requirements of each design standard or specification, and these markings appear together and in their entirety at each location they are placed on the packaging. Section 178.503(c)(2) of the HMR permits a packaging that has been reconditioned to bear markings that identify a different performance capability than the original tested design type of the packaging, and these markings may even be different from those permanently marked on the bottom of a drum, but these markings may not identify a greater performance capability than the original tested design type. This provision permits the reconditioner to permanently downgrade a packaging (*e.g.*, an “X” rated PG I packaging to a “Y” PG II packaging) provided the new marking includes the reconditioner’s mark. This practice does not apply to new packagings because dual marking for these packagings is already authorized under the HMR.

#### I. UN Symbol Marking

The Dangerous Goods Advisory Council (DGAC) petitioned PHMSA (P–1455; Docket PHMSA–2005–22474–2) to allow stenciling of the United Nations symbol (UN Symbol). The HMR do not currently prohibit stenciling of the UN symbol; however, the current marking requirements in § 178.503 discourage stenciling because they do not tolerate even small gaps in the circle surrounding the letters “u” and “n.” The only way to stencil the UN symbol without leaving gaps in the circle is to use a two-step stenciling system. DGAC states that a two-step process introduces

variability, which often results in a smeared image. In the NPRM, we proposed revising § 178.503 paragraphs (a)(1) and (e)(1) to include an objective standard under which small gaps in the UN symbol are permitted. We proposed restricting the gaps to a size no greater than ten percent of the circumference of the circle and the number of gaps to no more than three to ensure that the symbol will remain readily identifiable.

Three commenters (RIPA, Charles E. Tudor, and SSCI) support the proposal. However, the commenters suggest that PHMSA adopt a more performance-based approach and permit a stenciled mark so long as it is legible and readily identifiable. Specifying the permissible number, size, and placement of gaps in the symbol allows any person to determine whether his or her stencil meets the standard without a case-by-case regulatory determination by PHMSA. Another commenter, the DGAC, recommends PHMSA adopt a similar approach to that of the UN Subcommittee, which considered stenciling the UN symbol mark acceptable without establishing any specific provisions on stenciling. The DGAC also supports adding language to permit a stenciled UN mark if it is identifiable from a normal reading distance, which it states can be implied from a letter of clarification PHMSA issued on another type of marking process when it was the Research and Special Programs Administration. If PHMSA does retain the regulatory language to permit stenciling, the DGAC recommends that the proposed requirements in paragraphs § 178.503(e)(1)(ii)(A) through (e)(1)(ii)(D) be removed.

In this final rule, we are adopting the proposal to permit the UN symbol to be stenciled on a packaging. In response to Charles E. Tudor's comments, we are modifying the proposed standard to allow four gaps in the circle, and we are adopting a total gap size no greater than 15 percent of the circumference of the circle to accommodate the fourth break in the circle. Consistent with this revision, in this final rule we are revising § 178.703 (a)(1)(i) to authorize stenciling of the UN symbol for IBCs.

#### *J. Design-Type Variations*

Current § 178.601(g)(1) provides exception "Variation 1" that allows a person to substitute an inner receptacle without additional testing to demonstrate compliance with the applicable performance standard if it can be determined that the substitute inner packaging, including its closure, maintains an equivalent level of performance as the originally tested

package. The current requirements do not specifically require documentation of the methodology used to determine that a packaging maintains an equivalent level of performance. In the NPRM, we proposed to revise § 178.601(g)(1) to require the person making a change to a packaging design under the provisions of Variation 1 to document the methodology used to demonstrate equivalent performance.

Air Products and DGAC do not support the proposed amendment to document an equivalent level of performance. They both state the proposed text suggests that a detailed analysis would be required and that such a detailed analysis would negate the benefits currently derived from using the variation. DGAC states that it is not aware of any incidents stemming from substituted inner packaging under Variation 1. Air Products also states the proposed amendment will create disharmony with international standards and constitutes a significant increase in paperwork requirements. RIPA does not oppose the new requirement, but asks that PHMSA take steps to make sure the paperwork burden isn't substantial, and that existing combination packagings that are already authorized be grandfathered for compliance purposes.

NAAHAC strongly supports the proposed changes stating "This clarifies the process that the package designer/tester must use in certifying the packaging." The C. L. Smith Company supports PHMSA's proposed changes but suggests we provide more detailed guidance on how to determine whether or not a packaging meets the "equivalent level of performance" standard, especially for plastic inner packagings which vary widely in performance based on variations in the type and amount of ingredients used to make these packagings (e.g., colorants, additives, and regrind materials), as well as manufacturing processes and cooling rates. The C. L. Smith Company also asks what kind of data would be sufficient to show an equivalent level of safety without having to retest the packaging.

It is not our intention to impose analysis and documentation requirements that would negate the benefits currently realized from utilizing the packaging variations, nor do we believe that a requirement to document the methodology used to determine equivalent performance of the variation to the originally tested packaging will result in a significantly increased regulatory burden. We agree that, in general, the supporting documentation may be minimal depending on the

degree to which the packaging varies from the original tested design. In many cases, preparation of the documentation should take as little as 60 seconds. The type and level of documentation necessary for demonstration of equivalent level of performance will be based on the change made to the packaging. In addition, we are not specifying a format or detailed examples to provide flexibility to the person making the certification. Documentation may be copies of specification sheets from the original packaging component and the substituted component along with a brief explanation of why they are similar and the name of the individual who made that determination. If the person certifying compliance with § 178.601(g)(1) has a copy of the original test report, he or she may hand-write a few sentences on the report itself in association with the substituted component explaining what was changed and why the packagings are significantly similar. For example, if a person is substituting a plastic bottle used as an inner receptacle with one from a different manufacturer, he or she would describe why the packages are of similar design; similar thread types, same or smaller closure, same type and grade of plastic, and who made these determinations. If the person certifying compliance with the variation chooses to perform tests on the components as a means of comparison, he or she could choose to describe the tests and the results. Because testing is not a requirement for determining an equivalent level of performance, the test description could be as detailed as needed by the person certifying compliance for their complete understanding of the test results.

Based on comments to the NPRM, in this final rule we are revising the proposed language. The language in the NPRM was ambiguous regarding a shipper's responsibilities versus the responsibilities of the manufacturer. PHMSA did not intend to imply that a manufacturer need only document changes made in accordance with Variation 1 and shippers must document changes made to a packaging design in accordance with any variation. For consistency with § 178.601, PHMSA is clarifying that the supporting documentation for equivalent level of performance is only applicable to Variation 1.

#### *K. Selective Testing of Steel Drums*

SSCI petitioned PHMSA (P-1337) to make several changes to the provisions in § 178.601(g)(8), which apply to the approval of selective testing of steel drums that differ in minor respects from

a tested type of drum. The changes proposed by SSCI would allow drums with capacities between 12 and 50 liters (3 and 13 gallons, respectively) to be excepted from re-testing design types found under § 178.601(g)(8).

We are revising § 178.601(g)(8) to allow drums with a capacity of 12 liters or more to take advantage of the exception from further design testing under certain conditions. Commenters generally support this proposal as reducing costs without compromising safety.

The NPRM proposed a list of changes for which design testing would be required, such as a change from straight-sided to tapered, a change to the rated capacity and outside dimensions, a change to the type of side seam welding or type of steel used, and changes in the locations in the type, size, and locations of closures. As proposed in the NPRM, for UN 1A2 drums, a change in the width of lugs or extensions in the crimp/lug cover would necessitate design testing of the drum. SSCI suggests that minor modifications dealing with the width of lugs or extensions in a crimp/lug cover relate to making a package more user-friendly and should not be considered a different design type so long as the package performance is repeatable as tested. We disagree. Historically, modest changes in the size and style of the materials and closures for a hazardous materials package have produced changes in that packaging's test results. Therefore, PHMSA is incorporating the language as proposed.

PHMSA has issued numerous approvals to manufacturers authorizing the use of fewer than eighteen test samples. As proposed in the NPRM, we are revising § 178.601(k) to authorize a lesser quantity of test samples used in testing of stainless steel drums. We are adding the provisions found in these approvals to § 178.601(k). PHMSA received no comments on the proposed language change to this section as proposed in the NPRM.

#### *L. Revisions to Requirements for IBCs*

In the NPRM, we proposed to revise the lower volumetric limit for flexible IBCs (FIBCs). In Docket HM-181E (59 FR 38068), published July 26, 1994, we defined "Body" as having a lower limit of 450 liters, thus precluding the manufacture of IBCs with a volume of less than 450 L. In reviewing the HMR, we have identified a gap in the allowable packaging specifications for flexible packagings with a capacity between 50 kg and 400 kg (*i.e.*, specification non-bulk bags may not exceed 50 kg). To remedy this gap, we

proposed to allow bags between 50 kg and 400 kg to be manufactured and tested under IBC standards in Subparts N and O of Part 178. FIBCA, in support of the proposed change, stated that it is important to address flexible packagings between 50 kg and 400 kg. At this time we are incorporating the change to flexible IBC allowing smaller IBCs. We received numerous comments in support of eliminating the limit for all or certain IBCs and Large Packagings. We are continuing to research to determine if we should eliminate the lower limit for all IBCs. The comments received in response to this rulemaking will be taken under consideration if we develop a future rulemaking.

We proposed moving the lower limit for IBCs currently in the definition of "Body" in § 178.700 to the individual standards in §§ 178.705 through 178.710. These are more appropriate sections for the lower limit and will result in better understanding of the individual IBC specifications. In addition, we proposed to authorize smaller flexible IBCs in § 178.710 by decreasing the limit to 50 kg. Several commenters supported lowering the quantity limit for flexible IBCs. Commenters did not remark on moving these provisions to individual standards. Therefore, we are decreasing the lower limit for flexible IBCs to 50 kg and retaining the 400 kg lower limit for rigid IBCs.

Two commenters (DGAC and FIBCA) oppose a lower volumetric limit for IBCs; they suggest there should be no lower limit on any IBC design type. DGAC contends this would provide consistency with the UN Model Regulations allowing manufacturers to construct IBCs to non-bulk sizes. For example, a shipper would have the choice between a 4G or an 11G packaging when choosing a non-bulk box. In the NPRM, we did not propose to remove the existing lower volumetric limit for IBCs other than flexible IBCs, but we did invite comment on this issue for discussion for a future rulemaking. We are not implementing a change in this final rule to the lower limit of all IBCs. However, we are lowering the limit on FIBCs as proposed in the NPRM. The change to the language in these sections does not constitute a change in the HMR. IBCs have always had a lower volumetric limit under the HMR.

In the NPRM, we proposed requiring in § 178.810 a second drop test for IBCs with a capacity of 0.45 cubic meters (15.9 cubic feet) or less in combination with the proposal to remove the lower limit of 450 liters (119 gallons) and 0.45 cubic meters (15.9 cubic feet) from the

specifications for flexible IBCs. Two commenters (Kurt Colborn and FIBCA) support the addition of a second drop test requirement for IBCs. FIBCA states that the second drop test proposed is consistent with approvals that have been issued by the DOT. One commenter (RIPA) is opposed to a second drop test because it applies only to flexible IBCs and, in RIPA's view, is arbitrary and is inadequate from a safety perspective.

The additional drop test is not an arbitrary requirement. Non-bulk packagings are handled in transportation in a different manner than IBCs. Often loading and unloading of a transport vehicle is performed without the use of a mechanical handling device such as a fork lift or hoist. Non-bulk packages are more likely to be dropped while in transportation. Over the past ten years, when issuing an approval in accordance with § 178.801(i), we have imposed an additional drop test for non-bulk capacity IBCs. Therefore, we are incorporating this additional drop test in § 178.810. The net effect of this revision is to eliminate the need to obtain an approval.

We proposed revising the stacking test for IBCs prescribed in § 178.815 by adding a new paragraph (e)(4) to specify the passing criteria for the dynamic compression test after application of the required load include (1) no permanent deformation that would render the IBC or its base pallet unsafe, and (2) maximum deflection may not exceed one inch. We received no comments on this proposal. We are adopting this revision in the final rule as a clarification of existing requirements.

In the NPRM, we proposed that § 178.819 be revised to clarify IBCs intended to contain liquids be permitted to use water as the filling material for a vibration test, and that an IBC sample be placed on a vibrating platform with a vertical or rotary double-amplitude of one inch. One commenter (RIPA) addressed this issue. The commenter supports both proposals. Therefore, we are revising subparagraph (b)(1) to clarify that water is a suitable test filler material for the vibration test, and subparagraph (b)(2) to clarify that these testing provisions are permitted and to provide additional options when performing the vibration test. In paragraph (b)(2), we clarify that a vibrating platform may be used that will produce vertical or rotary double-amplitude.

