

(3) The pool-fire simulator must be constructed in a manner that results in total flame engulfment of the front surface of the bare plate. The apex of the flame must be directed at the center of the plate.

(4) The bare plate holder must be constructed in such a manner that the only heat transfer to the back side of the bare plate is by heat conduction through the plate and not by other heat paths.

(5) Before the bare plate is exposed to the simulated pool fire, none of the temperature recording devices may indicate a plate temperature in excess of 37.8 °C (100 °F) nor less than 0 °C (32 °F).

(6) A minimum of two thermocouple devices must indicate 427 °C (800 °F) after 13 minutes, plus-or-minus one minute, of simulated pool-fire exposure.

b. A thermal protection system must be tested in the simulated pool-fire environment described in paragraph 2a of this appendix in the following manner:

(1) The thermal protection system must cover one side of a bare plate as described in paragraph 2a(2) of this appendix.

(2) The non-protected side of the bare plate must be instrumented with not less than nine thermocouples placed as described in paragraph 2a(2) of this appendix to record the thermal response of the plate.

(3) Before exposure to the pool-fire simulation, none of the thermocouples on the thermal protection system configuration may indicate a plate temperature in excess of 37.8 °C (100 °F) nor less than 0 °C (32 °F).

(4) The entire surface of the thermal protection system must be exposed to the simulated pool fire.

(5) A pool-fire simulation test must run for a minimum of 100 minutes. The thermal protection system must retard the heat flow to the plate so that none of the thermocouples on the non-protected side of the plate indicate a plate temperature in excess of 427 °C (800 °F).

(6) A minimum of three consecutive successful simulation fire tests must be performed for each thermal protection system.

3. Simulated torch fire test.

a. A torch-fire environment must be simulated in the following manner:

(1) The source of the simulated torch must be a hydrocarbon fuel with a flame temperature of 1,204 °C (2,200 °F), plus-or-minus 37.8 °C (100 °F), throughout the duration of the test. Furthermore, torch velocities must be 64.4 km/h ± 16 km/h (40 mph ± 10 mph) throughout the duration of the test.

(2) A square bare plate with thermal properties equivalent to the material of construction of the tank car must be used. The plate dimensions must be at least four feet by four feet by nominal 1.6 cm (0.625 inch) thick. The bare plate must be instrumented with not less than nine thermocouples to record the thermal response of the plate. The

thermocouples must be attached to the surface not exposed to the simulated torch and must be divided into nine equal squares with a thermocouple placed in the center of each square.

(3) The bare plate holder must be constructed in such a manner that the only heat transfer to the back side of the plate is by heat conduction through the plate and not by other heat paths. The apex of the flame must be directed at the center of the plate.

(4) Before exposure to the simulated torch, none of the temperature recording devices may indicate a plate temperature in excess of 37.8 °C (100 °F) or less than 0 °C (32 °F).

(5) A minimum of two thermocouples must indicate 427 °C (800 °F) in four minutes, plus-or-minus 30 seconds, of torch simulation exposure.

b. A thermal protection system must be tested in the simulated torch-fire environment described in paragraph 3a of this appendix in the following manner:

(1) The thermal protection system must cover one side of the bare plate identical to that used to simulate a torch fire under paragraph 3a(2) of this appendix.

(2) The back of the bare plate must be instrumented with not less than nine thermocouples placed as described in paragraph 3a(2) of this appendix to record the thermal response of the material.

(3) Before exposure to the simulated torch, none of the thermocouples on the back side of the thermal protection system configuration may indicate a plate temperature in excess of 37.8 °C (100 °F) nor less than 0 °C (32 °F).

(4) The entire outside surface of the thermal protection system must be exposed to the simulated torch-fire environment.

(5) A torch-simulation test must be run for a minimum of 30 minutes. The thermal protection system must retard the heat flow to the plate so that none of the thermocouples on the backside of the bare plate indicate a plate temperature in excess of 427 °C (800 °F).

(6) A minimum of two consecutive successful torch-simulation tests must be performed for each thermal protection system.

[Amdt. 179-50, 60 FR 49078, Sept. 21, 1995]

PART 180—CONTINUING QUALIFICATION AND MAINTENANCE OF PACKAGINGS

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§ 180.1

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- APPENDIX B TO PART 180—ACCEPTABLE INTERNAL SELF-CLOSING STOP VALVE LEAKAGE TESTS FOR CARGO TANKS TRANSPORTING LIQUEFIED COMPRESSED GASES

AUTHORITY: 49 U.S.C. 5101–5127; 49 CFR 1.53.

SOURCE: Amdt. 180–2, 54 FR 25032, June 12, 1989, unless otherwise noted.

Subpart A—General

§ 180.1 Purpose and scope.

This part prescribes requirements pertaining to the maintenance, reconditioning, repair, inspection and testing of packagings, and any other function having an effect on the continuing qualification and use of a packaging under the requirements of this subchapter.

§ 180.2 Applicability.

(a) Any person who performs a function prescribed in this part shall perform that function in accordance with this part.

(b) Any person who performs a function prescribed in this part is considered subject to the regulations of this subchapter when that person—

(1) Makes any representation indicating compliance with one or more of the requirements of this part; or

(2) Reintroduces into commerce a packaging that bears markings indicating compliance with this part.

[Amdt. 180–2, 54 FR 25032, June 12, 1989, as amended by Amdt. 180–2, 56 FR 27877, June 17, 1991]

§ 180.3 General requirements.

(a) No person may represent, mark, certify, sell, or offer a packaging or container as meeting the requirements of this part, or an exemption pertaining to this part issued under subchapter A of this chapter, whether or

not the packaging or container is intended to be used for the transportation of a hazardous material, unless it is marked, maintained, reconditioned, repaired, or retested, as appropriate, in accordance with this part, an approval issued thereunder, or an exemption issued under subchapter A of this chapter.

(b) The representations, markings, and certifications subject to the prohibitions of paragraph (a) of this section include:

(1) Identifications that include the letters "DOT", "MC", "ICC", or "UN";

(2) Exemption, approval, and registration numbers that include the letters "DOT";

(3) Test dates displayed in association with specification, registration, approval, or exemption markings indicating conformance to a test or retest requirement of this subchapter, an approval issued thereunder, or an exemption issued under subchapter A of this chapter;

(4) Documents indicating conformance to the testing, inspection, maintenance or other continuing qualification requirements of this part; and

(5) Sales literature, including advertising, indicating that the packaging or container represented therein conforms to requirements contained in subchapter A or C of this chapter.

[Amdt. 180-2, 54 FR 25032, June 12, 1989, as amended by Amdt. 180-3, 58 FR 33306, June 16, 1993]

Subpart B [Reserved]

Subpart C—Qualification, Maintenance and Use of Cylinders

SOURCE: 67 FR 51660, Aug. 8, 2002, unless otherwise noted.

§ 180.201 Applicability.

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

§ 180.203 Definitions.

In addition to the definitions contained in §171.8 of this subchapter, the following definitions apply to this subpart:

Commercially free of corrosive components means a hazardous material having a dew point at or below minus 46.7 °C (minus 52 °F) at 101kPa (1 atmosphere) and free of components that will adversely react with the cylinder (e.g. chemical stress corrosion).

Condemn means a determination that a cylinder is unserviceable for the continued transportation of hazardous materials in commerce and that the cylinder may not be restored by repair, rebuilding, requalification, or any other procedure.

Defect means an imperfection requiring removal of a cylinder from service.

Elastic expansion means a temporary increase in a cylinder's volume, due to application of pressure, that is lost when pressure is released (elastic expansion = total expansion minus permanent expansion).

Filled or charged means an introduction or presence of a hazardous material in a cylinder.

Non-corrosive service means a hazardous material that, in the presence of moisture, is not corrosive to the materials of construction of a cylinder (including valve, pressure relief device, etc.).

Over-heated means a condition in which the temperature of any portion of an aluminum cylinder has reached 176 °C (350 °F) or higher, or in which the temperature of any portion of a steel or nickel cylinder has reached 343 °C (650 °F) or higher.

Permanent expansion means a permanent increase in a cylinder's volume after the test pressure is released.

Proof pressure test means a pressure test by interior pressurization without the determination of a cylinder's expansion.

Rebuild means the replacement of a pressure part (e.g. a wall, head, or pressure fitting) by welding.

Rejected cylinder means a cylinder that cannot be used for the transportation of a hazardous material in commerce without repair, rebuilding, and requalification.

Repair means a procedure for correction of a rejected cylinder that may involve welding.

Requalification means the completion of a visual inspection and/or the test(s) required to be performed on a cylinder to determine its suitability for continued service.

Requalification identification number or RIN means a code assigned by DOT to uniquely identify a cylinder requalification, repair, or rebuilding facility.

Test pressure means the pressure used for the requalification of a cylinder.

Total expansion means the total increase in a cylinder's volume due to application of the test pressure.

Visual inspection means an internal or external visual examination, or both, performed as part of the cylinder requalification process.

Volumetric expansion test means a pressure test to determine the total and permanent expansion of a cylinder at a given pressure. The *volumetric expansion test* is conducted using the water jacket or direct expansion methods:

(1) *Water jacket method* means a volumetric expansion test to determine a cylinder's total and permanent expansion by measuring the difference between the volume of water the cylinder externally displaces at test pressure and the volume of water the cylinder externally displaces at ambient pressure.

(2) *Direct expansion method* means a volumetric expansion test to calculate a cylinder's total and permanent expansion by measuring the amount of water forced into a cylinder at test pressure, adjusted for the compressibility of water, as a means of determining the expansion.

§ 180.205 General requirements for requalification of cylinders.

(a) *General.* Each cylinder used for the transportation of hazardous materials must be an authorized packaging. To qualify as an authorized packaging, each cylinder must conform to this subpart, the applicable requirements specified in part 173 of this subchapter, and the applicable requirements of subpart C of part 178 of this subchapter.

(b) *Persons performing requalification functions.* No person may represent

that a repair or requalification of a cylinder has been performed in accordance with the requirements in this subchapter unless that person holds a current approval issued under the procedural requirements prescribed in subpart I of part 107 of this chapter. No person may mark a cylinder with a RIN and a requalification date or otherwise represent that a DOT specification or exemption cylinder has been requalified unless all applicable requirements of this subpart have been met. A person who requalifies cylinders must maintain the records prescribed in § 180.215 at each location at which it inspects, tests, or marks cylinders.

(c) *Periodic requalification of cylinders.* Each cylinder bearing a DOT specification marking must be requalified and marked as specified in the Requalification Table in this subpart. Each cylinder bearing a DOT exemption number must be requalified and marked in conformance with this section and the terms of the applicable exemption. No cylinder may be filled with a hazardous material and offered for transportation in commerce unless that cylinder has been successfully requalified and marked in accordance with this subpart. A cylinder may be requalified at any time during or before the month and year that the requalification is due. However, a cylinder filled before the requalification becomes due may remain in service until it is emptied. A cylinder with a specified service life may not be refilled and offered for transportation after its authorized service life has expired.

(1) Each cylinder that is requalified in accordance with the requirements specified in this section must be marked in accordance with § 180.213.

(2) Each cylinder that fails requalification must be:

(i) Rejected and may be requalified in accordance with § 180.211; or

(ii) Condemned in accordance with paragraph (i) of this section.

(3) For DOT specification cylinders, the marked service pressure may be changed upon approval of the Associate Administrator and in accordance with written procedures specified in the approval.

(4) For a DOT-3 series cylinder, at the first requalification due on and after

October 1, 2002, the set pressure of a pressure relief device must be set at test pressure with a tolerance of plus zero and minus 10%.

(d) *Conditions requiring test and inspection of cylinders.* Without regard to any other periodic requalification requirements, a cylinder must be tested and inspected in accordance with this section prior to further use if—

(1) The cylinder shows evidence of dents, corrosion, cracked or abraded areas, leakage, thermal damage, or any other condition that might render it unsafe for use in transportation;

(2) The cylinder has been in an accident and has been damaged to an extent that may adversely affect its lading retention capability;

(3) The cylinder shows evidence of or is known to have been over-heated; or

(4) The Associate Administrator determines that the cylinder may be in an unsafe condition.

