

**DEPARTMENT OF TRANSPORTATION****Pipeline and Hazardous Materials Safety Administration**

**49 CFR Parts 107, 171, 172, 173, 178, and 180**

[Docket No. PHMSA-2005-17463 (HM-220E)]

RIN 2137-AD91

**Hazardous Materials: Requirements for UN Cylinders**

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

**ACTION:** Final rule.

**SUMMARY:** In this final rule, PHMSA is amending the Hazardous Materials Regulations (HMR) to adopt standards for the design, construction, maintenance and use of cylinders and multiple-element gas containers based on the standards contained in the United Nations Recommendations on the Transport of Dangerous Goods. Aligning the HMR with the international standards promotes greater flexibility, permits the use of advanced technology for the manufacture of pressure receptacles, provides for a broader selection of pressure receptacles, reduces the need for special permits, and facilitates international commerce in the transportation of compressed gases without sacrificing the current level of safety and without imposing undue burdens on the regulated community.

**DATES:** *Effective Date:* This final rule is effective on September 11, 2006.

*Voluntary Compliance Date:* Compliance with the requirements adopted herein is authorized as of June 12, 2006. 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 could be subject to further revision.

*Incorporation by Reference Date:* The incorporation by reference of publications listed in this final rule has been approved by the Director of the Federal Register as of September 11, 2006.

**FOR FURTHER INFORMATION CONTACT:**

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**I. Background**

The United Nations Recommendations on the Transport of Dangerous Goods (UN Model Regulations) establish international standards for the safe transportation of hazardous materials. The UN Model Regulations are not regulations, but rather recommendations issued by the UN Sub-Committee of Experts on the Transport of Dangerous Goods (UN Sub-Committee of Experts). These recommendations are amended and updated biennially by the UN Sub-Committee of Experts. The UN Model Regulations serve as the basis for national, regional, and international modal regulations, including the International Maritime Dangerous Goods (IMDG) Code issued by the International Maritime Organization, and the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions) issued by ICAO. The HMR authorize domestic transportation of hazardous materials shipments prepared in accordance with the IMDG Code if all or part of the transportation is by vessel, subject to certain conditions and limitations, and the transportation of hazardous materials shipments prepared in accordance with the ICAO Technical Instructions for transportation by aircraft and by motor vehicle either before or after being transported by aircraft.

Since 1999, the UN Sub-Committee of Experts has been working to develop international standards for the design, construction, inspection, and testing of cylinders and other pressure receptacles for inclusion in the UN Model Regulations. Their objective was to develop cylinder standards that are globally accepted for international transportation, storage, and use. Representatives from the European Industrial Gases Association, the Compressed Gas Association, the European Cylinder Makers Association, the International Standards Organization Technical Committee 58 (ISO/TC 58), and cylinder experts from DOT, participated in the UN Sub-Committee of Experts' efforts.

The standards developed for cylinders and other gas receptacles address manufacture, approval, filling, and use. The cylinders and other gas receptacles must be in compliance with ISO standards for design, manufacture, and testing; constructed of materials that are compatible with the gas to be contained in the cylinder, as established in ISO standards; and periodically requalified according to ISO standards. The standards were adopted by the UN Sub-Committee of Experts and are included in the 13th revised edition of the UN Model Regulations. Cylinders manufactured in accordance with these requirements are marked with the internationally recognized UN mark, which is an indication that the cylinders meet the applicable standards.

The continually increasing amount of hazardous materials transported in international commerce warrants the harmonization of domestic and international requirements to the greatest extent possible. Harmonization serves to facilitate international transportation and at the same time ensures the safety of people, property and the environment. While the intent of harmonization is to align the HMR with international standards, we review and consider each amendment on its own merit. Each amendment is considered on the basis of the overall impact on transportation safety and the economic implications associated with its adoption into the HMR. Our goal is to harmonize without sacrificing the current level of safety and without imposing undue burdens on the regulated community.

On March 9, 2005, the Pipeline and Hazardous Materials Safety Administration (PHMSA, we) published a notice of proposed rulemaking (NPRM) (70 FR 11768) proposing to adopt into the HMR the UN standards for cylinders (pressure receptacles limited to a water capacity of 150 L),

tubes (pressure receptacles with a water capacity exceeding 150 L and not more than 3,000 L capacity), cylinder bundles (cylinders held together in a frame and manifolded together with up to a total water capacity of 3,000 L or 1,000 L for toxic gases), and multiple element gas containers or MEGCs (assemblies of UN cylinders, tubes or bundles of cylinders interconnected by a manifold and assembled within a framework). Our proposal did not remove existing requirements for DOT specification cylinders; rather, we proposed to incorporate the UN standards so that a shipper may use either a DOT specification cylinder or a UN standard pressure receptacle, as appropriate, for individual gases and circumstances. The goal of this rulemaking is to promote greater flexibility and permit the use of advanced technology for the manufacture of pressure receptacles, to provide for a broader selection of pressure receptacles, to reduce the need for special permits, and to facilitate international commerce in the transportation of compressed gases without sacrificing the current level of safety and without imposing undue burden on the regulated community.

DOT technical experts participated in evaluating the ISO standards and the requirements of the UN Model Regulations applicable to pressure receptacles. Based on this evaluation, we believe the amendments adopted in this final rule will provide an equivalent level of safety to that achieved under the HMR.

## II. Overview of Changes in This Final Rule

This final rule amends the HMR to authorize:

- Design, construction and testing of refillable seamless aluminum alloy cylinders conforming to ISO 7866;
- Design, construction and testing of refillable seamless steel cylinders conforming to ISO 9809-1, ISO 9809-2, and ISO 9809-3;
  - Design, construction and testing of non-refillable metallic cylinders conforming to ISO 11118;
  - Design, construction and testing of composite cylinders conforming to ISO 11119-1, 11119-2 and 11119-3, with certain limitations;
  - Design, construction and testing of refillable seamless steel tubes with a water capacity between 150 L and 3,000 L conforming to ISO 11120;
  - Design, construction and testing of UN acetylene cylinders conforming to applicable ISO standards, except the cylinders must be refillable, made of seamless steel, filled with a suitable quantity of solvent (solvent-free not

authorized) and fitted with suitable fusible plugs;

- Design, construction and testing of MEGCs;
- Requalification of UN pressure receptacles, including pressure receptacles installed as components of MEGCs;
  - A quality conformity assessment system for UN pressure receptacles based on section 6.2.2.5 of the UN Model Regulations;
  - A 10-year requalification interval for UN pressure receptacles, except for acetylene and composite cylinders and pressure receptacles used for certain specifically named gases; and
  - Compliance with the UN pressure receptacle filling densities prescribed in P200 of the UN Model Regulations and as prescribed in § 173.302b or § 173.304b of this final rule.

## III. Summary of Comments

PHMSA received eighteen comments in response to the March 9, 2005 NPRM from gas distributors, trade associations, cylinder manufacturers, an independent inspection agency, and a consultant. The following companies, organizations and individuals submitted comments: Air Liquide Canada Inc. (Air Liquide Canada; RSPA-2004-17463-20), Air Products and Chemicals (Air Products; RPSA-2004-17463-9), Arrowhead Industrial Services, Inc. (Arrowhead; RSPA-2004-17463-12), Baker Petrolite Corporation (Baker; RSPA-2004-17463-23), Barlen and Associates Inc. (Barlen; RSPA-2004-17463-16, RSPA-2004-17463-17), Carleton Aerosystems, Inc (Carleton; RSPA-2004-17463-19), Compressed Gas Association (CGA; RSPA-2004-17463-13), Lincoln Composites Inc. (Lincoln Composite; RSPA-2004-17463-4), Luxfer Gas Cylinders (Luxfer; RSPA-2004-17463-14, RSPA-2004-17463-15), Matheson Tri-Gas (Matheson; RSPA-2004-17463-8), National Propane Gas Association (NPGA; RSPA-2004-17463-22), Norris Cylinder Company (Norris; RPSA-2004-17463-10), Praxair, Inc. (Praxair; RSPA-2004-17463-21), Public Utilities Commission of Ohio (PUCO; RSPA-2004-17463-7), Taylor-Wharton Harsco (Taylor-Wharton; RSPA-2004-17463-6) and TLCCI Inc. (TLCCI; RSPA-2004-17463-11).

Commenters were supportive of PHMSA's efforts to harmonize the HMR with the international cylinder standards. Most of the proposals in the NPRM received little or no comment. Several comments were beyond the scope of the rulemaking and are not addressed in this final rule. The majority of the comments relate to the approval process for independent

inspection agencies, UN pressure receptacles, and manufacturers of UN pressure receptacles. These comments are discussed below.

### A. Approval of Independent Inspection Agencies (IIAs; Notified Bodies) and Certification of UN Pressure Receptacles

*Current approval procedures:* Current § 107.803 contains procedures and application criteria for a person seeking approval as an IIA to perform inspections, verifications, and certifications of DOT specification cylinders as prescribed in 49 CFR parts 178 and 180 and special permit cylinders. These requirements apply to DOT specification and special permit cylinders manufactured within or outside the United States. An IIA applicant is required to submit the following information: A detailed description of the testing facilities; a description of the applicant's qualifications to perform the inspections and verifications prescribed in part 178; ownership information; the name of each individual responsible for certifying the inspection and test results; and a statement that the applicant will perform the prescribed functions independent of the cylinder manufacturers and owners.

Under the current procedures for approval of foreign cylinder manufacturers and IIAs, a cylinder manufacturer located outside the United States must be approved by the Associate Administrator under § 107.807, and must employ an IIA approved under § 107.803, before any cylinders may be manufactured, inspected, certified, and marked to a DOT specification or DOT special permit. An applicant under these sections may be a person or a corporation.

Prior to scheduling an approval inspection, the manufacturer and the IIA must each submit an application for approval and must jointly or separately prepare a quality control manual, which demonstrates production and inspection procedures based on the relevant cylinder specification in 49 CFR part 178 and relates those procedures to the specification for which approval is sought. The manufacturer must produce a prototype lot of cylinders. The IIA applicant must conduct a preliminary audit with design qualification testing to certify the design for the prototype cylinders meets the applicable DOT specification or special permit. The IIA applicant prepares documentation indicating a current audit was performed with certified test results showing the prototype cylinders comply

with the DOT specification or special permit.

The manufacturer submits the design application to the Associate Administrator for approval. If all documents are found acceptable, the applicant is notified regarding details of the required on-site inspection to be conducted by a DOT representative. A DOT approval inspection consists of witnessing and reviewing manufacturing, inspection and test procedures of a designated cylinder lot produced to the specification or special permit for which approval is sought. This inspection includes, but is not limited to, the following: Reviewing all controls; ensuring the traceability of raw material and partially completed cylinders throughout production; verifying the chemical analysis of each heat of material by witnessing a lab check analysis or by obtaining certified check analysis of the samples taken from each lot; observing the IIA performing the duties as required in § 178.35(c) of 49 CFR and the applicable cylinder specification or special permit; witnessing all inspections and tests required for newly manufactured cylinders; and reviewing the test results.

During the inspection, sample cylinders are selected from the lot for on-site testing. If the procedures and controls are acceptable, and all test results obtained from the sample cylinders comply with the specification or special permit requirements, an additional group of cylinders is randomly selected from the same lot. The manufacturer must ship these cylinders to a contract test lab in the United States for verification testing. If the results of the verification testing comply with the specification or special permit requirements and corroborate test results obtained during the inspection, separate approvals are issued to the manufacturer and the IIA to perform cylinder certifications at this particular facility location of the manufacturer.

*Proposed revisions to cylinder approval procedures:* In the NPRM, we proposed to broaden the applicability of § 107.803 to include UN pressure receptacles. In paragraph (c)(8), we proposed to permit the selection of a person whose principal place of business is in a country other than the United States based on an approval issued by a foreign Competent Authority. Also in paragraph (c)(8)(ii), we proposed to require an IIA applicant to submit written evidence the foreign Competent Authority provides similar authority to IIAs and manufacturers of UN pressure receptacles in the United

States with no additional limitations that are not required of its own citizenry.

Arrowhead disagrees with the language in § 107.803(c)(8), stating the wording will allow the U.S. Competent Authority to delegate approval responsibilities to a foreign national government without specifying any globally recognized assessment standards and minimum requirements, such as ISO 17020. Arrowhead suggests the U.S. Competent Authority should consider establishing accreditation processes similar to those presently used in Europe. For the reasons discussed below we disagree with Arrowhead's position. ISO 17020, titled "General criteria for the operation of various types of bodies performing inspection," contains general criteria for the qualification of third party inspection bodies. This standard is intended for use by inspection bodies and their accreditation bodies.

As adopted in this final rule, the Associate Administrator approves all IIAs, both foreign and domestic. The Associate Administrator may approve foreign IIAs on the basis of an on-site audit performed by a U.S. DOT representative or an approval issued by the foreign Competent Authority of the country of the manufacturer. In the latter situation, the applicant must submit a copy of its Competent Authority approval for the type of pressure receptacle for which a U.S. approval is being sought. The Associate Administrator will review the certifying documents from the foreign competent authority and other required supporting application documents. The criteria for approving IIAs incorporate many of the same principles for technical competence and impartiality specified in ISO 17020. In addition, we may perform competency assessments of the IIA in conjunction with manufacturing audits. The Associate Administrator reserves the right to accept or deny an applicant.

In the NPRM, we proposed to require each new UN pressure receptacle design type to be approved by the Associate Administrator and marked with the letters "USA" to identify the United States of America as the country of approval. The USA marking is required on all UN pressure receptacles manufactured within or being shipped to, from or within the United States. Air Liquide Canada states we should accept UN pressure receptacles as having an equivalent level of safety without regard to the country of manufacture. We agree cylinders bearing a UN marking must conform to the appropriate UN and ISO standards and should be acceptable throughout the world. However, it is

essential we maintain oversight of IIAs and cylinder manufacturers to ensure the accountability of persons who conduct cylinder inspections and certifications. Without the benefit of appropriate compliance oversight, there is no way to ensure a UN cylinder was manufactured and tested to standards offering an equal or greater level of integrity as provided by the standards contained in part 178. Therefore, in this final rule we are adopting the proposal requiring a UN cylinder, acceptable for import and use within the United States, to bear a "USA" mark to indicate it has been approved by the U.S. DOT. This oversight and approval process is necessary to ensure a level of safety is maintained for the cylinders as intended by the standards prescribed in 6.2.2.5 of the UN Model Regulations and the HMR. A UN cylinder without the "USA" marking may be transported in the United States in accordance with the provisions prescribed in paragraph (k) or (l) of § 173.301, or under the terms of a DOT special permit.

The European Commission (EC) Member States require UN cylinders and valves to be marked with a  $\pi$  (Pi) mark. The Pi mark provides an easily recognizable indication of conformance with the Transportable Pressure Equipment Directive (Council Directive 1999/36/EC of April 29, 1999) (TPED). Only UN cylinders with the Pi mark are allowed free movement and use in all EC Member states. The Pi mark may be applied on cylinders and valves only under the authority of a Notified Body. Within the EC, member states approve organizations as Notified Bodies to perform specific tasks identified in the TPED. The applicable tasks identified in the TPED are the same as the functions prescribed for Notified Bodies in the UN Model Regulations and are equivalent to the functions prescribed for IIAs in this final rule.

Under this final rule, the Associate Administrator may approve any qualified person or organization located outside the United States as an IIA based on an on-site audit at the foreign manufacturing facility or based on an approval issued by the foreign Competent Authority. An IIA who is not a resident of the United States must designate a person in the United States to act on his or her behalf. (See 49 CFR 107.705(a), 107.801(c).)

The NPRM proposed to require an applicant to submit written evidence the foreign Competent Authority provides similar authority to IIAs and manufacturers of UN pressure receptacles in the United States with no additional limitations not required of its own citizenry. Upon further

consideration, we believe requiring an applicant to submit written evidence of the foreign Competent Authority's reciprocal agreement should not be the applicant's responsibility. Instead, we are adding § 107.809 to contain conditions for approval of UN pressure receptacle manufacturers. As adopted in this rule § 107.809 specifies failure of a competent authority to recognize qualified IIAs domiciled in the United States as a possible basis for the disapproval of an application. If the United States recognizes Notified Bodies designated by the Competent Authority of another country, equal treatment should be expected from the Competent Authority of the foreign country relative to IIAs domiciled in the United States.

Over the last five years, we have made efforts to work with the EC to attain mutual recognition of U.S. IIAs under the TPED. Our efforts to obtain mutual recognition of U.S. based companies have not been successful because it is the position of the EC that only Member States may approve bodies under their own jurisdiction. Only one U.S.-based IIA has been recognized within the EC because of a provision in the TPED requiring a notified body to be "established within the Community". The EC has interpreted this provision to mean a notified body must have an established legal entity (place of business) within an EC member state. As an alternative, we suggested to the EC our willingness to work toward developing a mutual recognition agreement (MRA). In its response, the EC stated its reluctance to initiate new MRA negotiations. Instead, the EC suggested we pursue this matter with its U.S. counterpart, the U.S. Trade Representative. Our efforts to obtain recognition by the TPED for U.S. companies to perform conformity assessment and inspection activities for UN pressure receptacles are on-going.

Air Products and CGA request PHMSA work with the UN to create a registry of internationally recognized bodies and the criteria for being listed in that registry. They further request the registry be published and maintained so regional approvals, such as the European Pi mark or our "USA" markings, are not necessary. As stated earlier, the United States will work with the EC and other government bodies to establish mutual recognition of independent inspection bodies. We will continue to maintain a list of IIAs approved by the Associate Administrator to perform inspections and verifications of cylinder manufacture, repair and modification as prescribed in parts 178 and 180. The list

of approved IIAs is available from the Associate Administrator (PHH-32) and may be viewed on the Internet by accessing <http://www.phmsa.dot.gov>. However, the establishment of a registry of internationally recognized bodies will not obviate the need for the "USA" marking. The "USA" marking is a certification that the UN pressure receptacle conforms in all respects to the applicable part 178 requirements.

#### *B. Approval of UN Pressure Receptacle Manufacturers*

In the NPRM, we proposed to require each manufacturer to have in place a documented quality system for the manufacture of UN pressure receptacles. The manufacturer's quality system involves detailed documentation related to the types of UN pressure receptacles to be produced, and written policies, procedures and instructions. The documentation must include: (1) Adequate descriptions of the organizational structure; (2) responsibilities of personnel with regard to design and product quality; (3) the design control and verification techniques; (4) cylinder manufacturing, quality control, quality assurance and operating instructions; (5) quality records, such as inspection reports, test data, and calibration data; (6) the process for control of documents and their revision; (7) means for control of non-conforming gas cylinders, purchased components, in-process and final materials; and (8) the training of relevant personnel. The manufacturer's quality system will be audited by PHMSA during the final review of the initial design type approval.

Lincoln Composite expresses concern regarding the potential complexity of compliance and enforcement of the manufacturer's quality system due to the lack of formalized assessment criteria in the NPRM. Lincoln Composite requests we recognize manufacturers with a quality control system certified to existing international quality control standards such as ISO 9000 as meeting the intent of § 178.69. CGA and Taylor-Wharton also recommend we acknowledge a manufacturer's systems approved by a competent authority and in conformance with internationally recognized quality systems such as the ISO 9000 series. The requirements for a manufacturer's quality system, as specified in this final rule, conform to those contained in the UN Model Regulations. These requirements are based on the fundamentals of the ISO 9000 series. Therefore, companies operating in conformance with the ISO 9000 series should be able to adapt their

quality management system to fully conform to the prescribed requirements.

In the NPRM, we proposed to require the Associate Administrator to approve all modifications to an approved quality management system. CGA and Taylor-Wharton recommend a revision of the regulatory language to read: "The manufacturer shall notify the Associate Administrator of any intended changes to the approved quality system prior to making the change." Lincoln Composite objects to the need to obtain an approval for all quality system changes and recommends requiring an approval only when the quality system change reduces the number, type, or frequency of inspections for a specific design type. Lincoln Composite further suggests we delegate to the production IIA the authority to determine what quality system changes require approval. We disagree with the commenters as their suggestions would allow a manufacturer to modify the approved quality system without approval from the Associate Administrator. Based on experience gained through interaction with manufacturers seeking modifications to approved quality systems, we may consider revising this language at a later date if we find these requests pertain to matters that will not substantially affect the overall process.

Arrowhead and Barlen ask PHMSA to specifically exclude section 5.1 of ISO Technical Report 14600 from incorporation in the final rule. They state the language in this section authorizes a manufacturer to self-certify high pressure cylinders. We did not propose to incorporate ISO Technical Report 14600 by reference in the NPRM and are not adopting it in this final rule. In § 178.71, we are adopting a conformity assessment system consistent with the system described in section 6.2.2.5 of the UN Model Regulations. The conformity assessment system requirements in the UN Model Regulations were adopted on the basis of the requirements in ISO Technical Report 14600. The procedures prescribed in § 178.71 of the final rule require an IIA, and not a company employee, to perform cylinder certifications.

#### **IV. Summary of Regulatory Changes by Section**

The following is a section-by-section summary of the changes adopted in this final rule and, where applicable, a discussion of comments received.

*Part 107*

## Section 107.801

This section lists persons who are required to obtain approvals to inspect, requalify, test, or certify cylinders. In the NPRM, we proposed to expand the scope of the functions performed by IIAs and cylinder requalifiers to include UN pressure receptacles. We are adopting this provision as proposed.

## Section 107.803

This section establishes requirements for the approval of IIAs. In this final rule, we are revising the application criteria for IIA applicants to include inspections, verifications, and certifications of UN pressure receptacles. The revisions to this section are discussed earlier in this preamble under the heading "III.A. Approval of Independent Inspection Agencies (IIAs; Notified Bodies) and Certification of UN Cylinders."

## Section 107.805

This section establishes requirements for cylinder requalifiers. In this final rule, we are revising the procedures and application criteria for persons seeking to be approved as cylinder requalifiers to also apply to persons seeking to be approved as UN pressure receptacle requalifiers.

## Section 107.809

New § 107.809 contains the conditions applicable to UN pressure receptacle approvals as discussed earlier in this preamble under the heading "III.A. Approval of Independent Inspection Agencies (IIAs; Notified Bodies) and Certification of UN Cylinders."

*Part 171*

## Section 171.7

This section addresses material incorporated by reference. In paragraph (a)(3), in the table of material incorporated by reference, under the General Services Administration, the reference to Federal Specification RR-C-901C titled "Cylinders, Compressed Gas: High Pressure Steel" is updated to read Federal Specification RR-C-901D titled "Cylinders, Compressed Gas: Seamless Shatterproof, High Pressure DOT 3AA Steel, and 3AL Aluminum." This standard is referenced in §§ 173.302, 173.336, and 173.337 for the cleaning of aluminum cylinders.

We are adding 20 new ISO entries for standards containing design, manufacture, testing, requalification, and use requirements for UN pressure receptacles as proposed in the NPRM.

Air Products requests we update the reference to CGA S-1.1, "Pressure Relief Standards" from the 2001 edition to the more recent 2003 edition. We agree the more recent 2003 edition of CGA S-1.1 should be referenced for UN pressure receptacles. In addition, we are continuing to exclude the requirements in 9.1.1.1 from mandatory compliance. Section 171.7 continues to reference the 2001 edition of CGA S-1.1 for the DOT specification cylinders. Amending provisions relative to DOT specification cylinder is beyond the scope of this rulemaking. Therefore, we will consider requiring the 2003 edition of this standard for DOT specification cylinders in a future rulemaking.

Matheson requests we incorporate by reference the valve requirements contained in CGA V-9, "Standard for Compressed Gas Cylinder Valves" in place of, or in addition to, ISO 10297 in § 173.301b. CGA V-9 contains general design, performance, design qualification tests, and maintenance requirements for valves. Since we did not propose to reference CGA V-9 in the NPRM, the adoption of this standard is beyond the scope of this rule. We will address this matter in a future rulemaking. Matheson also requests we incorporate by reference CGA Technical Bulletin, TB-16, "Recommended Coding System of Threaded Cylinder Outlets and Threaded Valve Inlets." TB-16 recommends that all new cylinder valves and cylinders made after December 31, 1998, be permanently marked with the thread codes. We may consider a proposal to incorporate CGA TB-16 in a future rulemaking.

Under the entry for United Nations, we are revising the reference to the UN Recommendations on the Transport of Dangerous Goods to include the new 49 CFR section references added in this rule. The new references are §§ 173.40, 173.192, 173.302b, 173.304b, and 173.75.

All incorporated matter is available for inspection at the Office of the Federal Register or the U.S. Department of Transportation, PHMSA's Office of Hazardous Materials Standards, Room 8430, NASSIF Building, 400 Seventh Street, SW., Washington, DC 20590. Persons may also obtain these documents from the sources identified in § 171.7 of the HMR.

## Section 171.8

Section 171.8 sets forth definitions for terms used in the HMR. In this section, we are adding new definitions for "bundles of cylinders," "multiple element gas containers or MEGCs," "settled pressure," "UN cylinder," "UN

pressure receptacle," "UN tube," and "working pressure."

In the NPRM, we proposed to define "working pressure" to mean the "settled pressure" of a compressed gas at a reference temperature of 15 °C (59 °F). Praxair notes the term "settled pressure" is not defined in the regulations, but is used to define the term "working pressure," which includes a reference temperature different from that of 65 °C (149 °F) and is used in determining the filling pressures in §§ 173.301—173.305. We agree with the commenter that the term "settled pressure" should be defined. We are defining the term "settled pressure" to mean "pressure exerted by the contents of a UN pressure receptacle in thermal and diffusive equilibrium." This definition is consistent with that specified in the UN Model Regulations.