#### *M. Large Packagings*

Large Packagings are currently authorized for the transportation of

hazardous materials if approved by the Associate Administrator for Hazardous Materials Safety. In the NPRM, we proposed to remove the approval requirement and add two new subparts (P and Q) to Part 178 for the design, construction, and testing of Large Packagings. Adding the manufacture, testing and use requirements into the HMR provides additional flexibility and effectively removes the need to apply for an approval to manufacture and use these packagings in the United States. The design, construction and testing requirements are based on the UN Recommendations on the Transport of Dangerous Goods, Thirteenth Revised Edition (2003); Chapter 6.6 Requirements for the Construction and Testing of Large Packagings. The regulatory layout and language is modeled on the current requirements for IBCs. We also proposed a number of other changes to the HMR to authorize the use of Large Packagings for the transportation of specific hazardous materials and to specify operational requirements.

*Special provisions.* Section 172.102 defines special provisions for entries in the Hazardous Materials Table (HMT). In paragraph (c)(4) introductory text and in Table 1, the HMR authorize the use of IBCs for entries that reference certain IB Special Provisions (e.g., IB3). To authorize the use of Large Packagings we proposed to revise paragraph (c)(4) to include provisions for Large Packagings. In this section, we also proposed to restrict the use of Large Packagings to Packing Group III materials, with the exception of the following PG II entries, which are authorized via a new Special Provision 41: "UN 2531, Methacrylic acid, stabilized" and "UN 3291, Regulated medical waste, n.o.s." These two Packing Group II entries are authorized consistent with the UN Recommendations. We did not receive any comments on the proposal to authorize these two Packing Group II materials for transportation in Large Packagings.

Consistent with the decision to authorize the use of Large Packagings we are adopting the revisions to Special Provisions IB3 and IB8. The revised language specifies that Large Packagings are authorized when a table entry specifies Special Provision IB3 or IB8. We are inserting a new Table 3 authorizing Large Packagings and revising Table 1 so that IB3 and IB8 reference the new Table 3.

One commenter, (Charles E. Tudor) states that we should authorize Large Packagings through a separate Special Provision table to allow for future

flexibility. We do not agree that a separate table is necessary at this time. We may reassess the need depending on future rulemaking actions in this area.

*Placarding.* General provisions for placarding of bulk packagings require bulk packagings, including IBCs, to be placarded on each side and each end for a total of four placards. In accordance with an exception in § 172.514, a shipper may choose to placard an IBC and certain other bulk packagings on two opposite sides or label the IBC in accordance with Part 172, Subpart E. In this final rule, we are adding, as proposed in the NPRM, Large Packagings to the types of packagings that may be placarded on only two opposite sides or labeled instead of placarded. We received no comments regarding the proposed revisions to this section.

*Operational requirements.* In the NPRM, we proposed a new § 173.36 to specify operational requirements for the use of Large Packagings. This section addresses the Large Packaging filling limits and procedures. Specifically, we proposed to require Large Packagings to be stowed with closures upright for liquid cargoes, and inner packagings in Large Packagings to be packed, secured, and cushioned to prevent breakage or leakage during transportation. In addition, we proposed conditions under which Large Packagings may be reused. We also proposed to require that no hazardous material be on the outside of Large Packagings during transportation, and that Large Packagings be securely fastened to or contained within a transport unit. Further, we proposed to prohibit the use of inner packagings made of paper or fiber in Large Packagings used to transport solids that could become liquid during transportation, and we proposed to require inner packagings in Large Packagings used to transport liquids to be resistant to internal pressure releases likely to be encountered during transportation. Finally, we proposed to limit the capacity of Large Packagings used to transport hazardous materials to a maximum of 3 cubic meters, and we proposed conditions under which Large Packagings could be used to transport more than one hazardous material.

DGAC and CropLife oppose the new § 173.36 for Large Packagings on the grounds that they would prefer Large Packagings be treated as they are in the UN Model Regulations.

All the provisions for Large Packagings in this rulemaking that differ from international requirements are consistent with the current HMR provisions for non-bulk combination packagings and IBCs. We do not believe

that Large Packagings should be addressed differently than IBCs in the HMR. In the HMR we spell out specific standards that must be met. These standards include requirements that a package must be inspected prior to offering for transportation to ensure that there are no leaks, that no hazardous material is on the external surface of the packaging, and that the package does not have sharp or protruding objects that may puncture it or other packagings in transport. The intention of this rulemaking in regard to Large Packagings was not to make a major change in packaging requirements, but rather to incorporate Large Packagings into the HMR. IBC and non-bulk packaging standards are based on the UN Model regulations with minor alterations for safety and consistency with domestic practices. In this final rule, we are adopting the operational requirements proposed in the NPRM.

Two commenters (DGAC and APE) state that the vibration testing requirement for all Large Packagings should be a "capability" rather than an actual test because the inner packagings perform a cushioning function. APE also objects to requiring a vibration test for Large Packagings, stating this represents an additional cost burden for the U.S. industry as compared to their international competitors because the UN Recommendations do not require that these packagings be subject to this test, especially those containing inner packagings and articles. A Large Packaging, other than a flexible Large Packaging, is similar in design to an IBC, and subject to similar packaging design stresses and opportunities for failure. We believe the vibration test is an essential component for assessing the integrity of an IBC packaging and a Large Packaging, therefore, in this final rule are requiring a Large Packaging to pass a vibration test as well. We agree with the commenters that, like an IBC, a Large Packaging may be used as a single or combination packaging, and that inner packagings, when used, may provide some cushioning. However, the degree to which these packagings can provide cushioning depends greatly on their structure and content, which can vary greatly. Because the use of inner packagings is not mandatory in Large Packagings, and because inner packagings cannot be relied upon to provide a consistent level of cushioning, we believe the vibration test is necessary to assist us with determining the performance capability of a Large Packaging in transportation. Therefore, in this final rule we are requiring the vibration test to be performed and

documented for Large Packagings, other than flexible Large Packagings.

In the NPRM, we proposed to revise § 173.62 to authorize Large Packagings for the transportation of certain explosives. One commenter (Charles E. Tudor) suggests that the HMR should authorize the use of Large Packagings to transport additional explosives that have a very low mass. APE urges PHMSA to permit consumer fireworks be transported in UN 50G Large Packagings. The commenters did not submit safety data or information to demonstrate that consumer fireworks or other low-mass explosives may be transported safely in Large Packagings. Absent such data, we cannot support a broad authorization for the use of Large Packagings to transport explosive materials. Therefore, in this final rule, we are adopting the provisions for the use of Large Packagings for the transportation of certain explosives without change.

In the NPRM, we proposed to amend §§ 173.240 through 173.242 to authorize Large Packagings for the transportation of certain hazardous materials and to clarify that Large Packagings are not authorized for Packing Group I or II materials. We received no comments on the proposed changes. Therefore, we are adopting them without change in this final rule.

As indicated above, we proposed to add Subparts P and Q to Part 178 to specify design, construction, and testing requirements for Large Packagings. Most commenters support the addition of these subparts. Therefore, we are adopting them as proposed in the NPRM.

#### *N. Additional Revisions in This Final Rule*

Under Docket HM–215G (69 FR 76043), published on December 20, 2004, we revised § 173.249(c) to authorize the return of portable tanks containing a residue of bromine. In this final rule, we are revising paragraph (b) to authorize the transportation of bromine residue in cargo tanks to facilitate the return of empty cargo tanks with a bromine residue. PHMSA received no comments on the proposed language change to this section; in this final rule, it is adopted as proposed in the NPRM.

We are changing the section heading and paragraph (a) of § 174.63, which describes rail specific operational requirements for Portable tanks, IM portable tanks, IBCs, cargo tanks, and multi-unit tank car tanks, to indicate that the requirements in this section also apply to Large Packagings. PHMSA received no comments on the proposed

language change to this section. Therefore, in this final rule, it is adopted as proposed in the NPRM.

### **V. Rulemaking Analysis and Notices**

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

This final rule is published under authority of 49 U.S.C. 5103(b), which authorizes the Secretary of Transportation to prescribe regulations for the safe transportation, including security, of hazardous materials in intrastate, interstate, and foreign commerce. This final rule adopts regulations to enhance the safe and secure transportation of hazardous materials by aircraft in intrastate, interstate, and foreign commerce. This notice revises miscellaneous HMR requirements applicable to hazardous materials packaging.

#### *B. Executive Order 12866 and DOT Regulatory Policies and Procedures*

This final rule is a non-significant regulatory action under section 3(f) of Executive Order 12866 and, therefore, is not subject to formal review by the Office of Management and Budget. This final rule is considered non-significant under the Regulatory Policies and Procedures of the Department of Transportation (44 FR 11034).

The cost impacts of the changes in this rulemaking are expected to be minimal. Many of the amendments in this rulemaking are intended to clarify current regulatory requirements specific to the construction and use of packagings and do not impose any additional costs on the regulated community. The most significant changes in the final rule relate to: (1) The manufacture, testing and use of a new packaging category called “Large Packagings”; (2) the information required to be contained in a packaging test report prepared by the person certifying compliance with the HMR; (3) requiring shippers to maintain a copy of the manufacture notification already provided to them by the packaging manufacture in accordance with current regulations; and (4) providing guidance to packaging manufacturers on how to instruct shippers to effectively assemble and close packagings.

A “Large Packaging” is a type of packaging design authorized by the UN Recommendations but currently only authorized in the HMR through an approval. Adding the manufacture, testing and use requirements for this packaging into the HMR provides additional flexibility and effectively removes the need to apply for an approval to manufacture and use these

packagings in the United States, resulting in a reduction in cost to the regulated community. This final rule also includes amendments to require Large Packaging manufacturers to keep records for the qualification of each design type and for each design requalification. We expect this recordkeeping requirement will apply to fewer than 10 regulated entities. Thus, the overall impact of this requirement will be minimal and will be more than offset by the additional flexibility and administrative cost savings provided by the elimination of current approval provisions.

Currently under the HMR, a person certifying that a packaging meets the construction and testing requirements for UN standard packaging must retain documentation relative to the: (1) Name and address of the packaging manufacture and testing facility; (2) material of construction; (3) capacity, dimensions, closures, and method of closures; and (4) test results. However, all of the record retention requirements associated with UN standard packaging certification are currently spread out throughout the HMR. Therefore, this amendment should not result in any substantial cost impacts on the regulated community.

We are also revising the HMR to require shippers to maintain a copy of the manufacture notification provided to them by the packaging manufacture, and to provide guidance to packaging manufacturers on how to instruct shippers to effectively assemble and close packagings. As a result of comments to the notice of proposed rulemaking, these amendments have been modified to allow more flexibility to packaging manufacturers and to allow for packagings with a simpler means of closure for the end user. Therefore, these amendments should not result in significant cost impacts to the regulated community.

This final rule is designed to increase the clarity of the HMR, thereby enhancing voluntary compliance with existing regulatory requirements while reducing compliance costs. Enhanced voluntary compliance by the regulated community improves overall safety. In addition, we anticipate many changes contained in this rule will have economic benefits. For example, the final rule broadens the scope of several packaging exceptions, which manufacturers and shippers may use to reduce transportation costs. Moreover, the incorporation of Large Packaging specifications into the HMR will eliminate the need for shippers to obtain an approval from PHMSA to use Large Packagings, thus increasing flexibility

and reducing transportation costs. Finally, incorporation of the Large Packaging specifications into the HMR and adoption of other provisions intended to align the HMR with international standards will promote better understanding of the regulations, increased industry compliance, and the smooth flow of hazardous materials in transportation.

#### C. Executive Order 13132

This final rule has been analyzed in accordance with the principles and criteria contained in Executive Order 13132 ("Federalism"). This final rule preempts State, local, and Indian tribe requirements, but does not impose any regulation with substantial direct effects on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

The Federal Hazardous Materials Transportation Law, 49 U.S.C. 5101–5127, contains an express preemption provision (49 U.S.C. 5125(b)) preempting State, local, and Indian tribe requirements on the following subjects:

- (1) The designation, description, and classification of hazardous materials;
- (2) The packing, repacking, handling, labeling, marking, and placarding of hazardous materials;
- (3) The preparation, execution, and use of shipping documents related to hazardous materials and requirements related to the number, contents, and placement of those documents;
- (4) The written notification, recording, and reporting of the unintentional release in transportation of hazardous material; or
- (5) The design, manufacture, fabrication, marking, maintenance, recondition, repair, or testing of a packaging or container represented, marked, certified, or sold as qualified for use in transporting hazardous material.

This final rule addresses covered subject items 1, 2, 3, and 5 above. This rule preempts any State, local, or Indian tribe requirements concerning these subjects unless the non-Federal requirements are "substantively the same" as the Federal requirements.

Federal hazardous materials transportation law provides at § 5125(b)(2) that, if DOT issues a regulation concerning any of the covered subjects, DOT must determine and publish in the **Federal Register** the effective date of Federal preemption. The effective date may not be earlier than the 90th day following the date of

issuance of the final rule and not later than two years after the date of issuance. This effective date of preemption is 90 days after the publication of this final rule in the **Federal Register**.