(e) *Cylinders containing Class 8 (corrosive) liquids.* A cylinder previously containing a Class 8 (corrosive) liquid may not be used to transport a Class 2 material in commerce unless the cylinder is—

(1) Visually inspected, internally and externally, in accordance with paragraph (f) of this section and the inspection is recorded as prescribed in § 180.215;

(2) Requalified in accordance with this section, regardless of the date of the previous requalification;

(3) Marked in accordance with § 180.213; and

(4) Decontaminated to remove all significant residue or impregnation of the Class 8 material.

(f) *Visual inspection.* Except as otherwise provided in this subpart, each time a cylinder is pressure tested, it must be given an internal and external visual inspection.

(1) The visual inspection must be performed in accordance with the following CGA Pamphlets: C-6 for steel and nickel cylinders (incorporated by reference; *see* § 171.7 of this subchapter); C-6.1 for seamless aluminum cylinders (incorporated by reference; *see* § 171.7 of this subchapter); C-6.2 for fiber reinforced composite exemption cylinders (incorporated by reference; *see* § 171.7 of this subchapter); C-6.3 for low pressure

aluminum cylinders (incorporated by reference; *see* § 171.7 of this subchapter); C-8 for DOT 3HT cylinders (incorporated by reference; *see* § 171.7 of this subchapter); and C-13 for DOT 8 series cylinders (incorporated by reference; *see* § 171.7 of this subchapter).

(2) For each cylinder with a coating or attachments that would inhibit inspection of the cylinder, the coating or attachments must be removed before performing the visual inspection.

(3) Each cylinder subject to visual inspection must be approved, rejected, or condemned according to the criteria in the applicable CGA pamphlet.

(4) In addition to other requirements prescribed in this paragraph (f), a DOT specification or exemption cylinder made of aluminum alloy 6351-T6 must be inspected for evidence of sustained load cracking in the neck and shoulder area in accordance with the cylinder manufacturer's written recommendations, which must be approved in writing by the Associate Administrator.

(g) *Pressure test.* (1) Unless otherwise provided, each cylinder required to be retested under this subpart must be retested by means suitable for measuring the expansion of the cylinder under pressure. Bands and other removable attachments must be loosened or removed before testing so that the cylinder is free to expand in all directions.

(2) The pressure indicating device of the testing apparatus must permit reading of pressures to within 1% of the minimum prescribed test pressure of each cylinder tested, except that for an analog device, interpolation to ½ of the marked gauge divisions is acceptable. The expansion-indicating device of the testing apparatus must also permit incremental reading of the cylinder expansion to 1% of the total expansion of each cylinder tested or 0.1 cm³, whichever is larger. Midpoint visual interpolation is permitted.

(3) Each day before retesting, the retester shall confirm, by using a calibrated cylinder or other method authorized in writing by the Associate Administrator, that:

(i) The pressure-indicating device, as part of the retest apparatus, is accurate within ±1.0% of the prescribed test pressure of any cylinder tested that day. The pressure indicating device,

itself, must be certified as having an accuracy of $\pm 0.5\%$, or better, of its full range, and must permit readings of pressure from 90%-110% of the minimum prescribed test pressure of the cylinder to be tested. The accuracy of the pressure indicating device within the test system can be demonstrated at any point within 500 psig of the actual test pressure for test pressures at or above 3000 psig, or 10% of the actual test pressure for test pressures below 3000 psig.

(ii) The expansion-indicating device, as part of the retest apparatus, gives a stable reading of expansion and is accurate to $\pm 1.0\%$ of the total expansion of any cylinder tested or 0.1 cubic centimeter, whichever is larger. The expansion-indicating device itself must have an accuracy of $\pm 0.5\%$, or better, of its full scale.

(4) The test equipment must be verified to be accurate within $\pm 1.0\%$ of the calibrated cylinder's pressure and corresponding expansion values. This may be accomplished by bringing the pressure to a value shown on the calibration certificate for the calibrated cylinder used and verifying that the resulting total expansion is within $\pm 1.0\%$ of the total expansion shown on the calibration certificate. Alternatively, calibration may be demonstrated by bringing the total expansion to a known value on the calibration certificate for the calibrated cylinder used and verifying that the resulting pressure is within $\pm 1.0\%$ of the pressure shown on the calibration certificate. The calibrated cylinder must show no permanent expansion. The retester must demonstrate calibration in conformance with this paragraph (g) to an authorized inspector on any day that it retests cylinders. A retester must maintain calibrated cylinder certificates in conformance with § 180.215(b)(4).

(5) Minimum test pressure must be maintained for at least 30 seconds, and as long as necessary for complete expansion of the cylinder. A system check may be performed at or below 90% of test pressure prior to the retest. In the case of a malfunction of the test equipment, the test may be repeated at a pressure increased by 10% or 100 psig, whichever is less. This paragraph (g)

does not authorize retest of a cylinder otherwise required to be condemned under paragraph (i) of this section.

(h) *Cylinder rejection.* A cylinder must be rejected when, after a visual inspection, it meets a condition for rejection under the visual inspection requirements of paragraph (f) of this section.

(1) Except as provided in paragraphs (h)(3) and (h)(4) of this section, a cylinder that is rejected may not be marked as meeting the requirements of this section.

(2) The requalifier must notify the cylinder owner, in writing, that the cylinder has been rejected.

(3) Unless the cylinder is requalified in conformance with requirements in § 180.211, it may not be filled with a hazardous material and offered for transportation in commerce where use of a specification packaging is required.

(4) A rejected cylinder with a service pressure of less than 900 psig may be requalified and marked if the cylinder is repaired or rebuilt and subsequently inspected and tested in conformance with—

(i) The visual inspection requirements of paragraph (f) of this section;

(ii) Part 178 of this subchapter and this part;

(iii) Any exemption covering the manufacture, requalification, and/or use of that cylinder; and

(iv) Any approval required under § 180.211.

(i) *Cylinder condemnation.* (1) A cylinder must be condemned when—

(i) The cylinder meets a condition for condemnation under the visual inspection requirements of paragraph (f) of this section.

(ii) The cylinder leaks through its wall.

(iii) Evidence of cracking exists to the extent that the cylinder is likely to be weakened appreciably.

(iv) For a DOT specification cylinder, other than a DOT 4E aluminum cylinder or an exemption cylinder, permanent expansion exceeds 10 percent of total expansion.

(v) For a DOT 3HT cylinder—

(A) The pressure test yields an elastic expansion exceeding the marked rejection elastic expansion (REE) value.

(B) The cylinder shows evidence of denting or bulging.

(C) The cylinder bears a manufacture or an original test date older than twenty-four years or after 4380 pressurizations, whichever occurs first. If a cylinder is refilled, on average, more than once every other day, an accurate record of the number of rechargings must be maintained by the cylinder owner or the owner's agent.

(vi) For a DOT 4E aluminum cylinder, permanent expansion exceeds 12 percent of total expansion.

(vii) For a DOT exemption cylinder, permanent expansion exceeds the limit in the applicable exemption, or the cylinder meets another criterion for condemnation in the applicable exemption.

(viii) For an aluminum or an aluminum-lined composite exemption cylinder, the cylinder is known to have been or shows evidence of having been over-heated.

(2) When a cylinder must be condemned, the requalifier must stamp a series of X's over the DOT specification number and the marked pressure or

stamp "CONDEMNED" on the shoulder, top head, or neck using a steel stamp. Alternatively, at the direction of the owner, the requalifier may render the cylinder incapable of holding pressure. In addition, the requalifier must notify the cylinder owner, in writing, that the cylinder is condemned and may not be filled with hazardous material and offered for transportation in commerce where use of a specification packaging is required.

(3) No person may remove or obliterate the "CONDEMNED" marking.

§ 180.207 [Reserved]

§ 180.209 Requirements for requalification of specification cylinders.

(a) *Periodic qualification of cylinders.*

(1) Each specification cylinder that becomes due for periodic requalification, as specified in the following table, must be requalified and marked in conformance with the requirements of this subpart. Requalification records must be maintained in accordance with § 180.215. Table 1 follows:

TABLE 1.—REQUALIFICATION OF CYLINDERS¹

Specification under which cylinder was made	Minimum test pressure (psig) ²	Test period (years)
DOT 3	3000 psig	5
DOT 3A, 3AA	5/3 times service pressure, except non-corrosive service (see § 180.209(g)).	5, 10, or 12 (see § 180.209(b), (f), (h), and (j))
DOT 3AL	5/3 times service pressure	5 or 12 (see § 180.209(j))
DOT 3AX, 3AAX	5/3 times service pressure	5
3B, 3BN	2 times service pressure (see § 180.209(g)).	5 or 10 (see § 180.209(f))
3E	Test not required.	
3HT	5/3 times service pressure	3 (see §§ 180.209(i) and 180.213(c))
3T	5/3 times service pressure	5
4AA480	2 times service pressure (see § 180.209(g)).	5 or 10 (see § 180.209(e)(14))
4B, 4BA, 4BW, 4B-240ET	2 times service pressure, except non-corrosive service (see § 180.209(g)).	5, 10, or 12 (see § 180.209(e), (f), and (j))
4D, 4DA, 4DS	2 times service	5
DOT 4E	2 times service pressure, except non-corrosive (see § 180.209(g)).	5
4L	Test not required.	
8, 8AL		10 or 20 (see § 180.209(i))
Exemption cylinder	See current exemption	See current exemption
Foreign cylinder (see § 173.301(j) of this subchapter for restrictions on use).	As marked on cylinder, but not less than 5/3 of any service or working pressure marking.	5 (see §§ 180.209(k) and 180.213(d)(iii))

¹ Any cylinder not exceeding 2 inches outside diameter and less than 2 feet in length is excepted from volumetric expansion test.

² For cylinders not marked with a service pressure, see § 173.301(e)(1) of this subchapter.

(b) *DOT 3A or 3AA cylinders.* (1) A cylinder conforming to specification DOT 3A or 3AA with a water capacity of 56.7

kg (125 lb) or less that is removed from

any cluster, bank, group, rack, or vehicle each time it is filled, may be requalified every ten years instead of every five years, provided the cylinder conforms to all of the following conditions:

(i) The cylinder was manufactured after December 31, 1945.

(ii) The cylinder is used exclusively for air; argon; cyclopropane; ethylene; helium; hydrogen; krypton; neon; nitrogen; nitrous oxide; oxygen; sulfur hexafluoride; xenon; fluorinated hydrocarbons, liquefied hydrocarbons, and mixtures thereof that are commercially free from corroding components; permitted mixtures of these gases (*see* §173.301(d) of this subchapter); and permitted mixtures of these gases with up to 30 percent by volume of carbon dioxide, provided the gas has a dew point at or below minus (52 °F) at 1 atmosphere.

(iii) Before each refill, the cylinder is removed from any cluster, bank, group, rack or vehicle and passes the hammer test specified in CGA Pamphlet C-6 (incorporated by reference; *see* §171.7 of this subchapter).

(iv) The cylinder is dried immediately after hydrostatic testing to remove all traces of water.

(v) The cylinder is not used for underwater breathing.

(vi) Each cylinder is stamped with a five-pointed star at least one-fourth of an inch high immediately following the test date.

(2) If, since the last required requalification, a cylinder has not been used exclusively for the gases specifically identified in paragraph (b)(1)(ii) of this section, but currently conforms with all other provisions of paragraph (b)(1) of this section, it may be requalified every 10 years instead of every five years, provided it is first requalified and examined as prescribed by §173.302a(b) (2), (3) and (4) of this subchapter.

(3) Except as specified in paragraph (b)(2) of this section, if a cylinder, marked with a star, is filled with a compressed gas other than as specified in paragraph (b)(1)(ii) of this section, the star following the most recent test date must be obliterated. The cylinder must be requalified five years from the marked test date, or prior to the first filling with a compressed gas, if the re-

quired five-year requalification period has passed.

(c) *DOT 4-series cylinders.* A DOT 4-series cylinder, except a 4L cylinder, that at any time shows evidence of a leak or of internal or external corrosion, denting, bulging or rough usage to the extent that it is likely to be weakened appreciably, or that has lost five percent or more of its official tare weight must be requalified before being refilled and offered for transportation. (Refer to CGA Pamphlet C-6 or C-6.3, as applicable, regarding cylinder weakening.) After testing, the actual tare weight must be recorded as the new tare weight.