## Section 171.11

This section contains provisions for the shipment of hazardous materials by aircraft in accordance with the ICAO Technical Instructions. In the NPRM, we proposed to add a new paragraph (d)(19), and is adopted as new paragraph (d)(20) herein, to authorize the transport of hazardous materials in cylinders (including UN pressure receptacles) in accordance with the ICAO Technical Instructions, under certain conditions. Proposed paragraph (d)(19) reads:

(d)(19) Cylinders transported to, from or within the United States must conform to the applicable requirements of this subchapter. Unless otherwise excepted in this subchapter, a cylinder may not be transported unless—

(i) The cylinder is manufactured, inspected and tested in accordance with a DOT specification or a UN standard prescribed in part 178 of this subchapter, except that cylinders not conforming to these requirements must meet the requirements in § 173.301(j) through (k);

(ii) The cylinder is equipped with a pressure relief device in accordance with § 173.301(f) of this subchapter and conforms to the applicable requirements in part 173 for the hazardous material involved;

(v) For aluminum cylinders in oxygen service except those used aboard aircraft in accordance with the applicable airworthiness requirements and operating regulations, the opening is configured with straight (parallel) threads (UN cylinders are marked with the cylinder thread type, e.g. "18P" or "18S"); and

(vi) A UN cylinder is marked with "USA" as a country of approval in conformance with §§ 178.69 and 178.70 of this subchapter.

Air Liquide Canada, CGA, and Taylor-Wharton request we revise paragraph (d)(19)(ii) to permit the transportation of UN cylinders without PRDs for export

only. Upon further consideration, we agree with the commenters' request to permit UN cylinders not intended for use in the United States to be filled and transported for export only. In this final rule, these cylinders may be transported under the conditions prescribed in paragraph (l) of § 173.301. Paragraph (l) permits, under certain conditions, the transportation of UN pressure receptacles without the "USA" marking, and "USA" marked UN pressure receptacles without the required PRD, to be filled for export only. We are making a similar change to the regulatory language in §§ 171.12 and 171.12a.

These amendments eliminate the need for DOT-E 12929, which authorizes certain DOT specification cylinders and foreign cylinders without PRDs to be charged and transported for export only. We are also adding certain safety conditions prescribed in DOT E-12929:

(1) Each DOT specification cylinder or UN pressure receptacle must be plainly and durably marked "For Export Only";

(2) The shipping paper must include the following certification: "This cylinder has (These cylinders have) been retested and refilled in accordance with the DOT requirements for export."; and

(3) The emergency response information provided with the shipment and available from the emergency response telephone contact person must indicate the pressure receptacles are not fitted with pressure relief devices and provide appropriate guidance in the event of exposure to a fire.

For aluminum cylinders in oxygen service, we proposed in paragraph (d)(19)(v), to require each opening to be configured with straight (parallel) threads. The UN Model Regulations permit the use of either tapered or straight threads in aluminum alloy oxygen cylinders through the incorporation by reference of other ISO standards. However, we did not propose to allow the use of tapered threads in aluminum alloy cylinders used in oxygen service and transported in the United States. This position is consistent with the current requirement in § 173.302(b) of the HMR, which requires each aluminum oxygen cylinder opening to be configured with straight threads only. Requiring the use of straight threads eliminates the possibility of a taper threaded valve being inadvertently inserted into a straight threaded cylinder opening. Such a mismatch or cross connect could lead to a violent expulsion of the taper threaded valve or unintended release of oxygen which cause product loss, property damage, personal injury, or death.

Within the United States, there are 20 million or more DOT 3AL aluminum alloy cylinders in oxygen service equipped with straight threads. At the time of the proposed rule, we were concerned that allowing the use of UN aluminum alloy oxygen cylinders with tapered threads could increase the potential for inserting improper valves, even though the UN cylinders will be marked with the thread type code, e.g. 18P for straight or 25E for tapered. Persons who are not familiar with the ISO thread type codes may assume that the aluminum alloy oxygen cylinder is equipped with straight threads.

Although our experience in the United States involves straight thread designs, we are aware the use of both thread designs may offer certain advantages. In the NPRM, we asked commenters to address the impact of retaining the prohibition against using taper threads in aluminum alloy oxygen cylinders.

Barlen supports the proposed prohibition. Citing the difference between the European and U.S. tapered threads, Barlen explains the angle of the European tapered threads provides for more problem-free valve insertion into aluminum cylinders and asserts that cylinder owners support this proposal. Air Liquide Canada, CGA, and Matheson do not support the proposed prohibition. CGA states the UN cylinders will be marked with information significantly different than a DOT cylinder. The commenters further suggest that the cylinders and valves must be marked with the thread type. Matheson requests we mandate the use of tapered ISO threads for aluminum UN cylinders in oxygen service and suggest this will avoid any safety concern where valve ejection can take place because of incorrect valves.

CGA and Matheson state all UN cylinders and their valves should be marked with the ISO thread type. Matheson states the cylinders and valves should be marked according to the CGA technical bulletin, TB-16, "Recommended Coding System for Threaded Cylinders Outlets and Threaded Valve Inlets." CGA developed this technical bulletin for use in the United States and Canada in response to several serious incidents where users inserted a straight thread valve into a cylinder with taper threads, inserted a taper thread valve into a cylinder with straight threads, or interchanged ISO and/or other metric classification threads with American National Standards threads. Also CGA published safety bulletin, SB-19, "Potential Valve Thread and Cylinder Thread Mismatch" to alert users that mismatching the

thread on the valve and the cylinder can result in the ejection of the valve. The safety bulletin contains illustrations of various valve thread types.

Upon consideration of the comments received, in this final rule we are allowing the openings on aluminum alloy UN cylinders in oxygen service to be configured with straight or taper threads. The thread type must be marked on the cylinder as required by § 178.71(o)(11) and on the valve as required by ISO 10297, as referenced in §§ 173.301b(c) and 178.71(d)(2). Further, we are adding a requirement, in § 173.301(a)(10) that any person who installs a valve into an aluminum cylinder in oxygen service must verify the valve and the cylinder have the same thread type. We believe these requirements will provide for harmonization with the UN Model Regulations while maintaining an adequate level of safety.

We are adopting the requirement that each UN cylinder be marked with "USA" as a country of approval for transportation within the United States as discussed earlier in this preamble.

#### Section 171.12

This section contains provisions for the import and export of hazardous materials in commerce. Paragraph (b) contains provisions specific to the shipment of hazardous materials by vessel in accordance with the IMDG Code. In this final rule, we are revising paragraph (b)(15) to authorize the transport of hazardous materials in UN pressure receptacles in accordance with the IMDG Code under certain conditions. Readers should refer to the preamble discussion to § 171.11 for changes made to this section.

#### Section 171.12a

This section contains provisions for the transportation by rail or highway of shipments of hazardous materials conforming to the regulations of the Government of Canada. Paragraph (b) contains provisions specific to the shipment of hazardous materials in accordance with the Transport Dangerous Goods (TDG) Regulations. We are revising paragraph (b)(13) to authorize the transport of hazardous materials in UN pressure receptacles in accordance with the TDG Regulations under certain conditions. Readers should refer to the preamble discussion to § 171.11 for changes made to this section.

#### Part 172

#### Section 172.101

In § 172.101, we are amending the Hazardous Materials Table (HMT). In a

final rule published July 31, 2003 (Docket No. RSPA 2002-13658 (HM-215E), 68 FR 44992), we revised eleven entries by removing the qualifying word "compressed." The eleven entries are as follows:

1008 Boron trifluoride  
 2417 Carbonyl fluoride  
 1911 Diborane  
 1962 Ethylene  
 2193 Hexafluoroethane *or* Refrigerant gas R116  
 2451 Nitrogen trifluoride  
 2198 Phosphorous pentafluoride  
 2203 Silane  
 1859 Silicon tetrafluoride  
 1982 Tetrafluoromethane *or* Refrigerant gas R14  
 2036 Xenon

We also made revisions for consistency with another amendment that revised the reference temperature used in the definitions of a non-liquefied and liquefied compressed gas in § 173.115(d) and (e), respectively, from 20 °C (68 °F) to -50 °C (-58 °F) consistent with internationally accepted definitions for gases adopted in the Twelfth Edition of the UN Model Regulations. In the NPRM, we solicited comments on whether the packaging authorization for these gases should remain in § 173.302 or be relocated to § 173.304. Praxair recommends revising the packaging authorization reference found in column 8B of the HMT to show 304 for the following gases so as to remain consistent with the requirements of other liquefied gases: Boron trifluoride, UN1008, Carbonyl fluoride, UN2417, Diborane, UN1911, Nitrogen trifluoride, UN2451, Phosphorus pentafluoride, UN2198, Silane, UN2203, Silicon tetrafluoride, UN1859, Tetrafluoromethane, UN1982, and Xenon, UN2036. Although these materials now meet the definition of liquefied compressed gases in § 173.115(e) based on the revised reference temperatures, it remains our understanding that these gases seldom encounter temperatures of -50 °C (-58 °F) and below when transported within the United States. Since these gases will seldom, if ever, reach temperatures causing them to become liquefied in transportation, we have determined the non-bulk packaging authorizations for these gases should remain in § 173.302.

Air Products and CGA note in the NPRM, the Hazardous Materials Table entry, "Ammonia, anhydrous, 2.3, UN 1005" was missing the symbol "I" which identifies the proper shipping name as appropriate for describing materials in international transportation. The symbol was inadvertently removed in the NPRM.

We are correcting this error in this final rule.

New Special provision N86 is added to 21 entries. This special provision prohibits the shipment of these gases in UN pressure receptacles made of aluminum. The 21 entries are as follows:

1001 Acetylene  
 1017 Chlorine  
 1037 Ethyl chloride  
 1045 Fluorine, compressed  
 1048 Hydrogen bromide, anhydrous  
 1050 Hydrogen chloride, anhydrous  
 1052 Hydrogen fluoride, anhydrous  
 1062 Methyl bromide  
 1063 Methyl chloride *or* Refrigerant gas R 40  
 1085 Vinyl bromide, stabilized  
 1086 Vinyl chloride, stabilized  
 1581 Chloropicrin and Methyl bromide mixture  
 1582 Chloropicrin and Methyl chloride mixture  
 1749 Chlorine trifluoride  
 1860 Vinyl fluoride, stabilized  
 1912 Methyl chloride and Methylene chloride mixture  
 2190 Oxygen difluoride, compressed  
 2196 Tungsten hexafluoride  
 2197 Hydrogen iodide, anhydrous  
 2548 Chlorine pentafluoride  
 2901 Bromine chloride

• New special provision N87 is added to eight entries. The special provision prohibits the shipment of these gases in UN pressure receptacles with copper valves. The eight entries are as follows:

1005 Ammonia, anhydrous  
 1032 Dimethylamine, anhydrous  
 1036 Ethylamine  
 1043 Fertilizer ammoniating solution *with free ammonia*  
 1061 Methylamine, anhydrous  
 1083 Trimethylamine, anhydrous  
 2073 Ammonia solution, *relative density less than 0.880 at 15 °C in water, with more than 35% but not more than 50% ammonia.*  
 3318 Ammonia solution, *relative density less than 0.880 at 15 °C in water, with more than 50% ammonia.*

• New special provision N88 is added to three entries. The special provision provides that the UN pressure receptacle's metal parts in contact with the gas must contain no more than 65% copper. Barlen disagrees with our adding this special provision, citing the low occurrence of copper metal coming in contact with any of the specifically named gases. Praxair requests we revise this special provision to allow metal parts to contain a "nominal" 65% copper, suggesting that some brass alloys contain slightly more than 65% copper. We agree with the latter commenter and will allow brass alloys

that may contain slightly more than 65% copper. However, we believe the term "nominal" is not sufficiently prescriptive. Therefore, we are providing that the copper content of metal parts in contact with the gases may exceed the limit with a tolerance of 1%. The three entries are as follows:

1001 Acetylene, dissolved  
 1060 Methyl acetylene and propadiene mixtures, stabilized  
 2452 Ethylacetylene, stabilized

• New special provision N89 is added to ten entries. The special provision provides that when steel UN pressure receptacles are used, only those bearing an "H" mark are authorized. We proposed to add this requirement to fourteen entries. However, Barlen, Matheson, and Praxair request that we do not assign this special provision to Arsine (UN2188), Germane (UN2192), Phosphine (UN2199), and Silane (UN2203) because these ladings are not prone to hydrogen disassociating from the compounds and posing a threat of hydrogen embrittlement, as is the case with pure hydrogen. We agree with the commenters and we are not adding this special provision to Arsine (UN2188), Germane (UN2192), Phosphine (UN2199), and Silane (UN2203). We are adding the special provision to the following ten entries:

1048 Hydrogen bromide, anhydrous  
 1049 Hydrogen, compressed  
 1050 Hydrogen chloride, anhydrous  
 1053 Hydrogen sulphide  
 1064 Methyl mercaptan  
 1911 Diborane  
 1957 Deuterium, compressed  
 2034 Hydrogen and Methane mixture, compressed  
 2197 Hydrogen iodide, anhydrous  
 2600 Carbon monoxide and Hydrogen mixture, compressed

#### Part 173

##### Section 173.40

This section establishes general packaging requirements for toxic materials packaged in cylinders. In the NPRM we proposed to revise this section to include UN cylinders. In paragraph (a), we proposed to prohibit the transport of Hazard Zone A material in UN tubes and MEGCs. Baker expresses concern regarding the proposal to prohibit the transport of Hazard Zone A material in UN tubes and MEGCs. We disagree. This final rule is intended to align the HMR with international standards. The UN Model Regulations prohibit the transportation of Hazard Zone A materials in UN tubes and MEGCs; therefore we are adopting the prohibition as proposed.

In paragraph (b), we proposed to limit a UN cylinder used for Hazard Zone A

or B material to a maximum water capacity of 85 liters. To maintain consistency with the UN Model Regulations, we are not adopting the NPRM proposal to limit UN cylinders to a capacity of 85 liters for Hazard Zone B materials. We are placing the 85 L limitation for Hazard Zone A materials in paragraph (d)(4).

We also proposed to require the UN cylinder to have a minimum test pressure of 200 bar and a minimum wall thickness of 3.5 mm if made of aluminum alloy or 2 mm if made of steel or, alternatively, be packed in an outer packaging meeting the Packing Group I performance level. Praxair believes these restrictions in the proposed paragraph (b) should be moved to § 173.192 and apply only to Hazard Zone A materials. We disagree. Section 173.40 contains general packaging requirements for toxic materials. Relocating the requirements for minimum test pressure and minimum wall thickness to § 173.192 would apply these requirements to Division 2.3, Hazard Zone A materials, but not to the Division 6.1 Hazard Zone A materials.

Praxair notes the UN Model Regulations allow UN pressure receptacles containing certain Hazard Zone B materials to meet minimum test pressures lower than 200 bar. Although the commenter is correct, the UN Model Regulations also require UN pressure receptacles containing other Hazard Zone B materials to have a minimum test pressure greater than 200 bar. To maintain consistency with the UN Model Regulations, in this final rule we are specifying when UN pressure receptacles are used, the minimum test pressure must be in accordance with P200 of the UN Model Regulations.

We are revising paragraph (e) to specify that MEGCs are authorized for Hazard Zone B materials subject to the conditions and limitations of § 173.312.

#### Section 173.163

This section lists requirements for transporting hydrogen fluoride in cylinders. We are revising this section to authorize UN cylinders for the transport of hydrogen fluoride.

#### Section 173.192

This section lists requirements for transporting bromoacetone, methyl bromide, chloropicrin, and methyl bromide or methyl chloride mixtures in cylinders. We are revising the introductory text and paragraph (a) to specify that UN cylinders with a marked test pressure of 200 bar or greater are authorized for certain toxic gases in Hazard Zone A. Praxair requests that

provisions from § 173.40 applicable to Hazard Zone A materials be relocated to this section. Readers should refer to the preamble discussion in § 173.40.

#### Section 173.195

This section lists requirements for transporting hydrogen cyanide and anhydrous, stabilized (hydrocyanic acid, aqueous solution) in cylinders. As proposed in the NPRM, we are adding a new paragraph (a)(3) to authorize the use of UN cylinders with a minimum test pressure of 100 bar and a maximum filling ratio of 0.55 for hydrogen cyanide, anhydrous, stabilized or hydrocyanic acid, aqueous solution. We are prohibiting the use of UN tubes and MEGCs.

#### Section 173.201

This section lists authorized packagings for the transportation of liquid hazardous materials in Packing Group I. As proposed in the NPRM, we are revising paragraph (c) to authorize the use of UN cylinders for liquid hazardous materials in Packing Group I.

#### Section 173.205

This section addresses general requirements for liquid hazardous materials. As proposed in the NPRM, we are revising this section to authorize the use of UN cylinders for liquid hazardous materials.

#### Section 173.226

This section lists authorized packagings for the transportation of Division 6.1 materials in Hazard Zone A. As proposed in the NPRM, we are revising paragraph (a) to authorize the use of UN cylinders for materials poisonous by inhalation, Division 6.1, Packing Group I, Hazard Zone A.

#### Section 173.227

This section lists authorized packagings for Division 6.1 materials in Hazard Zone B. We proposed to revise paragraph (a) to authorize the use of UN cylinders for materials poisonous by inhalation, Division 6.1, Packing Group I, Hazard Zone B, subject to the terms and conditions of § 173.40. Praxair suggests the requirements in § 173.40 should not apply to cylinders used for Division 6.1 Hazard Zone B materials. Readers should refer to the preamble discussion in § 173.40.

#### Section 173.228

This section lists authorized packagings for bromine pentafluoride or bromine trifluoride. We proposed to revise paragraph (a) to authorize the use of UN cylinders, but not UN tubes and MEGCs, for "Bromine pentafluoride"

and "Bromine trifluoride," which are poisonous Hazard Zone A and B materials, respectively. The shipment of these materials is subject to the terms and conditions of § 173.40. Praxair requests we allow the use of UN tubes and MEGCs to maintain consistency with the capacity authorized for DOT specification cylinders. We disagree. Consistent with § 173.40 and the UN Model Regulations, "Bromine pentafluoride" and "Bromine trifluoride" must be transported in seamless cylinders. The use of UN tubes and MEGCs is prohibited.

#### Section 173.301

This section establishes general requirements for the transportation of compressed gases in cylinders. As proposed in the NPRM, we are revising this section to apply to UN pressure receptacles. In the NPRM, we proposed to add a new paragraph (a)(10) to require a cylinder certified to ISO 11119-3 to have a working pressure not to exceed 62 bar when used for Division 2.1 materials due to our concerns about the permeation of flammable gases through the plastic liner at high temperatures. Upon further review of the requirements in ISO 11119-3 and composite cylinders authorized by special permits, we found the permeation of flammable gases from these cylinders at high temperatures to be negligible. Therefore, we are not adopting the proposed requirement for composite cylinders to have a test pressure less than 62 bar when used for Division 2.1 materials.

In the NPRM, we proposed to prohibit the use of ISO 11119-3 composite cylinders for underwater breathing applications because of the effects of saltwater on some resins. CGA notes ISO 11119-3 contains special requirements for cylinders used in underwater applications. Lincoln Composite states the primary pressure containment structure of ISO 11119-2 and 11119-3 cylinders is the composite over wrap and any adverse effect of saltwater on the structural performance of the resin matrix of composite cylinders manufactured to ISO 11119-3 would also apply to the resin matrix of composite cylinders manufactured to ISO 11119-2. Lincoln Composites requests we remove this underwater use restriction or apply the restriction to composite cylinders manufactured to ISO 11119-2 and to ISO 11119-3 and cites extensive experience in producing and using composite cylinders in saltwater environments without incident. We agree with the commenter regarding the uniform regulation of ISO 11119-2 and 11119-3 for underwater

use. The ISO standards permit a wide range of resin mixtures for the construction of composite cylinders. In reviewing a manufacturer's prototype design of a composite cylinder intended for underwater applications, we will determine the suitability of the particular resin for underwater application. Therefore, in this final rule, in § 173.301b(g), we will permit the use of ISO 11119-2 and 11119-3 composite cylinders for underwater applications. Composite cylinders manufactured to ISO 11119-2 or 11119-3 for underwater applications must be stamped with the "UW" marking as specified in § 178.71(o)(17).

In this final rule, we are adding a new paragraph (a)(10) to require a person who installs a valve into an aluminum cylinder in oxygen service to verify the valve and the cylinder have the same thread type, as we state in the earlier preamble discussion to § 171.11.

In paragraph (c) of the NPRM, we proposed to prohibit the use of a UN non-refillable cylinder, or a UN composite cylinder certified to ISO 11119-3 (fully wrapped fibre reinforced composite gas cylinders with non-load sharing metallic liners or non-metallic liners) for toxic gas or toxic gas mixtures in Hazard Zone A or B. Lincoln Composite agrees with the limited use of non-metallic (plastic) composite cylinders for toxic gases or toxic gas mixtures containing a Division 2.3, Hazard Zone A or B, material. However, Lincoln Composite believes we should not ban the use of these composite cylinders without "definitive performance goals." Lincoln Composite acknowledges, however, that the suitability of plastic-lined composite cylinders for toxic gases is an issue yet to be evaluated. PHMSA does not have sufficient safety data on the permeation of toxic gases from composite cylinders. Therefore, in the absence of this data, we are adopting the prohibition as proposed.

In paragraph (d), we are prohibiting the use of UN cylinders made of aluminum alloy 6351-T6 as proposed.

We are revising paragraph (f)(5) to specify PRDs are not required on UN pressure receptacles transported in accordance with paragraph (k) or (l) of this section, for consistency with the revisions made to §§ 171.11, 171.12, and 171.12a in this final rule. Readers should refer to our earlier preamble discussion to § 171.11.

As proposed in the NPRM, we are revising paragraph (h) to specify UN pressure receptacles must meet the cylinder valve protection requirements in § 173.301b(f).

As proposed in the NPRM, we are revising paragraph (i), containing requirements for cylinders mounted on a motor vehicle or in frames, to specify MEGCs must meet the requirements in § 173.312.

Also, as proposed in the NPRM, we are revising paragraphs (j), (k) and (l) to include UN cylinders. Paragraph (l) is revised to permit the transportation of UN cylinders without PRDs that are not intended for use in the United States to be filled and transported for export only, under certain conditions. These conditions provide that a UN cylinder manufactured, inspected, tested and marked in accordance with part 178 of this subchapter and otherwise conforms to the requirements of this part for the gas involved, except that the cylinder is not equipped with a PRD, may be filled with a gas and offered for transportation and transported for export under certain conditions. Readers should refer to our earlier discussion to § 171.11 regarding the transport of UN pressure receptacles without PRDs for export only.

#### Section 173.301b

New § 173.301b contains additional general requirements for the shipment of hazardous materials in UN pressure receptacles.

When a refillable pressure receptacle is filled with a gas different from that previously contained in the cylinder, the cylinder must be cleaned in accordance with ISO 11621 prior to refilling. We proposed to require a UN pressure receptacle to have its valve protected in accordance with the methods prescribed in § 173.301b(f). CGA and Taylor Wharton request we clarify this requirement applies to valves that have inherent protection as provided by the ISO standard. We are revising the requirement to clarify that the valves must be designed and constructed with sufficient inherent strength to withstand damage in accordance with Annex B of ISO 10297. In this final rule, we are placing this requirement in § 173.301b(c)(2).

We proposed in paragraph (g) to require a non-refillable UN pressure receptacle transported as an inner packaging of a combination packaging to be limited to a water capacity not exceeding 1.25 L when used for a flammable or toxic gas, and to be prohibited for a Hazard Zone A material. Praxair suggests current regulations do not impose a limit on the water capacity for DOT specification cylinders in flammable gas service; therefore, no limit should be prescribed for the UN cylinders. We disagree with the commenter. Current § 173.302a limits the internal volume of DOT 39

non-refillable cylinders to 1.23 L when filled with a Division 2.1 material and § 173.40 prohibits the use of DOT 39 cylinders for Hazard Zone A materials. We are adopting the provision as proposed and placing it in paragraph (d). We are also rearranging the other requirements in this section for the benefit of users.

#### Section 173.302

This section addresses requirements for filling cylinders with non-liquefied (permanent) compressed gases. As proposed in the NPRM, we are making several revisions to this section. Paragraph (a) is revised to authorize the use of UN pressure receptacles for permanent gases. Paragraph (b)(2) is revised to permit the openings in aluminum UN cylinders in oxygen service to be configured with straight or taper threads as we stated in the earlier preamble discussion to § 171.11. We proposed in paragraph (b)(3) to require UN pressure receptacles to be subject to the cleaning requirements in ISO 11621 and to update the cleaning requirements for DOT specification cylinders from Federal Specification RR-C-901C to Federal Specification RR-C-901D. However, in the NPRM, we failed to update one of the paragraph cites we referenced in Federal Specification RR-C-901D. Luxfer requests we correct the cite reference to paragraph 4.4.2.2 to read paragraph 4.2.2.2. The sampling provisions in Federal Specification RR-C-901C, paragraph 4.4.2.2, are actually contained in Federal Specification RR-C-901D, paragraph 4.3.2. Therefore, in this final rule, we are correcting the cite reference to read paragraph 4.3.2.

#### Section 173.302b

New § 173.302b contains the filling requirements for UN pressure receptacles used to transport non-liquefied (permanent) gases. Praxair requests we revise paragraph (d) to authorize the use of UN tubes for diborane and diborane mixtures. We disagree. We did not propose to allow the use of UN tubes for diborane and diborane mixtures because their use is not authorized under the UN Model Regulations. Readers should refer to the earlier discussion in § 173.40.