#### D. Executive Order 13175

This final rule has been analyzed in accordance with the principles and criteria contained in Executive Order 13175 ("Consultation and Coordination with Indian Tribal Governments"). Because this final rule does not have tribal implications and does not impose direct compliance costs, the funding and consultation requirements of Executive Order 13175 do not apply.

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

The Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*) requires an agency to review regulations to assess their impact on small entities. An agency must conduct a regulatory flexibility analysis unless it determines and certifies that a rule is not expected to have a significant impact on a substantial number of small entities. This final rule amends miscellaneous packaging provisions in the HMR to clarify provisions based on our own initiatives and also on petitions for rulemaking. While maintaining safety, it relaxes certain requirements. Many of the amendments in this rulemaking are intended to clarify current regulatory requirements specific to the construction and use of non-bulk and bulk packagings and do not impose any additional costs on small entities.

This final rule has been developed in accordance with Executive Order 13272 ("Proper Consideration of Small Entities in Agency Rulemaking") and DOT's procedures and policies to promote compliance with the Regulatory Flexibility Act to ensure that potential impacts of draft rules on small entities are properly considered. The changes in this final rule will enhance safety, and I certify that this proposal, if promulgated, would not have a significant economic impact on a substantial number of small entities.

#### F. Unfunded Mandates Reform Act of 1995

This final rule does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It will not result in costs of \$120.7 million or more, in the aggregate, to any of the following: State, local, or Native American tribal governments, or the private sector.

#### G. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995, no person is required to respond to an information collection unless it has been approved by OMB and displays a valid OMB control number. PHMSA currently has approved information collections under OMB Control No. 2137–0018, "Inspection and Testing of Portable Tanks and Intermediate Bulk Containers," expiring on October 31, 2010; OMB Control No. 2137–0034, "Hazardous Materials Shipping Papers and Emergency Response Information," expiring on May 31, 2011; OMB Control No. 2137–0557, "Approvals for Hazardous Materials," expiring on June 30, 2011; and OMB Control No. 2137–0572, "Testing Requirements for Non-Bulk Packaging," expiring on March 31, 2010. This final rule will result in an increase in annual burden and costs under OMB Control No. 2137–0034 and OMB Control No. 2137–0572.

PHMSA will submit revised information collections to the Office of Management and Budget (OMB) for approval based on the amendments adopted in this final rule. Specifically, this final rule identifies an increase in annual burden and costs under OMB Control No. 2137–0018 which is being offset by a reduction in burden under OMB Control No. 2137–0557 because of the conversion of several approval provisions for packagings into the HMR. These amendments will necessitate a revision to the title of OMB Control No. 2137–0018 to "Inspection and Testing of Portable Tanks, Intermediate Bulk Containers, and Large Packagings." In addition, due to comments received in response to the notice of proposed rulemaking, we have revised the total information collection burden for OMB Control No. 2137–0034 and OMB Control No. 2137–0572 as follows:

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

*Total Annual Number of Respondents:* 250,000.  
*Total Annual Responses:* 260,000,000.  
*Total Annual Burden Hours:* 6,500,000.  
*Total Annual Burden Cost:* \$6,510,000.

OMB Control No. 2137–0572, "Testing Requirements for Non-Bulk Packaging"

*Total Annual Number of Respondents:* 5,010.  
*Total Annual Responses:* 15,500.  
*Total Annual Burden Hours:* 32,500.  
*Total Annual Burden Cost:* \$812,500.

Please direct your requests for a copy of this information collection to

Deborah Boothe (PHH-11) or T. Glenn Foster (PHH-12), Office of Hazardous Materials Standards, Pipeline and Hazardous Materials Safety Administration (PHMSA), U.S. Department of Transportation, 1200 New Jersey Avenue, SE., Washington, DC 20590-0001.

#### H. Regulation Identifier Number (RIN)

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document may be used to cross-reference this action with the Unified Agenda.

#### I. Environmental Assessment

The National Environmental Policy Act (NEPA), 42 U.S.C. 4321-4375, requires federal agencies to analyze regulatory actions to determine whether the action will have a significant impact on the human environment. The Council on Environmental Quality (CEQ) regulations order federal agencies to conduct an environmental review considering (1) The need for the action, (2) alternatives to the action, (3) environmental impacts of the action and alternatives, and (4) the agencies and persons consulted during the consideration process. 40 CFR 1508.9(b).

*Purpose and Need.* As discussed elsewhere in this preamble, this final rule is intended to clarify existing requirements, enhance flexibility, and reduce compliance burdens. The revisions will reduce confusion and promote safety.

*Alternatives.* PHMSA considered the following alternatives:

*No action*—Under this alternative, we would not attempt to revise HMR packaging requirements. This alternative does not address the problems we have identified related to unclear or confusing regulations nor does it reduce regulatory burdens and promote flexibility. Thus, it was not selected.

*Adopt revisions to the HMR packaging regulations to clarify requirements and reduce regulatory burdens*—This is the selected alternative. It accomplishes our regulatory reform goals while enhancing understanding of and compliance with the HMR.

*Analysis of Environmental Impacts.* Hazardous materials are substances that may pose a threat to public safety or the environment during transportation because of their physical, chemical, or

nuclear properties. The hazardous material regulatory system is a risk management system that is prevention-oriented and focused on identifying a safety hazard and reducing the probability and quantity of a hazardous material release. Hazardous materials are categorized by hazard analysis and experience into hazard classes and packing groups. The regulations require each shipper to classify a material in accordance with these hazard classes and packing groups; the process of classifying a hazardous material is itself a form of hazard analysis. Further, the regulations require the shipper to communicate the material's hazards through use of the hazard class, packing group, and proper shipping name on the shipping paper and the use of labels on packages and placards on transport vehicles. Thus, the shipping paper, labels, and placards communicate the most significant findings of the shipper's hazard analysis. A hazardous material is assigned to one of three packing groups based upon its degree of hazard—from a high hazard Packing Group I to a low hazard Packing Group III material. The quality, damage resistance, and performance standards of the packaging in each packing group are appropriate for the hazards of the material transported.

Releases of hazardous materials, whether caused by accident or deliberate sabotage, can result in explosions or fires. Radioactive, toxic, infectious, or corrosive hazardous materials can have short- or long-term exposure effects on humans or the environment. Generally, however, the hazard class definitions are focused on the potential safety hazards associated with a given material or type of material rather than the environmental hazards of such materials.

Under the HMR, hazardous materials may be transported by aircraft, vessel, rail, and highway. The potential for environmental damage or contamination exists when packages of hazardous materials are involved in accidents or en route incidents resulting from cargo shifts, valve failures, package failures, loading, unloading, collisions, handling problems, or deliberate sabotage. The release of hazardous materials can cause the loss of ecological resources and the contamination of air, aquatic environments, and soil. Contamination of soil can lead to the contamination of ground water. For the most part, the adverse environmental impacts associated with releases of most hazardous materials are short-term impacts that can be reduced or eliminated through prompt clean-up/decontamination of the accident scene.

We have reviewed the risks associated with adopting the miscellaneous amendments in this rule. The amendments in this rulemaking are intended to clarify existing requirements concerning the construction and use of non-bulk and bulk packagings, such as requiring the shipper to maintain a copy of a hazmat packaging's closure instructions for 365 days (unless the instructions are permanently embossed or printed on the packaging) and adopting requirements for UN standard Large Packagings (removing the need for an approval). The amendments also involve minor changes to existing regulations that will permit additional flexibility, such as permitting the UN symbol to be stenciled on packagings, clarifying definitions, and not requiring international plastic packagings to bear a domestic mark currently required under § 172.313(b). The requirements in this rulemaking will reduce confusion and enhance voluntary compliance, thereby reducing the likelihood of deaths, injuries, property damage, hazardous materials release, and other adverse consequences of incidents involving the transportation of hazardous materials. We have determined there will be no significant environmental impacts associated with this final rule.

*Consultation and Public Comment.* As discussed above, PHMSA published an NPRM to solicit public comments on our proposal. A total of 24 persons submitted comments, including industry associations, shippers, carriers, federal and State agencies, and private citizens.

#### J. Privacy Act

Anyone is able to search the electronic form for all comments received into any of our dockets by the name of the individual submitting the comments (or signing the comment, if submitted on behalf of an association, business, labor union, etc.). You may review DOT's complete Privacy Act Statement in the **Federal Register** published on April 11, 2000 (Volume 65, Number 70; Pages 19477-78).

#### List of Subjects

##### 49 CFR Part 171

Exports, Hazardous materials transportation, Hazardous waste, Imports, Incorporation by reference, Reporting and recordkeeping requirements.

##### 49 CFR Part 172

Education, Hazardous materials transportation, Hazardous waste,

Labeling, Markings, Packaging and containers, Reporting and recordkeeping requirements.

49 CFR Part 173

Hazardous materials transportation, Packaging and containers, Radioactive materials, Reporting and recordkeeping requirements, Uranium.

49 CFR Part 174

Hazardous materials transportation, Radioactive materials, Railroad safety.

49 CFR Part 178

Hazardous materials transportation, Motor vehicle safety, Packaging and containers, Reporting and recordkeeping requirements.

■ In consideration of the foregoing, we are amending 49 CFR Chapter I, Subchapter C as follows:

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

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

**Authority:** 49 U.S.C. 5101–5128, 44701; 49 CFR 1.45 and 1.53; Pub. L. 101–410 section 4 (28 U.S.C. 2461 note); Pub L. 104–134 section 31001.

■ 1. In § 171.8:

■ a. The definitions for “Reconditioned packaging,” “Remanufactured packaging,” “Reused packaging,” and “Strong outer packaging” are added in appropriate alphabetical order.

■ b. The definition for “Strong outside container” is removed.

■ c. The introductory text of the definition for “Bulk packaging” is revised.

■ d. The definition for “Large packaging” is revised.

The additions and revisions read as follows:

**§ 171.8 Definitions and abbreviations.**

\* \* \* \* \*

*Bulk packaging* means a packaging, other than a vessel or a barge, including a transport vehicle or freight container, in which hazardous materials are loaded, and which has:

\* \* \* \* \*

*Large packaging* means a packaging that—

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

(2) Is designated for mechanical handling;

(3) Exceeds 400 kg net mass or 450 liters (118.9 gallons) capacity;

(4) Has a volume of not more than 3 cubic meters (m<sup>3</sup>) (see § 178.801(i) of this subchapter); and

(5) Conforms to the requirements as specified in § 173.36, and subparts P and Q of part 178 of this subchapter, as applicable.

\* \* \* \* \*

*Reconditioned packaging.* See § 173.28 of this subchapter.

\* \* \* \* \*

*Remanufactured packagings.* See § 173.28 of this subchapter.

\* \* \* \* \*

*Reused packaging.* See § 173.28 of this subchapter.

\* \* \* \* \*

*Strong outer packaging* means the outermost enclosure that provides protection against the unintentional release of its contents. It is a packaging that is sturdy, durable, and constructed so that it will retain its contents under normal conditions of transportation. In addition, a strong outer packaging must meet the general packaging requirements of subpart B of part 173 of this subchapter but need not comply with the specification packaging requirements in part 178 of the subchapter. For transport by aircraft, a

strong outer packaging is subject to § 173.27 of this subchapter. The terms “strong outside container” and “strong outside packaging” are synonymous with “strong outer packaging.”

\* \* \* \* \*

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

■ 3. The authority citation for part 172 continues to read as follows:

**Authority:** 49 U.S.C. 5101–5128, 44701; 49 CFR 1.53.

■ 4. Section 172.101, the Hazardous Materials Table is amended to read as follows:

■ a. The entry “Azodicarbonamide,” in Column (8B) the reference “212” is removed and “223” is added in its place, and in Column (10B) the reference “12” is removed and “2” is added in its place.

■ b. The entry “Isosorbide-5-mononitrate,” in Column (7) the reference Special Provision “159” is added in the correct numeric order, and in Column (8B) the reference “213” is removed and “223” is added in its place.

■ c. The entry “Regulated medical waste, n.o.s. or Clinical waste, unspecified, n.o.s. or (BIO)Medical waste, n.o.s., or Biomedical waste, n.o.s. or Medical waste, n.o.s.,” in Column (7) the reference for Special Provision “41” is added before “A13”.

■ d. The entry “Methacrylic acid, stabilized,” in Column (7) the reference for Special Provision “41” is added before “B2”.