(d) *Cylinders 5.44 kg (12 lb) or less with service pressures of 300 psig or less.* A cylinder of 5.44 (12 lb) or less water capacity authorized for service pressure of 300 psig or less must be given a complete external visual inspection at the time periodic requalification becomes due. External visual inspection must be in accordance with CGA Pamphlet C-6 or C-6.1 (incorporated by reference; *see* §171.7 of this subchapter). The cylinder may be proof pressure tested. The test is successful if the cylinder, when examined under test pressure, does not display a defect described in §180.205(i)(1) (ii) or (iii). Upon successful completion of the test and inspection, the cylinder must be marked in accordance with §180.213.

(e) *Proof pressure test.* A cylinder made in conformance with specifications DOT 4B, 4BA, 4BW, or 4E used exclusively for: liquefied petroleum gas that meets the requirements in Table I of ASTM D 1835, Standard Specification for Liquefied Petroleum (LP) Gases (incorporated by reference; *see* §171.7 of this subchapter); anhydrous dimethylamine; anhydrous methylamine; anhydrous trimethylamine; methyl chloride; methylacetylene-propadiene stabilized; or dichlorodifluoromethane, difluoroethane, difluorochloroethane, chlorodifluoromethane, chlorotetrafluoroethane, trifluorochloroethylene, or mixture thereof, or mixtures of one or more with trichlorofluoromethane; and commercially free from corroding components and protected externally by a suitable corrosion-resistant coating

(such as galvanizing or painting) may be requalified by volumetric expansion testing every 12 years instead of every five years. As an alternative, the cylinder may be subjected to a proof pressure test at least two times the marked service pressure, but this latter type of test must be repeated every seven years after expiration of the first 12-year period. When subjected to a proof pressure test, the cylinder must be carefully examined under test pressure and removed from service if a leak or defect is found.

(f) *Poisonous materials.* A cylinder conforming to specification DOT 3A, 3AA, 3B, 4BA, or 4BW having a service pressure of 300 psig or less and used exclusively for methyl bromide, liquid; mixtures of methyl bromide and ethylene dibromide, liquid; mixtures of methyl bromide and chlorpicrin, liquid; mixtures of methyl bromide and petroleum solvents, liquid; or methyl bromide and nonflammable, nonliquefied compressed gas mixtures, liquid; commercially free of corroding components, and protected externally by a suitable corrosion resistant coating (such as galvanizing or painting) and internally by a suitable corrosion resistant lining (such as galvanizing) may be tested every 10 years instead of every five years, provided a visual internal and external examination of the cylinder is conducted every five years in accordance with CGA Pamphlet C-6 (incorporated by reference; see § 171.7 of this subchapter). The cylinder must be examined at each filling, and rejected if a dent, corroded area, leak or other condition indicates possible weakness.

(g) *Visual inspections.* A cylinder conforming to a specification listed in the table in this paragraph and used exclusively in the service indicated may, instead of a periodic hydrostatic test, be given a complete external visual inspection at the time periodic requalification becomes due. External visual inspection must be in accordance with CGA Pamphlet C-6 or C-6.3, as applicable (incorporated by reference; see § 171.7 of this subchapter). When this inspection is used instead of hydrostatic pressure testing, subsequent inspections are required at five-year intervals after the first inspection. After September 30, 2003, inspections must be made only by persons holding a current RIN and the results recorded and maintained in accordance with § 180.215. Records must include: date of inspection (month and year); DOT specification number; cylinder identification (registered symbol and serial number, date of manufacture, and owner); type of cylinder protective coating (including statement as to need of refinishing or recoating); conditions checked (*e.g.*, leakage, corrosion, gouges, dents or digs in shell or heads, broken or damaged footing or protective ring or fire damage); disposition of cylinder (returned to service, returned to cylinder manufacturer for repairs or condemned). A cylinder passing requalification by the external visual inspection must be marked in accordance with § 180.213. Specification cylinders must be in exclusive service as shown in the following table:

Cylinders conforming to—	Used exclusively for—
DOT 3A, DOT 3AA, DOT 3A480X, DOT 4AA480	Anhydrous ammonia of at least 99.95% purity.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW.	Butadiene, inhibited, that is commercially free from corroding components.
DOT 3A, DOT 3A480X, DOT 3AA, DOT 3B, DOT 4AA480, DOT 4B, DOT 4BA, DOT 4BW.	Cyclopropane that is commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E.	Fluorinated hydrocarbons and mixtures thereof that are commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E.	Liquefied hydrocarbon gas that is commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3A480X, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E.	Liquefied petroleum gas that meets the requirements in Table I of ASTM D 1835, Standard Specification for Liquefied Petroleum (LP) Gases (incorporated by reference; see § 171.7 of this subchapter).
DOT 3A, DOT 3AA, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW, DOT 4E.	Methylacetylene-propadiene, stabilized, that is commercially free from corroding components.
DOT 3A, DOT 3AA, DOT 3B, DOT 4B, DOT 4BA, DOT 4BW ..	Anhydrous mono, di, trimethylamines that are commercially free from corroding components.
DOT 4B240, DOT 4BW240	Ethyleneimine, inhibited.

(h) *Cylinders containing anhydrous ammonia.* A cylinder conforming to specification DOT 3A, 3A480X, or 4AA480 used exclusively for anhydrous ammonia, commercially free from corroding components, and protected externally by a suitable corrosion-resistant coating (such as paint) may be requalified every 10 years instead of every five years.

(i) *Requalification of DOT–8 series cylinders.* (1) Each owner of a DOT–8 series cylinder used to transport acetylene must have the cylinder shell and the porous filler requalified in accordance with CGA Pamphlet C–13 (incorporated by reference; see §171.7 of this subchapter). Requalification must be performed in accordance with the following schedule:

Date of cylinder manufacture	Shell (visual inspection) requalification		Porous filler requalification	
	Initial	Subsequent	Initial	Subsequent
Before January 1, 1991	Before January 1, 2001	10 years	Before January 1, 2011	Not required.
On or after January 1, 1991.	10 years ¹	10 years	3 to 20 years ²	Not required.

¹ Years from date of cylinder manufacture.
² For a cylinder manufactured on or after January 1, 1991, requalification of the porous filler must be performed no sooner than 3 years, and no later than 20 years, from the date of manufacture.

(2) Unless requalified and marked in accordance with CGA Pamphlet C–13 (incorporated by reference; see §171.7 of this subchapter) before October 1, 1994, an acetylene cylinder must be requalified by a person who holds a current RIN.

(3) If a cylinder valve is replaced, a cylinder valve of the same weight must be used or the tare weight of the cylinder must be adjusted to compensate for valve weight differential.

(4) The person performing a visual inspection or requalification must record the results as specified in §180.215.

(5) The person performing a visual inspection or requalification must mark the cylinder as specified in §180.213.

(j) *Cylinder used as a fire extinguisher.* Only a DOT specification cylinder used as a fire extinguisher and meeting Special Provision 18 in §172.102(c)(1) of this subchapter may be requalified in accordance with this paragraph (j).

(1) A DOT 4B, 4BA, 4B240ET or 4BW cylinder may be tested as follows:

(i) For a cylinder with a water capacity of 5.44 kg (12 lb) or less, by volumetric expansion test using the water jacket method or by proof pressure test. A requalification must be performed by the end of 12 years after the original test date and at 12-year intervals thereafter.

(ii) For a cylinder having a water capacity over 5.44 kg (12 lb)—

(A) *By proof pressure test.* A requalification must be performed by the end

of 12 years after the original test date and at 7-year intervals; or

(B) *By volumetric expansion test using the water jacket method.* A requalification must be performed 12 years after the original test date and at 12-year intervals thereafter.

(2) A DOT 3A, 3AA, or 3AL cylinder must be requalified by volumetric expansion test using the water jacket method. A requalification must be performed 12 years after the original test date and at 12-year intervals thereafter.

(k) *Requalification of foreign cylinders filled for export.* A cylinder manufactured outside the United States, other than as provided in §171.12a of this subchapter, that has not been manufactured, inspected, tested and marked in accordance with part 178 of this subchapter may be filled with compressed gas in the United States, and shipped solely for export if it meets the following requirements, in addition to other requirements of this subchapter:

(1) It has been inspected, tested and marked (with only the month and year of test) in conformance with the procedures and requirements of this subpart or the Associate Administrator has authorized the filling company to fill foreign cylinders under an alternative method of qualification; and

(2) It is offered for transportation in conformance with the requirements of §173.301(1) of this subchapter.

§ 180.211 Repair, rebuilding and reheat treatment of DOT-4 series specification cylinders.

(a) *General requirements for repair and rebuilding.* Any repair or rebuilding of a DOT 4-series cylinder must be performed by a person holding an approval as specified in § 107.805 of this chapter. A person performing a rebuild function is considered a manufacturer subject to the requirements of § 178.2(a)(2) and subpart C of part 178 of this subchapter. The person performing a repair, rebuild, or reheat treatment must record the test results as specified in § 180.215. Each cylinder that is successfully repaired or rebuilt must be marked in accordance with § 180.213.

(b) *General repair requirements.* Each repair of a DOT 4-series cylinder must be made in accordance with the following conditions:

(1) The repair and the inspection of the work performed must be made in accordance with the requirements of the cylinder specification.

(2) The person performing the repair must use the procedure, equipment, and filler metal or brazing material as authorized by the approval issued under § 107.805 of this chapter.

(3) Welding and brazing must be performed on an area free from contaminants.

(4) A weld defect, such as porosity in a pressure retaining seam, must be completely removed before re-welding. Puddling may be used to remove a weld defect only by the tungsten inert gas shielded arc process.

(5) After removal of a non-pressure attachment and before its replacement, the cylinder must be given a visual inspection in accordance with § 180.205(f).

(6) Reheat treatment of DOT 4B, 4BA or 4BW specification cylinders after replacement of non-pressure attachments is not required when the total weld material does not exceed 20.3 cm (8 inches). Individual welds must be at least 7.6 cm (3 inches) apart.

(7) After repair of a DOT 4B, 4BA or 4BW cylinder, the weld area must be leak tested at the service pressure of the cylinder.

(8) Repair of weld defects must be free of cracks.

(9) When a non-pressure attachment with the original cylinder specification

markings is replaced, all markings must be transferred to the attachment on the repaired cylinder.

(10) Walls, heads or bottoms of cylinders with defects or leaks in base metal may not be repaired, but may be replaced as provided for in paragraph (d) of this section.

(c) *Additional repair requirements for 4L cylinders.* (1) Repairs to a DOT 4L cylinder must be performed in accordance with paragraphs (a) and (b) of this section and are limited to the following:

(i) The removal of either end of the insulation jacket to permit access to the cylinder, piping system, or neck tube.

(ii) The replacement of the neck tube. At least a 13 mm (0.51 inch) piece of the original neck tube must be protruding above the cylinder's top end. The original weld attaching the neck tube to the cylinder must be sound and the replacement neck tube must be welded to this remaining piece of the original neck tube.

(iii) The replacement of material such as, but not limited to, the insulating material and the piping system within the insulation space is authorized. The replacement material must be equivalent to that used at the time of original manufacture.

(iv) Other welding procedures that are permitted by CGA Pamphlet C-3 (incorporated by reference; see § 171.7 of this subchapter), and not excluded by the definition of "rebuild," are authorized.

(2) After repair, the cylinder must be—

(i) Pressure tested in accordance with the specifications under which the cylinder was originally manufactured;

(ii) Leak tested before and after assembly of the insulation jacket using a mass spectrometer detection system; and

(iii) Tested for heat conductivity requirements.

(d) *General rebuilding requirements.* (1) The rebuilding of a DOT 4-series cylinder must be made in accordance with the following requirements:

(i) The person rebuilding the cylinder must use the procedures and equipment as authorized by the approval issued under § 107.805 of this chapter.

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(ii) After removal of a non-pressure component and before replacement of any non-pressure component, the cylinder must be visually inspected in accordance with CGA Pamphlet C-6 (incorporated by reference; see §171.7 of this subchapter).

(iii) The rebuilder may rebuild a DOT 4B, 4BA or 4BW cylinder having a water capacity of 9.07 kg (20 lb) or greater by replacing a head of the cylinder using a circumferential joint. When this weld joint is located at other than an original welded joint, a notation of this modification must be shown on the Manufacturer's Report of Rebuilding in §180.215(d)(2). The weld joint must be on the cylindrical section of the cylinder.