Praxair requests we revise paragraph (e) to increase the settled pressure in UN pressure receptacles for carbon monoxide to the level permitted for DOT specification cylinders. As proposed in the NPRM, the settled pressure in UN cylinders for carbon monoxide is equivalent to the settled pressure allowed for DOT cylinders. The limits may appear to be different because the settled pressure in UN

cylinders is linked to the test pressure at 65 °C (149 °F) while the settled pressure in DOT cylinders is linked to service pressure at a reference temperature of 20 °C (65 °F).

#### Section 173.303

This section establishes requirements for filling cylinders with acetylene. As proposed in the NPRM, we are authorizing the use of UN cylinders and bundles of cylinders for acetylene. The cylinder must conform to ISO 9809 and have fusible plugs in accordance with ISO 3807-2. Taylor-Wharton requests we consider increasing the settled pressure of DOT specification cylinders for acetylene. This comment is beyond the steps of this rulemaking. We will consider the commenter's request in a future rulemaking.

In the NPRM, we proposed a new paragraph (f) to authorize UN cylinders and bundles of cylinders for the transport of acetylene gas. In this paragraph, we proposed that any metal part in contact with the contents may not contain more than 65% copper in the alloy. As discussed earlier in this preamble, special provision N88 contains this same requirement; therefore, it is removed in paragraph (f).

#### Section 173.304

This section addresses requirements for filling cylinders with liquefied compressed gases. As proposed in the NPRM, we are revising paragraph (a) to authorize the use of UN pressure receptacles for liquefied compressed gases.

#### Section 173.304b

New § 173.304b contains specific requirements for the shipment of liquefied compressed gases in UN pressure receptacles. In paragraph (b), we proposed to allow UN pressure receptacles to be filled with liquefied gases by using the numerical values and data specified in Table 2 of P200 of the UN Model Regulations or by using the formulas in paragraphs (b)(3) and (b)(4) of § 173.304b for determining filling limits for liquefied compressed gases and gas mixtures with unknown densities. Barlen and Matheson express concern regarding the required use of these formulas, which generally result in lower and more restrictive filling limits than those permitted in § 173.301. Barlen and Matheson request we revise the method for determining filling limits of liquefied compressed gases and gas mixtures in UN pressure receptacles to remove these proposed formulas or allow the use of alternative methods. We agree. In this final rule, we are permitting use of alternative methods

for determining filling limits for liquefied compressed gases and gas mixtures in UN pressure receptacles.

CGA notes that the P200 filling limits in the UN Model Regulations were under review at the time we published the NPRM. This review, completed during the summer of 2005, verified the acceptance of most of the current P200 filling ratio values. Based on this review, we are lowering the filling limits for eleven gases. We are adding a table containing the revised filling limits for the effected gases in paragraph (c). Matheson further notes gas mixtures are not specifically addressed in the regulatory text, and requests we add the term "mixture" as appropriate. We agree, and have added the term "mixture" as appropriate.

#### Section 173.312

New § 173.312 contains general requirements for MEGCs consistent with the UN Model Regulations. This new section includes filling requirements, provisions for damage protection, and HMR references for manufacturing and requalification. Praxair requests we revise proposed paragraph (a)(6) to require UN pressure receptacles to be assembled with a manifold and individual shutoff valves to allow each UN pressure receptacle to be filled separately when used for Division 2.2 liquefied gases, or any 2.1 or 2.3 gases. We agree and we are revising this section accordingly.

#### Section 173.323

This section specifies requirements applicable to ethylene oxide. As proposed in the NPRM, we are revising paragraph (b)(2) to authorize the use of UN pressure receptacles as authorized packagings for any ethylene oxide gas, with the exception of acetylene.

#### Section 173.334

This section specifies requirements applicable to organic phosphates mixed with compressed gas. As proposed in the NPRM, we are revising paragraph (a) to authorize the use of UN cylinders for certain compressed gases that are mixed with organic phosphates.

#### Section 173.336

This section addresses requirements for nitrogen dioxide, liquefied, and dinitrogen tetroxide, liquefied. As proposed in the NPRM, we are revising this section to authorize the use of UN cylinders for nitrogen dioxide, liquefied and dinitrogen tetroxide, liquefied. The use of UN tubes and MEGCs is not authorized. In addition, we are correcting an inconsistency in the current requirements. We are relocating

from § 173.337 the requirement for cylinders to be equipped with a stainless steel valve and valve seat that will not deteriorate if in contact with nitrogen dioxide. Praxair requests we allow the use of UN pressure receptacles of equal capacity to DOT specification cylinders. Although this request may have merit, we did not propose to allow the use of UN tubes in this section because the UN Model Regulations do not permit the use of UN tubes or MEGCs for the transport of nitrogen dioxide, liquefied or dinitrogen tetroxide, liquefied.

In addition, the reference to GSA Federal Specification RR-C-901C is revised to read RR-C-901D and the reference to paragraph 4.4.2.2 is revised to read 4.3.2. In addition, readers should refer to the preamble discussion to § 173.302.

#### Section 173.337

This section addresses requirements for nitric oxide. As proposed in the NPRM, we are revising this section to authorize the use of UN cylinders for nitric oxide. UN tubes and MEGCs are not authorized. In addition, the reference to GSA Federal Specification RR-C-901C is revised to read RR-C-901D and the reference to paragraph 4.4.2.2 is revised to read 4.3.2. In addition, readers should refer to the preamble discussion to § 173.302.

#### Part 178

#### Section 178.69

New § 178.69 contains the responsibilities and requirements applicable to manufacturers of UN pressure receptacles. Praxair requests we remove the words "made in the United States" stating the NPRM language unnecessarily restricts the requirements to U.S. manufacturers. We agree with the commenter and have revised this section to reference UN cylinders marked with "USA" as a country of approval.

CGA and Taylor-Wharton request PHMSA clarify that a manufacturer's quality system be documented in the "English language." We have revised the regulatory text accordingly.

#### Section 178.70

New § 178.70 contains the procedures for obtaining design type approval to manufacture UN pressure receptacles. These procedures include a pre-audit inspection by an IIA, an application for initial design type approval, approval modification procedures, production inspections, and recordkeeping requirements. Praxair requests we revise paragraph (a) to clarify the requirements

in this section apply to all manufacturers of UN pressure receptacles regardless of whether the manufacturer's facility is located inside or outside of the United States. We agree and are revising the language in paragraph (a) to clearly state this section applies to all manufacturers of UN pressure receptacles intended for the transportation of hazardous materials within the United States regardless of the manufacturer's location.

CGA, Norris and Taylor-Wharton object to the requirement for a separate audit and inspection prior to the production of each design type and request we only require an audit and inspection prior to the initial manufacture of UN pressure receptacles and not for subsequent design type approvals. CGA and Taylor-Wharton request we do not subject manufacturers to auditing and destructive testing for each new design type without warrant. CGA and Taylor-Wharton further object to the requirement in § 178.70(f)(4) requiring a sample from the production lot to be selected and sent to a testing laboratory, and suggest this requirement should be at the discretion of DOT. Norris objects to the requirement for separate inspection audits that must be conducted by the IIA and the Associate Administrator prior to registration of a new UN cylinder design type. Norris suggests requiring separate inspections by the IIA and the Associate Administrator when applying for the initial design approval but not for subsequent design type approvals. Norris suggests manufacturers submit the documentation for each subsequent design type to the IIA who will also witness the tests, then submit the results of the testing to the Associate administrator for final approval. We disagree with the commenters. To assure the level of safety required under the HMR is maintained, PHMSA reserves the right to conduct subsequent audits prior to the manufacture of each new design type to verify each additional UN pressure receptacle design type is designed and manufactured to the appropriate standards.

#### Section 178.71

New § 178.71 contains the manufacturing specifications for UN pressure receptacles, including the specification marking requirements. As proposed in the NPRM, this section prescribes definitions for terms such as "alternative arrangement," "design type," and "UN pressure receptacle design type." In addition, in this final rule we are adding a definition for "design type approval," based on a

request from CGA. A design type approval is the overall approval of the manufacturer's quality system and approval of the design type of each pressure receptacle to be produced. The initial and subsequent design type approval process is outlined in § 178.70 of this final rule and Section IV of the preamble to the NPRM. Finally, a number of ISO technical standards containing design, construction, and test requirements for seamless or composite UN pressure receptacles are incorporated by reference.

We proposed to subject the pressure receptacles to a hydraulic volumetric expansion test at the time of manufacture. CGA and Taylor-Wharton request we permit the use of both the volumetric expansion test and the proof pressure test for UN cylinders, tubes, and bundles of cylinders. We disagree. The volumetric expansion test measures a cylinder's elastic expansion and ensures the adequacy of the physical properties of each cylinder.

In § 178.71(d)(4) of the NPRM, we proposed to require UN pressure receptacles filled by volume to be equipped with a level indicator. Praxair requests we revise this section to authorize the use of a volume activated shut-off valve as an alternative to a level indicator. A petition for a rulemaking (P-1039) submitted by NPGA regarding the volumetric filling of liquefied petroleum gas cylinders is beyond the scope of this rulemaking, but will be considered along with Praxair's request in a future proceeding. Therefore, we are adopting this provision as proposed. CGA and Taylor-Wharton request we incorporate by reference ISO 4706-1, "Refillable Welded Steel Gas Cylinders-Test pressure 60 bar and below" ISO 4706-2, "Refillable Welded Steel Gas Cylinders-Test pressure greater than 60 bar" as the standards are approved, or consider the current 1989 version of ISO 4706. We did not propose in the NPRM to adopt the design, construction, and test requirements for refillable, welded steel cylinders. Therefore, the commenters' request is outside the scope of this rulemaking. Further, ISO has not finalized the refillable, welded steel cylinders standards. When those standards are finalized, we will consider whether to adopt them into the HMR.

In the NPRM, we proposed to allow the use of refillable composite cylinders designed, manufactured and tested in accordance with ISO 11119. In addition, we proposed for these composite cylinders to be designed and manufactured to unlimited service life standards while limiting their service life to fifteen years from the date of manufacture. Barlen agrees with this

position. Lincoln Composite disagrees with this position, citing the rigorous hydraulic cycle requirements in ISO 11119 necessary to designate a cylinder for unlimited life as compared to the hydraulic cycling required for the DOT-Fully Wrapped Carbon Fiber Reinforced Composite (DOT-CFFC) cylinders which are currently authorized under several special permits. Lincoln Composite further requests that we provide an unlimited service life for those cylinders designed, manufactured and tested to the unlimited life requirements provided by ISO 11119. We disagree. Hydraulic cycling in a controlled setting alone does not provide an adequate evaluation of the conditions that may be encountered in the transportation of a composite cylinder. Therefore, limiting the service life for composite cylinders is warranted at this time. Any increase in service life for these composite cylinders would have to be based on a sound non-destructive examination (NDE) performed during requalification. The NDE method used would have to accurately detect and measure a flaw (e.g. impact damage) that occurred during the transportation of the composite cylinders and that may or may not be detectable by a visual inspection. We are conducting research to evaluate several NDE methods on composite cylinders made in accordance with DOT-CFFC requirements. In the interim, we may consider extending the service life of composite cylinders on a case-by-case basis through an approval from the Associate Administrator.

We proposed in the NPRM to prohibit in the United States the manufacture and use of fully wrapped UN composite cylinders without liners under ISO 11119-3. Carleton expresses concern regarding the properties of ISO 11119-3 composite cylinders with non-metallic and non-load sharing metal liners that do not exhibit the leak before burst failure mode. Carleton suggests this is a primary safety feature of composite cylinders with a load sharing metallic liner. Carleton requests we ensure adequate safety data exists before authorizing the manufacture and use of composite cylinders with non-metallic and non load-sharing metal liners. Lincoln Composite disagrees with the prohibition on the manufacture of ISO 11119-3 composite cylinders without liners based on the satisfactory shipping experience of fully wrapped composite cylinders under several DOT special permits. Lincoln Composite points out that DOT-E 8487, originally issued September 11, 1980, is for fully

wrapped fiberglass composite shell with an aluminum liner, which carries no more than 20% of the pressure load at burst. After review of the ISO 11119-3 standard and the design and shipping experience of composite cylinders under special permits, we agree with the Lincoln Composite and in this final rule are authorizing the use of composite cylinders without liners for Division 2.1 and 2.2 gases. As specified in ISO 11119-3 for composite cylinders without liners, the test pressure must be limited to less than 60 bar.

Carleton notes the preamble in the NPRM contains a list of criteria that constitute a change in an existing approved design. The commenter requests we use the criteria contained in the DOT-CFFC cylinder standard for defining a new composite cylinder design. We disagree. The design change criteria contained in the NPRM preamble is specified in ISO 11119 and must be used when determining if a change constitutes a new design.

CGA and Taylor-Wharton request that we require manufacturers to mark the ISO porous mass standard and not the ISO standard identification that is the "9809" on acetylene cylinders. They suggest that the "9809" marking could lead to confusion and cause these cylinders to be filled with a gas other than acetylene. In this final rule, we are requiring acetylene cylinders to be made of steel. Therefore, we are requiring the cylinder to be marked with the acetylene porous mass standard followed by the steel shell standard, for example "ISO 3807-2/ISO 9809-1." This will provide for easy identification of acetylene cylinders and verification of the steel shell.

#### Section 178.74

New § 178.74 contains the approval procedures for MEGCs. These provisions include procedures for submitting and processing applications for approval, approval denials and terminations, approval modifications, and the responsibilities of MEGC manufacturers and of approval agencies.

The MEGC's manufacturer will submit the application to the approval agency. Each application must include all engineering drawings and calculations necessary for the approval agency to ensure the MEGC design complies in all respects with the requirements in § 178.75 and documentation showing the cylinders or tubes comprising the MEGC assembly are approved. An incomplete application will be returned to the applicant with an explanation.

If an application is complete, the approval agency will review the design

and arrange with the MEGC manufacturer to witness all required tests. Upon satisfactory completion of the prototype testing, the approval agency will prepare a design type approval certificate and return the certificate and documentation to the manufacturer. The manufacturer will submit the certificate and an approval application to the Associate Administrator. If the application and supporting documentation of the examination and tests performed are acceptable, the Associate Administrator will approve the certificate. The approval agency will be required to maintain a set of the approved drawings and calculations for each MEGC design it reviews and a copy of each initial design type approval certificate approved by the Associate Administrator for at least 20 years. The approval agency will ensure each MEGC is manufactured to the approved design type and fully conforms to the applicable requirements. The approval agency will issue a certificate of compliance for each MEGC manufactured.

#### Section 178.75

New § 178.75 contains the manufacturing specifications for MEGCs and definitions for: "Leakproofness test," "Manifold," "Maximum permissible gross mass or MPGM," and "Structural equipment." This section also references a number of ISO technical standards for the design and construction of MEGCs. In addition, the section includes requirements for specification marking. In the NPRM, we proposed for shut off valves, other than those with screwed spindles, to require "the open and closed positions and the direction of closure must be clearly shown." Air Products suggests that we revise this statement for clarity purposes. We believe the NPRM language is appropriate and are adopting the proposed language in this final rule.

#### Section 180.201

This section lists persons to whom the requirements for qualification, maintenance, and use of cylinders apply. As proposed in the NPRM, we are revising the general applicability provisions to include UN pressure receptacles.

#### Section 180.203

This section establishes definitions specific to cylinder qualification, maintenance, and use. As proposed in the NPRM, we are revising the definition for "cylinder" to include UN pressure receptacles.

#### Section 180.205

We are revising the section heading to read: "General requirements for requalification of specification cylinders."

#### Section 180.207

New § 180.207 contains the UN pressure receptacle requalification requirements, which include requalification intervals and procedures. All seamless steel and aluminum cylinder types authorized in this final rule must be requalified in accordance with ISO 6406 (for steel) and 10461 (for aluminum). Both ISO 6406 and ISO 10461 provide for the periodic requalification of cylinders by an ultrasonic examination or a pressure test. The pressure test may be either the hydraulic proof pressure test or the hydrostatic volumetric expansion test. In the NPRM, we solicited comments on whether we should permit, under certain conditions, requalification of UN pressure receptacles by the proof pressure method as an alternative to the volumetric expansion test. Arrowhead supports the proposal to require volumetric expansion testing of all UN pressure receptacles. Barlen suggests that, with the exception of pure or mixtures of carbon dioxide, all cylinders in Division 2.1 and 2.2 services could be retested by the proof pressure method. Barlen further suggests PHMSA mandate that the cylinders be marked with a clear indication of their gas service and authorize a 15-year retest period.

The hydrostatic volumetric expansion test provides useful information during the manufacturing of a cylinder to assure a complete and uniform heat treatment of that cylinder. Permanent expansion in excess of 10% of total expansion at the time of manufacture may indicate a defective cylinder. During requalification, hydrostatic volumetric expansion testing may result in excessive permanent expansion (above 10%) if a cylinder has a substantial loss of side-wall thickness due to severe internal or external corrosion. A cylinder that has been engulfed in a fire for a period of time also may undergo excessive expansion. Cylinders showing excessive permanent expansion must be condemned.

Based on studies reviewed by PHMSA, a cylinder must lose a substantial amount of its original wall thickness before excessive permanent expansion is measured during a hydrostatic pressure test. Since a complete visual inspection (external and internal) is required for any requalification, a cylinder with side-

wall corrosion will be rejected in accordance with the appropriate requalification standard. The size of rejectable side-wall corrosion is much smaller than what will cause excessive permanent expansion.

Based on a survey we have conducted with participation from re-testers, over 90% of all cylinders rejected during requalification are rejected because of flaws identified through visual inspection. Both the hydraulic volumetric expansion test and the proof pressure test will provide equal assurance that a cylinder, at the time of requalification has been pressurized to approximately 1.5 times the service pressure without failure. Based on the review of public comments, our technical evaluation of these two test methods and their impact, we will allow UN pressure receptacles, including UN pressure receptacles installed in MEGCs, to be requalified by either the hydraulic volumetric expansion method or the hydraulic proof pressure method.

Proposed paragraph (a)(3) states a cylinder with a specified service life may not be refilled and offered for transportation after its authorized service life has expired. Further, the paragraph states, a UN composite cylinder may not be requalified beyond its 15-year authorized service life unless approval has been received from the Associate Administrator. CGA and Lincoln Composite request we revise paragraph (a)(3) to clarify that UN pressure receptacles may have their authorized service life extended if specifically approved by the Associate Administrator. We are revising paragraph (a)(3) as requested by the commenters. This provision applies only to UN composite cylinders, since we did not propose to limit the authorized service life of seamless UN pressure receptacles. Air Products requests we align the requalification interval for DOT specification cylinders with the interval of the corresponding UN pressure receptacle. This rulemaking addresses UN cylinder requirements; thus, the requalification requirements for DOT specification cylinders are beyond the scope of this rulemaking.

We proposed, in paragraph (d)(1), to allow UN pressure receptacles made of high strength steel with a tensile strength equal to or greater than 950 MPa and UN tubes to be requalified in accordance with § 180.209 or in accordance with procedures approved by the Associate Administrator. CGA and Taylor-Wharton request we require all seamless steel UN pressure receptacles to be requalified in accordance with the requirements of

ISO 6406. They state requalifiers will not be able to determine the 950 MPa limitation of the steel because the tensile strength is not required to be marked on the cylinders. Therefore, a requalifier will not be able to determine if a hydrostatic test is appropriate. We agree. Most, if not all, UN seamless steel cylinders with a tensile strength less than 950 MPa will bear the H mark to show the compatibility of the steel with corrosive or embrittling gases as required by ISO 11114-1. Therefore, those UN seamless steel cylinders bearing the H mark may be tested by the hydrostatic test method. Those UN seamless steel cylinders bearing no H mark must be requalified by ultrasonic examination (UE) in accordance with ISO 6406 by a requalifier who is approved by the Associate Administrator to requalify pressure receptacles using UE. UN tubes and MEGCs may be requalified by acoustic emission (AE) under the terms of a special permit issued by the Associate Administrator. A list of requalifiers who are authorized to examine UN pressure receptacles by UE or AE is available for review on the PHMSA Web site: [http://hazmat.dot.gov/sp\\_app/approvals/exsys.htm#approvals](http://hazmat.dot.gov/sp_app/approvals/exsys.htm#approvals).

#### Section 180.212

This section addresses requirements for the repair of DOT-3 series specification cylinders. As proposed in the NPRM, we are revising the cylinder repair requirements to include UN pressure receptacles.

#### Section 180.213

This section establishes marking requirements for requalified cylinders. As proposed in the NPRM, we are revising the requalification marking provisions to include UN pressure receptacles. Lincoln Composite requests we permit the use of a permanent label bearing the requalification markings on UN composite cylinders. Lincoln Composite states the label should be applied to the cylinder in a manner prescribed by the cylinder's manufacturer because differing surface treatments during manufacture may limit or preclude the use of certain adhesives. We agree, and are authorizing the label to be affixed to the cylinder in a manner authorized by the cylinder manufacturer. We are also correcting a cite reference.

#### Section 180.217

New § 180.217 contains requalification requirements for MEGCs. This section specifies the requalification intervals and marking requirements for

MEGCs and is adopted as proposed in the NPRM.

#### *Other Miscellaneous Comments*

Praxair recommends that throughout the final rule, we revise the term "UN cylinders" to the read "UN cylinders or UN pressure receptacles," noting that the term "UN pressure receptacles" includes pressure receptacles with a capacity larger than the 150 L capacity in the definition of UN cylinder. We disagree with the commenter. Revising the term "UN cylinders" to read "UN cylinders or UN pressure receptacles" would permit the use of UN tubes, which are not permitted for certain hazardous materials.

Carleton raised three questions regarding DOT fully wrapped aluminum lined composite (CFFC) cylinder specifications and DOT fiber reinforced plastic type composite (FRP-1) cylinder specifications. Carleton asks whether DOT FRP-1 and DOT CFFC will continue as active standards; how long will these standards remain active; and may new designs be qualified to these standards. With exception of the question regarding the future longevity of the DOT FRP-1 and DOT DFFC standards, the answer to these questions is yes. This final rule addresses the design and manufacture of UN pressure receptacles and MEGCs. We did not propose to modify DOT CFFC or DOT FRP-1 specifications. Taylor-Wharton requests PHMSA consider clarifying that the service pressure is not required to be marked on DOT series 8 acetylene cylinders. We agree with the commenter that 49 CFR 178.59 and 178.60 do not require the service pressures to be marked on acetylene cylinders. This final rule addresses UN pressure receptacles and, therefore, any revision to these sections is beyond the scope of this rulemaking.

PUCO expressed concern regarding the adoption of UN pressure receptacles and potential confusion of enforcement agencies. PUCO requests PHMSA, in coordination with DOT modal administrations and state enforcement agencies, to create and disseminate training materials describing the changes and how to properly inspect UN pressure receptacles. To assist enforcement agencies and the regulated communities, we will develop and disseminate training materials regarding these amendments following the publication of this final rule.

## V. Rulemaking Analyses and Notices

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

This final rule is published under the following statutory authorities:

1. 49 U.S.C. 5103(b) authorizes the Secretary of Transportation to prescribe regulations for the safe transportation, including security, of hazardous material in intrastate, interstate, and foreign commerce. This final rule aligns the HMR with the UN Model Regulations, which will (1) promote flexibility; (2) permit the use of technological advances for the manufacture of pressure receptacles; (3) provide for a broader selection of pressure receptacles; (4) reduce the need for special permits and exemptions to the existing regulations; and (5) facilitate international commerce in the transportation of compressed gases while maintaining a level of safety at least equal to that achieved under the HMR. To this end, as discussed in detail earlier in this preamble, the final rule amends the HMR to more fully align it with the biennial updates of the UN Recommendations, the IMDG Code and the ICAO Technical Instructions to facilitate the transport of hazardous materials in international commerce.

2. 49 U.S.C. 5120(b) authorizes the Secretary of Transportation to ensure that, to the extent practicable, regulations governing the transportation of hazardous materials in commerce are consistent with standards adopted by international authorities. This final rule amends the HMR to maintain alignment with international standards by incorporating various amendments to facilitate the transport of hazardous material in international commerce. To this end, as discussed in detail earlier in this preamble, the final rule incorporates changes into the HMR based on the Thirteenth Revised Edition of the UN Recommendations, Amendment 32 to the IMDG Code, and the 2005–2006 ICAO Technical Instructions, which became effective January 1, 2005. The continually increasing amount of hazardous materials transported in international commerce warrants the harmonization of domestic and international requirements to the greatest extent possible. Harmonization serves to facilitate international transportation; at the same time, harmonization ensures the safety of people, property, and the environment by reducing the potential for confusion and misunderstanding that could result if shippers and transporters were required to comply with two or more conflicting sets of regulatory requirements. While the

intent of this rulemaking is to align the HMR with international standards, we review and consider each amendment on its own merit based on its overall impact on transportation safety and the economic implications associated with its adoption into the HMR. Our goal is to harmonize without sacrificing the current HMR level of safety and without imposing undue burdens on the regulated public. Thus, as discussed in detail earlier in this preamble, there are several instances where we elected not to adopt a specific provision of the UN Model Regulations, the IMDG Code or the ICAO Technical Instructions. Further, we are maintaining a number of current exceptions for domestic transportation that should minimize the compliance burden on the regulated community.

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

This final rule is a not considered a significant regulatory action under section 3(f) of Executive Order 12866 or the Regulatory Policies and Procedures of the Department of Transportation (44 FR 11034). This final rule was not reviewed by the Office of Management and Budget. A regulatory evaluation is in the docket for this rulemaking.

This final rule adds provisions to the HMR, based on the standards contained in the United Nations Model Regulations, that would permit the design, construction, maintenance, and use of seamless UN pressure receptacles and MEGCs. The changes provide shippers with an optional means of compliance; therefore, any increased compliance costs associated with the proposals in this final rule would be incurred voluntarily by the compressed gas industry. Ultimately, we expect each company to make reasonable decisions based on its own business operations and future goals. Thus, costs incurred if a company elects to manufacture or use UN pressure receptacles and MEGCs would be balanced by the benefits (e.g., access to foreign markets) accruing from this decision.