■ e. In Column (8c), for the following entries, the word “None” is removed and “62” is added in its place:

Column (2) entry	Column (4) entry
Ammunition smoke, white phosphorus <i>with burster, expelling charge, or propelling charge</i> .....	UN0245
Ammunition smoke, white phosphorus <i>with burster, expelling charge, or propelling charge</i> .....	UN0246
Ammunition, illuminating <i>with or without burster, expelling charge or propelling charge</i> .....	UN0171
Ammunition, illuminating <i>with or without burster, expelling charge or propelling charge</i> .....	UN0254
Ammunition, illuminating <i>with or without burster, expelling charge or propelling charge</i> .....	UN0297
Ammunition, incendiary <i>with or without burster, expelling charge or propelling charge</i> .....	UN0300
Ammunition, incendiary <i>with or without burster, expelling charge, or propelling charge</i> .....	UN0009
Ammunition, incendiary <i>with or without burster, expelling charge, or propelling charge</i> .....	UN0010
Ammunition, incendiary, white phosphorus, <i>with burster, expelling charge or propelling charge</i> .....	UN0243
Ammunition, incendiary, white phosphorus, <i>with burster, expelling charge or propelling charge</i> .....	UN0244
Ammunition, practice .....	UN0362
Ammunition, practice .....	UN0488
Ammunition, proof .....	UN0363
Ammunition, smoke <i>with or without burster, expelling charge or propelling charge</i> .....	UN0015
Ammunition, smoke <i>with or without burster, expelling charge or propelling charge</i> .....	UN0016
Ammunition, smoke <i>with or without burster, expelling charge or propelling charge</i> .....	UN0303
Ammunition, tear-producing <i>with burster, expelling charge or propelling charge</i> .....	UN0018
Ammunition, tear-producing <i>with burster, expelling charge or propelling charge</i> .....	UN0019
Ammunition, tear-producing <i>with burster, expelling charge or propelling charge</i> .....	UN0301
Bombs, photo-flash .....	UN0038



Column (2) entry	Column (4) entry
Bombs, photo-flash .....	UN0039
Bombs, photo-flash .....	UN0299
Bombs, with bursting charge .....	UN0034
Bombs, with bursting charge .....	UN0035
Cartridges for weapons, inert projectile .....	UN0328
Cartridges for weapons, with bursting charge .....	UN0006
Cartridges for weapons, with bursting charge .....	UN0321
Cartridges for weapons, with bursting charge .....	UN0412
Cartridges, oil well .....	UN0277
Cartridges, oil well .....	UN0278
Cartridges, power device .....	UN0275
Cartridges, power device .....	UN0276
Cartridges, power device .....	UN0323
Cartridges, power device .....	UN0381
Charges, demolition .....	UN0048
Charges, depth .....	UN0056
Cutters, cable, explosive .....	UN0070
Fracturing devices, explosive, without detonators for oil wells .....	UN0099
Mines with bursting charge .....	UN0137
Mines with bursting charge .....	UN0138
Projectiles, inert with tracer .....	UN0345
Projectiles, inert, with tracer .....	UN0424
Projectiles, inert, with tracer .....	UN0425
Projectiles, with burster or expelling charge .....	UN0346
Projectiles, with burster or expelling charge .....	UN0347
Projectiles, with burster or expelling charge .....	UN0434
Projectiles, with burster or expelling charge .....	UN0435
Projectiles, with bursting charge .....	UN0168
Projectiles, with bursting charge .....	UN0169
Projectiles, with bursting charge .....	UN0344
Release devices, explosive .....	UN0173
Rivets, explosive .....	UN0174
Rocket motors .....	UN0186
Rocket motors .....	UN0280
Rocket motors .....	UN0281
Rockets, with bursting charge .....	UN0181
Rockets, with bursting charge .....	UN0182
Rockets, with expelling charge .....	UN0436
Rockets, with expelling charge .....	UN0437
Rockets, with expelling charge .....	UN0438
Rockets, with inert head .....	UN0183
Rockets, with inert head .....	UN0502
Sounding devices, explosive .....	UN0204
Sounding devices, explosive .....	UN0296
Sounding devices, explosive .....	UN0374
Sounding devices, explosive .....	UN0375
Torpedoes with bursting charge .....	UN0329
Torpedoes with bursting charge .....	UN0451
Warheads, rocket with burster or expelling charge .....	UN0370
Warheads, rocket with bursting charge .....	UN0286
Warheads, rocket with bursting charge .....	UN0287
Warheads, torpedo with bursting charge .....	UN0221

\* \* \* \* \*

- 1. In § 172.102:
  - a. In paragraph (c)(1), a new Special provision 41 is added in appropriate numerical order.
  - b. In paragraph (c)(4), the introductory paragraph is revised.
  - c. In paragraph (c)(4), Table 1, the entries IB3 and IB8 are revised, and the headings for the table and first and second columns of the table are revised.
  - d. In paragraph (c)(4), Table 2, the first column heading is revised to read "IP Code," and the second column heading is removed.
  - e. In paragraph (c)(4), a new Table 3 is added.

The additions and revisions read as follows:

**§ 172.102 Special provisions.**

- \* \* \* \* \*
- (c) \* \* \*
- (1) \* \* \*

**Code/Special Provisions**

\* \* \* \* \*

41 This material at the Packing Group II hazard criteria level may be transported in Large Packagings.

\* \* \* \* \*

(4) *IB Codes and IP Codes.* These provisions apply only to transportation in IBCs and Large Packagings. Table 1

authorizes IBCs for specific proper shipping names through the use of IB Codes assigned in the § 172.101 table of this subchapter. Table 2 defines IP Codes on the use of IBCs that are assigned to specific commodities in the § 172.101 Table of this subchapter. Table 3 authorizes Large Packagings for specific proper shipping names through the use of IB Codes assigned in the § 172.101 table of this subchapter. Large Packagings are authorized for the Packing Group III entries of specific proper shipping names when either Special Provision IB3 or IB8 is assigned to that entry in the § 172.101 Table. When no IB code is assigned in the

§ 172.101 Table for a specific proper shipping name, or in § 173.225(e) Organic Peroxide Table for Type F organic peroxides, use of an IBC or Large Packaging for the material may be

authorized when approved by the Associate Administrator. The letter “Z” shown in the marking code for composite IBCs must be replaced with a capital code letter designation found

in § 178.702(a)(2) of this subchapter to specify the material used for the other packaging. Tables 1, 2, and 3 follow:

TABLE 1—IB CODES  
[IBC authorizations]

IB code	Authorized IBCs
* * * * *	
IB3 .....	Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1 and 31HA2, 31HB2, 31HN2, 31HD2 and 31HH2). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 °C (1.1 bar at 122 °F), or 130 kPa at 55 °C (1.3 bar at 131 °F) are authorized, except for UN2672 ( <i>also see</i> Special Provision IP8 in Table 3 for UN2672). For authorized Large Packagings, see Table 3.
* * * * *	
IB8 .....	Authorized IBCs: Metal (11A, 11B, 11N, 21A, 21B, 21N, 31A, 31B and 31N); Rigid plastics (11H1, 11H2, 21H1, 21H2, 31H1 and 31H2); Composite (11HZ1, 11HZ2, 21HZ1, 21HZ2, 31HZ1 and 31HZ2); Fiberboard (11G); Wooden (11C, 11D and 11F); Flexible (13H1, 13H2, 13H3, 13H4, 13H5, 13L1, 13L2, 13L3, 13L4, 13M1 or 13M2). For authorized Large Packagings, see Table 3.
* * * * *	

\* \* \* \* \*

TABLE 3—IB CODES  
[Large packaging authorizations]

IB3	Authorized Large Packagings (LIQUIDS) (PG III materials only) <sup>2</sup>
Inner packagings: Glass 10 liter .....	Large outer packagings: steel (50A). aluminum (50B). metal other than steel or aluminum (50N). rigid plastics (50H). natural wood (50C). plywood (50D). reconstituted wood (50F). rigid fiberboard (50G).
Plastics 30 liter .....	
Metal 40 liter .....	
IB8	Authorized Large Packagings (SOLIDS) (PG III materials only) <sup>2</sup>
Inner packagings: Glass 10 kg .....	Large outer packagings: steel (50A). aluminum (50B). metal other than steel or aluminum (50N). flexible plastics (51H). <sup>1</sup> rigid plastics (50H). natural wood (50C). plywood (50D). reconstituted wood (50F). rigid fiberboard (50G).
Plastics 50 kg .....	
Metal 50 kg .....	
Paper 50 kg .....	
Fiber 50 kg .....	

<sup>1</sup> Flexible plastic (51H) Large Packagings are only authorized for use with flexible inner packagings.  
<sup>2</sup> Except when authorized under Special Provision 41.

\* \* \* \* \*

■ 6. In § 172.514, paragraphs (c)(3) and (c)(4) are revised and a new paragraph (c)(5) is added to read as follows:

**§ 172.514 Bulk packagings.**

\* \* \* \* \*

(c) \* \* \*

(3) A bulk packaging other than a portable tank, cargo tank, or tank car

(*e.g.*, a bulk bag or box) with a volumetric capacity of less than 18 cubic meters (640 cubic feet);  
 (4) An IBC; and  
 (5) A Large Packaging as defined in § 171.8 of this subchapter.

**PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS**

■ 7. The authority citation for part 173 continues to read as follows:

**Authority:** 49 U.S.C. 5101–5128, 44701; 49 CFR 1.45, 1.53.

**§ 173.4 [Amended]**

■ 8. In § 173.4, paragraph (a)(5), the wording “strong outside packaging” is removed and the wording “strong outer packaging” is added in its place.

**§ 173.4b [Amended]**

■ 9. In § 173.4b, paragraph (a)(4), the wording “strong outside packaging” is removed and the wording “strong outer packaging” is added in its place.

**§ 173.7 [Amended]**

■ 10. In § 173.7, paragraph (c), the first sentence, the wording “strong outside packaging” is removed and the wording “strong outer packaging” is added in its place.

■ 11. In § 173.22, in paragraph (a)(4), three new sentences are added to the end of the paragraph to read as follows:

**§ 173.22 Shipper's responsibility.**

(a) \* \* \*

(4) \* \* \* A person must maintain a copy of the manufacturer's notification, including closure instructions (*see* § 178.2(c) of this subchapter) unless permanently embossed or printed on the packaging. When applicable, a person must maintain a copy of any supporting documentation for an equivalent level of performance under the selective testing variation in § 178.601(g)(1) of this subchapter. A copy of the notification, unless permanently embossed or printed on the packaging, and supporting documentation, when applicable, must be made available for inspection by a representative of the Department upon request for 365 days after offering the package for transportation.

\* \* \* \* \*

■ 12. In § 173.28, in paragraph (a), a third sentence is added and, in paragraph (f), a third sentence is added to read as follows:

**§ 173.28 Reuse, reconditioning, and remanufacture of packagings.**

(a) \* \* \* Packagings not meeting the minimum thickness requirements prescribed in paragraph (b)(4)(i) of this section may not be reused, reconditioned, or remanufactured for reuse.

\* \* \* \* \*

(f) \* \* \* Drums or jerricans not meeting the minimum thickness requirements prescribed in paragraph (b)(4)(i) of this section may not be reused, reconditioned, or remanufactured for reuse.

■ 13. In § 173.35, paragraph (h)(2), introductory paragraph, is revised to read as follows:

**§ 173.35 Hazardous materials in IBCs.**

\* \* \* \* \*

(h) \* \* \*

(2) Liquids having a vapor pressure greater than 110 kPa (16 psig) at 50 °C (122 °F) or 130 kPa (18.9 psig) at 55 °C (131 °F) may not be transported in metal IBCs.

\* \* \* \* \*

■ 14. New § 173.36 is added to read as follows:

**§ 173.36 Hazardous materials in Large Packagings.**

(a) No person may offer or accept a hazardous material for transportation in a Large Packaging except as authorized by this subchapter. Except as otherwise provided in this subchapter, no Large Packaging may be filled with a Packing Group I or II material. Each Large Packaging used for the transportation of hazardous materials must conform to the requirements of its specification and regulations for the transportation of the particular commodity.

(b) *Packaging design.* (1) *Inner packaging closures.* A Large Packaging containing liquid hazardous materials must be packed so that closures on inner packagings are upright.

(2) *Flexible Large Packagings.* Flexible Large Packagings (*e.g.*, 51H) are only authorized for use with flexible inner packagings.

(3) *Friction.* The nature and thickness of the outer packaging must be such that friction during transportation is not likely to generate an amount of heat sufficient to dangerously alter the chemical stability of the contents.

(4) *Securing and cushioning.* Inner packagings of Large Packagings must be packed, secured and cushioned to prevent their breakage or leakage and to control their shifting within the outer packaging under conditions normally incident to transportation. Cushioning material must not be capable of reacting dangerously with the contents of the inner packagings or having its protective properties significantly weakened in the event of leakage.

(5) *Metallic devices.* Nails, staples and other metallic devices must not protrude into the interior of the outer packaging in such a manner as to be likely to damage inner packagings or receptacles.