(iv) Any welding and the inspection of the rebuilt cylinder must be in accordance with the requirements of the applicable cylinder specification and the following requirements:

(A) Rebuilding of any cylinder involving a joint subject to internal pressure may only be performed by fusion welding;

(B) Welding must be performed on an area free from contaminants; and

(C) A weld defect, such as porosity in a pressure retaining seam, must be completely removed before re-welding. Puddling may be used to remove a weld defect only by using the tungsten inert gas shielded arc process.

(2) Any rebuilt cylinder must be—

(i) Heat treated in accordance with paragraph (f) of this section;

(ii) Subjected to a volumetric expansion test on each cylinder. The results of the tests must conform to the applicable cylinder specification;

(iii) Inspected and have test data reviewed to determine conformance with the applicable cylinder specification; and

(iv) Made of material conforming to the specification. Determination of conformance shall include chemical analysis, verification, inspection and tensile testing of the replaced part. Tensile tests must be performed on the replaced part after heat treatment by lots defined in the applicable specification.

(3) For each rebuilt cylinder, an inspector's report must be prepared to in-

clude the information listed in §180.215(d).

(4) Rebuilding a cylinder with brazed seams is prohibited.

(5) When an end with the original cylinder specification markings is replaced, all markings must be transferred to the rebuilt cylinder.

(e) *Additional rebuilding requirements for DOT 4L cylinders.* (1) The rebuilding of a DOT 4L cylinder must be performed in accordance with paragraph (d) of this section. Rebuilding of a DOT 4L cylinder is:

(i) Substituting or adding material in the insulation space not identical to that used in the original manufacture of that cylinder;

(ii) Making a weld repair not to exceed 150 mm (5.9 inches) in length on the longitudinal seam of the cylinder or 300 mm (11.8 inches) in length on a circumferential weld joint of the cylinder; or

(iii) Replacing the outer jacket.

(2) Reheat treatment of cylinders is prohibited.

(3) After rebuilding, each inner containment vessel must be proof pressure tested at 2 times its service pressure. Each completed assembly must be leak-tested using a mass spectrometer detection system.

(f) *Reheat treatment.* (1) Prior to reheat treatment, each cylinder must be given a visual inspection, internally and externally, in accordance with §180.205(f).

(2) Cylinders must be segregated in lots for reheat treatment. The reheat treatment and visual inspection must be performed in accordance with the specification for the cylinders except as provided in paragraph (f)(4) of this section.

(3) After reheat treatment, each cylinder in the lot must be subjected to a volumetric expansion test and meet the acceptance criteria in the applicable specification or be scrapped.

(4) After all welding and heat treatment, a test of the new weld must be performed as required by the original specification. The test results must be recorded in accordance with §180.215.

§ 180.213 Requalification markings.

(a) *General.* Each cylinder 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.

(b) *Placement of markings.* Each cylinder must be plainly and permanently marked on the metal of the cylinder as permitted by the applicable specification. Unless authorized by the cylinder specification, marking on the cylinder sidewall is prohibited.

(1) Requalification and required specification markings must be legible so as to be readily visible at all times. Illegible specification markings may be remarked on the cylinder as provided by the original specification. Requalification markings may be placed on any portion of the upper end of the cylinder excluding the sidewall, as provided in this section. Requalification and required specification markings that are illegible may be reproduced on a metal plate and attached as provided by the original specification.

(2) Previous requalification markings may not be obliterated, except that, when the space originally provided for requalification dates becomes filled, additional dates may be added as follows:

(i) All preceding requalification dates may be removed by peening provided that—

(A) Permission is obtained from the cylinder owner;

(B) The minimum wall thickness is maintained in accordance with manufacturing specifications for the cylinder; and

(C) The original manufacturing test date is not removed.

(ii) When the cylinder is fitted with a footing, additional dates may be marked on the external surface of the footing.

(c) *Requalification marking method.* The depth of requalification markings may not be greater than specified in the applicable specification. The markings must be made by stamping, engraving, scribing or other method that produces a legible, durable mark.

(1) A cylinder used as a fire extinguisher (§180.209(j)) may be marked by using a pressure sensitive label.

(2) For a DOT 3HT cylinder, the test date and RIN must be applied by low-stress steel stamps to a depth no great-

er than that prescribed at the time of manufacture. Stamping on the sidewall is not authorized.

(d) *Requalification markings.* Each cylinder that has successfully passed requalification must be marked with the RIN set in a square pattern, between the month and year of the requalification date. The first character of the RIN must appear in the upper left corner of the square pattern; the second in the upper right; the third in the lower right, and the fourth in the lower left. Example: A cylinder requalified in September 1998, and approved by a person who has been issued RIN "A123", would be marked plainly and permanently into the metal of the cylinder in accordance with location requirements of the cylinder specification or on a metal plate permanently secured to the cylinder in accordance with paragraph (b) of this section. An example of the markings prescribed in this paragraph (d) is as follows:

9 A1 98 X
32

Where:

"9" is the month of requalification,

"A123" is the RIN,

"98" is the year of requalification, and

"X" represents the symbols described in paragraphs (f)(2) through (f)(7) of this section.

(1) Upon a written request, variation from the marking requirement may be approved by the Associate Administrator.

(2) *Exception.* A cylinder subject to the requirements of §173.301(1) of this subchapter may not be marked with a RIN.

(e) *Size of markings.* The size of the markings must be at least 6.35 mm (¼ in.) high, except RIN characters must be at least 3.18 mm (⅛ in.) high.

(f) *Marking illustrations.* Examples of required requalification markings for DOT specification and exemption cylinders are illustrated as follows:

(1) For designation of the 5-year volumetric expansion test, 10-year volumetric expansion test for 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.

(2) For designation of the 10-year volumetric expansion test for cylinders conforming to §180.209(b), the marking is as illustrated in paragraph (d) of this section, except that the “X” is replaced with a five-point star.

(3) For designation of special filling limits up to 10% in excess of the marked service pressure for cylinders conforming to §173.302a(b) of this subchapter, the marking is as illustrated in paragraph (d) of this section, except that the “X” is replaced with a plus sign “+”.

(4) For designation of the proof pressure test, the marking is as illustrated in paragraph (d) of this section, except that the “X” is replaced with the letter “S”.

(5) For designation of the 5-year external visual inspection for cylinders conforming to §180.209(g), the marking is as illustrated in paragraph (d) of this section, except that the “X” is replaced with the letter “E”.

(6) For designation of DOT 8 series cylinder shell requalification only, the marking is as illustrated in paragraph (d) of this section, except that the “X” is replaced with the letter “S”.

(7) For designation of DOT 8 series 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”.

§ 180.215 Reporting and record retention requirements.

(a) *Facility records.* A person who requalifies, repairs or rebuilds cylinders must maintain the following records where the requalification is performed:

(1) Current RIN issuance letter;

(2) If the RIN has expired and renewal is pending, a copy of the renewal request;

(3) Copies of notifications to Associate Administrator required under §107.805 of this chapter;

(4) Current copies of those portions of this subchapter applicable to its cylinder requalification and marking activities at that location;

(5) Current copies of all exemptions governing exemption cylinders requalified or marked by the requalifier at that location; and

(6) The information contained in each applicable CGA or ASTM standard incorporated by reference in §171.7 of this subchapter applicable to the requalifier’s activities. This information must be the same as contained in the edition incorporated by reference in §171.7 of this subchapter.

(b) *Requalification records.* Daily records of visual inspection, pressure test, and ultrasonic examination if permitted under an exemption, as applicable, must be maintained by the person who performs the requalification until either the expiration of the requalification period or until the cylinder is again requalified, whichever occurs first. A single date may be used for each test sheet, provided each test on the sheet was conducted on that date. Ditto marks or a solid vertical line may be used to indicate repetition of the preceding entry for the following entries only: date; actual dimensions; manufacturer’s name or symbol, if present; owner’s name or symbol, if present; and test operator. Blank spaces may not be used to indicate repetition of a prior entry. The records must include the following information:

(1) *Pressure test records.* For each test to demonstrate calibration, the date; serial number of the calibrated cylinder; calibration test pressure; total, elastic and permanent expansions; and legible identification of test operator. The test operator must be able to demonstrate that the results of the daily calibration verification correspond to the hydrostatic tests performed on that day. The daily verification of calibration(s) may be recorded on the same sheets as, and with, test records for that date.

(2) *Pressure test and visual inspection records.* The date of requalification; serial number; DOT specification or exemption number; marked pressure; actual dimensions; manufacturer’s name or symbol; owner’s name or symbol, if present; result of visual inspection; actual test pressure; total, elastic and

permanent expansions; percent permanent expansion; disposition, with reason for any repeated test, rejection or condemnation; and legible identification of test operator. For each cylinder marked pursuant to §173.302a(b)(5) of this subchapter, the test sheet must indicate the method by which any average or maximum wall stress was computed. Records must be kept for all completed, as well as unsuccessful tests. The entry for a second test after a failure to hold test pressure must indicate the date of the earlier test.

(3) *Wall stress.* Calculations of average and maximum wall stress pursuant to §173.302a(b)(3) of this subchapter, if performed.

(4) *Calibration certificates.* The most recent certificate of calibration must be maintained for each calibrated cylinder.

(c) *Repair, rebuilding or reheat treatment records.* (1) Records covering welding or brazing repairs, rebuilding or reheat treating shall be retained for a minimum of fifteen years by the approved facility.

(2) A record of rebuilding, in accordance with §180.211(d), must be completed for each cylinder rebuilt. The record must be clear, legible, and contain the following information:

(i) Name and address of test facility, date of test report, and name of original manufacturer;

(ii) Marks stamped on cylinder to include specification number, service pressure, serial number, symbol of manufacturer, inspector's mark, and other marks, if any;

(iii) Cylinder outside diameter and length in inches;

(iv) Rebuild process (welded, brazed, type seams, etc.);

(v) Description of assembly and any attachments replaced (e.g., neckrings, footrings);

(vi) Chemical analysis of material for the cylinder, including seat and Code No., type of analysis (ladle, check), chemical components (Carbon (C), Phosphorous (P), Sulfur (S), Silicon (Si), Manganese (Mn), Nickel (Ni), Chromium (Cr), Molybdenum (Mo), Copper (Cu), Aluminum (Al), Zinc (Zn)), material manufacturer, name of person performing the analysis, results of physical tests of material for cyl-

inder (yield strength (psi), tensile strength (psi), elongation percentage (inches), reduction in area percentage, weld bend, tensile bend, name of inspector);

(vii) Results of proof pressure test on cylinder, including test method, test pressure, total expansion, permanent expansion, elastic expansion, percent permanent expansion (permanent expansion may not exceed ten percent (10%) of total expansion), and volumetric capacity (volumetric capacity of a rebuilt cylinder must be within $\pm 3\%$ of the calculated capacity);

(viii) Each report must include the following certification statement: "I certify that this rebuilt cylinder is accurately represented by the data above and conforms to all of the requirements in Subchapter C of Chapter I of Title 49 of the Code of Federal Regulations.". The certification must be signed by the rebuild technician and principal, officer, or partner of the rebuild facility.

Subpart D—Qualification and Maintenance of IBCs

SOURCE: Amdt. 180-5, 59 FR 38079, July 26, 1994, unless otherwise noted.

§ 180.350 Applicability.

This subpart prescribes requirements, in addition to those contained in parts 107, 171, 172, 173, and 178 of this chapter, applicable to any person responsible for the continuing qualification, maintenance, or periodic retesting of an IBC.

[Amdt. 180-5, 59 FR 38079, July 26, 1994, as amended at 66 FR 45391, Aug. 28, 2001]

§ 180.351 Qualification of IBCs.

(a) *General.* Each IBC used for the transportation of hazardous materials must be an authorized packaging.

(b) *IBC specifications.* To qualify as an authorized packaging, each IBC must conform to this subpart, the applicable requirements specified in part 173 of this subchapter, and the applicable requirements of subparts N and O of part 178 of this subchapter.

[Amdt. 180-5, 59 FR 38079, July 26, 1994, as amended at 66 FR 45391, Aug. 28, 2001]

§ 180.352 Requirements for retest and inspection of IBCs.