More broadly, this final rule harmonizes the requirements in the HMR for the manufacture and use of cylinders with international standards in the UN Model Regulations. Harmonization of the HMR with international standards will eliminate inconsistencies between the regulations, thereby facilitating efficient transportation of hazardous materials in pressure receptacles across national borders. More importantly, harmonized regulations reduce the potential for misunderstanding and confusion and, thus, enhance safety.

### 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 propose any regulation that has substantial direct effects on the States, the relationship between the national government and the States, or the distribution of power and responsibilities among the various levels of government. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

The Federal hazardous materials transportation law, 49 U.S.C. 5101–5128, contains an express preemption provision (49 U.S.C. 5125(b)) that preempts State, local, and Indian tribe requirements on certain covered subjects. Covered subjects are:

(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, inspection, marking, maintenance, reconditioning, 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) described above and would preempt State, local, and Indian tribe requirements not meeting the “substantively the same” standard. This final rule is necessary to harmonize domestic regulations for the transportation of hazardous materials in cylinders with international standards.

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. The effective date of Federal preemption will be 90 days from 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 and Executive Order 13272

The Regulatory Flexibility Act (5 U.S.C. 601–611) requires each agency to review regulations and assess their impact on small businesses and other small entities to determine whether the proposed rule is expected to have a significant impact on a substantial number of small entities. This rule imposes only minimal new costs of compliance on the regulated industry. Based on the assessment in the regulatory evaluation, I hereby certify that while this rule applies to a substantial number of small entities, there will not be a significant economic impact on those small entities. A detailed Regulatory Flexibility analysis is available for review in the docket.

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.

*Need for the final rule.* Current requirements for the manufacture, use, and requalification of cylinders can be traced to standards first applied in the early 1900s. Over the years, the regulations have been revised to reflect advancements in transportation efficiency and changes in the national and international economic environment. The changes in this final rule permit shippers to use either current DOT specification cylinders or the new seamless UN pressure receptacles and MEGCs for the transportation of compressed gases. This action is being taken to facilitate international transportation, increase flexibility for the regulated community and promote technological advancement while maintaining a comparable level of safety.

*Description of action.* In this final rule, we are adding optional requirements for the manufacture, maintenance, testing, and use of UN pressure receptacles and to adopt a qualification and approval process for

persons who choose to certify refillable UN pressure receptacles.

*Identification of potentially affected small entities.* Businesses likely to be affected by the final rule are cylinder manufacturers, cylinder requalifiers, independent inspection agencies, and commercial establishments that own and use DOT specification cylinders. There are approximately three United States manufacturers of seamless pressure receptacles. In addition, the Associate Administrator has approved approximately 2,150 active domestic cylinder requalifiers who use the volumetric expansion test and seven domestic independent inspection agencies. There are also two facilities approved to perform seamless cylinder repairs. Cylinder requalifiers include businesses that manage large fleets of cylinders, such as cylinders filled with propane to power forklift trucks and for use by retail customers through cylinder exchange programs. There are literally hundreds of thousands of commercial establishments that own and use cylinders manufactured to DOT specifications. These business sectors include agriculture; mining; construction; manufacturing; transportation; communications; electric, gas, and sanitary services; wholesale trade; retail trade; and other services.

Unless alternative definitions have been established by the agency in consultation with the Small Business Administration (SBA), the definition of "small business" has the same meaning as under the Small Business Act. Since no such special definition has been established, we employ the thresholds published by SBA for industries subject to the HMR. Based on 1997 data compiled by the U.S. Census Bureau, it appears that upwards of 97 percent of firms subject to this final rule are small businesses. For the most part, these entities will incur minimal costs to comply with the provisions of this final rule. The provisions are optional; companies will choose to expand their operations to include UN pressure receptacles based on their ability to offset any additional costs.

*Reporting and recordkeeping requirements.* Consistent with the UN Model Regulations, the final rule includes a new recordkeeping requirement for a proposed quality control system for facilities that manufacture UN pressure receptacles in the United States. The requirements will affect about 50 cylinder manufacturers; we anticipate that each manufacturer may incur minimal costs each year to comply with the new requirement.

*Related Federal rules and regulations.* With respect to the transportation of compressed gases in cylinders, there are no related rules or regulations issued by other department or agencies of the Federal Government.

*Alternate proposals for small business.* While certain regulatory actions may affect the competitive situation of an individual company or group of companies by imposing relatively greater burdens on small rather than large enterprises, we do not believe that this will be the case with this final rule. The requirements for the manufacture, testing, and use of UN pressure receptacles as in the final rule are optional. Ultimately, we expect each company to make reasonable decisions based on its own business operations and future goals. Thus, the costs incurred if a company elects to manufacture or use UN pressure receptacles and MEGCs would be balanced by the benefits (e.g., access to foreign markets) accruing from this decision.

*Conclusion.* I certify this final rule would not have a significant economic impact on a substantial number of small entities. The costs associated with this final rule will be assumed voluntarily based on a company's ability to offset the costs with benefits such as increased access to foreign markets. Indeed, adoption of the UN pressure receptacle standards should result in overall cost savings to those who choose to utilize them and will ease the regulatory compliance burden for shippers engaged in international commerce, including trans-border shipments in North America.

#### F. Paperwork Reduction Act

This final rule resulted in an increase in annual burden and costs based on a new information collection requirement. This notice identifies a new information collection request that PHMSA submitted to the Office of Management and Budget (OMB) for approval based on the requirements in this final rule. The information collection regarding the design, construction, maintenance and use of UN cylinders has been approved by OMB under OMB Control No. 2137–0621, "Requirements for UN Cylinders," with an expiration date of May 31, 2008.

PHMSA developed burden estimates to reflect changes in this final rule. PHMSA estimates that the total information collection and recordkeeping burden for the current requirements of this final rule will be as follows:

OMB No. 2137–0621:

Total Annual Number of Respondents: 50.

*Total Annual Responses:* 150.  
*Total Annual Burden Hours:* 900.  
*Total Annual Burden Cost:*  
 \$22,500.00.

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. Section 1320.8(d), Title 5, Code of Federal Regulations requires that PHMSA provide interested members of the public and affected agencies an opportunity to comment on information collection and recordkeeping requests. PHMSA specifically requested comments on the information collection and recordkeeping burdens associated with developing, implementing, and maintaining these requirements for approval under this final rule. No comments were received regarding this information collection.

Direct your requests for a copy of the information collection to Deborah Boothe or T. Glenn Foster, Office of Hazardous Materials Standards (PHH-10), Pipeline and Hazardous Materials Safety Administration (PHMSA), Room 8102, 400 Seventh Street, SW., Washington, DC 20590-0001, Telephone (202) 366-8553.

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

This final rule does not impose unfunded mandates under the Unfunded Mandates Reform Act of 1995. It does 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.

#### 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 of 1969 (NEPA), as amended (42 U.S.C. 4321-4347), requires Federal agencies to consider the consequences of major Federal actions and prepare a detailed statement on actions significantly affecting the quality of the human environment. There are no significant environmental impacts associated with this final rule. We are revising certain HMR requirements for the transportation of hazardous

materials in cylinders in order to promote safer transportation practices, facilitate international commerce, and make these requirements compatible with international standards regarding such transportation.

#### 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) or you may visit <http://dms.dot.gov>.

#### List of Subjects

##### 49 CFR Part 107

Administrative practice and procedure, Hazardous materials transportation, Packaging and containers, Penalties, Reporting and recordkeeping requirements.

##### 49 CFR Part 171

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

##### 49 CFR Part 172

Hazardous materials transportation, Hazardous waste, Labeling, Packaging and containers, Reporting and recordkeeping requirements.

##### 49 CFR Part 173

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

##### 49 CFR Part 178

Hazardous materials transportation, Incorporation by reference, Packaging and containers, Reporting and recordkeeping requirements.

##### 49 CFR Part 180

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

■ In consideration of the foregoing, we amend 49 CFR Chapter I as follows:

#### PART 107—HAZARDOUS MATERIALS PROGRAM PROCEDURES

■ 1. The authority citation for part 107 continues to read as follows:

**Authority:** 49 U.S.C. 5101-5128, 44701; Pub. L. 101-410 section 4 (28 U.S.C. 2461 note); Pub. L. 104-121 sections 212-213; Pub. L. 104-134 section 31001; 49 CFR 1.45, 1.53.

■ 2. Section 107.801(a) is revised to read as follows:

#### § 107.801 Purpose and scope.

(a) This subpart prescribes procedures for—

(1) A person who seeks approval to be an independent inspection agency to perform tests, inspections, verifications and certifications of DOT specification cylinders or UN pressure receptacles as required by parts 178 and 180 of this chapter;

(2) A person who seeks approval to engage in the requalification (*e.g.* inspection, testing, or certification), rebuilding, or repair of a cylinder manufactured in accordance with a DOT specification or a pressure receptacle in accordance with a UN standard, under subchapter C of this chapter or under the terms of a special permit issued under this part;

(3) A person who seeks approval to perform the manufacturing chemical analyses and tests of DOT specification cylinders, special permit cylinders, or UN pressure receptacles outside the United States.

\* \* \* \* \*

■ 3. In § 107.803, the section heading is revised, paragraph (c)(8) is redesignated as paragraph (c)(9), and a new paragraph (c)(8) is added to read as follows:

#### § 107.803 Approval of an independent inspection agency (IIA).

\* \* \* \* \*

(c) \* \* \*

(8) If the applicant's principal place of business is in a country other than the United States, the Associate Administrator may approve the applicant on the basis of an approval issued by the Competent Authority of the country of manufacture. The Competent Authority must maintain a current listing of approved IIAs and their identification marks. The applicant must provide a copy of the designation from the Competent Authority of that country delegating to the applicant an approval or designated agency authority for the type of packaging for which a DOT or UN designation is sought; and

\* \* \* \* \*

■ 4. In § 107.805, the section heading and paragraphs (a), (c)(2), and (d) are revised to read as follows:

#### § 107.805 Approval of cylinder and pressure receptacle requalifiers.

(a) *General.* A person must meet the requirements of this section to be

approved to inspect, test, certify, repair, or rebuild a cylinder in accordance with a DOT specification or a UN pressure receptacle under subpart C of part 178 or subpart C of part 180 of this chapter, or under the terms of a special permit issued under this part.

\* \* \* \* \*

(c) \* \* \*

(2) The types of DOT specification or special permit cylinders, or UN pressure receptacles that will be inspected, tested, repaired, or rebuilt at the facility;

\* \* \* \* \*

(d) *Issuance of requalifier identification number (RIN).* The Associate Administrator issues a RIN as evidence of approval to requalify DOT specification or special permit cylinders, or UN pressure receptacles if it is determined, based on the applicant's submission and other available information, that the applicant's qualifications and, when applicable, facility are adequate to perform the requested functions in accordance with the criteria prescribed in subpart C of part 180 of this subchapter.

\* \* \* \* \*

■ 5. Section 107.809 is added to read as follows:

**§ 107.809 Conditions of UN pressure receptacle approvals.**

(a) Each approval issued under this subpart contains the following conditions:

(1) Upon the request of the Associate Administrator, the applicant or holder must allow the Associate Administrator or the Associate Administrator's designee to inspect the applicant's pressure receptacle manufacturing and testing facilities and records, and must provide such materials and pressure receptacles for analyses and tests as the Associate Administrator may specify. The applicant or holder must bear the cost of the initial and subsequent inspections, analyses, and tests.

(2) Each holder must comply with all of the terms and conditions stated in the approval letter issued under this subpart.

(b) In addition to the conditions specified in § 107.713, an approval may be denied or if issued, suspended or terminated if the Competent Authority of the country of manufacture fails to initiate, maintain or recognize an IIA approved under this subpart; fails to recognize UN standard packagings manufactured in accordance with this subchapter; or implements a condition or limitation on United States citizens

or organizations that is not required of its own citizenry.

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

■ 6. 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.

■ 7. In § 171.7, in the table in paragraph (a)(3) make the following changes:

■ a. Under Compressed Gas Association Inc., a new entry for CGA S–1.1, 2003 edition, is added;

■ b. Under General Services Administration, the entry Federal Specification RRC901C is removed, and an entry for RR–C–901D is added;

■ c. Revise the entry for “International Organization for Standardization,” and

■ d. Under “United Nations,” the entry for UN Recommendations on the Transport of Dangerous Goods is revised.

The revisions and additions read as follows:

**§ 171.7 Reference material.**

(a) \* \* \*

(3) Table of material incorporated by reference. \* \* \*

| Source and name of material                                                                                                                                                        | 49 CFR reference               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|
| * * * * *                                                                                                                                                                          | * * * * *                      |
| <i>Compressed Gas Association, Inc.,</i>                                                                                                                                           |                                |
| * * * * *                                                                                                                                                                          | * * * * *                      |
| CGA Pamphlet S–1.1, Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases, 2003 (with the exception of paragraph 9.1.1.1), Eleventh Edition.                      | 173.301, 178.75.               |
| * * * * *                                                                                                                                                                          | * * * * *                      |
| <i>General Services Administration,</i>                                                                                                                                            |                                |
| * * * * *                                                                                                                                                                          | * * * * *                      |
| Federal Specification RR–C–901D, Cylinders, Compressed Gas: Seamless Shatterproof, High Pressure DOT 3AA Steel, and 3AL Aluminum, February 21, 2003 (Superseding RR–C–901C, 1981). | 173.302; 173.336; 173.337.     |
| * * * * *                                                                                                                                                                          | * * * * *                      |
| <i>International Organization for Standardization, Case Postale 56, CH–1211, Geneve 20, Switzerland;</i><br>Also available from: ANSI 25 West 43rd Street, New York, NY 10036      |                                |
| ISO 82–74(E) Steels Tensile Testing .....                                                                                                                                          | 178.270–3.                     |
| ISO 535–1991(E) Paper and board—Determination of water absorptiveness—Cobb method .....                                                                                            | 178.516; 178.707; 178.708.     |
| ISO 1496–1: 1990 (E)—Series 1 freight containers—Specification and testing, Part 1: General cargo containers. Fifth Edition, (August 15, 1990).                                    | 173.411                        |
| ISO 1496–3—Series 1 freight containers—Specification and testing—Part 3: Tank containers for liquids, gases and pressurized dry bulk, Fourth edition, March 1995, (E).             | 178.74; 178.75; 178.274.       |
| ISO 2431–1984(E) Standard Cup Method .....                                                                                                                                         | 173.121.                       |
| ISO 2592–1973(E) Petroleum products—Determination of flash and fire points—Cleveland open cup method.                                                                              | 173.120.                       |
| ISO 2919–1980(E) Sealed radioactive sources—Classification .....                                                                                                                   | 173.469.                       |
| ISO 3036–1975(E) Board—Determination of puncture resistance .....                                                                                                                  | 178.708.                       |
| ISO 3574–1986(E) Cold-reduced carbon steel sheet of commercial and drawing qualities .....                                                                                         | 178.503; Part 178, appendix C. |
| ISO 3807–2, Cylinders for acetylene—Basic requirements—Part 2: Cylinders with fusible plugs, First edition, March 2000, (E).                                                       | 173.303; 178.71.               |
| ISO 4126–1 Safety valves—Part 1: General Requirements, December 15, 1991, First Edition .....                                                                                      | 178.274.                       |
| ISO 6406, Gas cylinders—Seamless steel gas cylinders—Periodic inspection and testing, Second edition, February 2005, (E).                                                          | 180.207.                       |

| Source and name of material                                                                                                                                                                                                                   | 49 CFR reference                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO 6892 Metallic materials—Tensile testing, July 15, 1984, First Edition .....                                                                                                                                                               | 178.274.                                                                                                                                                  |
| ISO 7225, Gas cylinders—Precautionary labels, First edition, November 1994, (Corrected and reprinted August 1995), (E).                                                                                                                       | 178.71.                                                                                                                                                   |
| ISO 7866, Gas cylinders—Refillable seamless aluminum alloy gas cylinders—Design, construction and testing, First edition, June 1999, (E).                                                                                                     | 178.71.                                                                                                                                                   |
| ISO 8115 Cotton bales—Dimensions and density, 1986 Edition .....                                                                                                                                                                              | 172.102.                                                                                                                                                  |
| ISO 9809-1: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa., First edition, June 1999, (E).                   | 178.71; 178.75.                                                                                                                                           |
| ISO 9809-2: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa., First edition, June 2000, (E).    | 178.71; 178.75.                                                                                                                                           |
| ISO 9809-3: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 3: Normalized steel cylinders, First edition, December 2000, (E).                                                                     | 178.71; 178.75.                                                                                                                                           |
| ISO 9978:1992(E)—Radiation protection—Sealed radioactive sources—Leakage test methods. First Edition, (February 15, 1992).                                                                                                                    | 173.469.                                                                                                                                                  |
| ISO 10297, Gas cylinders—Refillable gas cylinder valves—Specification and type testing, First edition, May 1999, (E).                                                                                                                         | 173.301b, 178.71.                                                                                                                                         |
| ISO 10461, Gas cylinders—Seamless aluminum—alloy gas cylinders—Periodic inspection and testing, Second edition, February 2005, (E).                                                                                                           | 180.207.                                                                                                                                                  |
| ISO 10462, Gas cylinders—Transportable cylinders for dissolved acetylene—Periodic inspection and maintenance, Second edition, February 2005, (E).                                                                                             | 180.207.                                                                                                                                                  |
| ISO 11114-1, Transportable gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials, First edition, October 1997, (E).                                                                        | 173.301b; 178.71.                                                                                                                                         |
| ISO 11114-2, Transportable gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials, First edition, December 2000, (E).                                                                   | 173.301b; 178.71.                                                                                                                                         |
| ISO 11117, Gas cylinders—Valve protection caps and valve guards for industrial and medical gas cylinders—Design, construction and tests, First edition, August 1998, (E).                                                                     | 173.301b.                                                                                                                                                 |
| ISO 11118, Gas cylinders—Non-refillable metallic gas cylinders—Specification and test methods, First edition, October 1999, (E).                                                                                                              | 178.71.                                                                                                                                                   |
| ISO 11119-1, Gas cylinders—Gas cylinders of composite construction—Specification and test methods—Part 1: Hoop-wrapped composite gas cylinders, First edition, May 2002, (E).                                                                 | 178.71.                                                                                                                                                   |
| ISO 11119-2, Gas cylinders—Gas cylinders of composite construction—Specification and test methods—Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners, First edition, May 2002, (E).                | 178.71.                                                                                                                                                   |
| ISO 11119-3, Gas cylinders of composite construction—Specification and test methods—Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners, First edition, September 2002, (E). | 178.71.                                                                                                                                                   |
| ISO 11120, Gas cylinders—Refillable seamless steel tubes of water capacity between 150 L and 3000 L—Design, construction and testing, First edition, March 1999, (E).                                                                         | 178.71; 178.75.                                                                                                                                           |
| ISO 11621, Gas cylinders—Procedures for change of gas service, First edition, April 1997, (E) ..                                                                                                                                              | 173.302, 173.336, 173.337.                                                                                                                                |
| ISO 11623, Transportable gas cylinders—Periodic inspection and testing of composite gas cylinders, First edition, March 2002, (E).                                                                                                            | 180.207.                                                                                                                                                  |
| * * * * *                                                                                                                                                                                                                                     | * * * * *                                                                                                                                                 |
| <i>United Nations,</i>                                                                                                                                                                                                                        |                                                                                                                                                           |
| * * * * *                                                                                                                                                                                                                                     | * * * * *                                                                                                                                                 |
| UN Recommendations on the Transport of Dangerous Goods, Thirteenth Revised Edition (2003), Volumes I and II.                                                                                                                                  | 171.12; 172.202; 172.401; 172.502; 173.22; 173.24; 173.24b; 173.40; 173.192; 173.197; 173.302b; 173.304b; Part 173, appendix H; 178.75; 178.274; 178.801. |
| * * * * *                                                                                                                                                                                                                                     | * * * * *                                                                                                                                                 |

■ 8. In § 171.8, definitions for “bundle of cylinders,” “multiple element gas container or MEGC,” “settled pressure,” “UN cylinder,” “UN pressure receptacle,” “UN tube” and “working pressure” are added in alphabetical order to read as follows:

**§ 171.8 Definitions.**

\* \* \* \* \*

*Bundle of cylinders* means assemblies of UN cylinders fastened together and interconnected by a manifold and transported as a unit. The total water

capacity for the bundle may not exceed 3,000 L, except that a bundle intended for the transport of gases in Division 2.3 is limited to a water capacity of 1,000 L.

\* \* \* \* \*

*Multiple-element gas container or MEGC* means assemblies of UN cylinders, tubes, or bundles of cylinders interconnected by a manifold and assembled within a framework. The term includes all service equipment and

structural equipment necessary for the transport of gases.

\* \* \* \* \*

*Settled pressure* means the pressure exerted by the contents of a UN pressure receptacle in thermal and diffusive equilibrium.

\* \* \* \* \*

*UN cylinder* means a transportable pressure receptacle with a water capacity not exceeding 150 L that has been marked and certified as conforming to the applicable

requirements in part 178 of this subchapter.

\* \* \* \* \*

*UN pressure receptacle* means a UN cylinder or tube.

\* \* \* \* \*

*UN tube* means a seamless transportable pressure receptacle with a water capacity exceeding 150 L but not more than 3,000 L that has been marked and certified as conforming to the requirements in part 178 of this subchapter.

\* \* \* \* \*

*Working pressure* for purposes of UN pressure receptacles, means the settled pressure of a compressed gas at a reference temperature of 15 °C (59 °F).

\* \* \* \* \*

■ 9. In § 171.11, paragraph (d)(20) is added to read as follows:

**§ 171.11 Use of ICAO Technical Instructions.**

\* \* \* \* \*

(d) \* \* \*

(20) Cylinders (including UN pressure receptacles) transported to, from, or within the United States must conform to the applicable requirements of this subchapter. Unless otherwise excepted in this subchapter, a cylinder may not be transported unless;

(i) The cylinder is manufactured, inspected and tested in accordance with a DOT specification or a UN standard prescribed in part 178 of this subchapter, except that cylinders not conforming to these requirements must meet the requirements in § 173.301(j), (k) or (l) of this subchapter;

(ii) The cylinder is equipped with a pressure relief device in accordance with § 173.301(f) of this subchapter and conforms to the applicable requirements in part 173 for the hazardous material involved;

(iii) For an aluminum cylinder in oxygen service, except when used aboard an aircraft in accordance with the applicable airworthiness requirements and operating regulations, the cylinder openings conform to the requirements in this paragraph. For a DOT specification cylinder (e.g. 3AL), the opening must be configured with straight (parallel) threads. A UN pressure receptacle may have straight (parallel) or tapered threads provided the UN pressure receptacle is marked

with the thread type (e.g. “17E, 25E, 18P or 25P”) and fitted with the properly marked valve; and

(iv) The UN pressure receptacle is marked with “USA” as a country of approval in conformance with §§ 178.69 and 178.70 of this subchapter.

■ 10. In § 171.12, paragraph (b)(15) is revised to read as follows:

**§ 171.12 Import and export shipments.**

\* \* \* \* \*

(b) \* \* \*

(15) Cylinders (including UN pressure receptacles) transported to, from, or within the United States must conform to the applicable requirements of this subchapter. Unless otherwise excepted in this subchapter, a cylinder may not be transported unless;

(i) The cylinder is manufactured, inspected and tested in accordance with a DOT specification or a UN standard prescribed in part 178 of this subchapter, except that cylinders not conforming to these requirements must meet the requirements in § 173.301(j), (k) or (l) of this subchapter;

(ii) The cylinder is equipped with a pressure relief device in accordance with § 173.301(f) of this subchapter and conforms to the applicable requirements in part 173 of this subchapter for the hazardous material involved;

(iii) For an aluminum cylinder in oxygen service used for other than aircraft parts, the cylinder openings conform to the requirements of this paragraph. For a DOT specification cylinder (e.g. DOT 3AL), the opening must be configured with straight (parallel) threads. A UN pressure receptacle may have straight (parallel) or tapered threads provided the cylinder is marked with the thread type, e.g. “17E, 25E, 18P, 25P” and fitted with the properly marked valve; and

(iv) The UN pressure receptacle is marked with “USA” as a country of approval in conformance with §§ 178.69 and 178.70 of this subchapter.

\* \* \* \* \*

■ 11. In § 171.12a, paragraph (b)(13) is revised to read as follows:

**§ 171.12a Canadian shipments and packagings**

\* \* \* \* \*

(b) \* \* \*

(13) When the provisions of this subchapter require that a DOT specification or a UN standard packaging must be used for a hazardous material, a packaging authorized by the TDG Regulations may be used only if it corresponds to the DOT specification or UN standard authorized by this subchapter. Unless otherwise excepted in this subchapter, a cylinder (including UN pressure receptacles) may not be transported unless;

(i) The packaging is a UN pressure receptacle marked with the letters “CAN” for Canada as a country of manufacture or a country of approval or is a cylinder that was manufactured, inspected and tested in accordance with a DOT specification or a UN standard prescribed in part 178 of this subchapter, except that cylinders not conforming to these requirements must meet the requirements in § 173.301(j), (k), (l) or (m) of this subchapter.

(ii) The cylinder conforms to the applicable requirements in part 173 of this subchapter for the hazardous material involved; and

(iii) For an aluminum cylinder in oxygen service used for other than aircraft parts, the cylinder openings conform to the requirements of this paragraph. For a DOT specification cylinder (e.g. DOT 3AL), the opening must be configured with straight (parallel) threads. UN pressure receptacles may have straight (parallel) or tapered threads provided the cylinder is marked with the thread type, e.g. “17E, 25E, 18P, 25P” and fitted with the properly marked valve.