(c) *Initial use and reuse of Large Packagings.* A Large Packaging may be reused. If an inner packaging is constructed of paper or flexible plastic, the inner packaging must be replaced before each reuse. Before a Large Packaging is filled and offered for transportation, the Large Packaging must be given an external visual

inspection, by the person filling the Large Packaging, to ensure:

(1) The Large Packaging is free from corrosion, contamination, cracks, cuts, or other damage which would render it unable to pass the prescribed design type test to which it is certified and marked; and

(2) The Large Packaging is marked in accordance with requirements in § 178.910 of this subchapter. Additional marking allowed for each design type may be present. Required markings that are missing, damaged or difficult to read must be restored or returned to original condition.

(d) During transportation—

(1) No hazardous material may remain on the outside of the Large Packaging; and

(2) Each Large Packaging must be securely fastened to or contained within the transport unit.

(e) Each Large Packaging used for transportation of solids which may become liquid at temperatures likely to be encountered during transportation may not be transported in paper or fiber inner packagings. The inner packagings must be capable of containing the substance in the liquid state.

(f) Liquid hazardous materials may only be offered for transportation in inner packagings appropriately resistant to an increase of internal pressure likely to develop during transportation.

(g) A Large Packaging used to transport hazardous materials may not exceed 3 cubic meters (106 cubic feet) capacity.

(h) *Mixed contents.* (1) An outer Large Packaging may contain more than one hazardous material only when—

(i) The inner and outer packagings used for each hazardous material conform to the relevant packaging sections of this part applicable to that hazardous material, and not result in a violation of § 173.21;

(ii) The package as prepared for shipment meets the performance tests prescribed in part 178 of this subchapter for the hazardous materials contained in the package;

(iii) Corrosive materials (except ORM-D) in bottles are further packed in securely closed inner receptacles before packing in outer packagings; and

(iv) For transportation by aircraft, the total net quantity does not exceed the lowest permitted maximum net quantity per package as shown in Column 9a or 9b, as appropriate, of the § 172.101 table. The permitted maximum net quantity must be calculated in kilograms if a package contains both a liquid and a solid.

(2) A packaging containing inner packagings of Division 6.2 materials

may not contain other hazardous materials, except dry ice.

(i) When a Large Packaging is used for the transportation of liquids with a flash point of 60.5 °C (141 °F) (closed cup) or lower, or powders with the potential for dust explosion, measures must be taken

during product loading and unloading to prevent a dangerous electrostatic discharge.

■ 15. In § 173.62, paragraph (c), Table of Packing Methods, Packing Instruction 130 is revised to read as follows:

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

\* \* \* \* \*

(c) \* \* \*

TABLE OF PACKING METHODS

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

■ 16. In § 173.223, the section heading and the introductory text to paragraph (a) are revised as follows:

**§ 173.223 Packagings for certain flammable solids.**

(a) Packagings for “Musk xylene,” “5-tert-Butyl-2,4,6-trinitro-m-xylene,” “Azodicarbonamide,” or “Isosorbide-5-mononitrate,” when offered for transportation or transported by rail, highway, or vessel, must conform to the general packaging requirements of subpart B of part 173, and to the requirements of part 178 of this subchapter at the Packing Group III performance level and may only be transported in the following packagings:  
\* \* \* \* \*

■ 17. In § 173.240, paragraph (e) is added as follows:

**§ 173.240 Bulk packaging for certain low hazard solid materials.**

\* \* \* \* \*

(e) *Large Packagings.* Large Packagings are authorized subject to the conditions and limitations of this section provided the Large Packaging type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the Large Packaging conforms to the requirements in subpart Q of part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table for the material being transported.

(1) Except as specifically authorized in this subchapter, Large Packagings may not be used for Packing Group I or II hazardous materials.

(2) Large Packagings with paper or fiberboard inner receptacles may not be used for solids that may become liquid in transportation.

■ 18. In § 173.241, paragraph (e) is added as follows:

**§ 173.241 Bulk packagings for certain low hazard liquid and solid materials.**

\* \* \* \* \*

(e) *Large Packagings.* Large Packagings are authorized subject to the conditions and limitations of this section provided the Large Packaging type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the Large Packaging conforms to the requirements in subpart Q of part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table for the material being transported.

(1) Except as specifically authorized in this subchapter, Large Packagings may not be used for Packing Group I or II hazardous materials.

(2) Large Packagings with paper or fiberboard inner receptacles may not be used for solids that may become liquid in transportation.

■ 19. In § 173.242, paragraph (e) is added as follows:

**§ 173.242 Bulk packagings for certain medium hazard liquids and solids, including solids with dual hazards.**

\* \* \* \* \*

(e) *Large Packagings.* Large Packagings are authorized subject to the conditions and limitations of this section provided the Large Packaging type is authorized according to the IBC packaging code specified for the specific hazardous material in Column (7) of the § 172.101 Table of this subchapter and the Large Packaging conforms to the requirements in subpart Q of part 178 of this subchapter at the Packing Group performance level as specified in Column (5) of the § 172.101 Table for the material being transported.

(1) Except as specifically authorized in this subchapter, Large Packagings may not be used for Packing Group I or II hazardous materials.

(2) Large Packagings with paper or fiberboard inner receptacles may not be used for solids that may become liquid in transportation.

■ 20. In § 173.249, paragraph (b) is revised to read as follows:

**§ 173.249 Bromine.**

\* \* \* \* \*

(b) Specification MC 310, MC 311, MC 312 or DOT 412 cargo tank motor vehicles conforming with paragraphs (d) through (f) of this section. Except when transported as a residue, the total quantity in one tank may not be less than 88 percent or more than 96 percent of the volume of the tank. Cargo tanks in bromine service built prior to August 31, 1991, may continue in service under the requirements contained in § 173.252(a)(4) of this part in effect on September 30, 1991.

\* \* \* \* \*

**§ 173.301 [Amended]**

■ 21. In § 173.301, paragraph (h)(3)(ii), the wording “strong outside packaging” is removed and the wording “strong outer packaging” is added in its place.

■ 22. In § 173.306, paragraph (a)(2)(i) is revised to read as follows:

**§ 173.306 Limited quantities of compressed gases.**

(a) \* \* \*

(2) \* \* \*

(i) Container is not over 0.95 L (1 quart) capacity and charged to not more than 11.17 bar (482.63 kPa, 170 psig) at 21 °C (70 °F), and must be packed in a strong outer packaging, or

\* \* \* \* \*

**§ 173.334 [Amended]**

■ 23. In § 173.334, paragraph (d), the wording “strong outside packaging” is removed and the wording “strong outer packaging” is added in its place in each place it appears.

**§ 173.338 [Amended]**

■ 24. In § 173.338, paragraph (a), the second sentence, the wording “strong outside container” is removed and the wording “strong outer packaging” is added in its place.

**PART 174—CARRIAGE BY RAIL**

■ 25. The authority citation for part 174 is revised to read as follows:

**Authority:** 49 U.S.C. 5101–5128; 49 CFR 1.53.

■ 26. In § 174.63, the section heading and paragraph (a) are revised as follows:

**§ 174.63 Portable tanks, IM portable tanks, IBCs, Large Packagings, cargo tanks, and multi-unit tank car tanks.**

(a) A carrier may not transport a bulk packaging (*e.g.*, portable tank, IM portable tank, IBC, Large Packaging, cargo tank, or multi-unit tank car tank) containing a hazardous material in container-on-flatcar (COFC) or trailer-on-flatcar (TOFC) service except as authorized by this section or unless approved for transportation by the Associate Administrator for Safety, FRA.

\* \* \* \* \*

**PART 178—SPECIFICATIONS FOR PACKAGINGS**

■ 27. The authority citation for part 178 continues to read as follows:

**Authority:** 49 U.S.C. 5101–5128; 49 CFR 1.53.

■ 28. In § 178.2, paragraph (c) is revised to read as follows:

**§ 178.2 Applicability and responsibility.**

\* \* \* \* \*

(c) *Notification.* (1) Except as specifically provided in §§ 178.337–18 and 178.345–10 of this part, the manufacturer or other person certifying compliance with the requirements of this part, and each subsequent distributor of that packaging must:

(i) Notify each person to whom that packaging is transferred—

(A) Of all requirements in this part not met at the time of transfer, and

(B) With information specifying the type(s) and dimensions of the closures, including gaskets and any other components needed to ensure that the packaging is capable of successfully passing the applicable performance tests. This information must include any

procedures to be followed, including closure instructions for inner packagings and receptacles, to effectively assemble and close the packaging for the purpose of preventing leakage in transportation. Closure instructions must provide for a consistent and repeatable means of closure that is sufficient to ensure the packaging is closed in the same manner as it was tested. For packagings sold or represented as being in conformance with the requirements of this subchapter applicable to transportation by aircraft, this information must include relevant guidance to ensure that the packaging, as prepared for transportation, will withstand the pressure differential requirements in § 173.27 of this subchapter.

(ii) Retain copies of each written notification for at least 365 days from date of issuance; and

(iii) Make copies of all written notifications available for inspection by a representative of the Department.

(2) The notification required in accordance with this paragraph (c) may be in writing or by electronic means, including e-mailed transmission or transmission on a CD or similar device. If a manufacturer or subsequent distributor of the packaging utilizes electronic means to make the required notifications, the notification must be specific to the packaging in question and must be in a form that can be printed in hard copy by the person receiving the notification.

■ 29. In § 178.503, paragraphs (a)(1) and (e)(1) are revised as follows:

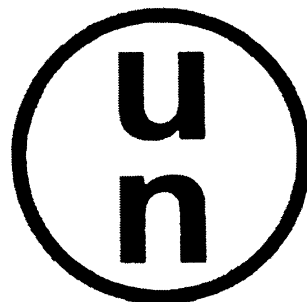
**§ 178.503 Marking of packagings.**

(a) \* \* \*

(1) Except as provided in paragraph (e)(1)(ii) of this section, the United Nations symbol as illustrated in paragraph (e)(1)(i) of this section (for embossed metal receptacles, the letters “UN”) may be applied in place of the symbol;

(e) \* \* \*

(1)(i) The United Nations symbol is:



(ii) The circle that surrounds the letters “u” and “n” may have small

breaks provided the following provisions are met:

(A) The total gap space does not exceed 15 percent of the circumference of the circle;

(B) There are no more than four gaps in the circle;

(C) The spacing between gaps is separated by no less than 20 percent of the circumference of the circle (72 degrees); and

(D) The letters "u" and "n" appear exactly as depicted in § 178.3(e)(1)(i) with no gaps.

\* \* \* \* \*

■ 30. In § 178.601, the introductory text of paragraph (g)(1), and paragraphs (g)(8) and (k) are revised to read as follows:

§ 178.601 General requirements.

\* \* \* \* \*

(g) \* \* \*

(1) *Selective testing of combination packagings. Variation 1.* Variations are permitted in inner packagings of a tested combination package, without further testing of the package, provided an equivalent level of performance is maintained and, when a package is altered under Variation 1 after October 1, 2010, the methodology used to determine that the inner packaging, including closure, maintains an equivalent level of performance is documented in writing by the person certifying compliance with this paragraph and retained in accordance with paragraph (l) of this section. Permitted variations are as follows:

\* \* \* \* \*

(8) For a steel drum with a capacity greater than 12 L (3 gallons) manufactured from low carbon, cold-rolled sheet steel meeting ASTM designations A 366/A 366M or A 568/A 568M, variations in elements other than the following design elements are considered minor and do not constitute a different drum design type, or "different packaging" as defined in paragraph (c) of this section for which design qualification testing and periodic retesting are required. Minor variations authorized without further testing include changes in the identity of the supplier of component material made to the same specifications, or the original manufacturer of a DOT specification or UN standard drum to be remanufactured. A change in any one or more of the following design elements constitutes a different drum design type:

- (i) The packaging type and category of the original drum and the remanufactured drum, i.e., 1A1 or 1A2;
(ii) The style, i.e., straight-sided or tapered;

(iii) Except as provided in paragraph (g)(3) of this section, the rated (marked) capacity and outside dimensions;

(iv) The physical state for which the packaging was originally approved (e.g., tested for solids or liquids);

(v) An increase in the marked level of performance of the original drum (i.e., to a higher packing group, hydrostatic test pressure, or specific gravity to which the packaging has been tested);

(vi) Type of side seam welding;

(vii) Type of steel;

(viii) An increase greater than 10% or any decrease in the steel thickness of the head, body, or bottom;

(ix) End seam type, (e.g., triple or double seam);

(x) A reduction in the number of rolling hoops (beads) which equal or exceed the diameter over the chimes;

(xi) The location, type or size, and material of closures (other than the cover of UN 1A2 drums);

(xii) The location (e.g., from the head to the body), type (e.g., mechanically seamed or welded flange), and materials of closure (other than the cover of UN 1A2 drums); and

(xiii) For UN 1A2 drums:

(A) Gasket material (e.g., plastic), or properties affecting the performance of the gasket;

(B) Configuration or dimensions of the gasket;

(C) Closure ring style including bolt size, (e.g., square or round back, 0.625" bolt); and

(D) Closure ring thickness.