(a) *General.* Each IBC constructed in accordance with a UN standard for which a test or inspection specified in paragraphs (b)(1), (b)(2) and (b)(3) of this section is required may not be filled and offered for transportation or transported until the test or inspection has been successfully completed. This paragraph does not apply to any IBC filled prior to the test or inspection due date. The requirements in this section do not apply to DOT 56 and 57 portable tanks.

(b) *Test and inspections for metal, rigid plastic, and composite IBCs.* Each IBC is subject to the following test and inspections:

(1) Each IBC intended to contain solids that are loaded or discharged under pressure or intended to contain liquids must be tested in accordance with the leakproofness test prescribed in §178.813 of this subchapter every 2.5 years, starting from the date of manufacture or the date of a repair conforming to paragraph (d)(1) of this section.

(2) An external visual inspection must be conducted initially after production and every 2.5 years starting from the date of manufacture or the date of a repair conforming to paragraph (d)(1) of this section to ensure that:

(i) The IBC is marked in accordance with requirements in §178.703 of this subchapter. Missing or damaged markings, or markings difficult to read must be restored or returned to original condition.

(ii) Service equipment is fully functional and free from damage which may cause failure. Missing, broken, or damaged parts must be repaired or replaced.

(iii) The IBC is capable of withstanding the applicable design qualification tests. The IBC must be externally inspected for cracks, warpage, corrosion or any other damage which might render the IBC unsafe for transportation. An IBC found with such defects must be removed from service or repaired in accordance with paragraph (d) of this section. The inner receptacle of a composite IBC must be removed from the outer IBC body for inspection

unless the inner receptacle is bonded to the outer body or unless the outer body is constructed in such a way (e.g., a welded or riveted cage) that removal of the inner receptacle is not possible without impairing the integrity of the outer body. Defective inner receptacles must be replaced in accordance with paragraph (d) of this section or the entire IBC must be removed from service. For metal IBCs, thermal insulation must be removed to the extent necessary for proper examination of the IBC body.

(3) Each metal, rigid plastic and composite IBC must be internally inspected at least every five years to ensure that the IBC is free from damage and to ensure that the IBC is capable of withstanding the applicable design qualification tests.

(i) The IBC must be internally inspected for cracks, warpage, and corrosion or any other defect that might render the IBC unsafe for transportation. An IBC found with such defects must be removed from hazardous materials service until restored to the original design type of the IBC.

(ii) Metal IBCs must be inspected to ensure the minimum wall thickness requirements in §178.705(c)(1)(iv) of this subchapter are met. Metal IBCs not conforming to minimum wall thickness requirements must be removed from hazardous materials service.

(c) *Visual inspection for flexible, fiberboard, or wooden IBCs.* Each IBC must be visually inspected prior to first use and permitted reuse, by the person who places hazardous materials in the IBC, to ensure that:

(1) The IBC is marked in accordance with requirements in §178.703 of this subchapter. Additional marking allowed for each design type may be present. Required markings that are missing, damaged or difficult to read must be restored or returned to original condition.

(2) Proper construction and design specifications have been met.

(i) Each flexible IBC must be inspected to ensure that:

(A) Lifting straps if used, are securely fastened to the IBC in accordance with the design type.

(B) Seams are free from defects in stitching, heat sealing or gluing which

would render the IBC unsafe for transportation of hazardous materials. All stitched seam-ends must be secure.

(C) Fabric used to construct the IBC is free from cuts, tears and punctures. Additionally, fabric must be free from scoring which may render the IBC unsafe for transport.

(ii) Each fiberboard IBC must be inspected to ensure that:

(A) Fluting or corrugated fiberboard is firmly glued to facings.

(B) Seams are creased and free from scoring, cuts, and scratches.

(C) Joints are appropriately overlapped and glued, stitched, taped or stapled as prescribed by the design. Where staples are used, the joints must be inspected for protruding staple-ends which could puncture or abrade the inner liner. All such ends must be protected before the IBC is authorized for hazardous materials service.

(iii) Each wooden IBC must be inspected to ensure that:

(A) End joints are secured in the manner prescribed by the design.

(B) IBC walls are free from defects in wood. Inner protrusions which could puncture or abrade the liner must be covered.

(d) *Requirements applicable to repair of IBCs.* (1) Except for flexible and fiberboard IBCs and the bodies of rigid plastic and composite IBCs, damaged IBCs may be repaired and the inner receptacles of composite packagings may be replaced and returned to service provided:

(i) The repaired IBC conforms to the original design type and is capable of withstanding the applicable design qualification tests;

(ii) An IBC intended to contain liquids or solids that are loaded or discharged under pressure is subjected to a leakproofness test as specified in §178.813 of this subchapter and is marked with the date of the test; and

(iii) The IBC is subjected to the internal and external inspection requirements as specified in paragraph (b) of this section.

(2) Except for flexible and fiberboard IBCs, the structural equipment of an IBC may be repaired and returned to service provided:

(i) The repaired IBC conforms to the original design type and is capable of withstanding the applicable design qualification tests; and

(ii) The IBC is subjected to the internal and external inspection requirements as specified in paragraph (b) of this section.

(3) Service equipment may be replaced provided:

(i) The repaired IBC conforms to the original design type and is capable of withstanding the applicable design qualification tests;

(ii) The IBC is subjected to the external visual inspection requirements as specified in paragraph (b) of this section; and

(iii) The proper functioning and leak tightness of the service equipment, if applicable, is verified.

(e) *Retest date.* The date of the most recent periodic retest must be marked as provided in §178.703(b) of this subchapter.

(f) *Record retention.* The IBC owner or lessee shall keep records of periodic retests and initial and periodic inspections. Records must include design types and packaging specifications, test and inspection dates, name and address of test and inspection facilities, names or name of any persons conducting tests or inspections, and test or inspection specifics and results. Records must be kept for each packaging at each location where periodic tests are conducted, until such tests are successfully performed again or for at least 2.5 years from the date of the last test. These records must be made available for inspection by a representative of the Department on request.

[Amdt. 180-5, 59 FR 38079, July 26, 1994, as amended at 64 FR 10782, Mar. 5, 1999; 65 FR 58632, Sept. 29, 2000; 66 FR 45186, 45391, Aug. 28, 2001]

Subpart E—Qualification and Maintenance of Cargo Tanks

§ 180.401 Applicability.

This subpart prescribes requirements, in addition to those contained in parts 107, 171, 172, 173 and 178 of this subchapter, applicable to any person

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responsible for the continuing qualification, maintenance or periodic testing of a cargo tank.

[Amdt. 180–2, 54 FR 25032, June 12, 1989, as amended at 55 FR 37065, Sept. 7, 1990]

§ 180.403 Definitions.

In addition to the definitions contained in §§ 171.8, 178.320(a) and 178.345–1 of this subchapter, the following definitions apply to this subpart:

Corrosive to the tank/valve means a lading meets the criteria for corrosivity specified in § 173.136 of this subchapter, for the material of construction of the tank or valve; or the lading has been shown through experience to be corrosive to the tank or valve.

Delivery hose assembly means a liquid delivery hose and its attached couplings.

Modification means any change to the original design and construction of a cargo tank or a cargo tank motor vehicle that affects its structural integrity or lading retention capability including changes to equipment certified as part of an emergency discharge control system required by § 173.315(n)(2) of this subchapter. Any modification that involves welding on the cargo tank wall must also meet all requirements for “Repair” as defined in this section. Excluded from this category are the following:

(1) A change to motor vehicle equipment such as lights, truck or tractor power train components, steering and brake systems, and suspension parts, and changes to appurtenances, such as fender attachments, lighting brackets, ladder brackets; and

(2) Replacement of components such as valves, vents, and fittings with a component of a similar design and of the same size.

Owner means the person who owns a cargo tank motor vehicle used for the transportation of hazardous materials, or that person’s authorized agent.

Piping system means any component of a cargo tank delivery system, other than a delivery hose assembly, that contains product during loading or unloading.

Rebarrelling means replacing more than 50 percent of the combined shell and head material of a cargo tank.

Repair means any welding on a cargo tank wall done to return a cargo tank or a cargo tank motor vehicle to its original design and construction specification, or to a condition prescribed for a later equivalent specification in effect at the time of the repair. Excluded from this category are the following:

(1) A change to motor vehicle equipment such as lights, truck or tractor power train components, steering and brake systems, and suspension parts, and changes to appurtenances, such as fender attachments, lighting brackets, ladder brackets; and

(2) Replacement of components such as valves, vents, and fittings with a component of a similar design and of the same size.

(3) Replacement of an appurtenance by welding to a mounting pad.

Replacement of a barrel means to replace the existing tank on a motor vehicle chassis with an unused (new) tank. For the definition of *tank*, see § 178.345–1(c), § 178.337–1, or § 178.338–1 of this subchapter, as applicable.

Stretching means any change in length, width or diameter of the cargo tank, or any change to a cargo tank motor vehicle’s undercarriage that may affect the cargo tank’s structural integrity.

[Amdt. 180–2, 54 FR 25032, June 12, 1989, as amended at 55 FR 37065, Sept. 7, 1990; Amdt. 180–3, 57 FR 45466, Oct. 1, 1992; Amdt. 180–7, 59 FR 55177, Nov. 3, 1994; 60 FR 17402, Apr. 5, 1995; Amdt. 180–10, 61 FR 51342, Oct. 1, 1996; 63 FR 52850, Oct. 1, 1998; 64 FR 28050, May 24, 1999]

§ 180.405 Qualification of cargo tanks.

(a) *General.* Unless otherwise provided in this subpart, each cargo tank used for the transportation of hazardous material must be an authorized packaging.

(b) *Cargo tank specifications.* To qualify as an authorized packaging, each cargo tank must conform to this subpart, the applicable requirements specified in part 173 of this subchapter for the specific lading and, where a DOT specification cargo tank is required, an applicable specification in effect on the date the initial construction began: MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC

312, MC 330, MC 331, MC 338, DOT 406, DOT 407, or DOT 412 (§178.337, §178.338, §178.345, §178.346, §178.347, §178.348 of this subchapter). However, no cargo tank may be marked or certified after August 31, 1995, to the applicable MC 306, MC 307, MC 312, MC 331 or MC 338 specification in effect on December 30, 1990.

(c) *Cargo tank specifications no longer authorized for construction.* (1) A cargo tank made to a specification listed in column 1 of table 1 or table 2 of this paragraph (c)(1) may be used when authorized in this part, provided—

(i) The cargo tank initial construction began on or before the date listed in table 1, column 2, as follows:

TABLE 1

Column 1	Column 2
MC 300	Sept. 2, 1967
MC 301	June 12, 1961
MC 302, MC 303, MC 304, MC 305, MC 310, MC 311.	Sept. 2, 1967
MC 330	May 15, 1967

(ii) The cargo tank was marked or certified before the date listed in table 2, column 2, as follows:

TABLE 2

Column 1	Column 2
MC 306, MC 307, MC 312	Sept. 1, 1995

(2) A cargo tank of a specification listed in paragraph (c)(1) of this section may have its pressure relief devices and outlets modified as follows:

(i) A Specification MC 300, MC 301, MC 302, MC 303, or MC 305 cargo tank, to conform with a Specification MC 306 or DOT 406 cargo tank (See §§178.346-3 and 178.346-4 of this subchapter).

(ii) A Specification MC 306 cargo tank to conform to a Specification DOT 406 cargo tank (See §§178.346-3 and 178.346-4 of this subchapter).

(iii) A Specification MC 304 cargo tank, to conform with a Specification MC 307 or DOT 407 cargo tank (See §§178.347-4 and 178.345-11 of this subchapter).

(iv) A Specification MC 307 cargo tank, to conform with a Specification DOT 407 cargo tank (See §§178.347-4 and 178.345-11 of this subchapter).

(v) A Specification MC 310 or MC 311 cargo tank, to conform with a Specifi-

fication MC 312 or DOT 412 cargo tank (See §§178.348-4 and 178.345-11 of this subchapter).

(vi) A Specification MC 312 cargo tank, to conform with a Specification DOT 412 cargo tank (See §§178.348-4 and 178.345-11 of this subchapter).

(vii) A Specification MC 330 cargo tank, to conform with a Specification MC 331 cargo tank, except as specifically required by §173.315 of this subchapter (see §§178.337-8 and 178.337-9 of this subchapter).