\* \* \* \* \*

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

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

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

**§ 172.101 [Amended]**

■ 13. In the § 172.101 Hazardous Materials Table, the following entries are revised to read as follows:

| Symbols<br>(1) | Hazardous materials descriptions and proper shipping names<br>(2)                                                                            | Hazard class or division<br>(3) | Identification<br>(4) | PG<br>(5) | Label codes<br>(6) | Special provisions (§ 172.102)<br>(7) | Packaging (§ 173.***)<br>(8) |                  |              | Quantity limitations<br>(9)     |                             | Vessel stowage<br>(10) |                            |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-----------------------|-----------|--------------------|---------------------------------------|------------------------------|------------------|--------------|---------------------------------|-----------------------------|------------------------|----------------------------|
|                |                                                                                                                                              |                                 |                       |           |                    |                                       | Exceptions<br>(8A)           | Non-bulk<br>(8B) | Bulk<br>(8C) | Passenger aircraft/rail<br>(9A) | Cargo aircraft only<br>(9B) | Location<br>(10A)      | Other<br>(10B)             |
|                | [REVISE:]                                                                                                                                    |                                 |                       |           |                    |                                       |                              |                  |              |                                 |                             |                        |                            |
| I              | Acetylene, dissolved                                                                                                                         | 2.1                             | UN1001                | *         | 2.1                | N88                                   | None                         | 303              | None         | Forbidden                       | 15 kg                       | D                      | 25, 40, 57                 |
| I              | Ammonia, anhydrous                                                                                                                           | 2.3                             | UN1005                | *         | 2.3, 8             | 4, N87, T50                           | None                         | 304              | 314, 315     | Forbidden                       | Forbidden                   | D                      | 40, 57                     |
| I              | Ammonia solution, relative density less than 0.880 at 15 degrees C in water, with more than 50 percent ammonia.                              | 2.2                             | UN3318                | *         | 2.3, 8             | 4, N87, T50                           | None                         | 304              | 314, 315     | Forbidden                       | Forbidden                   | D                      | 40, 57                     |
|                | Ammonia solution, relative density less than 0.880 at 15 degrees C in water, with more than 35 percent but not more than 50 percent ammonia. | 2.2                             | UN2073                | *         | 2.2                | N87                                   | 306                          | 304              | 314, 315     | Forbidden                       | 150 kg                      | E                      | 40, 57                     |
|                | Arsine                                                                                                                                       | 2.3                             | UN2188                | *         | 2.3, 2.1           | 1                                     | None                         | 192              | 245          | Forbidden                       | Forbidden                   | D                      | 40                         |
|                | Bromine chloride                                                                                                                             | 2.3                             | UN2901                | *         | 2.3, 8, 5.1        | 2, B9, B14, N86                       | None                         | 304              | 314, 315     | Forbidden                       | Forbidden                   | D                      | 40, 89, 90                 |
|                | Carbon monoxide and hydrogen mixture, compressed.                                                                                            | 2.3                             | UN2600                | *         | 2.3, 2.1           | 6, N89                                | None                         | 302              | 302          | Forbidden                       | Forbidden                   | D                      | 40, 57                     |
|                | Chlorine                                                                                                                                     | 2.3                             | UN1017                | *         | 2.3, 8             | 2, B9, B14, N86, T50, TP19            | None                         | 304              | 314, 315     | Forbidden                       | Forbidden                   | D                      | 40, 51, 55, 62, 68, 89, 90 |
|                | Chlorine pentafluoride                                                                                                                       | 2.3                             | UN2548                | *         | 2.3, 5.1, 8        | 1, B7, B9, B14, N86                   | None                         | 304              | 314          | Forbidden                       | Forbidden                   | D                      | 40, 89, 90                 |
|                | Chlorine trifluoride                                                                                                                         | 2.3                             | UN1749                | *         | 2.3, 5.1, 8        | 2, B7, B9, B14, N86                   | None                         | 304              | 314          | Forbidden                       | Forbidden                   | D                      | 40, 89, 90                 |
|                | Chloropicrin and methyl bromide mixtures.                                                                                                    | 2.3                             | UN1581                | *         | 2.3                | 2, B9, B14, N86, T50                  | None                         | 193              | 314, 315     | Forbidden                       | Forbidden                   | D                      | 25, 40                     |
|                | Chloropicrin and methyl chloride mixtures.                                                                                                   | 2.3                             | UN1582                | *         | 2.3                | 2, N86, T50                           | None                         | 193              | 245          | Forbidden                       | Forbidden                   | D                      | 25, 40                     |
|                | Deuterium, compressed                                                                                                                        | 2.1                             | UN1957                | *         | 2.1                | N89                                   | 306                          | 302              | None         | Forbidden                       | 150 kg                      | E                      | 40                         |

| Symbols<br>(1) | Hazardous materials descriptions and proper shipping names<br>(2) | Hazard class or division<br>(3) | Identification<br>(4) | PG<br>(5) | Label codes<br>(6) | Special provisions (§ 172.102)<br>(7) | Packaging (§ 173.***)<br>(8) |                  |               | Quantity limitations<br>(9)      |                             | Vessel stowage<br>(10) |                |
|----------------|-------------------------------------------------------------------|---------------------------------|-----------------------|-----------|--------------------|---------------------------------------|------------------------------|------------------|---------------|----------------------------------|-----------------------------|------------------------|----------------|
|                |                                                                   |                                 |                       |           |                    |                                       | Exceptions<br>(8A)           | Non-bulk<br>(8B) | Bulk<br>(8C)  | Passenger aircraft/train<br>(9A) | Cargo aircraft only<br>(9B) | Location<br>(10A)      | Other<br>(10B) |
|                | Diborane                                                          | 2.3                             | UN1911                | *         | 2.3, 2.1           | 1, N89                                | None                         | 302              | None          | Forbidden                        | Forbidden                   | D                      | 40, 57         |
|                | Dimethylamine, anhydrous                                          | 2.1                             | UN1032                | *         | 2.1                | N87, T50                              | None                         | 304              | 314, 315      | Forbidden                        | 150 kg                      | D                      | 40             |
|                | Ethyl chloride                                                    | 2.1                             | UN1037                | *         | 2.1                | B77, N86, T50                         | None                         | 322              | 314, 315      | Forbidden                        | 150 kg                      | B                      | 40             |
|                | Ethylacetylene, stabilized                                        | 2.1                             | UN2452                | *         | 2.1                | N88                                   | None                         | 304              | 314, 315      | Forbidden                        | 150 kg                      | B                      | 40             |
|                | Ethylamine                                                        | 2.1                             | UN1036                | *         | 2.1                | B77, N87, T50                         | None                         | 321              | 314, 315      | Forbidden                        | 150 kg                      | D                      | 40             |
|                | Fertilizer ammoniating solution with free ammonia.                | 2.2                             | UN1043                | *         | 2.2                | N87                                   | 306                          | 304              | 314, 315      | Forbidden                        | 150 kg                      | E                      | 40             |
|                | Fluorine, compressed                                              | 2.3                             | UN1045                | *         | 2.3, 5.1, 8        | 1, N86                                | None                         | 302              | None          | Forbidden                        | Forbidden                   | D                      | 40, 89, 90     |
|                | Germane                                                           | 2.3                             | UN2192                | *         | 2.3, 2.1           | 2                                     | None                         | 302              | 245           | Forbidden                        | Forbidden                   | D                      | 40             |
|                | Hydrogen and Methane mixtures, compressed.                        | 2.1                             | UN2034                | *         | 2.1                | N89                                   | 306                          | 302              | 302, 314, 315 | Forbidden                        | 150 kg                      | E                      | 40, 57         |
|                | Hydrogen bromide, anhydrous                                       | 2.3                             | UN1048                | *         | 2.3, 2.8           | 3, B14, N86, N89                      | None                         | 304              | 314, 315      | Forbidden                        | Forbidden                   | D                      | 40             |
|                | Hydrogen chloride, anhydrous                                      | 2.3                             | UN1050                | *         | 2.3, .8            | 3, N86, N89                           | None                         | 304              | None          | Forbidden                        | Forbidden                   | D                      | 40             |
|                | Hydrogen, compressed                                              | 2.1                             | UN1049                | *         | 2.1                | N89                                   | 306                          | 302              | 302, 314      | Forbidden                        | 150 kg                      | E                      | 40, 57         |
|                | Hydrogen fluoride, anhydrous                                      | 8                               | UN1052                | I         | 8, 6.1             | 3, B7, B46, B71, N86, T10, TP2        | None                         | 163              | 243           | Forbidden                        | Forbidden                   | D                      | 40             |
|                | Hydrogen iodide, anhydrous                                        | 2.3                             | UN2197                | *         | 2.3                | 3, B14, N89                           | None                         | 304              | 314, 315      | Forbidden                        | Forbidden                   | D                      | 40             |
|                | Hydrogen sulfide                                                  | 2.3                             | UN1053                | *         | 2.3, 2.1           | 2, B9, B14, N89                       | None                         | 304              | 314, 315      | Forbidden                        | Forbidden                   | D                      | 40             |

|                                                       |   |     |        |   |             |                          |      |   |     |   |          |          |          |   |             |
|-------------------------------------------------------|---|-----|--------|---|-------------|--------------------------|------|---|-----|---|----------|----------|----------|---|-------------|
| Methyl acetylene and propadiene mixtures, stabilized. | * | 2.1 | UN1060 | * | 2.1         | N88, T50                 | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | B | 40          |
| Methyl bromide                                        | * | 2.3 | UN1062 | * | 2.3         | 3, B14, N86, T50         | None | * | 193 | * | 314, 315 | Forbiddn | Forbiddn | D | 40          |
| Methyl chloride or Refrigerant gas R 40.              | * | 2.1 | UN1063 | * | 2.1         | N86, T50                 | 306  | * | 304 | * | 314, 315 | 5 kg     | 100 kg   | D | 40          |
| Methyl chloride and methylene chloride mixtures.      | * | 2.1 | UN1912 | * | 2.1         | N86, T50                 | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | D | 40          |
| Methyl mercaptan                                      | * | 2.3 | UN1064 | * | 2.3, 2.1    | 3, B7, B9, B14, N89, T50 | None | * | 304 | * | 314, 315 | Forbiddn | Forbiddn | D | 40          |
| Methylamine, anhydrous                                | * | 2.1 | UN1061 | * | 2.1         | N87, T50                 | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | B | 40          |
| Oxygen difluoride, compressed                         | * | 2.3 | UN2190 | * | 2.3, 5.1, 8 | 1, N86                   | None | * | 304 | * | None     | Forbiddn | Forbiddn | B | 40          |
| Phosphine                                             | * | 2.3 | UN2199 | * | 2.3, 2.1    | 1                        | None | * | 192 | * | 245      | Forbiddn | Forbiddn | D | 40          |
| Silane                                                | * | 2.1 | UN2203 | * | 2.1         |                          | None | * | 302 | * | None     | Forbiddn | Forbiddn | E | 40, 57, 104 |
| Trimethylamine, anhydrous                             | * | 2.1 | UN1083 | * | 2.1         | N87, T50                 | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | B | 40          |
| Tungsten hexafluoride                                 | * | 2.3 | UN2196 | * | 2.3, 8      | 2, N86                   | None | * | 338 | * | None     | Forbiddn | Forbiddn | D | 40          |
| Vinyl bromide, stabilized                             | * | 2.1 | UN1085 | * | 2.1         | N86, T50                 | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | B | 40          |
| Vinyl chloride, stabilized                            | * | 2.1 | UN1086 | * | 2.1         | 21, B44, N86, T50        | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | B | 40          |
| Vinyl fluoride, stabilized                            | * | 2.1 | UN1860 | * | 2.1         | N86                      | 306  | * | 304 | * | 314, 315 | Forbiddn | 150 kg   | E | 40          |
| [ADDED]<br>Acetylene, solvent free                    | * |     |        | * |             |                          |      | * |     | * |          |          |          |   |             |

■ 14. In § 172.102(c)(5), Special Provisions “N86”, “N87”, “N88” and “N89” are added to read as follows:

§ 172.102 Special Provisions.

- \* \* \* \* \*
(c) \* \* \*
(5) \* \* \*

Code/Special Provisions

- N86 UN pressure receptacles made of aluminum alloy are not authorized.
N87 The use of copper valves on UN pressure receptacles is prohibited.
N88 Any metal part of a UN pressure receptacle in contact with the contents may not contain more than 65% copper, with a tolerance of 1%.
N89 When steel UN pressure receptacles are used, only those bearing the “H” mark are authorized.
\* \* \* \* \*

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

■ 15. 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.

■ 16. In § 173.40, paragraphs (a)(1), (a)(2), and (b), (d) and (e) are revised and paragraphs (a)(3) and (a)(4) are added to read as follows:

§ 173.40 General packaging requirements for toxic materials packaged in cylinders.

- (a) \* \* \*
(1) A cylinder must conform to a DOT specification or a UN standard prescribed in subpart C of part 178 of this subchapter, except that acetylene cylinders and non-refillable cylinders are not authorized.
(2) The use of a specification 3AL cylinder made of aluminum alloy 6351–T6 is prohibited for a Division 2.3 Hazard Zone A material or a Division 6.1 Hazard Zone A material.
(3) A UN composite cylinder certified to ISO–11119–3 is not authorized for a Division 2.3 Hazard Zone A or B material.
(4) For UN seamless cylinders used for Hazard Zone A materials, the maximum water capacity is 85 L.
\* \* \* \* \*

(b) Outage and pressure requirements. For DOT specification cylinders, the pressure at 55 °C (131 °F) of Hazard Zone A and Hazard Zone B materials may not exceed the service pressure of the cylinder. Sufficient outage must be provided so that the cylinder will not be liquid full at 55 °C (131 °F).

\* \* \* \* \*

(d) Additional handling protection. Each cylinder or cylinder overpack combination offered for transportation containing a Division 2.3 or 6.1 Hazard Zone A or B material must conform to the valve damage protection performance requirements of this section. In addition to the requirements of this section, overpacks must conform to the overpack provisions of § 173.25.

- (1) DOT specification cylinders must conform to the following:
(i) Each cylinder with a wall thickness at any point of less than 2.03 mm (0.08 inch) and each cylinder that does not have fitted valve protection must be overpacked in a box. The box must conform to overpack provisions in § 173.25. Box and valve protection must be of sufficient strength to protect all parts of the cylinder and valve, if any, from deformation and breakage resulting from a drop of 2.0 m (7 ft) or more onto a non-yielding surface, such as concrete or steel, impacting at an orientation most likely to cause damage.
“Deformation” means a cylinder or valve that is bent, distorted, mangled, misshapen, twisted, warped, or in a similar condition.
(ii) Each cylinder with a valve must be equipped with a protective metal cap, other valve protection device, or an overpack which is sufficient to protect the valve from breakage or leakage resulting from a drop of 2.0 m (7 ft) onto a non-yielding surface, such as concrete or steel. Impact must be at an orientation most likely to cause damage.
(2) Each UN cylinder containing a Hazard Zone A or Hazard Zone B material must have a minimum test pressure in accordance with P200 of the UN Recommendations (IBR, see § 171.7 of this subchapter). For Hazard Zone A gases, the cylinder must have a minimum wall thickness of 3.5 mm if made of aluminum alloy or 2 mm if made of steel or, alternatively, cylinders may be packed in a rigid outer packaging that meets the Packing Group I performance level when tested as prepared for transport, and that is designed and constructed to protect the cylinder and valve from puncture or damage that may result in release of the gas.

(e) Interconnection. Cylinders may not be manifolded or connected. This provision does not apply to MEGCs containing Hazard Zone B materials in accordance with § 173.312.

■ 17. Section 173.163 is revised to read as follows:
§ 173.163 Hydrogen fluoride.
(a) Hydrogen fluoride (hydrofluoric acid, anhydrous) must be packaged as follows:

- (1) In specification 3, 3A, 3AA, 3B, 3BN, or 3E cylinders; or in specification 4B, 4BA, or 4BW cylinders except that brazed 4B, 4BA, and 4BW cylinders are not authorized. The filling density may not exceed 85 percent of the cylinder’s water weight capacity. In place of the periodic volumetric expansion test, cylinders used in exclusive service may be given a complete external visual inspection in conformance with part 180, subpart C, of this subchapter, at the time such requalification becomes due.
(2) In a UN cylinder, as specified in part 178 of this subchapter, having a minimum test pressure of 10 bar and a maximum filling ratio of 0.84.
(b) A cylinder removed from hydrogen fluoride service must be condemned in accordance with § 180.205 of this subchapter. Alternatively, at the direction of the owner, the requalifier may render the cylinder incapable of holding pressure.

■ 18. In § 173.192, the introductory text and paragraph (a) introductory text are revised to read as follows:

§ 173.192 Packaging for certain toxic gases in Hazard Zone A.
When § 172.101 of this subchapter specifies a toxic material must be packaged under this section, only the following cylinders are authorized:
(a) Specification 3A1800, 3AA1800, 3AL1800, 3E1800, or seamless UN cylinders with a minimum test pressure in accordance with P200 of the UN Recommendations (IBR, see § 171.7 of this subchapter).
\* \* \* \* \*
■ 19. In § 173.195, paragraph (a) is revised to read as follows:

§ 173.195 Hydrogen cyanide, anhydrous, stabilized (hydrocyanic acid, aqueous solution).
(a) Hydrogen cyanide, anhydrous, stabilized, must be packed in specification cylinders or UN pressure receptacles as follows:
(1) As prescribed in § 173.192;
(2) Specification 3A480, 3A480X, 3AA480, or 3A1800 metal cylinders of not over 126 kg (278 pounds) water capacity (nominal);
(3) Shipments in 3AL cylinders are authorized only when transported by highway and rail; or
(4) UN cylinders, as specified in part 178, with a minimum test pressure of 100 bar and a maximum filling ratio of 0.55. The use of UN tubes and MEGCs is not authorized.

\* \* \* \* \*

■ 20. In § 173.201, the last entry in paragraph (c) is revised to read as follows:

\* \* \* \* \*

**§ 173.201 Non-bulk packagings for liquid hazardous materials in Packing Group I.**

(c) \* \* \*

Cylinders, specification or UN standard, as prescribed for any compressed gas, except 3HT and those prescribed for acetylene.

■ 21. Section 173.205 is revised to read as follows:

**§ 173.205 Specification cylinders for liquid hazardous materials.**

When § 172.101 of this subchapter specifies that a hazardous material must be packaged under this section, the use of any specification or UN cylinder, except those specified for acetylene, is authorized. Cylinders used for toxic materials in Division 6.1 or 2.3 must conform to the requirements of § 173.40.

■ 22. In § 173.226, paragraph (a) is revised to read as follows:

**§ 173.226 Materials poisonous by inhalation, Division 6.1, Packing Group I, Hazard Zone A.**

\* \* \* \* \*

(a) In seamless specification or UN cylinders conforming to the requirements of § 173.40.

\* \* \* \* \*

■ 23. In § 173.227, paragraph (a) is revised to read as follows:

**§ 173.227 Materials poisonous by inhalation, Division 6.1, Packing Group I, Hazard Zone B.**

(a) In packagings as authorized in § 173.226 and seamless and welded specification cylinders or UN seamless cylinders conforming to the requirements of § 173.40.

\* \* \* \* \*

■ 24. In § 173.228, the introductory text is removed and paragraph (a) is revised to read as follows:

**§ 173.228 Bromine pentafluoride or bromine trifluoride.**

(a) Bromine pentafluoride and bromine trifluoride are authorized in packagings as follows:

(1) Specification 3A150, 3AA150, 3B240, 3BN150, 4B240, 4BA240, 4BW240, and 3E1800 cylinders.

(2) UN cylinders as specified in part 178 of this subchapter, except acetylene cylinders and non-refillable cylinders, with a minimum test pressure of 10 bar and a minimum outage of 8 percent by volume. The use of UN tubes and MEGCs is not authorized.

(3) The use of a pressure relief device is not authorized.

\* \* \* \* \*

■ 25. In § 173.301, paragraphs (a)(10) and (f)(5)(iv) are added; the section heading, paragraph (f)(1), the introductory text to paragraphs (a), (a)(1), (h), (h)(1), and (i), and paragraphs

(c), (d), (j), (k) and (l) are revised to read as follows:

**§ 173.301 General requirements for shipment of compressed gases and other hazardous materials in cylinders, UN pressure receptacles and spherical pressure vessels.**

(a) *General qualifications for use of cylinders.* Unless otherwise stated, as used in this section, the term "cylinder" includes a UN pressure receptacle. As used in this subpart, filled or charged means an introduction or presence of a hazardous material in a cylinder. A cylinder filled with a Class 2 hazardous material (gas) and offered for transportation must meet the requirements in this section and §§ 173.301a through 173.305, as applicable.

(1) Compressed gases must be in UN pressure receptacles built in accordance with the UN standards or in metal cylinders and containers built in accordance with the DOT and ICC specifications and part 178 of this subchapter in effect at the time of manufacture, and requalified and marked as prescribed in subpart C in part 180 of this subchapter, if applicable. The DOT and ICC specifications authorized for use are as follows:

\* \* \* \* \*

(10) Any person who installs a valve into an aluminum cylinder in oxygen service must verify the valve and the cylinder have the same thread type.

\* \* \* \* \*

(c) *Toxic gases and mixtures.* Cylinders containing toxic gases and toxic gas mixtures meeting the criteria of Division 2.3 Hazard Zone A or B must conform to the requirements of § 173.40 and CGA S-1.1 and S-7 (IBR; see § 171.7 of this subchapter). The CGA S-1.1, 2001 edition should be used for DOT specification cylinders and the CGA S-1.1 2003 edition should be used for UN pressure receptacles (compliance with paragraph 9.1.1.1 of CGA S-1.1 is not required). A DOT 39 cylinder, UN non-refillable cylinder, or a UN composite cylinder certified to ISO-11119-3 may not be used for a toxic gas or toxic gas mixture meeting the criteria for Division 2.3, Hazard Zone A or B.

(d) *Gases capable of combining chemically.* A cylinder may not contain any gas or material capable of combining chemically with the cylinder's contents or with the cylinder's material construction, so as to endanger the cylinder's serviceability. DOT 3AL cylinders made of aluminum alloy 6351-T6 may not be filled and offered for transportation with pyrophoric gases. The use of UN

cylinders made of aluminum alloy 6351-T6 is prohibited.

\* \* \* \* \*

(f) \* \* \*

(1) Except as provided in paragraphs (f)(5), (f)(6), and (l)(2) of this section, a cylinder filled with a gas and offered for transportation must be equipped with one or more pressure relief devices sized and selected as to type, location, and quantity, and tested in accordance with CGA S-1.1 and S-7. The CGA S-1.1, 2001 edition should be used for DOT specification cylinders and the CGA S-1.1 2003 edition should be used for UN pressure receptacles (compliance with paragraph 9.1.1.1 of CGA S-1.1 is not required). The pressure relief device must be capable of preventing rupture of the normally filled cylinder when subjected to a fire test conducted in accordance with CGA C-14 (IBR, see § 171.7 of this subchapter), or, in the case of an acetylene cylinder, CGA C-12 (IBR, see § 171.7 of this subchapter).

\* \* \* \* \*

(5) \* \* \*

(iv) A UN pressure receptacle transported in accordance with paragraph (k) or (l) or this section.

\* \* \* \* \*

(h) *Cylinder valve protection.* UN pressure receptacles must meet the valve protection requirements in § 173.301b(f). A DOT specification cylinder used to transport a hazardous material must meet the requirements specified in this paragraph (h).

(1) The following specification cylinders are not subject to the cylinder valve protection requirements in this paragraph (h):

\* \* \* \* \*

(i) *Cylinders mounted on motor vehicles or in frames.* MEGCs must conform to the requirements in § 173.313. DOT specification cylinders mounted on motor vehicles or in frames must conform to the requirements specified in this paragraph (i). Seamless DOT specification cylinders longer than 2 m (6.5 feet) are authorized for transportation only when horizontally mounted on a motor vehicle or in an ISO framework or other framework of equivalent structural integrity.

Cylinders may not be transported by rail in container on freight car (COFC) or trailer on flat car (TOFC) service except under conditions approved by the Associate Administrator for Safety, Federal Railroad Administration. The cylinder must be configured as follows:

\* \* \* \* \*

(j) *Non-specification cylinders in domestic use.* Except as provided in paragraphs (k) and (l) of this section, a

filled cylinder manufactured to other than a DOT specification or a UN standard in accordance with part 178 of this subchapter, or a DOT exemption or special permit cylinder or a cylinder used as a fire extinguisher in conformance with § 173.309(a), may not be transported to, from, or within the United States.

(k) *Importation of cylinders for discharge within a single port area.* A cylinder manufactured to other than a DOT specification or UN standard in accordance with part 178 of this subchapter and certified as being in conformance with the transportation regulations of another country may be authorized, upon written request to and approval by the Associate Administrator, for transportation within a single port area, provided—

(1) The cylinder is transported in a closed freight container;

(2) The cylinder is certified by the importer to provide a level of safety at least equivalent to that required by the regulations in this subchapter for a comparable DOT specification or UN cylinder; and

(3) The cylinder is not refilled for export unless in compliance with paragraph (l) of this section.

(l) *Filling of cylinders for export.* (1) A cylinder not manufactured, inspected, tested and marked in accordance with part 178 of this subchapter, or a cylinder manufactured to other than a UN standard, DOT specification, exemption or special permit, may be filled with a gas in the United States and offered for transportation and transported for export or alternatively, for use on board a vessel, if the following conditions are met:

(i) The cylinder has been requalified and marked with the month and year of requalification in accordance with subpart C of part 180 of this subchapter, or has been requalified as authorized by the Associate Administrator;

(ii) In addition to other requirements of this subchapter, the maximum filling density, service pressure, and pressure relief device for each cylinder conform to the requirements of this part for the gas involved; and

(iii) The bill of lading or other shipping paper identifies the cylinder and includes the following certification: “This cylinder has (These cylinders have) been qualified, as required, and filled in accordance with the DOT requirements for export.”