(E) Width of lugs or extensions in crimp/lug cover.

\* \* \* \* \*

(k) *Number of test samples.* Except as provided in this section, one test sample must be used for each test performed under this subpart.

(1) *Stainless steel drums.* Provided the validity of the test results is not affected, a person may perform the design qualification testing of stainless steel drums using three (3) samples rather than the specified eighteen (18) samples under the following provisions:

(i) The packaging must be tested in accordance with this subpart by subjecting each of the three containers to the following sequence of tests:

(A) The stacking test in § 178.606,

(B) The leakproofness test in § 178.604,

(C) The hydrostatic pressure test in § 178.608, and

(D) Diagonal top chime and flat on the side drop tests in § 178.603. Both drop tests may be conducted on the same sample.

(ii) For periodic retesting of stainless steel drums, a reduced sample size of one container is authorized.

(2) *Packagings other than stainless steel drums.* Provided the validity of the test results is not affected, several tests may be performed on one sample with the approval of the Associate Administrator.

\* \* \* \* \*

■ 31. In § 178.700, paragraph (c)(1) is revised as follows:

§ 178.700 Purpose, scope and definitions.

\* \* \* \* \*

(c) \* \* \*

(1) Body means the receptacle proper (including openings and their closures, but not including service equipment) that has a volumetric capacity of not more than 3 cubic meters (3,000 L, 793 gallons, or 106 cubic feet).

\* \* \* \* \*

■ 32. In § 178.703 paragraph (a)(1)(i) is revised as follows:

§ 178.703 Marking of IBCs.

(a) \* \* \*

(1) \* \* \*

(i) Except as provided in § 178.503(e)(1)(ii), the United Nations symbol as illustrated in § 178.503(e)(1)(i). For metal IBCs on which the marking is stamped or embossed, the capital letters "UN" may be applied instead of the symbol.

\* \* \* \* \*

■ 33. In § 178.705, paragraph (d) is added to read as follows:

§ 178.705 Standards for metal IBCs.

\* \* \* \* \*

(d) Metal IBCs may not have a volumetric capacity greater than 3,000 L (793 gallons) or less than 450 L (119 gallons).

■ 34. In § 178.706, paragraph (d) is added to read as follows:

§ 178.706 Standards for rigid plastic IBCs.

\* \* \* \* \*

(d) Rigid plastic IBCs may not have a volumetric capacity greater than 3,000 L (793 gallons) or less than 450 L (119 gallons).

■ 35. In § 178.707, paragraph (d) is added to read as follows:

§ 178.707 Standards for composite IBCs.

\* \* \* \* \*

(d) Composite IBCs may not have a volumetric capacity greater than 3,000 L (793 gallons) or less than 450 L (119 gallons).

■ 36. In § 178.708, paragraph (d) is added to read as follows:

§ 178.708 Standards for fiberboard IBCs.

\* \* \* \* \*

(d) Fiberboard IBCs may not have a volumetric capacity greater than 3,000 L

(793 gallons) or less than 450 L (119 gallons).

■ 37. In § 178.709, paragraph (d) is added to read as follows:

**§ 178.709 Standards for wooden IBCs.**

\* \* \* \* \*

(d) Wooden IBCs may not have a volumetric capacity greater than 3,000 L (793 gallons) or less than 450 L (119 gallons).

■ 38. In § 178.710, paragraph (d) is added to read as follows:

**§ 178.710 Standards for flexible IBCs.**

\* \* \* \* \*

(d) Flexible IBCs:

(1) May not have a volumetric capacity greater than 3,000 L (793 gallons) or less than 56 L (15 gallons); and

(2) Must be designed and tested to a capacity of no less than 50 kg (110 pounds).

■ 39. In § 178.801, paragraph (i) is revised to read as follows:

**§ 178.801 General requirements.**

\* \* \* \* \*

(i) *Approval of equivalent packagings.* An IBC differing from the standards in subpart N of this part, or tested using methods other than those specified in this subpart, may be used if approved by the Associate Administrator. Such IBCs must be shown to be equally effective, and testing methods used must be equivalent.

\* \* \* \* \*

■ 40. In § 178.810, paragraph (c) is revised as follows:

**§ 178.810 Drop test.**

\* \* \* \* \*

(c) *Test method.* (1) Samples of all IBC design types must be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface. The point of impact must be the most vulnerable part of the base of the IBC being tested. Following the drop, the IBC must be restored to the upright position for observation.

(2) IBC design types with a capacity of 0.45 cubic meters (15.9 cubic feet) or less must be subject to an additional drop test.

\* \* \* \* \*

■ 41. Section 178.815 is revised to read as follows:

**§ 178.815 Stacking test.**

(a) *General.* The stacking test must be conducted for the qualification of all IBC design types intended to be stacked.

(b) *Special preparation for the stacking test.* (1) All IBCs except flexible IBC design types must be loaded to their maximum permissible gross mass.

(2) The flexible IBC must be filled to not less than 95 percent of its capacity and to its maximum net mass, with the load being evenly distributed.

(c) *Test method.* (1) *Design Qualification Testing.* All IBCs must be placed on their base on level, hard ground and subjected to a uniformly distributed superimposed test load for a period of at least five minutes (see paragraph (c)(5) of this section).

(2) Fiberboard, wooden and composite IBCs with outer packagings constructed of other than plastic materials must be subject to the test for 24 hours.

(3) Rigid plastic IBC types and composite IBC types with plastic outer packagings (11HH1, 11HH2, 21HH1, 21HH2, 31HH1 and 31HH2) which bear the stacking load must be subjected to the test for 28 days at 40 °C (104 °F).

(4) For all IBCs, the load must be applied by one of the following methods:

(i) One or more IBCs of the same type loaded to their maximum permissible gross mass and stacked on the test IBC;

(ii) The calculated superimposed test load weight loaded on either a flat plate or a reproduction of the base of the IBC, which is stacked on the test IBC.

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

(d) *Periodic Retest.* (1) The package must be tested in accordance with paragraph (c) of this section; or

(2) The packaging may be tested using a dynamic compression testing

machine. The test must be conducted at room temperature on an empty, unsealed packaging. The test sample must be centered on the bottom platen of the testing machine. The top platen must be lowered until it comes in contact with the test sample.

Compression must be applied end to end. The speed of the compression tester must be one-half inch plus or minus one-fourth inch per minute. An initial preload of 50 pounds must be applied to ensure a definite contact between the test sample and the platens. The distance between the platens at this time must be recorded as zero deformation. The force "A" then to be applied must be calculated using the applicable formula:

Liquids:  $A = (1.8)(n - 1) [w + (s \times v \times 8.3 \times .98)] \times 1.5;$

or

Solids:  $A = (1.8)(n - 1) [w + (s \times v \times 8.3 \times .95)] \times 1.5$

Where:

A = applied load in pounds.

n = maximum number of IBCs being stacked during transportation.

w = maximum weight of one empty container in pounds.

s = specific gravity (liquids) or density (solids) of the lading.

v = actual capacity of container (rated capacity + outage) in gallons.

and:

8.3 corresponds to the weight in pounds of 1.0 gallon of water.

1.5 is a compensation factor converting the static load of the stacking test into a load suitable for dynamic compression testing.

(e) *Criteria for passing the test.* (1) For metal, rigid plastic, and composite IBCs, there may be no permanent deformation, which renders the IBC unsafe for transportation, and no loss of contents.

(2) For fiberboard and wooden IBCs, there may be no loss of contents and no permanent deformation, which renders the whole IBC, including the base pallet, unsafe for transportation.

(3) For flexible IBCs, there may be no deterioration, which renders the IBC unsafe for transportation, and no loss of contents.

(4) For the dynamic compression test, a container passes the test if, after application of the required load, there is no permanent deformation to the IBC, which renders the whole IBC, including the base pallet, unsafe for transportation; in no case may the maximum deflection exceed one inch.

■ 42. In § 178.819, paragraph (b)(1) is amended by adding a second sentence and paragraph (b)(2) is revised as follows:

**§ 178.819 Vibration test.**

\* \* \* \* \*

(b) \* \* \*

(1) \* \* \* IBCs intended for liquids may be tested using water as the filling material for the vibration test.

(2) The sample IBC must be placed on a vibrating platform with a vertical or rotary double-amplitude (peak-to-peak displacement) of one inch. The IBC must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

\* \* \* \* \*

■ 43. Subpart P is added to Part 178 as follows:

**Subpart P—Large Packagings Standards**

Sec.

178.900 Purpose and scope.

178.905 Large Packaging identification codes.

178.910 Marking of Large Packagings.

178.915 General Large Packaging standards.

- 178.920 Standards for metal Large Packagings.  
 178.925 Standards for rigid plastic Large Packagings.  
 178.930 Standards for fiberboard Large Packagings.  
 178.935 Standards for wooden Large Packagings.  
 178.940 Standards for flexible Large Packagings.

### Subpart P—Large Packagings Standards

#### § 178.900 Purpose and scope.

(a) This subpart prescribes requirements for Large Packaging intended for the transportation of hazardous materials. Standards for these packagings are based on the UN Recommendations.

(b) Terms used in this subpart are defined in § 171.8 of this subchapter.

#### § 178.905 Large Packaging identification codes.

Large packaging code designations consist of: two numerals specified in paragraph (a) of this section; followed by the capital letter(s) specified in paragraph (b) of this section.

(a) Large packaging code number designations are as follows: 50 for rigid Large Packagings; or 51 for flexible Large Packagings.

(b) Large Packagings code letter designations are as follows:

- (1) "A" means steel (all types and surface treatments).
- (2) "B" means aluminum.

- (3) "C" means natural wood.
- (4) "D" means plywood.
- (5) "F" means reconstituted wood.
- (6) "G" means fiberboard.
- (7) "H" means plastic.
- (8) "M" means paper, multiwall.
- (9) "N" means metal (other than steel or aluminum).

#### § 178.910 Marking of Large Packagings.

(a) The manufacturer must:  
 (1) Mark every Large Packaging in a durable and clearly visible manner. The marking may be applied in a single line or in multiple lines provided the correct sequence is followed with the information required by this section. The following information is required in the sequence presented:

(i) Except as provided in § 178.503(e)(1)(ii), the United Nations packaging symbol as illustrated in § 178.503(e)(1)(i). For metal Large Packagings on which the marking is stamped or embossed, the capital letters "UN" may be applied instead of the symbol;

(ii) The code number designating the Large Packaging design type according to § 178.901. The letter "W" must follow the Large Packaging design type identification code on a Large Packaging when the Large Packaging differs from the requirements in subpart P of this part, or is tested using methods other than those specified in this subpart, and is approved by the Associate Administrator in accordance with the provisions in § 178.1001;

(iii) A capital letter identifying the performance standard under which the design type has been successfully tested, as follows:

(A) X—for Large Packagings meeting Packing Groups I, II and III tests;

(B) Y—for Large Packagings meeting Packing Groups II and III tests; and

(C) Z—for Large Packagings meeting Packing Group III test.

(iv) The month (designated numerically) and year (last two digits) of manufacture;

(v) The country authorizing the allocation of the mark. The letters "USA" indicate that the Large Packaging is manufactured and marked in the United States in compliance with the provisions of this subchapter.

(vi) The name and address or symbol of the manufacturer or the approval agency certifying compliance with subpart P and subpart Q of this part. Symbols, if used, must be registered with the Associate Administrator.

(vii) The stacking test load in kilograms (kg). For Large Packagings not designed for stacking the figure "0" must be shown.

(viii) The maximum permissible gross mass or for flexible Large Packagings, the maximum net mass, in kg.

(2) The following are examples of symbols and required markings:

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



50A/X/05 05/USA/M9399/2500/1000

(ii) For a plastic Large Packaging not suitable for stacking; maximum gross mass: 800 kg.



50H/Y/11 04/USA/M9399/0/800

(iii) For a Flexible Large Packaging not suitable for stacking; maximum gross mass: 500 kg.



51H/Z/06 04/USA/+ZT1235/0/500



(b) [Reserved].

**§ 178.915 General Large Packaging standards.**

(a) Each Large Packaging must be resistant to, or protected from, deterioration due to exposure to the external environment. Large Packagings intended for solid hazardous materials must be sift-proof and water-resistant.

(b) All service equipment must be positioned or protected to minimize potential loss of contents resulting from damage during Large Packaging handling and transportation.

(c) Each Large Packaging, including attachments and service and structural equipment, must be designed to withstand, without loss of hazardous materials, the internal pressure of the contents and the stresses of normal handling and transport. A Large Packaging intended for stacking must be designed for stacking. Any lifting or securing features of a Large Packaging must be sufficient strength to withstand the normal conditions of handling and transportation without gross distortion or failure and must be positioned so as to cause no undue stress in any part of the Large Packaging.

(d) A Large Packaging consisting of packagings within a framework must be so constructed that the packaging is not damaged by the framework and is retained within the framework at all times.