(d) *MC 338 cargo tank.* The owner of a cargo tank that conforms to and was used under the terms of an exemption issued before October 1, 1984, that authorizes the transportation of a cryogenic liquid shall remove the exemption number stenciled on the cargo tank and stamp the specification plate (or a plate placed adjacent to the specification plate) "DOT MC 338" followed by the exemption number, for example, "DOT MC 338-E * * * *". (Asterisks to be replaced by the exemption number). The cargo tank must be remarked prior to the expiration date of the exemption. During the period the cargo tank is in service, the owner of a cargo tank that is remarked in this manner must retain at its principal place of business a copy of the last exemption in effect. No new construction of cargo tanks pursuant to such exemption is authorized.

(1) The holding time must be determined, as required in §178.338-9 of this subchapter, on each cargo tank or on at least one cargo tank of each design. Any subsequent cargo tank manufactured to the same design type (see §178.320), if not individually tested, must have the optional test regimen performed during the first shipment (see §178.338-9 (b) and (c) of this subchapter).

(2) The holding time determined by test for one authorized cryogenic liquid may be used as the basis for establishing the holding time for other authorized cryogenic liquids.

(e) *MC 331 cargo tanks.* The owner of a MC 331 (§178.337 of this subchapter) cargo tank that conforms to and was used under an exemption issued before October 1, 1984, that authorizes the transportation of ethane, refrigerated

liquid; ethane-propane mixture, refrigerated liquid; or hydrogen chloride, refrigerated liquid shall remove the exemption number stenciled on the cargo tank and stamp the exemption number on the specification plate (or a plate placed adjacent to the specification plate), immediately after the DOT Specification, for example, “DOT MC 331-E * * * *”. (Asterisks to be replaced by the exemption number.) The cargo tank must be remarked prior to the expiration date of the exemption. During the period the cargo tank is in service, the owner of a cargo tank that is remarked in this manner must retain at the owner’s principal place of business a copy of the last exemption in effect.

(f) *MC 306, MC 307, MC 312 cargo tanks.* Either a Registered Inspector or a Design Certifying Engineer and the owner of a MC 306, MC 307 or MC 312 cargo tank motor vehicle constructed in accordance with and used under an exemption issued before December 31, 1990, that authorizes a condition specified in this paragraph shall examine the cargo tank motor vehicle and its design to determine if it meets the requirements of the applicable MC 306, MC 307 or MC 312 specification in effect at the time of manufacture, except as specified herein.

(1) A cargo tank motor vehicle constructed after August 1, 1981, or the date specified in the applicable exemption, in conformance with the following conditions that apply, may be remarked and certified in accordance with paragraphs (f) (5) and (6) of this section:

(i) A vacuum-loaded cargo tank must have an ASME Code stamped specification plate marked with a minimum internal design pressure of 25 psig, and be designed for a minimum external design pressure of 15 psig.

(ii) An outlet equipped with a self-closing system which includes an external stop-valve must have the stop valve and associated piping protected within the vehicle’s rear-end tank protection device, vehicle frame or an equally adequate accident damage protection device (See §178.345-8 of this subchapter.) The self-closing system (See §178.345-11 of this subchapter) must be equipped with a remotely actuated means of closure as follows:

(A) For a cargo tank used in other than corrosive service, the remote means of closure must be activated for closure by manual or mechanical means and, in case of fire, by an automatic heat activated means.

(B) For a cargo tank used in corrosive service, the remote means of closure may be actuated by manual or mechanical means only.

(iii) A cargo tank having an unreinforced portion of the shell exceeding 60 inches must have the circumferential reinforcement located so that the thickness and tensile strength of shell material in combination with the frame and circumferential reinforcement produces a structural integrity at least equal to that prescribed in §178.345-3 of this subchapter or the specification in effect at time of manufacture.

(iv) A cargo tank having a projection from the tank shell or head that may contain lading in any tank position is authorized, provided such projection is as strong as the tank shell or head and is located within the motor vehicle’s rear-end tank protection or other appropriate accident damage protection device.

(v) A cargo tank may be constructed of nickel, titanium, or other ASME sheet or plate materials in accordance with an exemption.

(2) A vacuum-loaded cargo tank constructed after August 1, 1981, or the date specified in the applicable exemption, in conformance with paragraph (f)(1) of this section, except that an outlet equipped with an external valve which is not part of a self-closing system:

(i) Must be equipped with a self-closing system prior to September 1, 1993.

(ii) May be remarked and certified in accordance with paragraphs (f)(5) and (6) of this section after the cargo tank motor vehicle has been equipped with the self-closing system.

(3) A vacuum-loaded cargo tank constructed prior to August 1, 1981, in conformance with paragraph (f)(1) of this section, except for paragraph (f)(1)(i), may be remarked and certified in accordance with paragraphs (f) (5) and (6) of this section.

(4) A vacuum-loaded cargo tank constructed prior to August 1, 1981, in conformance with paragraph (f)(1) of this section, except for paragraph (f)(1)(i) of this section, and except that an outlet is equipped with an external valve which is not part of a self-closing system:

(i) Must be equipped with a self-closing system prior to September 1, 1993.

(ii) May be remarked and certified in accordance with paragraphs (f)(5) and (6) of this section after the cargo tank motor vehicle has been equipped with the self-closing system.

(5) The owner of a cargo tank for which a determination has been made that the cargo tank is in conformance with paragraph (f) (1), (2), (3), or (4) of this section shall complete a written certification, in English, signed by the owner and containing at least the following information:

(i) A statement certifying that each cargo tank conforms to §180.405 (f) (1), (2), (3), or (4);

(ii) The applicable DOT exemption number, the applicable specification number and the owner's and manufacturer's serial number for the cargo tank;

(iii) A statement setting forth any modifications made to bring the cargo tank into conformance with §180.405(f) (1), (2), (3), or (4), or the applicable specification;

(iv) A statement identifying the person certifying the cargo tank and the date of certification.

(6) The owner of a certified cargo tank shall remove the exemption number stenciled on the cargo tank and shall durably mark the specification plate (or a plate placed adjacent to the specification plate) "MC +++-E ****#####" (where "+++" is to be replaced by the applicable specification number, "* * * *" by the exemption number and "# # # #" by the alloy.)

(7) A cargo tank remarked and certified in conformance with this paragraph (f) is excepted from the provisions of §180.405(c).

(8) During the period the cargo tank is in service, and for one year thereafter, the owner of a cargo tank that is certified and remarked in this manner must retain on file at its principal

place of business a copy of the certificate and the last exemption in effect.

(g) *Cargo tank manhole assemblies.* (1) MC 306, MC 307, and MC 312 cargo tanks marked or certified after December 30, 1990, and DOT 406, DOT 407, and DOT 412 cargo tank motor vehicles must be equipped with manhole assemblies conforming with §178.345-5 of this subchapter.

(2) On or before August 31, 1995, each owner of a cargo tank marked or certified before December 31, 1990, authorized for the transportation of a hazardous material, must have the cargo tank equipped with manhole assemblies conforming with §178.345-5, except for the dimensional requirements in §178.345-5(a), the hydrostatic testing requirements in §178.345-5(b), and the marking requirements in §178.345-5(e) of this subchapter. A manhole assembly meeting one of the following provisions is considered to be in compliance with this paragraph:

(i) Manhole assemblies on MC 300, MC 301, MC 302, MC 303, MC 305, MC 306, MC 310, MC 311 and MC 312 cargo tanks which are marked or certified in writing as conforming to §178.345-5 of this subchapter or TTMA RP No. 61, or are tested and certified in accordance with TTMA TB No. 107.

(ii) Manhole assemblies on MC 304 and MC 307 cargo tanks.

(iii) Manhole assemblies on MC 310, MC 311, and MC 312 cargo tanks with a test pressure of 36 psig or greater.

(3) The owner of five or more DOT specification cargo tanks requiring retrofit or certification of the manhole closure must retrofit or certify at least 20 percent of the affected cargo tanks each year beginning in 1991 until all affected manhole closures on cargo tanks have been retrofitted or certified. The owner of fewer than 5 DOT specification cargo tanks has until August 31, 1995 to retrofit or certify the manhole closures.

(h) *Pressure relief system.* Properly functioning reclosing pressure relief valves and frangible or fusible vents need not be replaced. However, replacement of reclosing pressure relief valves on MC-specification cargo tanks is authorized subject to the following requirements:

(1) Until August 31, 1998, the owner of a cargo tank may replace a reclosing pressure relief device with a device which is in compliance with the requirements for pressure relief devices in effect at the time the cargo tank specification became superseded. If the pressure relief device is installed as an integral part of a manhole cover assembly, the manhole cover must comply with the requirements of paragraph (g) of this section.

(2) After August 31, 1998, replacement for any reclosing pressure relief valve must be capable of reseating to a leak-tight condition after a pressure surge, and the volume of lading released may not exceed 1 L. Specific performance requirements for these pressure relief valves are set forth in §178.345–10(b)(3) of this subchapter.

(3) As provided in paragraph (c)(2) of this section, the owner of a cargo tank may elect to modify reclosing pressure relief devices to more recent cargo tank specifications. However, replacement devices constructed to the requirements of §178.345–10 of this subchapter must provide the minimum venting capacity required by the original specification to which the cargo tank was designed and constructed.

(i) *Flammable cryogenic liquids.* Each cargo tank used to transport a flammable cryogenic liquid must be examined after each shipment to determine its actual holding time (See §173.318(g)(3) of this subchapter.)

(j) *Withdrawal of certification.* A specification cargo tank that for any reason no longer meets the applicable specification may not be used to transport hazardous materials unless the cargo tank is repaired and retested in accordance with §§180.413 and 180.407 prior to being returned to hazardous materials service. If the cargo tank is not in conformance with the applicable specification requirements, the specification plate on the cargo tank must be removed, obliterated or securely covered. The details of the conditions necessitating withdrawal of the certification must be recorded and signed on the written certificate for that cargo tank. The vehicle owner shall retain the certificate for at least 1 year after withdrawal of the certification.

(k) *DOT specification cargo tank with no marked design pressure or a marked design pressure of less than 3 psig.* The owner of an MC 300, MC 301, MC 302, MC 303, MC 305, MC 306 or MC 312 cargo tank, which has a pressure relief system set at 3 psig, may mark or remark the cargo tank with an MAWP or design pressure of not greater than 3 psig.

(1) *MC 300, MC 301, MC 302, MC 303, MC 305, MC 306 cargo tank—Rear accident damage protection.* (1) Notwithstanding the requirements in §180.405(b), the applicable specification requirement for a rear bumper or rear-end tank protection device on MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 cargo tanks does not apply to a cargo tank truck (power unit) until July 1, 1992, if the cargo tank truck—

(i) Was manufactured before July 1, 1989;

(ii) Is used to transport gasoline or any other petroleum distillate product; and

(iii) Is operated in combination with a cargo tank full trailer. However, an empty cargo tank truck, without a cargo tank full trailer attached, may be operated without the required rear bumper or rear-end tank protection device on a one-time basis while being transported to a repair facility for installation of a rear bumper or rear-end protection device.

(2) Each cargo tank shall be provided with a rear accident damage protection device to protect the tank and piping in the event of a rear-end collision and reduce the likelihood of damage which could result in the loss of lading. The rear-end protection device must be in the form of a rear-end tank protection device meeting the requirements of §178.345–8(d) or a rear bumper meeting the following:

(i) The bumper shall be located at least 6 inches to the rear of any vehicle component used for loading or unloading or that may contain lading while the vehicle is in transit.

(ii) The dimensions of the bumper shall conform to §393.86 of this title.

(iii) The structure of the bumper shall be designed to withstand, without leakage of lading, the impact of the vehicle with rated payload, at a deceleration of 2 “g” using a safety factor of two based on the ultimate strength of

the bumper material. Such impact shall be considered uniformly distributed and applied horizontally (parallel to the ground) from any direction at an angle not exceeding 30 degrees to the longitudinal axis of the vehicle.