(2) A DOT specification or a UN cylinder manufactured, inspected, tested and marked in accordance with part 178 of this subchapter and otherwise conforms to the requirements of this part for the gas involved, except

that the cylinder is not equipped with a pressure relief device may be filled with a gas and offered for transportation and transported for export if the following conditions are met:

(i) Each DOT specification cylinder or UN pressure receptacle must be plainly and durably marked “For Export Only”;

(ii) The shipping paper must carry the following certification: “This cylinder has (These cylinders have) been retested and refilled in accordance with the DOT requirements for export.”; and

(iii) The emergency response information provided with the shipment and available from the emergency response telephone contact person must indicate that the pressure receptacles are not fitted with pressure relief devices and provide appropriate guidance for exposure to fire.

\* \* \* \* \*

■ 26. Section 173.301b is added to read as follows:

**§ 173.301b Additional general requirements for shipment of UN pressure receptacles.**

(a) *General.* The requirements of this section are in addition to the requirements in § 173.301 and apply to the shipment of gases in UN pressure receptacles. A UN pressure receptacle, including closures, must conform to the design, construction, inspection and testing requirements specified in parts 178 and 180 of this subchapter, as applicable. Bundles of cylinders must conform to the requirements in § 178.70(e) of this subchapter.

(1) A UN pressure receptacle may not be filled and offered for transportation when damaged to such an extent that the integrity of the UN pressure receptacle or its service equipment may be affected. Prior to filling, the service equipment must be examined and found to be in good working condition (see § 178.70(d) of this subchapter). In addition, the required markings must be legible on the pressure receptacle.

(2) The gases or gas mixtures must be compatible with the UN pressure receptacle and valve materials as prescribed for metallic materials in ISO 11114–1 (IBR, see § 171.7 of this subchapter) and for non-metallic materials in ISO 11114–2 (IBR, see § 171.7 of this subchapter).

(3) A refillable UN pressure receptacle may not be filled with a gas or gas mixture different from that previously contained in the UN pressure receptacle unless the necessary operations for change of gas service have been performed in accordance with ISO 11621 (IBR, see § 171.7 of this subchapter).

(4) When a strong outer packaging is prescribed, for example as provided by paragraph (a)(6) or (g)(1) of this section, the UN pressure receptacles must be protected to prevent movement. Unless otherwise specified in this part, more than one UN pressure receptacle may be enclosed in the strong outer packaging.

(b) *Individual shut-off valves and pressure relief devices.* Except for Division 2.2 permanent gases, each UN pressure receptacle must be equipped with an individual shutoff valve that must be tightly closed while in transit. Each UN pressure receptacle must be individually equipped with a pressure relief device as prescribed by § 173.301(f), except that pressure relief devices on bundles of cylinders or manifolded horizontal cylinders must have a set-to-discharge pressure that is based on the lowest marked pressure of any cylinder in the bundle or manifolded unit.

(c) *Pressure receptacle valve requirements.* (1) When the use of a valve is prescribed, the valve must conform to the requirements in ISO 10297 (IBR, see § 171.7 of this subchapter).

(2) A UN pressure receptacle must have its valves protected from damage that could cause inadvertent release of the contents of the UN pressure receptacle by one of the following methods:

(i) By constructing the pressure receptacle so that the valves are recessed inside the neck of the UN pressure receptacle and protected by a threaded plug or cap;

(ii) By equipping the UN pressure receptacle with a valve cap conforming to the requirements in ISO 11117 (IBR, see § 171.7 of this subchapter). The cap must have vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valve;

(iii) By protecting the valves by shrouds or guards conforming to the requirements in ISO 11117;

(iv) By using valves designed and constructed with sufficient inherent strength to withstand damage in accordance with Annex B of ISO 10297;

(v) By enclosing the UN pressure receptacles in frames, e.g., bundles of cylinders; or

(vi) By packing the UN pressure receptacles in a strong outer package, such as a box or crate, capable of meeting the drop test specified in § 178.603 of this subchapter at the Packing Group I performance level.

(d) *Non-refillable UN pressure receptacles.* Non-refillable UN pressure receptacles must conform to the following requirements:

(1) The receptacles must be transported as an inner package of a combination package;

(2) The receptacle must have a water capacity not exceeding 1.25 L when used for a flammable or toxic gas; and

(3) The receptacle is prohibited for Hazard Zone A material.

(e) *Pyrophoric gases.* A UN pressure receptacle must have valves equipped with gas-tight plugs or caps when used for pyrophoric or flammable mixtures of gases containing more than 1% pyrophoric compounds.

(f) *Hydrogen bearing gases.* A steel UN pressure receptacle bearing an "H" mark must be used for hydrogen bearing gases or other embrittling gases that have the potential of causing hydrogen embrittlement.

(g) *Composite cylinders in underwater use.* A composite cylinder certified to ISO-11119-2 or ISO-11119-3 may not be used for underwater applications unless the cylinder is manufactured in accordance with the requirements for underwater use and is marked "UW" as prescribed in § 178.71(o)(17) of this subchapter.

■ 27. In § 173.302, the introductory text to paragraph (a) and paragraph (b)(2) and (b)(3) are revised to read as follows:

**§ 173.302 Filling of cylinders with non-liquefied (permanent) compressed gases.**

(a) *General requirements.* A cylinder filled with a non-liquefied compressed gas (except gas in solution) must be offered for transportation in accordance with the requirements of this section and § 173.301. In addition, a DOT specification cylinder must meet the requirements in §§ 173.301a, 173.302a and 173.305, as applicable. UN pressure receptacles must meet the requirements in §§ 173.301b and 173.302b, as applicable. Where more than one section applies to a cylinder, the most restrictive requirements must be followed.

\* \* \* \* \*

(b) \* \* \*

(2) Except for UN cylinders, each cylinder opening must be configured with straight threads only.

(3) Each UN pressure receptacle must be cleaned in accordance with the requirements of ISO 11621 (IBR, see § 171.7 or this subchapter). Each DOT cylinder must be cleaned in accordance with the requirements of GSA Federal Specification RR-C-901D, paragraphs 3.3.1 and 3.3.2 (IBR, see § 171.7 of this subchapter). Cleaning agents equivalent to those specified in Federal Specification RR-C-901D may be used provided they do not react with oxygen. One cylinder selected at random from a group of 200 or fewer and cleaned at the

same time must be tested for oil contamination in accordance with Federal Specification RR-C-901D, paragraph 4.3.2, and meet the specified standard of cleanliness.

\* \* \* \* \*

■ 28. Section 173.302b is added to read as follows:

**§ 173.302b Additional requirements for shipment of non-liquefied (permanent) compressed gases in UN pressure receptacles.**

(a) *General.* A cylinder filled with a non-liquefied gas must be offered for transportation in UN pressure receptacles subject to the requirements in this section and § 173.302. In addition, the requirements in §§ 173.301 and 173.301b must be met.

(b) *UN pressure receptacles filling limits.* A UN pressure receptacle is authorized for the transportation of non-liquefied compressed gases as specified in this section. Except where filling limits are specifically prescribed in this section, the working pressure of a UN pressure receptacle may not exceed  $\frac{2}{3}$  of the test pressure of the receptacle. Alternatively, the filling limits specified for non-liquefied gases in Table 1 of P200 of the UN Recommendations (IBR, see § 171.7 of this subchapter) are authorized. In no case may the internal pressure at 65 °C (149 °F) exceed the test pressure.

(c) *Fluorine, compressed, UN 1045 and Oxygen difluoride, compressed, UN 2190.* Fluorine, compressed and Oxygen difluoride, compressed must be packaged in a UN pressure receptacle with a minimum test pressure of 200 bar and a maximum working pressure not to exceed 30 bar. A UN pressure receptacle made of aluminum alloy is not authorized. The maximum quantity of gas authorized in each UN pressure receptacle is 5 kg.

(d) *Diborane and diborane mixtures, UN 1911.* Diborane and diborane mixtures must be packaged in a UN pressure receptacle with a minimum test pressure of 250 bar and a maximum filling ratio dependent on the test pressure not to exceed 0.07. Filling should be further limited so that if complete decomposition of diborane occurs, the pressure of diborane or diborane mixtures will not exceed the working pressure of the cylinder. The use of UN tubes and MEGCs is not authorized.

(e) *Carbon monoxide, compressed UN 1016.* Carbon monoxide, compressed is authorized in UN pressure receptacles. The settled pressure in a steel pressure receptacle containing carbon monoxide may not exceed  $\frac{1}{3}$  of the pressure receptacle's test pressure at 65 °C (149

°F) except, if the gas is dry and sulfur-free, the settled pressure may not exceed  $\frac{1}{2}$  of the marked test pressure.

■ 29. In § 173.303, paragraph (b) is revised and (f) is added to read as follows:

**§ 173.303 Filling of cylinders with compressed gas in solution (acetylene).**

\* \* \* \* \*

(b) *Filling limits.* For DOT specification cylinders, the pressure in the cylinder containing acetylene gas may not exceed 250 psig at 70 °F. If cylinders are marked for a lower allowable charging pressure at 70 °F., that pressure must not be exceeded. For UN cylinders, the pressure in the cylinder may not exceed the limits specified in § 173.304b(b)(2).

\* \* \* \* \*

(f) *UN cylinders.* (1) UN cylinders and bundles of cylinders are authorized for the transport of acetylene gas as specified in this section. Each UN acetylene cylinder must conform to ISO 3807-2 (IBR, see § 171.7 of this subchapter), have a homogeneous monolithic porous mass filler and be charged with acetone or a suitable solvent as specified in the standard. UN acetylene cylinders must have a minimum test pressure of 52 bar and may be filled up to the pressure limits specified in ISO 3807-2. The use of UN tubes and MEGCs is not authorized.

(2) UN cylinders equipped with pressure relief devices or that are manifolded together must be transported upright.

■ 30. In § 173.304, the introductory text in paragraph (a) is revised to read as follows:

**§ 173.304 Filling of cylinders with liquefied compressed gases.**

(a) *General requirements.* A cylinder filled with a liquefied compressed gas (except gas in solution) must be offered for transportation in accordance with the requirements of this section and the general requirements in § 173.301. In addition, a DOT specification cylinder must meet the requirement in §§ 173.301a, 173.304a, and 173.305, as applicable. UN pressure receptacles must be shipped in accordance with the requirements in 173.301b and 173.304b, as applicable.

\* \* \* \* \*

■ 31. Section 173.304b is added to read as follows:

**§ 173.304b Additional requirements for shipment of liquefied compressed gases in UN pressure receptacles.**

(a) *General.* Liquefied gases and gas mixtures must be offered for transportation in UN pressure

receptacles subject to the requirements in this section and § 173.304. In addition, the general requirements applicable to UN pressure receptacles in §§ 173.301 and 173.301b must be met.

(b) *UN pressure receptacle filling limits.* A UN pressure receptacle is authorized for the transportation of liquefied compressed gases and gas mixtures as specified in this section. When a liquefied compressed gas or gas mixture is transported in a UN pressure receptacle, the filling ratio may not exceed the maximum filling ratio (FR) prescribed in this section and the applicable ISO standard. Compliance with the filling limits may be determined by referencing the numerical values and data in Table 2 of

P200 of the UN Recommendations (IBR, see § 171.7 of this subchapter). Alternatively, the maximum allowable filling limits may be determined as follows:

(1) For high pressure liquefied gases, in no case may the filling ratio of the settled pressure at 65 °C (149 °F) exceed the test pressure of the UN pressure receptacle.

(2) For low pressure liquefied gases, the filling factor (maximum mass of contents per liter of water capacity) must be less than or equal to 95 percent of the liquid phase at 50 °C. In addition, the UN pressure receptacle may not be liquid full at 60 °C. The test pressure of the pressure receptacle must be equal to

or greater than the vapor pressure of the liquid at 65 °C.

(3) For high pressure liquefied gases or gas mixtures, the maximum filling ratio may be determined using the formulas in (3)(b) of P200 of the UN Recommendations.

(4) For low pressure liquefied gases or gas mixtures, the maximum filling ratio may be determined using the formulas in (3)(c) of P200 of the UN Recommendations.

(c) *Special filling limits.* Notwithstanding the numerical values shown in Table 2 of P200, the maximum allowable filling limits authorized for the following gases in UN pressure receptacles must be in accordance with the following table:

| Identification No. | Proper shipping name                                                                          | P-200 filling limit | HMR filling limit |
|--------------------|-----------------------------------------------------------------------------------------------|---------------------|-------------------|
| UN1020 ...         | Chloropentafluoroethane or Refrigerant gas R 115 .....                                        | 1.08                | 1.05              |
| UN1048 ...         | Hydrogen bromide .....                                                                        | 1.54                | 1.51              |
| UN1973 ...         | Chlorodifluoromethane and chloropentafluoroethane mixture or Refrigerant gas R 502 .....      | 1.05                | 1.01              |
| UN1976 ...         | Octafluorocyclobutane, or Refrigerant gas RC 318 .....                                        | 1.34                | 1.32              |
| UN1982 ...         | Tetrafluoromethane or Refrigerant gas R 14 .....                                              | 0.94                | 0.90              |
| UN2035 ...         | 1,1,1-Trifluoroethane, or Refrigerant gas R 143a .....                                        | 0.75                | 0.73              |
| UN2192 ...         | Germane .....                                                                                 | 1.02                | 1.00              |
| UN2198 ...         | Phosphorous Pentafluoride .....                                                               | 1.34                | 1.25              |
| UN2424 ...         | Octafluoropropane or Refrigerant gas R 218 .....                                              | 1.09                | 1.04              |
| UN2599 ...         | Chlorotrifluoromethane and trifluoromethane azeotropic mixture or Refrigerant gas R 503 ..... | 0.20, 0.66          | 0.17, 0.64        |

(d) *Tetrafluoroethylene, stabilized, UN1081* must be packaged in a pressure receptacle with a minimum test pressure of 200 bar and a working pressure not exceeding 5 bar.

(e) *Fertilizer ammoniating solution with free ammonia, UN1043* is not authorized in UN tubes or MEGCs.

■ 32. Section 173.312 is added to read as follows:

**§ 173.312 Requirements for shipment of MEGCs.**

(a) *General requirements.* (1) Unless otherwise specified, a MEGC is authorized for the shipment of liquefied and non-liquefied compressed gases. Each pressure receptacle contained in a MEGC must meet the requirements in §§ 173.301, 173.301b, 173.302b and 173.304b, as applicable.

(2) The MEGC must conform to the design, construction, inspection and testing requirements prescribed in § 178.75 of this subchapter.

(3) No person may offer or accept a hazardous material for transportation in a MEGC that is damaged to such an extent that the integrity of the pressure receptacles or the MEGC's structural or service equipment may be affected.

(4) No person may fill or offer for transportation a pressure receptacle in a MEGC if the pressure receptacle or the MEGC is due for periodic

requalification, as prescribed in subpart C to part 180 of this subchapter.

However, this restriction does not preclude transportation of pressure receptacles filled and offered for transportation prior to the requalification due date.

(5) Prior to filling and offering a MEGC for transportation, the MEGC's structural and service equipment must be visually inspected. Any unsafe condition must be corrected before the MEGC is offered for transportation. All required markings must be legible.

(6) Except for Division 2.2 permanent gases, each pressure receptacle must be equipped with an individual shutoff valve that must be tightly closed while in transit. For Division 2.1, Division 2.2 liquefied gases and 2.3 gases, the manifold must be designed so that each pressure receptacle can be filled separately and be kept isolated by a valve capable of being closed during transit. For Division 2.1 gases, the pressure receptacles must be isolated by a valve into assemblies of not more than 3,000 L.

(b) *Filling.* (1) A MEGC may not be filled to a pressure greater than the lowest marked working pressure of any pressure receptacle. A MEGC may not be filled above its marked maximum permissible gross mass.

(2) After each filling, the shipper must verify the leakproofness of the closures and equipment. Each fill opening must be closed by a cap or plug.

(c) *Damage protection.* During transportation, a MEGC must be protected against damage to the pressure receptacles and service equipment resulting from lateral and longitudinal impact and overturning as prescribed in § 178.75 of this subchapter.

■ 33. In § 173.323, the first sentence in paragraph (b)(2) is revised to read as follows:

**§ 173.323 Ethylene oxide.**

\* \* \* \* \*

(b) \* \* \*

(2) In specification cylinders or UN pressure receptacles, as authorized for any compressed gas except acetylene.\* \* \*

\* \* \* \* \*

■ 34. In § 173.334, the introductory text to paragraph (a) is revised to read as follows:

**§ 173.334 Organic phosphates mixed with compressed gas.**

\* \* \* \* \*

(a) Hexaethyl tetraphosphate, parathion, tetraethyl dithio pyrophosphate, tetraethyl pyrophosphate, or other Division 6.1 organic phosphates (including a

compound or mixture), may be mixed with a non-flammable compressed gas. This mixture may not contain more than 20 percent by weight of an organic phosphate and must be packaged in DOT 3A240, 3AA240, 3B240, 4A240, 4B240, 4BA240, 4BW240 or UN cylinders meeting all of the following requirements:

\* \* \* \* \*

■ 35. Section 173.336 is revised to read as follows:

**§ 173.336 Nitrogen dioxide, liquefied, or dinitrogen tetroxide, liquefied.**

(a) Nitrogen dioxide, liquefied, or dinitrogen tetroxide, liquefied, must be packaged in specification or UN cylinders as prescribed in § 173.192, except valves are not authorized. UN tubes and MEGCs are not authorized for use. Cylinders must be equipped with a stainless steel valve and valve seat that will not deteriorate in contact with nitrogen dioxide. Each valve opening must be closed by a solid metal plug with tapered thread properly luted to prevent leakage. Transportation in DOT 3AL cylinders is authorized only by highway and rail.

(b) Each UN pressure receptacle must be cleaned in accordance with the requirements of ISO 11621 (IBR, see § 171.7 of this subchapter). Each DOT specification cylinder must be cleaned according to the requirements of GSA Federal Specification RR-C-901D, paragraphs 3.3.1 and 3.3.2 (IBR, see § 171.7 of this subchapter). Cleaning agents equivalent to those specified in RR-C-901D may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or fewer and cleaned at the same time must be tested for oil contamination in accordance with Specification RR-C-901D, paragraph 4.3.2 (IBR, see § 171.7 of this subchapter) and meet the standard of cleanliness specified therein.

■ 36. Section 173.337 is revised to read as follows:

**§ 173.337 Nitric oxide.**

(a) Nitric oxide must be packaged in cylinders conforming to the requirements of § 173.40 and as follows:

(1) *DOT specification cylinder.* In a DOT 3A1800, 3AA1800, 3E1800, or 3AL1800 cylinder. A DOT specification cylinder must be charged to a pressure of not more than 5,170 kPa (750 psi) at 21 °C (70 °F). Transportation of nitric oxide in a DOT 3AL is cylinder is authorized only by highway and rail.

(2) *UN cylinder.* In a UN cylinder with a minimum test pressure of 200 bar. The maximum working pressure of the

cylinder must not exceed 50 bar. The pressure in the cylinder at 65 °C (149 °F) may not exceed the test pressure. The use of UN tubes and MEGCs is not authorized.

(3) *Valves.* Cylinders must be equipped with a stainless steel valve and valve seat that will not deteriorate in contact with nitric oxide. Cylinders or valves may not be equipped with pressure relief devices of any type.

(b) Each UN cylinder must be cleaned in accordance with the requirements of ISO 11621 (IBR, see § 171.7 of this subchapter). Each DOT specification cylinder must be cleaned in compliance with the requirements of GSA Federal Specification RR-C-901D, paragraphs 3.3.1 and 3.3.2 (IBR, see § 171.7 of this subchapter). Cleaning agents equivalent to those specified in Federal Specification RR-C-901D may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or fewer and cleaned at the same time must be tested for oil contamination in accordance with Federal Specification RR-C-901D paragraph 4.3.2 and meet the standard of cleanliness specified therein.

**PART 178—SPECIFICATIONS FOR PACKAGINGS**

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

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

■ 38. Section 178.69 is added to read as follows:

**§ 178.69 Responsibilities and requirements for manufacturers of UN pressure receptacles.**

(a) Each manufacturer of a UN pressure receptacle marked with “USA” as a country of approval must comply with the requirements in this section. The manufacturer must maintain a quality system, obtain an approval for each initial pressure receptacle design type, and ensure that all production of UN pressure receptacles meets the applicable requirements.

(1) *Quality system.* The manufacturer of a UN pressure receptacle must have its quality system approved by the Associate Administrator. The quality system will initially be assessed through an audit by the Associate Administrator or his or her representative to determine whether it meets the requirements of this section. The Associate Administrator will notify the manufacturer in writing of the results of the audit. The notification will contain the conclusions of the audit and any corrective action required. The

Associate Administrator may perform periodic audits to ensure that the manufacturer operates in accordance with the quality system. Reports of periodic audits will be provided to the manufacturer. The manufacturer must bear the cost of audits.

(2) *Quality system documentation.* The manufacturer must be able to demonstrate a documented quality system. Management must review the adequacy of the quality system to assure that it is effective and conforms to the requirements in § 178.70. The quality system records must be in English and must include detailed descriptions of the following:

(i) The organizational structure and responsibilities of personnel with regard to design and product quality;

(ii) The design control and design verification techniques, processes, and procedures used when designing the pressure receptacles;

(iii) The relevant procedures for pressure receptacle manufacturing, quality control, quality assurance, and process operation instructions;

(iv) Inspection and testing methodologies, measuring and testing equipment, and calibration data;

(v) The process for meeting customer requirements;

(vi) The process for document control and document revision;

(vii) The system for controlling non-conforming material and records, including procedures for identification, segregation, and disposition;

(viii) Production, processing and fabrication, including purchased components, in-process and final materials; and

(ix) Training programs for relevant personnel.

(3) *Maintenance of quality system.* The manufacturer must maintain the quality system as approved by the Associate Administrator. The manufacturer shall notify the Associate Administrator of any intended changes to the approved quality system prior to making the change. The Associate Administrator will evaluate the proposed change to determine whether the amended quality system will satisfy the requirements. The Associate Administrator will notify the manufacturer of the findings.

(b) *Design type approvals.* The manufacturer must have each pressure receptacle design type reviewed by an IIA and approved by the Associate Administrator in accordance with § 178.70. A cylinder is considered to be of a new design, compared with an existing approved design, as stated in the applicable ISO design, construction and testing standard.

(c) *Production inspection and certification.* The manufacturer must ensure that each UN pressure receptacle is inspected and certified in accordance with § 178.71.

■ 39. Section 178.70 is added to read as follows:

**§ 178.70 Approval of UN pressure receptacles.**

(a) *Initial design-type approval.* The manufacturer of a UN pressure receptacle must obtain an initial design type approval from the Associate Administrator. The initial design type approval must be of the pressure receptacle design as it is intended to be produced. The manufacturer must arrange for an IIA, approved by the Associate Administrator in accordance with subpart I of part 107 of this chapter, to perform a pre-audit of its pressure receptacle manufacturing operation prior to having an audit conducted by the Associate Administrator or his designee.

(b) *IIA pre-audit.* The manufacturer must submit an application for initial design type approval to the IIA for review. The IIA will examine the manufacturer's application for initial design type approval for completeness. An incomplete application will be returned to the manufacturer with an explanation. If an application is complete, the IIA will review all technical documentation, including drawings and calculations, to verify that the design meets all requirements of the applicable UN pressure receptacle standard and specification requirements. If the technical documentation shows that the pressure receptacle prototype design conforms to the applicable standards and requirements in § 178.70, the manufacturer will fabricate a prototype lot of pressure receptacles in conformance with the technical documentation representative of the design. The IIA will verify that the prototype lot conforms to the applicable requirements by selecting pressure receptacles and witnessing their testing. After prototype testing has been satisfactorily completed, showing the pressure receptacles fully conform to all applicable specification requirements, the certifying IIA must prepare a letter of recommendation and a design type approval certificate. The design type approval certificate must contain the name and address of the manufacturer and the IIA certifying the design type, the test results, chemical analyses, lot identification, and all other supporting data specified in the applicable ISO design, construction and testing standard. The IIA must provide the

certificate and documentation to the manufacturer.

(c) *Application for initial design type approval.* If the pre-audit is found satisfactory by the IIA, the manufacturer will submit the letter of recommendation from the IIA and an application for design type approval to the Associate Administrator. An application for initial design type approval must be submitted for each manufacturing facility. The application must be in English and, at a minimum, contain the following information:

(1) The name and address of the manufacturing facility. If the application is submitted by an authorized representative on behalf of the manufacturer, the application must include the representative's name and address.

(2) The name and title of the individual responsible for the manufacturer's quality system, as required by § 178.69.

(3) The designation of the pressure receptacle and the relevant pressure receptacle standard.

(4) Details of any refusal of approval of a similar application by a designated approval agency of another country.

(5) The name and address of the production IIA that will perform the functions prescribed in paragraph (e) of this section. The IIA must be approved in writing by the Associate Administrator in accordance with subpart I of part 107 of this chapter.

(6) Documentation on the manufacturing facility as specified in § 178.69.

(7) Design specifications and manufacturing drawings, showing components and subassemblies if relevant, design calculations, and material specifications necessary to verify compliance with the applicable pressure receptacle design standard.

(8) Manufacturing procedures and any applicable standards that describe in detail the manufacturing processes and control.

(9) Design type approval test reports detailing the results of examinations and tests conducted in accordance with the relevant pressure receptacle standard, to include any additional data, such as suitability for underwater applications or compatibility with hydrogen embrittlement gases.