(e) Large packaging design types must be constructed in such a way as to be bottom-lifted or top-lifted as specified in §§ 178.1004 and 178.1005.

**§ 178.920 Standards for metal Large Packagings.**

(a) The provisions in this section apply to metal Large Packagings intended to contain liquids and solids. Metal Large Packaging types are designated:

- (1) 50A steel
- (2) 50B aluminum
- (3) 50N metal (other than steel or aluminum)

(b) Each Large Packaging must be made of suitable ductile metal materials. Welds must be made so as to maintain design type integrity of the receptacle under conditions normally incident to transportation. Low-temperature performance must be taken into account when appropriate.

(c) The use of dissimilar metals must not result in deterioration that could affect the integrity of the Large Packaging.

(d) Metal Large Packagings may not have a volumetric capacity greater than 3,000 L (793 gallons) and not less than 450 L (119 gallons).

**§ 178.925 Standards for rigid plastic Large Packagings.**

(a) The provisions in this section apply to rigid plastic Large Packagings intended to contain liquids and solids. Rigid plastic Large Packaging types are designated:

- (1) 50H rigid plastics.
- (2) [Reserved]

(b) A rigid plastic Large Packaging must be manufactured from plastic material of known specifications and be of a strength relative to its capacity and to the service it is required to perform. In addition to conformance to § 173.24 of this subchapter, plastic materials must be resistant to aging and to degradation caused by ultraviolet radiation.

(1) If protection against ultraviolet radiation is necessary, it must be provided by the addition of a pigment or inhibitor such as carbon black to plastic materials. These additives must be compatible with the contents and remain effective throughout the life of the plastic Large Packaging body. 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 changes in the carbon black content, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

(2) Additives may be included in the composition of the plastic material to improve the resistance to aging or to serve other purposes, provided they do not adversely affect the physical or chemical properties of the material of construction.

(3) No used material other than production residues or regrind from the same manufacturing process may be used in the manufacture of rigid plastic Large Packagings.

(c) Rigid plastic Large Packagings:

- (1) May not have a volumetric capacity greater than 3,000 L (793 gallons); and
- (2) May not have a volumetric capacity less than 450 L (119 gallons).

**§ 178.930 Standards for fiberboard Large Packagings.**

(a) The provisions in this section apply to fiberboard Large Packagings intended to contain solids. Rigid fiberboard large Packaging types are designated:

- (1) 50G fiberboard
- (2) [Reserved]

(b) *Construction requirements for fiberboard Large Packagings.*

(1) Fiberboard Large Packagings must be constructed of strong, solid or double-faced corrugated fiberboard

(single or multiwall) that is appropriate to the capacity of the Large Packagings and to their intended use. Water resistance of the outer surface must be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 grams per square meter (0.0316 pounds per square foot)—see ISO 535 (E) (IBR, see § 171.7 of this subchapter). Fiberboard must have proper bending qualities. Fiberboard must be cut, creased without cutting through any thickness of fiberboard, and slotted so as to permit assembly without cracking, surface breaks or undue bending. The fluting or corrugated fiberboard must be firmly glued to the facings.

(i) The walls, including top and bottom, must have a minimum puncture resistance of 15 Joules (11 foot-pounds of energy) measured according to ISO 3036 (IBR, see § 171.7 of this subchapter).

(ii) Manufacturers' joints in the outer packaging of Large Packagings must be made with an appropriate overlap and be taped, glued, stitched with metal staples or fastened by other means at least equally effective. Where joints are made by gluing or taping, a water resistant adhesive must be used. Metal staples must pass completely through all pieces to be fastened and be formed or protected so that any inner liner cannot be abraded or punctured by them.

(2) *Integral and detachable pallets.*

(i) Any integral pallet base forming part of a Large Packaging or any detachable pallet must be suitable for mechanical handling with the Large Packaging filled to its maximum permissible gross mass.

(ii) The pallet or integral base must be designed to avoid protrusions causing damage to the fiberboard Large Packagings in handling.

(iii) The body must be secured to any detached pallet to ensure stability in handling and transport. Where a detachable pallet is used, its top surface must be free from protrusions that might damage the Large Packaging.

(3) Strengthening devices, such as timber supports to increase stacking performance may be used but must be external to the liner.

(4) The load-bearing surfaces of Large Packagings intended for stacking must be designed to distribute the load in a stable manner.

(c) Fiberboard Large Packagings may not have a volumetric capacity greater than 3,000 L (793 gallons) and not less than 450 L (119 gallons).

**§ 178.935 Standards for wooden Large Packagings.**

(a) The provisions in this section apply to wooden Large Packagings intended to contain solids. Wooden Large Packaging types are designated:

- (1) 50C natural wood.
- (2) 50D plywood.
- (3) 50F reconstituted wood.

(b) Construction requirements for wooden Large Packagings are as follows:

- (1) The strength of the materials used and the method of construction must be appropriate to the capacity and intended use of the Large Packagings.

(i) Natural wood used in the construction of Large Packagings must be well-seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the Large Packagings. Each Large Packaging part must consist of uncut wood or a piece equivalent in strength and integrity. Large Packagings parts are equivalent to one piece when a suitable method of glued assembly is used (*i.e.*, a Lindermann joint, tongue and groove joint, ship, lap or babbet joint; or butt joint with at least two corrugated metal fasteners at each joint, or when other methods at least equally effective are used).

(ii) Plywood used in construction must be at least 3-ply. Plywood must be made of well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the Large Packagings. All adjacent piles must be glued with water resistant adhesive. Materials other than plywood may be used for the construction of the Large Packaging.

(iii) Reconstituted wood used in the construction of Large Packagings must be water resistant reconstituted wood such as hardboard, particle board or other suitable type.

(iv) Wooden Large Packagings must be firmly nailed or secured to corner posts or ends or be assembled by similar devices.

**(2) Integral and detachable pallets.**

(i) Any integral pallet base forming part of a Large Packaging, or any detachable pallet must be suitable for mechanical handling of a Large Packaging filled to its maximum permissible gross mass.

(ii) The pallet or integral base must be designed to avoid protrusion that may cause damage to the Large Packaging in handling.

(iii) The body must be secured to any detachable pallet to ensure stability in handling and transportation. Where a detachable pallet is used, its top surface must be free from protrusions that might damage the Large Packaging.

(3) Strengthening devices, such as timber supports to increase stacking

performance, may be used but must be external to the liner.

(4) The load bearing surfaces of the Large Packaging must be designed to distribute loads in a stable manner.

(c) Wooden Large Packagings:

- (1) May not have a volumetric capacity greater than 3,000 L (793 gallons); and
- (2) May not have a volumetric capacity less than 450 L (119 gallons).

**§ 178.940 Standards for flexible Large Packagings.**

(a) The provisions in this section apply to flexible Large Packagings intended to contain liquids and solids. Flexible Large Packagings types are designated:

- (1) 51H flexible plastics.
- (2) 51M flexible paper.

(b) Construction requirements for flexible Large Packagings are as follows:

(1) The strength of the material and the construction of the flexible Large Packagings must be appropriate to its capacity and its intended use.

(2) All materials used in the construction of flexible Large Packagings of types 51M must, after complete immersion in water for not less than 24 hours, retain at least 85 percent of the tensile strength as measured originally on the material conditioned to equilibrium at 67 percent relative humidity or less.

(3) Seams must be stitched or formed by heat sealing, gluing or any equivalent method. All stitched seam-ends must be secured.

(4) In addition to conformance with the requirements of § 173.24 of this subchapter, flexible Large Packaging must be resistant to aging and degradation caused by ultraviolet radiation.

(5) For plastic flexible Large Packagings, if necessary, protection against ultraviolet radiation must be provided by the addition of pigments or inhibitors such as carbon black. These additives must be compatible with the contents and remain effective throughout the life of the Large Packaging. 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, the pigment content or the inhibitor content do not adversely affect the physical properties of the material of construction.

(6) Additives may be included in the composition of the material of the Large Packaging to improve the resistance to aging, provided they do not adversely affect the physical or chemical properties of the material.

(7) When flexible material Large Packagings are filled, the ratio of height to width must be no more than 2:1.

(c) Flexible Large Packagings:

(1) May not have a volumetric capacity greater than 3,000 L (793 gallons);

(2) May not have a volumetric capacity less than 56 L (15 gallons); and

(3) Must be designed and tested to a capacity of not less than 50 kg (110 pounds).

■ 44. Subpart Q is added to Part 178 as follows:

**Subpart Q—Testing of Large Packagings**

Sec.

178.950	Purpose and scope.
178.955	General requirements.
178.960	Preparation of Large Packagings for testing.
178.965	Drop test.
178.970	Bottom lift test.
178.975	Top lift test.
178.980	Stacking test.
178.985	Vibration test.

**Subpart Q—Testing of Large Packagings****§ 178.950 Purpose and scope.**

This subpart prescribes certain testing requirements for Large Packagings identified in subpart P of this part.

**§ 178.955 General requirements.**

(a) *General.* The test procedures prescribed in this subpart are intended to ensure that Large Packagings containing hazardous materials can withstand normal conditions of transportation. These test procedures are considered minimum requirements. Each packaging must be manufactured and assembled so as to be capable of successfully passing the prescribed tests and to conform to the requirements of § 173.24 of this subchapter while in transportation.

(b) *Responsibility.* The Large Packaging manufacturer is responsible for ensuring each Large Packaging is capable of passing the prescribed tests. To the extent a Large Packaging's assembly function, including final closure, is performed by the person who offers a hazardous material for transportation, that person is responsible for performing the function in accordance with §§ 173.22 and 178.2 of this subchapter.

(c) *Definitions.* For the purpose of this subpart:

(1) *Large packaging design type* refers to a Large Packaging which does not differ in structural design, size, material of construction and packing.

(2) *Design qualification testing* is the performance of the drop, stacking, and

bottom-lift or top-lift tests, as applicable, prescribed in this subpart, for each different Large Packaging design type, at the start of production of that packaging.

(3) *Periodic design requalification test* is the performance of the applicable tests specified in paragraph (c)(2) of this section on a Large Packaging design type, to requalify the design for continued production at the frequency specified in paragraph (e) of this section.

(4) *Production inspection* is the inspection, which must initially be conducted on each newly manufactured Large Packaging.

(5) *Different Large Packaging design type* is one which differs from a previously qualified Large Packaging design type in structural design, size, material of construction, wall thickness, or manner of construction, but does not include:

(i) A packaging which differs in surface treatment;

(ii) A rigid plastic Large Packaging, which differs with regard to additives used to comply with §§ 178.906(b) or 178.909(b);

(iii) A packaging which differs only in its lesser external dimensions (*i.e.*, height, width, length) provided materials of construction and material thickness or fabric weight remain the same;

(d) *Design qualification testing*. The packaging manufacturer must achieve successful test results for the design qualification testing at the start of production of each new or different Large Packaging design type. Application of the certification mark by the manufacturer constitutes certification that the Large Packaging design type passed the prescribed tests in this subpart.

(e) *Periodic design requalification testing*. (1) Periodic design requalification must be conducted on each qualified Large Packaging design type if the manufacturer is to maintain authorization for continued production. The Large Packaging manufacturer must achieve successful test results for the periodic design requalification at sufficient frequency to ensure each packaging produced by the manufacturer is capable of passing the design qualification tests. Design requalification tests must be conducted at least once every 24 months.

(2) Changes in the frequency of design requalification testing specified in paragraph (e)(1) of this section are authorized if approved by the Associate Administrator.

(f) *Test samples*. The manufacturer must conduct the design qualification

and periodic tests prescribed in this subpart using random samples of packagings, in the numbers specified in the appropriate test section.

(g) *Selective testing*. The selective testing of Large Packagings, which differ only in minor respects from a tested type is permitted as described in this section. For air transport, Large Packagings must comply with § 173.27(c)(1) and (c)(2) of this subchapter. Variations are permitted in inner packagings of a tested Large Packaging, without further testing of the package, provided an equivalent level of performance is maintained and the methodology used to determine that the inner packaging, including closure, maintains an equivalent level of performance is documented in writing by the person certifying compliance with this paragraph and retained in accordance with paragraph (l) of this section. Permitted variations are as follows:

(1) Inner packagings of equivalent or smaller size may be used provided—

(i) The inner packagings are of similar design to the tested inner packagings (*i.e.*, shape—round, rectangular, etc.);

(ii) The material of construction of the inner packagings (glass, plastic, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;

(iii) The inner packagings have the same or smaller openings and the closure is of similar design (*e.g.*, screw cap, friction lid, etc.);

(iv) Sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings;

(v) Inner packagings are oriented within the outer packaging in the same manner as in the tested package; and

(vi) The gross mass of the package does not exceed that originally tested.

(2) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in paragraph (g)(1) of this section, may be used provided sufficient cushioning is added to fill void space(s) and to prevent significant movement of the inner packagings.