(m) *Specification MC 330, MC 331 cargo tank motor vehicles, and nonspecification cargo tank motor vehicles conforming to §173.315(k) of this subchapter, intended for use in the transportation of liquefied compressed gases.* (1) No later than the date of its first scheduled pressure test after July 1, 2001, each specification MC 330 and MC 331 cargo tank motor vehicle, and each nonspecification cargo tank motor vehicle conforming to §173.315(k) of this subchapter, marked and certified before July 1, 2001, that is used to transport a Division 2.1 material, a Division 2.2 material with a subsidiary hazard, a Division 2.3 material, or anhydrous ammonia must have an emergency discharge control capability as specified in §173.315(n) of this subchapter. Each passive shut-off system installed prior to July 1, 2001, must be certified by a Design Certifying Engineer that it meets the requirements of §173.315(n)(2) of this subchapter.

(2) The requirement in paragraph (m)(1) of this section does not apply to a cargo tank equal to or less than 13,247.5 L (3,500 gallons) water capacity transporting in metered delivery service a Division 2.1 material, a Division 2.2 material with a subsidiary hazard, or anhydrous ammonia equipped with an off-truck remote shut-off device that was installed prior to July 1, 2000. The device must be capable of stopping the transfer of lading by operation of a transmitter carried by a qualified person attending unloading of the cargo tank. The device is subject to the requirement in §177.840(o) of this subchapter for a daily test at 45.72 meters (150 feet).

(3) Each specification MC 330 and MC 331 cargo tank in metered delivery service of greater than 13,247.5 L (3,500 gallons) water capacity transporting a Division 2.1 material, a Division 2.2 material with a subsidiary hazard, or anhydrous ammonia, marked and certified before July 1, 1999, must have an emergency discharge control capability as specified in §§173.315(n) and 177.840 of

this subchapter no later than the date of its first scheduled pressure test after July 1, 2001, or July 1, 2003, whichever is earlier.

(n) *Thermal activation.* No later than the date of its first scheduled leakage test after July 1, 1999, each specification MC 330 or MC 331 cargo tank motor vehicle and each nonspecification cargo tank motor vehicle conforming to §173.315(k) of this subchapter, marked and certified before July 1, 1999, that is used to transport a liquefied compressed gas, other than carbon dioxide and chlorine, that has a water capacity of 13,247.5 L (3,500 gallons) or less must be equipped with a means of thermal activation for the internal self-closing stop valve as specified in §178.337-8(a)(4) of this subchapter.

[Amdt. 180-2, 54 FR 25032, June 12, 1989, as amended at 55 FR 21038, May 22, 1990; 55 FR 37066, Sept. 7, 1990; 56 FR 27877, 27878, June 17, 1991; Amdt. 180-3, 57 FR 45466, Oct. 1, 1992; 58 FR 12905, Mar. 8, 1993; Amdt. 180-4, 58 FR 51534, Oct. 1, 1993; Amdt. 180-2, 59 FR 1786, Jan. 12, 1994; Amdt. 180-6, 59 FR 49135, Sept. 26, 1994; Amdt. 180-7, 59 FR 55177, Nov. 3, 1994; 63 FR 37463, July 10, 1998; 64 FR 28051, May 24, 1999; 65 FR 58632, Sept. 29, 2000; 66 FR 45391, Aug. 28, 2001]

§ 180.407 Requirements for test and inspection of specification cargo tanks.

(a) *General.* (1) A cargo tank constructed in accordance with a DOT specification for which a test or inspection specified in this section has become due, may not be filled and offered for transportation or transported until the test or inspection has been successfully completed. This paragraph does not apply to any cargo tank filled prior to the test or inspection due date.

(2) Except during a pressure test or during loading or unloading, a cargo tank may not be subjected to a pressure greater than its design pressure or MAWP.

(3) A person witnessing or performing a test or inspection specified in this section must meet the minimum qualifications prescribed in §180.409.

(4) Each cargo tank must be evaluated in accordance with the acceptable results of tests and inspections prescribed in §180.411.

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(5) Each cargo tank which has successfully passed a test or inspection specified in this section must be marked in accordance with § 180.415.

(6) A cargo tank which fails a prescribed test or inspection must:

(i) Be repaired and retested in accordance with § 180.413; or

(ii) Be removed from hazardous materials service and the specification plate removed, obliterated or covered in a secure manner.

(b) *Conditions requiring test and inspection of cargo tanks.* Without regard to any other test or inspection requirements, a specification cargo tank must be tested and inspected in accordance with this section prior to further use if:

(1) The cargo tank shows evidence of bad dents, corroded or abraded areas, leakage, or any other condition that might render it unsafe for transportation service.

(2) The cargo tank has been in an accident and has been damaged to an extent that may adversely affect its lading retention capability.

(3) The cargo tank has been out of hazardous materials transportation service for a period of one year or more. Each cargo tank that has been out of hazardous materials transportation service for a period of one year or more must be pressure tested in accordance with § 180.407(g) prior to further use.

(4) The cargo tank has been modified from its original design specification.

(5) The Department so requires based on the existence of probable cause that the cargo tank is in an unsafe operating condition.

(c) *Periodic test and inspection.* Each specification cargo tank must be tested and inspected as specified in the following table by an inspector meeting the qualifications in § 180.409.

COMPLIANCE DATES—INSPECTIONS AND TEST UNDER § 180.407(C)

Test or inspection (cargo tank specification, configuration, and service)	Date by which first test must be completed (see note 1)	Interval period after first test
External Visual Inspection: All cargo tanks designed to be loaded by vacuum with full opening rear heads.	September 1, 1991	6 months.
All other cargo tanks	September 1, 1991	1 year.
Internal Visual Inspection: All insulated cargo tanks, except MC 330, MC 331, MC 338	September 1, 1991	1 year.
All cargo tanks transporting lading corrosive to the tank	September 1, 1991	1 year.
All other cargo tanks, except MC 338	September 1, 1995	5 years.
Lining Inspection: All lined cargo tanks transporting lading corrosive to the tank	September 1, 1991	1 year.
Leakage Test: MC 330 and MC 331 cargo tanks in chlorine service	September 1, 1991	2 years.
All other cargo tanks except MC 338	September 1, 1991	1 year.
Pressure Test: (Hydrostatic or pneumatic) (See Notes 2 and 3)	September 1, 1991	1 year.
All cargo tanks which are insulated with no manhole or insulated and lined, except MC 338.	September 1, 1991	1 year.
All cargo tanks designed to be loaded by vacuum with full opening rear heads.	September 1, 1992	2 years.
MC 330 and MC 331 cargo tanks in chlorine service	September 1, 1992	2 years.
All other cargo tanks	September 1, 1995	5 years.
Thickness Test: All unlined cargo tanks transporting material corrosive to the tank, except MC 338.	September 1, 1992	2 years.

Note 1: If a cargo tank is subject to an applicable inspection or test requirement under the regulations in effect on December 30, 1990, and the due date (as specified by a requirement in effect on December 30, 1990) for completing the required inspection or test occurs before the compliance date listed in table I, the earlier date applies.

Note 2: Pressure testing is not required for MC 330 and MC 331 cargo tanks in dedicated sodium metal service.

Note 3: Pressure testing is not required for uninsulated lined cargo tanks, with a design pressure or MAWP 15 psig or less, which receive an external visual inspection and lining inspection at least once each year.

(d) *External visual inspection and testing.* (1) Where insulation precludes external visual inspection, the cargo tank, other than an MC 330 or MC 331

cargo tank, must be given a visual internal inspection in accordance with § 180.407(e). The tank must be

hydrostatically or pneumatically tested in accordance with §180.407(c) and (g) where:

(i) Visual inspection is precluded by internal lining or coating, or

(ii) The cargo tank is not equipped with a manhole or inspection opening.

(2) The external visual inspection and testing must include as a minimum the following:

(i) The tank shell and heads must be inspected for corroded or abraded areas, dents, distortions, defects in welds and any other conditions, including leakage, that might render the tank unsafe for transportation service;

(ii) The piping, valves, and gaskets must be carefully inspected for corroded areas, defects in welds, and other conditions, including leakage, that might render the tank unsafe for transportation service;

(iii) All devices for tightening manhole covers must be operative and there must be no evidence of leakage at manhole covers or gaskets;

(iv) All emergency devices and valves including self-closing stop valves, excess flow valves and remote closure devices must be free from corrosion, distortion, erosion and any external damage that will prevent safe operation. Remote closure devices and self-closing stop valves must be functioned to demonstrate proper operation;

(v) Missing bolts, nuts and fusible links or elements must be replaced, and loose bolts and nuts must be tightened;

(vi) All markings on the cargo tank required by parts 172, 178 and 180 of this subchapter must be legible;

(vii) [Reserved]

(viii) All major appurtenances and structural attachments on the cargo tank including, but not limited to, suspension system attachments, connecting structures, and those elements of the upper coupler (fifth wheel) assembly that can be inspected without dismantling the upper coupler (fifth wheel) assembly must be inspected for any corrosion or damage which might prevent safe operation;

(ix) For cargo tanks transporting lading corrosive to the tank, areas covered by the upper coupler (fifth wheel) assembly must be inspected at least once in each two year period for cor-

roded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service. The upper coupler (fifth wheel) assembly must be removed from the cargo tank for this inspection.

(3) All reclosing pressure relief valves must be externally inspected for any corrosion or damage which might prevent safe operation. All reclosing pressure relief valves on cargo tanks carrying lading corrosive to the valve must be removed from the cargo tank for inspection and testing. Each reclosing pressure relief valve required to be removed and tested must open at the required set pressure and reseal to a leak-tight condition at 90 percent of the set-to-discharge pressure or the pressure prescribed for the applicable cargo tank specification.

(4) Corroded or abraded areas of the cargo tank wall must be thickness tested in accordance with the procedures set forth in paragraphs (i)(2), (i)(3), (i)(5) and (i)(6) of this section.

(5) The gaskets on any full opening rear head must be:

(i) Visually inspected for cracks or splits caused by weather or wear; and

(ii) Replaced if cuts or cracks which are likely to cause leakage, or are of a depth one-half inch or more, are found.

(6) The inspector must record the results of the external visual examination as specified in §180.417(b).

(e) *Internal visual inspection.* (1) When the cargo tank is not equipped with a manhole or inspection opening, or the cargo tank design precludes an internal inspection, the tank shall be hydrostatically or pneumatically tested in accordance with 180.407(c) and (g).

(2) The internal visual inspection must include as a minimum the following:

(i) The tank shell and heads must be inspected for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service.

(ii) Tank liners must be inspected as specified in §180.407(f).

(3) Corroded or abraded areas of the cargo tank wall must be thickness tested in accordance with paragraphs

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(i)(2), (i)(3), (i)(5) and (i)(6) of this section.

(4) The inspector must record the results of the internal visual inspection as specified in §180.417(b).

(f) *Lining inspection.* The integrity of the lining on all lined cargo tanks, when lining is required by this subchapter, must be verified at least once each year as follows:

(1) Rubber (elastomeric) lining must be tested for holes as follows:

(i) Equipment must consist of:

(A) A high frequency spark tester capable of producing sufficient voltage to ensure proper calibration;

(B) A probe with an “L” shaped 2.4 mm (0.09 inch) diameter wire with up to a 30.5 cm (12-inch) bottom leg (end bent to a 12.7 mm (0.5 inch) radius), or equally sensitive probe; and

(C) A steel calibration coupon 30.5 cm × 30.5 cm (12 inches × 12 inches) covered with the same material and thickness as that to be tested. The material on the coupon shall have a test hole to the metal substrate made by puncturing the material with a 22 gauge hypodermic needle or comparable piercing tool.

(ii) The probe must be passed over the surface of the calibration coupon in a constant uninterrupted manner until the hole is found. The hole is detected by the white or light blue spark formed. (A sound lining causes a dark blue or purple spark.) The voltage must be adjusted to the lowest setting that will produce a minimum 12.7 mm (0.5 inch) spark measured from the top of the lining to the probe. To assure that the setting on the probe has not changed, the spark tester must be calibrated periodically using the test calibration coupon, and the same power source, probe, and cable length.

(iii) After calibration, the probe must be passed over the lining in an uninterrupted stroke.

(iv) Holes that are found must be repaired using equipment and procedures prescribed by the lining manufacturer or lining installer.

(2) Linings made of other than rubber (elastomeric material) must be tested using equipment and procedures prescribed by the lining manufacturer or lining installer.