(d) *Modification of approved pressure receptacle design type.* Modification of an approved UN pressure receptacle design type is not authorized without the approval of the Associate Administrator. A manufacturer seeking modification of an approved UN pressure receptacle design type may be required to submit design qualification

test data to the Associate Administrator before production. An audit may be required as part of the process to modify an approval.

(e) *Responsibilities of the production IIA.* The production IIA is responsible for ensuring that each pressure receptacle conforms to the design type approval. The production IIA must perform the following functions:

(1) Witness all inspections and tests specified in the UN pressure receptacle standard to ensure compliance with the standard and that the procedures adopted by the manufacturer meet the requirements of the standard;

(2) Verify that the production inspections were performed in accordance with this section;

(3) Select UN pressure receptacles from a prototype production lot and witness testing as required for the design type approval;

(4) Ensure that the various type approval examinations and tests are performed accurately;

(5) Verify that each pressure receptacle is marked in accordance with the applicable requirements in § 178.72; and

(6) Furnish complete test reports to the manufacturer and upon request to the purchaser. The test reports and certificate of compliance must be retained by the IIA for at least 20 years from the original test date of the pressure receptacles.

(f) *Production inspection audit and certification.* (1) If the application, design drawing and quality control documents are found satisfactory, PHMSA will schedule an on-site audit of the pressure receptacle manufacturer's quality system, manufacturing processes, inspections, and test procedures.

(2) During the audit, the manufacturer will be required to produce pressure receptacles to the technical standards for which approval is sought.

(3) The production IIA must witness the required inspections and verifications on the pressure receptacles during the production run. The IIA selected by the manufacturer for production inspection and testing may be different from the IIA who performed the design type approval verifications.

(4) If the procedures and controls are deemed acceptable, test sample pressure receptacles will be selected at random from the production lot and sent to a laboratory designated by the Associate Administrator for verification testing.

(5) If the pressure receptacle test samples are found to conform to all the applicable requirements, the Associate Administrator will issue approvals to the manufacturer and the production

IIA to authorize the manufacture of the pressure receptacles. The approved design type approval certificate will be returned to the manufacturer.

(6) Upon the receipt of the approved design type approval certificate from the Associate Administrator, the pressure receptacle manufacturer must sign the certificate.

(g) *Recordkeeping.* The production IIA and the manufacturer must retain a copy of the design type approval certificate and certificate of compliance records for at least 20 years.

(h) *Denial of design type application.* If the design type application is denied, the Associate Administrator will notify the applicant in writing and provide the reason for the denial. The manufacturer may request that the Associate Administrator reconsider the decision. The application request must—

(1) Be written in English and filed within 60 days of receipt of the decision;

(2) State in detail any alleged errors of fact and law; and

(3) Enclose any additional information needed to support the request to reconsider.

(i) *Appeal.* (1) A manufacturer whose reconsideration request is denied may appeal to the PHMSA Administrator. The appeal must—

(i) Be written in English and filed within 60 days of receipt of the Associate Administrator's decision on reconsideration;

(ii) State in detail any alleged errors of fact and law;

(iii) Enclose any additional information needed to support the appeal; and

(iv) State in detail the modification of the final decision sought.

(2) The PHMSA Administrator will grant or deny the relief and inform the appellant in writing of the decision. PHMSA Administrator's decision is the final administrative action.

(j) *Termination of a design type approval certificate.* (1) The Associate Administrator may terminate an approval certificate issue under this section if it is determined that, because of a change in circumstances, the approval no longer is needed or no longer would be granted if applied for; information upon which the approval was based is fraudulent or substantially erroneous; or termination of the approval is necessary to adequately protect against risks to life and property.

(2) Before an approval is terminated, the Associate Administrator will provide the manufacturer and the approval agency—

(i) Written notice of the facts or conduct believed to warrant the withdrawal;

(ii) Opportunity to submit oral and written evidence, and

(iii) Opportunity to demonstrate or achieve compliance with the application requirement.

(3) If the Associate Administrator determines that a certificate of approval must be withdrawn to preclude a significant and imminent adverse affect on public safety, the procedures in paragraph (j)(2)(ii) and (iii) of this section need not be provided prior to withdrawal of the approval, but shall be provided as soon as practicable thereafter.

■ 40. Section 178.71 is added to read as follows:

**§ 178.71. Specifications for UN pressure receptacles.**

(a) *General.* Each UN pressure receptacle must meet the requirements of this section. Requirements for approval, qualification, maintenance, and testing are contained in § 178.70, and subpart C of part 180 of this subchapter.

(b) *Definitions.* The following definitions apply for the purposes of design and construction of UN pressure receptacles under this subpart:

*Alternative arrangement* means an approval granted by the Associate Administrator for a MEGC that has been designed, constructed or tested to the technical requirements or testing methods other than those specified for UN pressure receptacles in part 178 or part 180 of this subchapter.

*Bundle of cylinders.* See § 171.8 of this subchapter.

*Design type* means a pressure receptacle design as specified by a particular pressure receptacle standard.

*Design type approval* means an overall approval of the manufacturer's quality system and design type of each pressure receptacle to be produced within the manufacturer's facility.

*UN tube.* See § 171.8 of this subchapter.

(c) *General design and construction.* UN pressure receptacles and their closures must be designed, manufactured, tested and equipped in accordance with the requirements contained in this section.

(1) Following the final heat treatment, all cylinders, except those selected for batch testing must be subjected to a hydraulic volumetric expansion test.

(2) The standard requirements applicable to UN pressure receptacles may be varied only if approved in writing by the Associate Administrator.

(3) The test pressure of UN cylinders, tubes, and bundles of cylinders must

conform to the requirements in part 178 of this subchapter.

(d) *Service equipment.* (1) Except for pressure relief devices, UN pressure receptacle equipment, including valves, piping, fittings, and other equipment subjected to pressure must be designed and constructed to withstand at least 1.5 times the test pressure of the pressure receptacle.

(2) Service equipment must be configured or designed to prevent damage that could result in the release of the pressure receptacle contents during normal conditions of handling and transport. Manifold piping leading to shut-off valves must be sufficiently flexible to protect the valves and the piping from shearing or releasing the pressure receptacle contents. The filling and discharge valves and any protective caps must be secured against unintended opening. The valves must conform to ISO 10297 (IBR, see § 171.7 of this subchapter) and be protected as specified in § 173.301b(f) of this subchapter.

(3) UN pressure receptacles that cannot be handled manually or rolled, must be equipped with devices (*e.g.* skids, rings, straps) ensuring that they can be safely handled by mechanical means and so arranged as not to impair the strength of, nor cause undue stresses, in the pressure receptacle.

(4) Pressure receptacles filled by volume must be equipped with a level indicator.

(e) *Bundles of cylinders.* UN pressure receptacles assembled in bundles must be structurally supported and held together as a unit and secured in a manner that prevents movement in relation to the structural assembly and movement that would result in the concentration of harmful local stresses. The frame design must ensure stability under normal operating conditions.

(1) The frame must securely retain all the components of the bundle and must protect them from damage during conditions normally incident to transportation. The method of cylinder restraint must prevent any vertical or horizontal movement or rotation of the cylinder that could cause undue strain on the manifold. The total assembly must be able to withstand rough handling, including being dropped or overturned.

(2) The frame must include features designed for the handling and transportation of the bundle. The lifting rings must be designed to withstand a design load of 2 times the maximum gross weight. Bundles with more than one lifting ring must be designed such that a minimum sling angle of 45 degrees to the horizontal can be

achieved during lifting using the lifting rings. If four lifting rings are used, their design must be strong enough to allow the bundle to be lifted by two rings. Where two or four lifting rings are used, diametrically opposite lifting rings must be aligned with each other to allow for correct lifting using shackle pins. If the bundle is filled with forklift pockets, it must contain two forklift pockets on each side from which it is to be lifted. The forklift pockets must be positioned symmetrically consistent with the bundle center of gravity.

(3) The frame structural members must be designed for a vertical load of 2 times the maximum gross weight of the bundle. Design stress levels may not exceed 0.9 times the yield strength of the material.

(4) The frame may not contain any protrusions from the exterior frame structure that could cause a hazardous condition.

(5) The frame design must prevent collection of water or other debris that would increase the tare weight of bundles filled by weight.

(6) The floor of the bundle frame must not buckle during normal operating conditions and must allow for the drainage of water and debris from around the base of the cylinders.

(7) If the frame design includes movable doors or covers, they must be capable of being secured with latches or other means that will not become dislodged by operational impact loads. Valves that need to be operated in normal service or in an emergency must be accessible.

(g) *Design and construction requirements for UN refillable seamless steel cylinders.* In addition to the general requirements of this section, UN refillable seamless steel cylinders must conform to the following ISO standards, as applicable:

(1) ISO 9809-1: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. (IBR, see § 171.7 of this subchapter).

(2) ISO 9809-2: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa. (IBR, see § 171.7 of this subchapter).

(3) ISO 9809-3: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 3: Normalized steel cylinders. (IBR, see § 171.7 of this subchapter).

(h) *Design and construction requirements for UN refillable seamless*

*aluminum alloy cylinders.* In addition to the general requirements of this section, UN refillable seamless aluminum cylinders must conform to ISO 7866: Gas cylinders—Refillable seamless aluminum alloy gas cylinders—Design, construction and testing. (IBR, see § 171.7 of this subchapter). The use of Aluminum alloy 6351-T6 or equivalent is prohibited.

(i) *Design and construction requirements for UN non-refillable metal cylinders.* In addition to the general requirements of this section, UN non-refillable metal cylinders must conform to ISO 11118: Gas cylinders—Non-refillable metallic gas cylinders—Specification and test methods. (IBR, see § 171.7 of this subchapter.)

(j) *Design and construction requirements for UN refillable seamless steel tubes.* In addition to the general requirements of this section, UN refillable seamless steel tubes must conform to ISO 11120: Gas cylinders—Refillable seamless steel tubes of water capacity between 150 L and 3000 L—Design, construction and testing. (IBR, see § 171.7 of this subchapter).

(k) *Design and construction requirements for UN acetylene cylinders.* In addition to the general requirements of this section, UN acetylene cylinders must conform to the following ISO standards, as applicable:

(1) For the cylinder shell:

(i) ISO 9809-1: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa.

(ii) ISO 9809-3: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 3: Normalized steel cylinders.

(2) The porous mass in an acetylene cylinder must conform to ISO 3807-2: Cylinders for acetylene—Basic requirements—Part 2: Cylinders with fusible plugs. (IBR, see § 171.7 of this subchapter).

(l) *Design and construction requirements for UN composite cylinders.* (1) In addition to the general requirements of this section, UN composite cylinders must be designed for unlimited service life and conform to the following ISO standards, as applicable:

(i) ISO 11119-1: Gas cylinders of composite construction—Specification and test methods—Part 1: Hoop-wrapped composite gas cylinders. (IBR, see § 171.7 of this subchapter).

(ii) ISO 11119-2: Gas cylinders of composite construction—Specification and test methods—Part 2: Fully-wrapped fibre reinforced composite gas

cylinders with load-sharing metal liners. (IBR, see § 171.7 of this subchapter).

(iii) ISO 11119-3: Gas cylinders of composite construction—Specification and test methods—Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load sharing metallic or non-metallic liners. (IBR, see § 171.7 of this subchapter).

(2) ISO 11119-2 and ISO 11119-3 gas cylinders of composite construction manufactured in accordance with the requirements for underwater breathing applications must bear the “UW” mark.

(m) *Material compatibility.* In addition to the material requirements specified in the UN pressure receptacle design and construction ISO standards, and any restrictions specified in part 173 for the gases to be transported, the requirements of the following standards must be applied with respect to material compatibility:

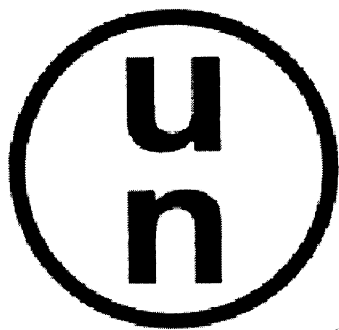
(1) ISO 11114-1: Transportable gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials. (IBR, see § 171.7 of this subchapter).

(2) ISO 11114-2: Transportable gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials. (IBR, see § 171.7 of this subchapter).

(n) *Protection of closures.* Closures and their protection must conform to the requirements in § 173.301(f) of this subchapter.

(o) *Marking of UN refillable pressure receptacles.* UN refillable pressure receptacles must be marked clearly and legibly. The required markings must be permanently affixed by stamping, engraving, or other equivalent method, on the shoulder, top end or neck of the pressure receptacle or on a permanently affixed component of the pressure receptacle, such as a welded collar. Except for the “UN” mark, the minimum size of the marks must be 5 mm for pressure receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for pressure receptacles with a diameter less than 140 mm. The minimum size of the “UN” mark must be 5 mm for pressure receptacles with a diameter less than 140 mm and 10 mm for pressure receptacles with a diameter of greater than or equal to 140 mm. The depth of the markings must not create harmful stress concentrations. A refillable pressure receptacle conforming to the UN standard must be marked as follows:

(1) The UN packaging symbol.



(2) The ISO standard, for example ISO 9809-1, used for design, construction and testing. Acetylene cylinders must be marked to indicate the porous mass and the steel shell, for example: "ISO 3807-2/ISO 9809-1."

(3) The mark of the country where the approval is granted. The letters "USA" must be marked on UN pressure receptacles approved by the United States. The manufacturer must obtain an approval number from the Associate Administrator. The manufacturer approval number must follow the country of approval mark, separated by a slash (for example, USA/MXXXX). Pressure receptacles approved by more than one national authority may contain the mark of each country of approval, separated by a comma.

(4) The identity mark or stamp of the IIA.

(5) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash, for example "2006/04".

(6) The test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR". The test pressure must be

obtained from the results of a hydraulic volumetric expansion test.

(7) The empty or tare weight. Except for acetylene cylinders, empty weight is the mass of the pressure receptacle in kilograms, including all integral parts (e.g., collar, neck ring, foot ring, etc.), followed by the letters "KG". The empty weight does not include the mass of the valve, valve cap or valve guard or any coating. The empty weight must be expressed to three significant figures rounded up to the last digit. For cylinders of less than 1 kg, the empty weight must be expressed to two significant figures rounded down to the last digit. For acetylene cylinders, the tare weight must be marked on the cylinders in kilograms (KG). The tare weight is the sum of the empty weight, mass of the valve, any coating and all permanently attached parts (e.g. fittings and accessories) that are not removed during filling. The tare weight must be expressed to two significant figures rounded down to the last digit. The tare weight does not include the cylinder cap or any outlet cap or plug not permanently attached to the cylinder.

(8) The minimum wall thickness of the pressure receptacle in millimeters followed by the letters "MM". This mark is not required for pressure receptacles with a water capacity less than or equal to 1.0 L or for composite cylinders.

(9) For pressure receptacles intended for the transport of compressed gases and UN 1001 acetylene, dissolved, the working pressure in bar, preceded by the letters "PW".

(10) For liquefied gases, the water capacity in liters expressed to three significant digits rounded down to the last digit, followed by the letter "L". If the value of the minimum or nominal water capacity is an integer, the digits after the decimal point may be omitted.

(11) Identification of the cylinder thread type (e.g., 25E).

(12) The country of manufacture. The letters "USA" must be marked on cylinders manufactured in the United States.

(13) The serial number assigned by the manufacturer.

(14) For steel pressure receptacles, the letter "H" showing compatibility of the steel, as specified in ISO 11114-1.

(15) Identification of aluminum alloy, if applicable.

(16) Stamp for nondestructive testing, if applicable.


(17) Stamp for underwater use of composite cylinders, if applicable.

(p) *Marking sequence.* The marking required by paragraph (o) of this section must be placed in three groups as shown in the example below:

(1) The top grouping contains manufacturing marks and must appear consecutively in the sequence given in paragraphs (o)(11) through (16) of this section.

(2) The middle grouping contains operational marks described in paragraphs (o)(11) through (15) of this section.

(3) The bottom grouping contains certification marks and must appear consecutively in the sequence given in paragraph (o)(1) through (5) of this section.

|                                                                                   |            |           |      |         |      |      |
|-----------------------------------------------------------------------------------|------------|-----------|------|---------|------|------|
| (11)                                                                              | (12)       | (13)      | (14) | (15)    | (16) | (17) |
| 25E                                                                               | USA        | 765432    | H    |         |      | UW   |
| -----                                                                             |            |           |      |         |      |      |
| (9)                                                                               | (6)        | (7)       | (10) | (8)     |      |      |
| PW200                                                                             | PH300BAR   | 62.1KG    | 50L  | 5.8MM   |      |      |
| -----                                                                             |            |           |      |         |      |      |
| (1)                                                                               | (2)        | (3)       | (4)  | (5)     |      |      |
|  | ISO 9809-1 | USA/MXXXX | IB   | 2005/12 |      |      |

(q) *Other markings.* Other markings are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

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

(1) The marking requirements and sequence listed in paragraphs (o)(1) through (16) of this section are required, except the markings in paragraphs (o)(7), (8), and (11) are not applicable. The required serial number marking in paragraph (o)(13) may be replaced by the batch number.

(2) Each receptacle must be marked with the words "DO NOT REFILL" in letters of at least 5 mm in height.

(3) A non-refillable pressure receptacle, because of its size, may substitute the marking required by this paragraph with a label. Reduction in marking size is authorized only as prescribed in ISO 7225, Gas cylinders—Precautionary labels. (IBR, see § 171.7 of this subchapter).

(4) Each non-refillable pressure receptacle must also be legibly marked

by stenciling the following statement: "Federal law forbids transportation if refilled—penalty up to \$500,000 fine and 5 years in imprisonment (49 U.S.C. 5124)."

(5) No person may mark a non-refillable pressure receptacle as meeting the requirements of this section unless it was manufactured in conformance with this section.

■ 41. Section 178.74 is added to read as follows:

**§ 178.74 Approval of MEGCs.**

(a) *Application for design type approval.* (1) Each new MEGC design type must have a design approval certificate. An owner or manufacturer must apply to an approval agency that is approved by the Associate Administrator in accordance with subpart E of part 107 of this chapter +to obtain approval of a new design. When a series of MEGCs is manufactured without change in the design, the certificate is valid for the entire series. The design approval certificate must refer to the prototype test report, the materials of construction of the manifold, the standards to which the pressure receptacles are made and an approval number. The compliance requirements or test methods applicable to MEGCs as specified in this subpart may be varied when the level of safety is determined to be equivalent to or exceed the requirements of this subchapter and is approved in writing by the Associate Administrator. A design approval may serve for the approval of smaller MEGCs made of

materials of the same type and thickness, by the same fabrication techniques and with identical supports, equivalent closures and other appurtenances.

(2) Each application for design approval must be in English and contain the following information:

(i) Two complete copies of all engineering drawings, calculations, and test data necessary to ensure that the design meets the relevant specification.

(ii) The manufacturer's serial number that will be assigned to each MEGC.

(iii) A statement as to whether the design type has been examined by any approval agency previously and judged unacceptable. Affirmative statements must be documented with the name of the approval agency, reason for non-acceptance, and the nature of modifications made to the design type.

(b) *Actions by the approval agency.* The approval agency must review the application for design type approval, including all drawings and calculations, to ensure that the design of the MEGC meets all requirements of the relevant specification and to determine whether it is complete and conforms to the requirements of this section. An incomplete application will be returned to the applicant with the reasons why the application was returned. If the application is complete and all applicable requirements of this section are met, the approval agency must prepare a MEGC design approval certificate containing the manufacturer's name and address, results and conclusions of the examination and

necessary data for identification of the design type. If the Associate Administrator approves the Design Type Approval Certificate application, the approval agency and the manufacturer must each maintain a copy of the approved drawings, calculations, and test data for at least 20 years.

(c) *Approval agency's responsibilities.* The approval agency is responsible for ensuring that the MEGC conforms to the design type approval. The approval agency must:

(1) Witness all tests required for the approval of the MEGC specified in this section and § 178.75.

(2) Ensure, through appropriate inspection, that each MEGC is fabricated in all respects in conformance with the approved drawings, calculations, and test data.

(3) Determine and ensure that the MEGC is suitable for its intended use and that it conforms to the requirements of this subchapter.

(4) Apply its name, identifying mark or identifying number, and the date the approval was issued, to the metal identification marking plate attached to the MEGC upon successful completion of all requirements of this subpart. Any approvals by the Associate Administrator authorizing design or construction alternatives (Alternate Arrangements) of the MEGC (see paragraph (a) of this section) must be indicated on the metal identification plate as specified in § 178.75(j).

(5) Prepare an approval certificate for each MEGC or, in the case of a series of identical MEGCs manufactured to a single design type, for each series of MEGCs. The approval certificate must include all of the following information:

(i) The information displayed on the metal identification plate required by § 178.75(j);

(ii) The results of the applicable framework test specified in ISO 1496-3 (IBR, see § 171.7 of this subchapter);

(iii) The results of the initial inspection and test specified in paragraph (h) of this section;

(iv) The results of the impact test specified in § 178.75(i)(4);

(v) Certification documents verifying that the cylinders and tubes conform to the applicable standards; and

(vi) A statement that the approval agency certifies the MEGC in accordance with the procedures in this section and that the MEGC is suitable for its intended purpose and meets the requirements of this subchapter. When a series of MEGCs is manufactured without change in the design type, the certificate may be valid for the entire series of MEGCs representing a single design type. The approval number must

consist of the distinguishing sign or mark of the country ("USA" for the United States of America) where the approval was granted and a registration number.

(6) Retain on file a copy of each approval certificate for at least 20 years.

(d) *Manufacturers' responsibilities.*

The manufacturer is responsible for compliance with the applicable specifications for the design and construction of MEGCs. The manufacturer of a MEGC must:

(1) Comply with all the requirements of the applicable ISO standard specified in § 178.71;

(2) Obtain and use an approval agency to review the design, construction and certification of the MEGC;

(3) Provide a statement in the manufacturers' data report certifying that each MEGC manufactured complies with the relevant specification and all the applicable requirements of this subchapter; and

(4) Retain records for the MEGCs for at least 20 years. When required by the specification, the manufacturer must provide copies of the records to the approval agency, the owner or lessee of the MEGC, and to a representative of DOT, upon request.

(e) *Denial of application for approval.* If the Associate Administrator finds that the MEGC will not be approved for any reason, the Associate Administrator will notify the applicant in writing and provide the reason for the denial. The manufacturer may request that the Associate Administrator reconsider the decision. The application request must—

(1) Be written in English and filed within 90 days of receipt of the decision;

(2) State in detail any alleged errors of fact and law; and

(3) Enclose any additional information needed to support the request to reconsider.

(f) *Appeal.* (1) A manufacturer whose reconsideration request is denied may appeal to the PHMSA Administrator. The appeal must—

(i) Be in writing and filed within 90 days of receipt of the Associate Administrator's decision on reconsideration;

(ii) State in detail any alleged errors of fact and law;

(iii) Enclose any additional information needed to support the appeal; and

(iv) State in detail the modification of the final decision sought.

(2) The Administrator will grant or deny the relief and inform the appellant in writing of the decision. The Administrator's decision is the final administrative action.

(g) *Modifications to approved MEGCs.*

(1) Prior to modification of any approved MEGC that may affect conformance and safe use, and that may involve a change to the design type or affect its ability to retain the hazardous material in transportation, the MEGC's owner must inform the approval agency that prepared the initial approval certificate for the MEGC or, if the initial approval agency is unavailable, another approval agency, of the nature of the modification and request certification of the modification. The owner must supply the approval agency with all revised drawings, calculations, and test data relative to the intended modification. The MEGC's owner must also provide a statement as to whether the intended modification has been examined and determined to be unacceptable by any approval agency. The written statement must include the name of the approval agency, the reason for non-acceptance, and the nature of changes made to the modification since its original rejection.

(2) The approval agency must review the request for modification. If the approval agency determines that the proposed modification does not conform to the relevant specification, the approval agency must reject the request in accordance with paragraph (d) of this section. If the approval agency determines that the proposed modification conforms fully with the relevant specification, the request is accepted. If modification to an approved MEGC alters any information on the approval certificate, the approval agency must prepare a new approval certificate for the modified MEGC and submit the certificate to the Associate Administrator for approval. After receiving approval from the Associate Administrator, the approval agency must ensure that any necessary changes are made to the metal identification plate. A copy of each newly issued approval certificate must be retained by the approval agency and the MEGC's owner for at least 20 years. The approval agency must perform the following activities:

(i) Retain a set of the approved revised drawings, calculations, and data as specified in § 178.69(b)(4) for at least 20 years;

(ii) Ensure through appropriate inspection that all modifications conform to the revised drawings, calculations, and test data; and

(iii) Determine the extent to which retesting of the modified MEGC is necessary based on the nature of the proposed modification, and ensure that all required retests are satisfactorily performed.

(h) *Termination of Approval Certificate.* (1) The Associate Administrator may terminate an approval issued under this section if he or she determines that—

(i) Because of a change in circumstances, the approval no longer is needed or no longer would be granted if applied for;

(ii) Information upon which the approval was based is fraudulent or substantially erroneous;

(iii) Termination of the approval is necessary to adequately protect against risks to life and property; or

(iv) The MEGC does not meet the specification.

(2) Before an approval is terminated, the Associate Administrator will provide the person—

(i) Written notice of the facts or conduct believed to warrant the termination;

(ii) An opportunity to submit oral and written evidence; and

(3) An opportunity to demonstrate or achieve compliance with the applicable requirements.