(h) *Proof of compliance*. In addition to the periodic design requalification testing intervals specified in paragraph (e) of this section, the Associate Administrator, or a designated representative, may at any time require demonstration of compliance by a manufacturer, through testing in accordance with this subpart, to ensure packagings meet the requirements of this subpart. As required by the Associate Administrator, or a designated

representative, the manufacturer must either:

(1) Conduct performance tests or have tests conducted by an independent testing facility, in accordance with this subpart; or

(2) Make a sample Large Packaging available to the Associate Administrator, or a designated representative, for testing in accordance with this subpart.

(i) *Record retention*. Following each design qualification test and each periodic retest on a Large Packaging, a test report must be prepared. The test report must be maintained at each location where the Large Packaging is manufactured and each location where the design qualification tests are conducted, for as long as the Large Packaging is produced and for at least two years thereafter, and at each location where the periodic retests are conducted until such tests are successfully performed again and a new test report produced. In addition, a copy of the test report must be maintained by a person certifying compliance with this part. The test report must be made available to a user of a Large Packaging or a representative of the Department upon request. The test report, at a minimum, must contain the following information:

- (1) Name and address of test facility;
- (2) Name and address of applicant (where appropriate);
- (3) A unique test report identification;
- (4) Date of the test report;
- (5) Manufacturer of the packaging;
- (6) Description of the packaging design type (*e.g.*, dimensions, materials, closures, thickness, etc.), including methods of manufacture (*e.g.*, blow molding) and which may include drawing(s) and/or photograph(s);
- (7) Maximum capacity;
- (8) Characteristics of test contents, *e.g.*, viscosity and relative density for liquids and particle size for solids;
- (9) Mathematical calculations performed to conduct and document testing (for example, drop height, test capacity, outage requirements, etc.);
- (10) Test descriptions and results; and
- (11) Signature with the name and title of signatory.

#### § 178.960 Preparation of Large Packagings for testing.

(a) Except as otherwise provided in this subchapter, each Large Packaging and package must be closed in preparation for testing and tests must be carried out in the same manner as if prepared for transportation, including inner packagings. All closures must be installed using proper techniques and torques.

(b) For the drop and stacking test, inner receptacles must be filled to not less than 95 percent of maximum capacity (see § 171.8 of this subchapter) in the case of solids and not less than 98 percent of maximum in the case of liquids. Bags must be filled to the maximum mass at which they may be used. For Large Packagings where the inner packagings are designed to carry liquids and solids, separate testing is required for both liquid and solid contents. The material to be transported in the packagings may be replaced by a non-hazardous material, except for chemical compatibility testing or where this would invalidate the results of the tests.

(c) If the material to be transported is replaced for test purposes by a non-hazardous material, the material used must be of the same or higher specific gravity as the material to be carried, and its other physical properties (grain, size, viscosity) which might influence the results of the required tests must correspond as closely as possible to those of the hazardous material to be transported. It is permissible to use additives, such as bags of lead shot, to achieve the requisite total package mass, so long as they do not affect the test results.

(d) Paper or fiberboard Large Packagings must be conditioned for at least 24 hours immediately prior to testing in an atmosphere maintained—

(1) At 50 percent  $\pm$  2 percent relative humidity, and at a temperature of 23 °C  $\pm$  2 °C (73 °F  $\pm$  4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to  $\pm$  5 percent relative humidity without significant impairment of test reproducibility;

(2) At 65 percent  $\pm$  2 percent relative humidity, and at a temperature of 20 °C  $\pm$  2 °C (68 °F  $\pm$  4 °F), or 27 °C  $\pm$  2 °C (81 °F  $\pm$  4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to  $\pm$  5 percent relative humidity without significant impairment of test reproducibility; or

(3) For testing at periodic intervals only (*i.e.*, other than initial design qualification testing), at ambient conditions.

#### § 178.965 Drop test.

(a) *General.* The drop test must be conducted for the qualification of all Large Packagings design types and performed periodically as specified in § 178.1001(e) of this subpart.

(b) *Special preparation for the drop test.* Large Packagings must be filled in accordance with § 178.1002.

(c) *Conditioning.* Rigid plastic Large Packagings and Large Packagings with plastic inner receptacles must be conditioned for testing by reducing the temperature of the packaging and its contents to  $-18$  °C (0 °F) or lower. Test liquids must be kept in the liquid state, if necessary, by the addition of anti-freeze. Water/anti-freeze solutions with a minimum specific gravity of 0.95 for testing at  $-18$  °C (0 °F) or lower are considered acceptable test liquids, and may be considered equivalent to water for test purposes. Large Packagings conditioned in this way are not required to be conditioned in accordance with § 178.1002(d).

(d) *Test method.* (1) Samples of all Large Packaging design types must be dropped onto a rigid, non-resilient, smooth, flat and horizontal surface. The point of impact must be the most vulnerable part of the base of the Large Packaging being tested. Following the drop, the Large Packaging must be restored to the upright position for observation.

(2) Large Packaging design types with a capacity of 0.45 cubic meters (15.9 cubic feet) or less must be subject to an additional drop test.

(e) *Drop height.* (1) For all Large Packagings, drop heights are specified as follows:

- (i) Packing group I: 1.8 m (5.9 feet)
- (ii) Packing group II: 1.2 m (3.9 feet)
- (iii) Packing group III: 0.8 m (2.6 feet)

(2) Drop tests are to be performed with the solid or liquid to be transported or with a non-hazardous material having essentially the same physical characteristics.

(3) The specific gravity and viscosity of a substituted non-hazardous material used in the drop test for liquids must be similar to the hazardous material intended for transportation. Water also may be used for the liquid drop test under the following conditions:

(i) Where the substances to be carried have a specific gravity not exceeding 1.2, the drop heights must be those specified in paragraph (e)(1) of this section for each Large Packaging design type; and

(ii) Where the substances to be carried have a specific gravity exceeding 1.2, the drop heights must be as follows:

- (A) Packing Group I: SG  $\times$  1.5 m (4.9 feet).
- (B) Packing Group II: SG  $\times$  1.0 m (3.3 feet).
- (C) Packing Group III: SG  $\times$  0.67 m (2.2 feet).

(f) *Criteria for passing the test.* For all Large Packaging design types there may

be no loss of the filling substance from inner packaging(s) or article(s). Ruptures are not permitted in Large Packaging for articles of Class 1 which permit the spillage of loose explosive substances or articles from the Large Packaging. Where a Large Packaging undergoes a drop test, the sample passes the test if the entire contents are retained even if the closure is no longer sift-proof.

#### § 178.970 Bottom lift test.

(a) *General.* The bottom lift test must be conducted for the qualification of all Large Packagings design types designed to be lifted from the base.

(b) *Special preparation for the bottom lift test.* The Large Packaging must be loaded to 1.25 times its maximum permissible gross mass, the load being evenly distributed.

(c) *Test method.* All Large Packaging design types must be raised and lowered twice by a lift truck with the forks centrally positioned and spaced at three quarters of the dimension of the side of entry (unless the points of entry are fixed). The forks must penetrate to three quarters of the direction of entry.

(d) *Criteria for passing the test.* For all Large Packagings design types designed to be lifted from the base, there may be no permanent deformation which renders the Large Packaging unsafe for transport and there must be no loss of contents.

#### § 178.975 Top lift test.

(a) *General.* The top lift test must be conducted for the qualification of all of Large Packagings design types to be lifted from the top or, for flexible Large Packagings, from the side.

(b) *Special preparation for the top lift test.* (1) Metal and rigid plastic Large Packagings design types must be loaded to twice its maximum permissible gross mass.

(2) Flexible Large Packaging design types must be filled to six times the maximum permissible gross mass, the load being evenly distributed.

(c) *Test method.* (1) A Large Packaging must be lifted in the manner for which it is designed until clear of the floor and maintained in that position for a period of five minutes.

(2) Rigid plastic Large Packaging design types must be:

(i) Lifted by each pair of diagonally opposite lifting devices, so that the hoisting forces are applied vertically for a period of five minutes; and

(ii) Lifted by each pair of diagonally opposite lifting devices so that the hoisting forces are applied towards the center at 45° to the vertical, for a period of five minutes.

(3) If not tested as indicated in paragraph (c)(1) of this section, a

flexible Large Packaging design type must be tested as follows:

(i) Fill the flexible Large Packaging to 95% full with a material representative of the product to be shipped.

(ii) Suspend the flexible Large Packaging by its lifting devices.

(iii) Apply a constant downward force through a specially designed platen. The platen will be a minimum of 60 percent and a maximum of 80 percent of the cross sectional surface area of the flexible Large Packaging.

(iv) The combination of the mass of the filled flexible Large Packaging and the force applied through the platen must be a minimum of six times the maximum net mass of the flexible Large Packaging. The test must be conducted for a period of five minutes.

(v) Other equally effective methods of top lift testing and preparation may be used with approval of the Associate Administrator.

(d) *Criterion for passing the test.* For all Large Packagings design types designed to be lifted from the top, there may be no permanent deformation which renders the Large Packagings unsafe for transport and no loss of contents.

#### § 178.980 Stacking test.

(a) *General.* The stacking test must be conducted for the qualification of all Large Packagings design types intended to be stacked.

(b) *Special preparation for the stacking test.* (1) All Large Packagings except flexible Large Packaging design types must be loaded to their maximum permissible gross mass.

(2) Flexible Large Packagings must be filled to not less than 95 percent of their capacity and to their maximum net mass, with the load being evenly distributed.

(c) *Test method.* (1) All Large Packagings must be placed on their base on level, hard ground and subjected to a uniformly distributed superimposed test load for a period of at least five minutes (see paragraph (c)(5) of this section).

(2) Fiberboard and wooden Large Packagings must be subjected to the test for 24 hours.

(3) Rigid plastic Large Packagings which bear the stacking load must be subjected to the test for 28 days at 40 °C (104 °F).

(4) For all Large Packagings, the load must be applied by one of the following methods:

(i) One or more Large Packagings of the same type loaded to their maximum permissible gross mass and stacked on the test Large Packaging;

(ii) The calculated superimposed test load weight loaded on either a flat plate or a reproduction of the base of the Large Packaging, which is stacked on the test Large Packaging; or

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

(d) *Periodic Retest.* (1) The package must be tested in accordance with § 178.1015(c) of this subpart; or

(2) The packaging may be tested using a dynamic compression testing machine. The test must be conducted at room temperature on an empty, unsealed packaging. The test sample must be centered on the bottom platen of the testing machine. The top platen must be lowered until it comes in contact with the test sample. Compression must be applied end to end. The speed of the compression tester must be one-half inch plus or minus one-fourth inch per minute. An initial preload of 50 pounds must be applied to ensure a definite contact between the test sample and the platens. The distance between the platens at this time must be recorded as zero deformation. The force "A" to then be applied must be calculated using the applicable formula:

Liquids:  $A = (1.8)(n - 1) [w + (s \times v \times 8.3 \times .98)] \times 1.5;$

or

Solids:  $A = (1.8)(n - 1) [w + (s \times v \times 8.3 \times .95)] \times 1.5$

Where:

A = applied load in pounds.

n = maximum number of Large Packagings that may be stacked during transportation.

w = maximum weight of one empty container in pounds.

s = specific gravity (liquids) or density (solids) of the lading.

v = actual capacity of container (rated capacity + outage) in gallons.

and:

8.3 corresponds to the weight in pounds of 1.0 gallon of water.

1.5 is a compensation factor that converts the static load of the stacking test into a load suitable for dynamic compression testing.

(e) *Criterion for passing the test.* (1) For metal or rigid plastic Large Packagings, there may be no permanent deformation which renders the Large Packaging unsafe for transportation and no loss of contents.

(2) For flexible Large Packagings, there may be no deterioration which renders the Large Packaging unsafe for transportation and no loss of contents.

(3) For the dynamic compression test, a container passes the test if, after application of the required load, there is no permanent deformation to the Large Packaging which renders the whole Large Packaging; including the base pallet, unsafe for transportation; in no case may the maximum deflection exceed one inch.

#### § 178.985 Vibration test.

(a) *General.* The vibration test must be conducted for the qualification of all rigid Large Packaging design types. Flexible Large Packaging design types must be capable of withstanding the vibration test.

(b) *Test method.* (1) A sample Large Packaging, selected at random, must be filled and closed as for shipment. Large Packagings intended for liquids may be tested using water as the filling material for the vibration test.

(2) The sample Large Packaging must be placed on a vibrating platform that has a vertical or rotary double-amplitude (peak-to-peak displacement) of one inch. The Large Packaging must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(3) The sample Large Packaging must be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The Large Packaging must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(4) The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1.6-mm (0.063-inch) in thickness (such as steel strapping or paperboard) can be passed between the bottom of the Large Packaging and the platform. Other methods at least equally effective may be used (see § 178.801(i)).

(c) *Criterion for passing the test.* A Large Packaging passes the vibration test if there is no rupture or leakage.

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