(i) *Imminent Danger.* If the Associate Administrator determines that a certificate of approval must be terminated to preclude a significant and imminent adverse effect on public safety, the Associate Administrator may terminate the certificate immediately. In such circumstances, the opportunities of paragraphs (h)(2) and (3) of this section need not be provided prior to termination of the approval, but must be provided as soon as practicable thereafter.

■ 42. Section 178.75 is added to read as follows:

#### § 178.75 Specifications for MEGCs.

(a) *General.* Each MEGC must meet the requirements of this section. In a MEGC that meets the definition of a “container” within the terms of the International Convention for Safe Containers (CSC) must meet the requirements of the CSC as amended and 49 CFR parts 450 through 453, and must have a CSC approval plate.

(b) *Alternate Arrangements.* The technical requirements applicable to MEGCs may be varied when the level of safety is determined to be equivalent to or exceed the requirements of this subchapter. Such an alternate arrangement must be approved in writing by the Associate Administrator. MEGCs approved to an Alternate Arrangement must be marked as required by paragraph (j) of this section.

(c) *Definitions.* The following definitions apply:

*Leakproofness test* means a test using gas subjecting the pressure receptacles

and the service equipment of the MEGC to an effective internal pressure of not less than 20% of the test pressure.

*Manifold* means an assembly of piping and valves connecting the filling and/or discharge openings of the pressure receptacles.

*Maximum permissible gross mass or MPMG* means the heaviest load authorized for transport (sum of the tare mass of the MEGC, service equipment and pressure receptacle).

*Service equipment* means manifold system (measuring instruments, piping and safety devices).

*Shut-off valve* means a valve that stops the flow of gas.

*Structural equipment* means the reinforcing, fastening, protective and stabilizing members external to the pressure receptacles.

(d) *General design and construction requirements.* (1) The MEGC must be capable of being loaded and discharged without the removal of its structural equipment. It must possess stabilizing members external to the pressure receptacles to provide structural integrity for handling and transport. MEGCs must be designed and constructed with supports to provide a secure base during transport and with lifting and tie-down attachments that are adequate for lifting the MEGC including when loaded to its maximum permissible gross mass. The MEGC must be designed to be loaded onto a transport vehicle or vessel and equipped with skids, mountings or accessories to facilitate mechanical handling.

(2) MEGCs must be designed, manufactured and equipped to withstand, without loss of contents, all normal handling and transportation conditions. The design must take into account the effects of dynamic loading and fatigue.

(3) Each pressure receptacle of a MEGC must be of the same design type, seamless steel, and constructed and tested according to one of the following ISO standards:

(i) ISO 9809–1: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 1: Quenched and tempered steel cylinders with tensile strength less than 1 100 MPa. (IBR, see § 171.7 of this subchapter);

(ii) ISO 9809–2: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 2: Quenched and tempered steel cylinders with tensile strength greater than or equal to 1 100 MPa. (IBR, see § 171.7 of this subchapter);

(iii) ISO 9809–3: Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part

3: Normalized steel cylinders. (IBR, see § 171.7 of this subchapter); or

(iv) ISO 11120: Gas cylinders—Refillable seamless steel tubes of water capacity between 150 L and 3000 L—Design, construction and testing. (IBR, see § 171.7 of this subchapter).

(4) Pressure receptacles of MEGCs, fittings, and pipework must be constructed of a material that is compatible with the hazardous materials intended to be transported, as specified in this subchapter.

(5) Contact between dissimilar metals that could result in damage by galvanic action must be prevented by appropriate means.

(6) The materials of the MEGC, including any devices, gaskets, and accessories, must have no adverse effect on the gases intended for transport in the MEGC.

(7) MEGCs must be designed to withstand, without loss of contents, at least the internal pressure due to the contents, and the static, dynamic and thermal loads during normal conditions of handling and transport. The design must take into account the effects of fatigue, caused by repeated application of these loads through the expected life of the MEGC.

(8) MEGCs and their fastenings must, under the maximum permissible load, be capable of withstanding the following separately applied static forces (for calculation purposes, acceleration due to gravity ( $g$ ) = 9.81 m/s<sup>2</sup>):

(i) In the direction of travel: 2g (twice the MPMG multiplied by the acceleration due to gravity);

(ii) Horizontally at right angles to the direction of travel: 1g (the MPMG multiplied by the acceleration due to gravity. When the direction of travel is not clearly determined, the forces must be equal to twice the MPMG);

(iii) Vertically upwards: 1g (the MPMG multiplied by the acceleration due to gravity); and

(iv) Vertically downwards: 2g (twice the MPMG (total loading including the effect of gravity) multiplied by the acceleration due to gravity.

(9) Under each of the forces specified in paragraph (d)(8) of this section, the stress at the most severely stressed point of the pressure receptacles must not exceed the values given in the applicable design specifications (e.g., ISO 11120).

(10) Under each of the forces specified in paragraph (d)(8) of this section, the safety factor for the framework and fastenings must be as follows:

(i) For steels having a clearly defined yield point, a safety factor of 1.5 in

relation to the guaranteed yield strength; or

(ii) For steels with no clearly defined yield point, a safety factor of 1.5 in relation to the guaranteed 0.2 percent proof strength and, for austenitic steels, the 1 percent proof strength.

(11) MEGCs must be capable of being electrically grounded to prevent electrostatic discharge when intended for flammable gases.

(12) The pressure receptacles of a MEGC must be secured in a manner to prevent movement that could result in damage to the structure and concentration of harmful localized stresses.

(e) *Service equipment.* (1) Service equipment must be arranged so that it is protected from mechanical damage by external forces during handling and transportation. When the connections between the frame and the pressure receptacles allow relative movement between the subassemblies, the equipment must be fastened to allow movement to prevent damage to any working part. The manifolds, discharge fittings (pipe sockets, shut-off devices), and shut-off valves must be protected from damage by external forces. Manifold piping leading to shut-off valves must be sufficiently flexible to protect the valves and the piping from shearing, or releasing the pressure receptacle contents. The filling and discharge devices, including flanges or threaded plugs, and any protective caps must be capable of being secured against unintended opening.

(2) Each pressure receptacle intended for the transport of Division 2.3 gases must be equipped with an individual shut-off valve. The manifold for Division 2.3 liquefied gases must be designed so that each pressure receptacle can be filled separately and be kept isolated by a valve capable of being closed during transit. For Division 2.1 gases, the pressure receptacles must be isolated by an individual shut-off valve into assemblies of not more than 3,000 L.

(3) For MEGC filling and discharge openings:

(i) Two valves in series must be placed in an accessible position on each discharge and filling pipe. One of the valves may be a backflow prevention valve. (ii) The filling and discharge devices may be equipped to a manifold.

(iii) For sections of piping which can be closed at both ends and where a liquid product can be trapped, a pressure-relief valve must be provided to prevent excessive pressure build-up.

(iv) The main isolation valves on a MEGC must be clearly marked to indicate their directions of closure. All

shutoff valves must close by a clockwise motion of the handwheel.

(v) Each shut-off valve or other means of closure must be designed and constructed to withstand a pressure equal to or greater than 1.5 times the test pressure of the MEGC.

(vi) All shut-off valves with screwed spindles must close by a clockwise motion of the handwheel. For other shut-off valves, the open and closed positions and the direction of closure must be clearly shown.

(vii) All shut-off valves must be designed and positioned to prevent unintentional opening.

(viii) Ductile metals must be used in the construction of valves or accessories.

(4) The piping must be designed, constructed and installed to avoid damage due to expansion and contraction, mechanical shock and vibration. Joints in tubing must be brazed or have an equally strong metal union. The melting point of brazing materials must be no lower than 525 °C (977 °F). The rated pressure of the service equipment and of the manifold must be not less than two-thirds of the test pressure of the pressure receptacles.

(f) *Pressure relief devices.* Each pressure receptacle must be equipped with one or more pressure relief devices as specified in § 173.301(f) of this subchapter. When pressure relief devices are installed, each pressure receptacle or group of pressure receptacles of a MEGC that can be isolated must be equipped with one or more pressure relief devices. Pressure relief devices must be of a type that will resist dynamic forces including liquid surge and must be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

(1) The size of the pressure relief devices: CGA S-1.1, 2003 edition (IBR, see § 171.7 of this subchapter) must be used to determine the relief capacity of individual pressure receptacles.

(2) Connections to pressure-relief devices: Connections to pressure relief devices must be of sufficient size to enable the required discharge to pass unrestricted to the pressure relief device. A shut-off valve installed between the pressure receptacle and the pressure relief device is prohibited, except where duplicate devices are provided for maintenance or other reasons, and the shut-off valves serving the devices actually in use are locked open, or the shut-off valves are interlocked so that at least one of the duplicate devices is always operable and capable of meeting the requirements of paragraph (f)(1) of this section. No

obstruction is permitted in an opening leading to or leaving from a vent or pressure-relief device that might restrict or cut-off the flow from the pressure receptacle to that device. The opening through all piping and fittings must have at least the same flow area as the inlet of the pressure relief device to which it is connected. The nominal size of the discharge piping must be at least as large as that of the pressure relief device.

(3) Location of pressure-relief devices: For liquefied gases, each pressure relief device must, under maximum filling conditions, be in communication with the vapor space of the pressure receptacles. The devices, when installed, must be arranged to ensure the escaping vapor is discharged upwards and unrestrictedly to prevent impingement of escaping gas or liquid upon the MEGC, its pressure receptacles or personnel. For flammable, pyrophoric and oxidizing gases, the escaping gas must be directed away from the pressure receptacle in such a manner that it cannot impinge upon the other pressure receptacles. Heat resistant protective devices that deflect the flow of gas are permissible provided the required pressure relief device capacity is not reduced. Arrangements must be made to prevent access to the pressure relief devices by unauthorized persons and to protect the devices from damage caused by rollover.

(g) *Gauging devices.* When a MEGC is intended to be filled by mass, it must be equipped with one or more gauging devices. Glass level-gauges and gauges made of other fragile material are prohibited.

(h) *MEGC supports, frameworks, lifting and tie-down attachments.* (1) MEGCs must be designed and constructed with a support structure to provide a secure base during transport. MEGCs must be protected against damage to the pressure receptacles and service equipment resulting from lateral and longitudinal impact and overturning. The forces specified in paragraph (d)(8) of this section, and the safety factor specified in paragraph (d)(10) of this section must be considered in this aspect of the design. Skids, frameworks, cradles or other similar structures are acceptable. If the pressure receptacles and service equipment are so constructed as to withstand impact and overturning, additional protective support structure is not required (see paragraph (h)(4) of this section).

(2) The combined stresses caused by pressure receptacle mountings (e.g. cradles, frameworks, etc.) and MEGC lifting and tie-down attachments must

not cause excessive stress in any pressure receptacle. Permanent lifting and tie-down attachments must be equipped to all MEGCs. Any welding of mountings or attachments onto the pressure receptacles is prohibited.

(3) The effects of environmental corrosion must be taken into account in the design of supports and frameworks.

(4) When MEGCs are not protected during transport as specified in paragraph (h)(1) of this section, the pressure receptacles and service equipment must be protected against damage resulting from lateral or longitudinal impact or overturning. External fittings must be protected against release of the pressure receptacles' contents upon impact or overturning of the MEGC on its fittings. Particular attention must be paid to the protection of the manifold. Examples of protection include:

(i) Protection against lateral impact, which may consist of longitudinal bars;

(ii) Protection against overturning, which may consist of reinforcement rings or bars fixed across the frame;

(iii) Protection against rear impact, which may consist of a bumper or frame;

(iv) Protection of the pressure receptacles and service equipment against damage from impact or overturning by use of an ISO frame according to the relevant provisions of ISO 1496-3. (IBR, see § 171.7 of this subchapter).

(i) *Initial inspection and test.* The pressure receptacles and items of equipment of each MEGC must be inspected and tested before being put into service for the first time (initial inspection and test). This initial inspection and test of an MEGC must include the following:

(1) A check of the design characteristics.

(2) An external examination of the MEGC and its fittings, taking into account the hazardous materials to be transported.

(3) A pressure test performed at the test pressures specified in § 173.304b(b)(1) and (2) of this subchapter. The pressure test of the manifold may be performed as a hydraulic test or by using another liquid or gas. A leakproofness test and a test of the satisfactory operation of all service equipment must also be performed before the MEGC is placed into service. When the pressure receptacles and their fittings have been pressure-tested separately, they must be subjected to a leakproof test after assembly.

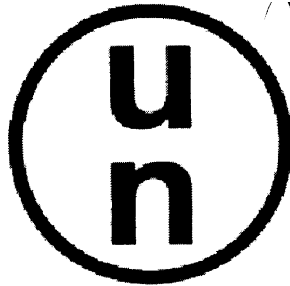
(4) An MEGC that meets the definition of "container" in the CSC (see 49 CFR 450.3(a)(2)) must be subjected to an

impact test using a prototype representing each design type. The prototype MEGC must be shown to be capable of absorbing the forces resulting from an impact not less than 4 times (4 g) the MPGM of the fully loaded MEGC, at a duration typical of the mechanical shocks experienced in rail transport. A listing of acceptable methods for performing the impact test is provided in the UN Recommendations (IBR, see § 171.7 of this subchapter).

(j) *Marking.* (1) Each MEGC must be equipped with a corrosion resistant metal plate permanently attached to the MEGC in a conspicuous place readily accessible for inspection. The pressure receptacles must be marked according to this section. Affixing the metal plate to a pressure receptacle is prohibited. At a minimum, the following information must be marked on the plate by stamping or by any other equivalent method:

Country of manufacture

UN



Approval Country

Approval Number

Alternate Arrangements (see § 178.75(b))

MEGC Manufacturer's name or mark

MEGC's serial number

Approval agency (Authorized body for the design approval)

Year of manufacture

Test pressure: \_\_\_\_\_ bar gauge

Design temperature range \_\_\_\_\_ °C to \_\_\_\_\_ °C

Number of pressure receptacles \_\_\_\_\_

Total water capacity \_\_\_\_\_ liters

Initial pressure test date and

identification of the Approval Agency

Date and type of most recent periodic tests

Year \_\_\_\_\_ Month \_\_\_\_\_ Type \_\_\_\_\_

(e.g. 2004-05, AE/UE, where "AE" represents acoustic emission and "UE" represents ultrasonic examination)

Stamp of the approval agency who performed or witnessed the most recent test

(2) The following information must be marked on a metal plate firmly secured to the MEGC:

Name of the operator

Maximum permissible load mass \_\_\_\_\_ kg

Working pressure at 15°C: \_\_\_\_\_ bar gauge

Maximum permissible gross mass (MPGM) \_\_\_\_\_ kg

Unladen (tare) mass \_\_\_\_\_ kg

#### **PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS**

■ 43. The authority citation for part 180 continues to read as follows:

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

■ 44. Section 180.201 is revised to read as follows:

##### **§ 180.201 Applicability.**

This subpart prescribes requirements, in addition to those contained in parts 107, 171, 172, 173, and 178 of this chapter, for the continuing qualification, maintenance, or periodic requalification of DOT specification and exemption cylinders and UN pressure receptacles.

■ 45. In § 180.203, the introductory paragraph is revised to read as follows:

##### **§ 180.203 Definitions.**

As used in this section, the word "cylinder" includes UN pressure receptacles. In addition to the definitions contained in § 171.8 of this subchapter, the following definitions apply to this subpart:

\* \* \* \* \*

■ 46. In § 180.205, the section heading is revised to read as set forth below:

##### **§ 180.205 General requirements for requalification of specification cylinders.**

\* \* \* \* \*

■ 47. Section 180.207 is added to read as follows:

##### **§ 180.207 Requirements for requalification of UN pressure receptacles.**

(a) *General.* (1) Each UN pressure receptacle used for the transportation of hazardous materials must conform to the requirements prescribed in paragraphs (a), (b) and (d) in § 180.205.

(2) No pressure receptacle due for requalification may be filled with a hazardous material and offered for transportation in commerce unless that pressure receptacle has been successfully requalified and marked in accordance with this subpart. A pressure receptacle may be requalified at any time during or before the month and year that the requalification is due. However, a pressure receptacle filled before the requalification becomes due

may remain in service until it is emptied.

(3) No person may requalify a UN composite pressure receptacle for continued use beyond its 15-years authorized service life. A pressure receptacle with a specified service life may not be refilled and offered for transportation after its authorized service life has expired unless approval

has been obtained in writing from the Associate Administrator.

(b) *Periodic requalification of UN pressure receptacles.* (1) Each pressure receptacle that is successfully requalified in accordance with the requirements specified in this section must be marked in accordance with § 180.213. The requalification results must be recorded in accordance § 180.215.

(2) Each pressure receptacle that fails requalification must be rejected or condemned in accordance with the applicable ISO requalification standard.

(c) *Requalification interval.* Each UN pressure receptacle that becomes due for periodic requalification must be requalified at the interval specified in the following table:

TABLE 1.—REQUALIFICATION INTERVALS OF UN PRESSURE RECEPTACLES

| Interval (years) | UN pressure receptacles/hazardous materials                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10 .....         | Pressure receptacles for all hazardous materials except as noted below (also for dissolved acetylene, see paragraph (d)(3) of this section):                                                                                                                                                                                                                                                                                                                                                    |
| 5 .....          | Composite pressure receptacles.                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 5 .....          | Pressure receptacles used for:<br>All Division 2.3 materials.<br>UN1013, Carbon dioxide.<br>UN1043, Fertilizer ammoniating solution with free ammonia.<br>UN1051, Hydrogen cyanide, stabilized containing less than 3% water.<br>UN1052, Hydrogen fluoride, anhydrous.<br>UN1745, Bromine pentafluoride.<br>UN1746, Bromine trifluoride.<br>UN2073, Ammonia solution.<br>UN2495, Iodine pentafluoride.<br>UN2983, Ethylene Oxide and Propylene oxide mixture, not more than 30% ethylene oxide. |

(d) *Requalification procedures.* Each UN pressure receptacle that becomes due for requalification must be requalified at the interval prescribed in paragraph (c) of this section and in accordance with the procedures contained in the following standard, as applicable. When a pressure test is performed on a UN pressure receptacle, the test must be a water jacket volumetric expansion test suitable for the determination of the cylinder expansion or a hydraulic proof pressure test. The test equipment must be calibrated daily in accordance with § 180.205(g). An alternative method (e.g. acoustic emission) may be performed if prior approval has been obtained in writing from the Associate Administrator.

(1) Seamless steel: Each seamless steel UN pressure receptacle, including MEGC's pressure receptacles, must be requalified in accordance with ISO 6406 (IBR, see § 171.7 of this subchapter), or in accordance with requalification procedures approved by the Associate Administrator.

(2) Seamless UN aluminum: Each seamless aluminum UN pressure receptacle must be requalified in accordance with ISO 10461 (IBR, see § 171.7 of this subchapter).

(3) Dissolved acetylene UN cylinders: Each dissolved acetylene cylinder must be requalified in accordance with ISO 10462 (IBR, see § 171.7 of this

subchapter). The porous mass and the shell must be requalified no sooner than 3 years, 6 months, from the date of manufacture. Thereafter, subsequent requalifications of the porous mass and shell must be performed at least once every ten years.

(4) Composite UN cylinders: Each composite cylinder must be inspected and tested in accordance with ISO 11623 (IBR, see § 171.7 of this subchapter).

■ 48. Section 180.212 is revised to read as follows:

**§ 180.212 Repair of seamless DOT 3-series specification cylinders and seamless UN pressure receptacles.**

(a) *General requirements for repair of DOT 3-series cylinders and UN pressure receptacles.* (1) No person may repair a DOT 3-series cylinder or a seamless UN pressure receptacle unless—

(i) The repair facility holds an approval issued under the provisions in § 107.805 of this subchapter; and

(ii) Except as provided in paragraph (b) of this section, the repair and the inspection is performed under the provisions of an approval issued under subpart H of Part 107 of this subchapter and conform to the applicable cylinder specification or ISO standard contained in part 178 of this subchapter.

(2) The person performing the repair must prepare a report containing, at a minimum, the results prescribed in § 180.215.

(b) *Repairs not requiring prior approval.* Approval is not required for the following specific repairs:

(1) The removal and replacement of a neck ring or foot ring on a DOT 3A, 3AA or 3B cylinder or a UN pressure receptacle that does not affect a pressure part of the cylinder when the repair is performed by a repair facility or a cylinder manufacturer of these types of cylinders. The repair may be made by welding or brazing in conformance with the original specification. After removal and before replacement, the cylinder must be visually inspected and any defective cylinder must be rejected. The heat treatment, testing and inspection of the repair must be performed under the supervision of an inspector and must be performed in accordance with the original specification.

(2) External re-threading of DOT 3AX, 3AAX or 3T specification cylinders or a UN pressure receptacle mounted in a MEGC; or the internal re-threading of a DOT-3 series cylinder or a seamless UN pressure receptacle when performed by the original manufacturer of the cylinder. The repair work must be performed under the supervision of an independent inspection agency. Upon completion of the re-threading, the threads must be gauged in accordance with Federal Standard H-28 or an equivalent standard containing the same specification limits. The re-threaded cylinder must be stamped clearly and

legibly with the words "RETHREAD" on the shoulder, top head, or neck. No DOT specification cylinder or UN cylinder may be re-threaded more than one time without approval of the Associate Administrator.

■ 49. In § 180.213, paragraphs (a), (f)(1), and (f)(7) are revised, and paragraphs (c)(3) and (f)(8) are added, to read as follows:

**§ 180.213 Requalification markings.**

(a) *General.* Each cylinder or UN pressure receptacle requalified in accordance with this subpart with acceptable results must be marked as specified in this section. Required specification markings may not be altered or removed.

\* \* \* \* \*

(c) \* \* \*

(3) For a composite cylinder, the requalification markings must be applied on a pressure sensitive label, securely affixed in a manner prescribed by the cylinder manufacturer, near the original manufacturer's label. Stamping of the composite surface is not authorized.

\* \* \* \* \*

(f) \* \* \*

(1) For designation of the 5-year volumetric expansion test, 10-year volumetric expansion test for UN cylinders and cylinders conforming to § 180.209(f) and (h), or 12-year volumetric expansion test for fire extinguishers conforming to § 173.309(b) of this subchapter and cylinders conforming to § 180.209(e) and 180.209(g), the marking is as illustrated in paragraph (d) of this section.

\* \* \* \* \*

(7) For designation of DOT 8 series and UN cylinder shell and porous filler requalification, the marking is as illustrated in paragraph (d) of this section, except that the "X" is replaced with the letters "FS."

(8) For designation of a nondestructive examination combined with a visual inspection, the marking is as illustrated in paragraph (d) of this section, except that the "X" is replaced with the type of test performed, for example the letters "AE" for acoustic emission or "UE" for ultrasonic examination.

■ 50. Section 180.217 is added to read as follows:

**§ 180.217 Requalification requirements for MEGCs.**

(a) *Periodic inspections.* Each MEGC must be given an initial visual inspection and test in accordance with § 178.75(i) of this subchapter before being put into service for the first time. After the initial inspection, a MEGC must be inspected at least once every five years.

(1) The 5-year periodic inspection must include an external examination of the structure, the pressure receptacles and the service equipment, as follows:

(i) The pressure receptacles are inspected externally for pitting, corrosion, abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the MEGC unsafe for transport.

(ii) The piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including leakage, that might render the MEGC unsafe for filling, discharge or transport.

(iii) Missing or loose bolts or nuts on any flanged connection or blank flange are replaced or tightened.

(iv) All emergency devices and valves are free from corrosion, distortion and any damage or defect that could prevent their normal operation. Remote closure devices and self-closing stop valves must be operated to demonstrate proper operation.

(v) Required markings on the MEGC are legible in accordance with the applicable requirements.

(vi) The framework, the supports and the arrangements for lifting the MEGC are in satisfactory condition.

(2) The MEGC's pressure receptacles and piping must be periodically requalified as prescribed in § 180.207(c), at the interval specified in Table 1 in § 180.207.

(b) *Exceptional inspection and test.* If a MEGC shows evidence of damaged or corroded areas, leakage, or other conditions that indicate a deficiency that could affect the integrity of the MEGC, an exceptional inspection and test must be performed, regardless of the last periodic inspection and test. The extent of the exceptional inspection and test will depend on the amount of damage or deterioration of the MEGC. As a minimum, an exceptional inspection of a MEGC must include inspection as specified in paragraph (a)(1) of this section.

(c) *Correction of unsafe condition.* When evidence of any unsafe condition

is discovered, the MEGC may not be returned to service until the unsafe condition has been corrected and the MEGC has been requalified in accordance with the applicable tests and inspection.

(d) *Repairs and modifications to MEGCs.* No person may perform a modification to an approved MEGC that may affect conformance to the applicable ISO standard or safe use, and that involve a change to the design type or affect its ability to retain the hazardous material in transportation. Before making any modification changes to an approved MEGC, the owner must obtain approval from the Associate Administrator as prescribed in § 178.74 of this subchapter. The repair of a MEGC's structural equipment is authorized provided such repairs are made in accordance with the requirements prescribed for its approved design and construction. Any repair to the pressure receptacles of a MEGC must meet the requirements of § 180.212.

(e) *Requalification markings.* Each MEGC must be durably and legibly marked in English, with the year and month, and the type of the most recent periodic requalification performed (e.g., 2004-05 AE/UE, where "AE" represents acoustic emission and "UE" represents ultrasonic examination) followed by the stamp of the approval agency who performed or witnessed the most recent test.

(f) *Records.* The owner of each MEGC or the owner's authorized agent must retain a written record of the date and results of all repairs and required inspections and tests. The report must contain the name and address of the person performing the inspection or test. The periodic test and inspection records must be retained until the next inspection or test is completed. Repair records and the initial exceptional inspection and test records must be retained during the period the MEGC is in service and for one year thereafter. These records must be made available for inspection by a representative of the Department on request.

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**Brigham A. McCown,**  
*Acting Administrator.*

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