(3) Degraded or defective areas of the cargo tank liner must be removed and the cargo tank wall below the defect must be inspected. Corroded areas of the tank wall must be thickness tested in accordance with paragraphs (i)(2), (i)(3), (i)(5) and (i)(6) of this section.

(4) The inspector must record the results of the lining inspection as specified in §180.417(b).

(g) *Pressure test.* All components of the cargo tank wall, as defined in §178.320(a) of this subchapter, must be pressure tested as prescribed by this paragraph.

(1) *Test Procedure*—(i) As part of the pressure test, the inspector must perform an external and internal visual inspection, except that on an MC 338 cargo tank, or a cargo tank not equipped with a manhole or inspection opening, an internal inspection is not required.

(ii) All reclosing pressure relief valves must be:

(A) Removed from the cargo tank for inspection and testing. Each reclosing pressure relief valve must open at the required set pressure and reseal to a leak-tight condition at 90 percent of the set-to-discharge pressure or the pressure prescribed for the applicable cargo tank specification; or,

(B) Replaced.

(iii) Except for cargo tanks carrying lading corrosive to the tank, areas covered by the upper coupler (fifth wheel) assembly must be inspected for corroded and abraded areas, dents, distortions, defects in welds, and any other condition that might render the tank unsafe for transportation service. The upper coupler (fifth wheel) assembly must be removed from the cargo tank for this inspection.

(iv) Each cargo tank must be tested hydrostatically or pneumatically to the internal pressure specified in the following table:

Speci- fication	Test pressure
MC 300, 301, 302, 303, 305, 306.	20.7 kPa (3 psig) or design pressure, whichever is greater.

Speci- fication	Test pressure
MC 304, 307.	275.8 kPa (40 psig) or 1.5 times the design pressure, whichever is greater.
MC 310, 311, 312.	20.7 kPa (3 psig) or 1.5 times the design pressure, whichever is greater.
MC 330, 331.	1.5 times either the MAWP or the re-rated pressure, whichever is applicable.
MC 338.	1.25 times either the MAWP or the re-rated pressure, whichever is applicable.
DOT 406.	34.5 kPa (5 psig) or 1.5 times the MAWP, whichever is greater.
DOT 407.	275.8 kPa (40 psig) or 1.5 times the MAWP, whichever is greater.
DOT 412.	1.5 times the MAWP.

(v) Each owner of 5 or more MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tanks must pressure test at least 20 percent of the cargo tanks in his ownership each year beginning in 1991. The owner of fewer than five MC specification cargo tanks has until August 31, 1995, to pressure test these units.

(vi) Each cargo tank of a multi-tank cargo tank motor vehicle must be tested with the adjacent cargo tanks empty and at atmospheric pressure.

(vii) All closures except pressure relief devices must be in place during the test. All prescribed loading and unloading venting devices rated at less than test pressure may be removed during the test. If retained, the devices must be rendered inoperative by clamps, plugs, or other equally effective restraining devices. Restraining devices may not prevent detection of leaks or damage the venting devices and must be removed immediately after the test is completed.

(viii) *Hydrostatic test method.* Each cargo tank, including its domes, must be filled with water or other liquid having similar viscosity, at a temperature not exceeding 100 °F. The cargo tank must then be pressurized to not less than the pressure specified in paragraph (g)(1)(iv) of this section. The cargo tank, including its closures, must hold the prescribed test pressure for at least 10 minutes during which time it shall be inspected for leakage, bulging or any other defect.

(ix) *Pneumatic test method.* Pneumatic testing may involve higher risk than

hydrostatic testing. Therefore, suitable safeguards must be provided to protect personnel and facilities should failure occur during the test. The cargo tank must be pressurized with air or an inert gas. The pneumatic test pressure in the cargo tank must be reached by gradually increasing the pressure to one-half of the test pressure. Thereafter, the pressure must be increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached. The test pressure must be held for at least 5 minutes. The pressure must then be reduced to the MAWP, which must be maintained during the time the entire cargo tank surface is inspected. During the inspection, a suitable method must be used for detecting the existence of leaks. This method must consist either of coating the entire surface of all joints under pressure with a solution of soap and water, or using other equally sensitive methods.

(2) When testing an insulated cargo tank, the insulation and jacketing need not be removed unless it is otherwise impossible to reach test pressure and maintain a condition of pressure equilibrium after test pressure is reached, or the vacuum integrity cannot be maintained in the insulation space. If an MC 338 cargo tank used for the transportation of a flammable gas or oxygen, refrigerated liquid is opened for any reason, the cleanliness must be verified prior to closure using the procedures contained in §178.338-15 of this subchapter.

(3) Each MC 330 and MC 331 cargo tank constructed of quenched and tempered steel (Part UHT of the ASME Code), or constructed of other than quenched and tempered steel but without postweld heat treatment, used for the transportation of anhydrous ammonia, or any other hazardous materials that may cause corrosion stress cracking, must be internally inspected by the wet fluorescent magnetic particle method immediately prior to and in conjunction with the performance of the pressure test prescribed in this section. Each MC 330 and MC 331 cargo tank constructed of quenched and tempered steel (Part UHT of the ASME Code) used for the transportation of

liquefied petroleum gas must be internally inspected by the wet fluorescent magnetic particle method immediately prior to and in conjunction with the performance of the pressure test prescribed in this section. The wet fluorescent magnetic particle inspection must be in accordance with Section V of the ASME Code and CGA Technical Bulletin TB-2. This paragraph does not apply to cargo tanks that do not have manholes. (See §180.417(c) for reporting requirements.)

(4) All pressure bearing portions of a cargo tank heating system employing a medium such as, but not limited to, steam or hot water for heating the lading must be hydrostatically pressure tested at least once every 5 years. The test pressure must be at least 1.5 times the heating system design pressure and must be maintained for five minutes. A heating system employing flues for heating the lading must be tested to ensure against lading leakage into the flues or into the atmosphere.

(5) *Exceptions.* (i) Pressure testing is not required for MC 330 and MC 331 cargo tanks in dedicated sodium metal service.

(ii) Pressure testing is not required for uninsulated lined cargo tanks, with a design pressure or MAWP of 15 psig or less, which receive an external visual inspection and a lining inspection at least once each year.

(6) *Acceptance criteria.* A cargo tank that leaks, fails to retain test pressure or pneumatic inspection pressure, shows distortion, excessive permanent expansion, or other evidence of weakness that might render the cargo tank unsafe for transportation service, may not be returned to service, except as follows: A cargo tank with a heating system which does not hold pressure may remain in service as an unheated cargo tank if:

(i) The heating system remains in place and is structurally sound and no lading may leak into the heating system, and

(ii) The specification plate heating system information is changed to indicate that the cargo tank has no working heating system.

(7) The inspector must record the results of the pressure test as specified in §180.417(b).

(h) *Leakage test.* (1) Each cargo tank must be tested for leaks in accordance with §180.407(c). The leakage test must include product piping with all valves and accessories in place and operative, except that any venting devices set to discharge at less than the leakage test pressure must be removed or rendered inoperative during the test. Test pressure must be maintained at least 5 minutes. Suitable safeguards must be provided to protect personnel should a failure occur. MC 330 and MC 331 cargo tanks may be leakage tested with the hazardous materials contained in the tank during the test. Leakage test pressure must be not less than 80 percent of the tank design pressure or MAWP, whichever is marked on the certification or specification plate, except as follows:

(i) A cargo tank with an MAWP of 690 kPa (100 psig) or more may be leakage tested at its maximum normal operating pressure provided it is in dedicated service or services; or

(ii) An MC 330 or MC 331 cargo tank in dedicated liquefied petroleum gas service may be leakage tested at not less than 414 kPa (60 psig).

(iii) An operator of a specification MC 330 or MC 331 cargo tank, and a nonspecification cargo tank authorized under §173.315(k) of this subchapter, equipped with a meter may check leak tightness of the internal self-closing stop valve by conducting a meter creep test. (See appendix B to this part.)

(2) Cargo tanks equipped with vapor collection equipment may be leakage tested in accordance with the Environmental Protection Agency's "Method 27—Determination of Vapor Tightness of Gasoline Delivery Tank Using Pressure-Vacuum Test," as set forth in 40 CFR part 60, appendix A. Acceptance criteria are found at 40 CFR 60.501.

(3) A cargo tank that fails to retain leakage test pressure may not be returned to service as a specification cargo tank, except under conditions specified in §180.411(d).

(4) After July 1, 2000, Registered Inspectors of specification MC 330 and MC 331 cargo tanks, and nonspecification cargo tanks authorized under

§173.315(k) of this subchapter must visually inspect the delivery hose assembly and piping system while the assembly is under leakage test pressure utilizing the rejection criteria listed in §180.416(g). Delivery hose assemblies not permanently attached to the cargo tank motor vehicle may be inspected separately from the cargo tank motor vehicle. In addition to a written record of the inspection prepared in accordance with §180.417(b), the Registered Inspector conducting the test must note the hose identification number, the date of the test, and the condition of the hose assembly and piping system tested.

(5) The inspector must record the results of the leakage test as specified in §180.417(b).

(i) *Thickness testing.* (1) The shell and head thickness of all unlined cargo tanks used for the transportation of materials corrosive to the tank must be measured at least once every 2 years, except that cargo tanks measuring less than the sum of the minimum prescribed thickness, plus one-fifth of the original corrosion allowance, must be tested annually.

(2) Measurements must be made using a device capable of accurately measuring thickness to within ±0.002 of an inch.

(3) Any person performing thickness testing must be trained in the proper use of the thickness testing device used in accordance with the manufacturer's instruction.

(4) Thickness testing must be performed in the following areas of the cargo tank wall, as a minimum:

- (i) Areas of the tank shell and heads and shell and head area around any piping that retains lading;
- (ii) Areas of high shell stress such as the bottom center of the tank;
- (iii) Areas near openings;
- (iv) Areas around weld joints;
- (v) Areas around shell reinforcements;
- (vi) Areas around appurtenance attachments;
- (vii) Areas near upper coupler (fifth wheel) assembly attachments;
- (viii) Areas near suspension system attachments and connecting structures;

(ix) Known thin areas in the tank shell and nominal liquid level lines; and

(x) Connecting structures joining multiple cargo tanks of carbon steel in a self-supporting cargo tank motor vehicle.

(5) Minimum thicknesses for MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, and MC 312 cargo tanks are shown in the tables below. The columns headed "Specified Manufactured Thickness" tabulate the minimum values required for new construction, generally found in Tables I and II of each specification. "In-Service Minimum Thicknesses" are based on 90 percent of the manufactured thickness as specified in the DOT specification, rounded to three places.

TABLE I—MINIMUM THICKNESS FOR MC 300, MC 303, MC 304, MC 306, MC 307, MC 310, MC 311 AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF STEEL AND STEEL ALLOYS

Specified manufactured thickness (US gauge or inches)	Nominal decimal equivalent for reference (inches)	In-service minimum thickness (inches)
19	0.0418	0.038
18	0.0478	0.043
17	0.0538	0.048
16	0.0598	0.054
15	0.0673	0.061
14	0.0747	0.067
13	0.0897	0.081
12	0.1046	0.094
11	0.1196	0.108
10	0.1345	0.121
9	0.1495	0.135
8	0.1644	0.148
7	0.1793	0.161
3/16	0.1875	0.169
1/4	0.2500	0.225
5/16	0.3125	0.281
3/8	0.3750	0.338

TABLE II—MINIMUM THICKNESS FOR MC 301, MC 302, MC 304, MC 305, MC 306, MC 307, MC 311 AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF ALUMINUM AND ALUMINUM ALLOYS

Specified manufactured thickness (inches)	In-service minimum thickness (inches)
0.078	0.070
0.087	0.078
0.096	0.086
0.109	0.098
0.130	0.117

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TABLE II—MINIMUM THICKNESS FOR MC 301, MC 302, MC 304, MC 305, MC 306, MC 307, MC 311 AND MC 312 SPECIFICATION CARGO TANKS CONSTRUCTED OF ALUMINUM AND ALUMINUM ALLOYS—Continued

Specified manufactured thickness (inches)	In-service minimum thickness (inches)
0.141	0.127
0.151	0.136
0.172	0.155
0.173	0.156
0.194	0.175
0.216	0.194
0.237	0.213
0.270	0.243
0.360	0.324
0.450	0.405
0.540	0.486

witnessing the inspections and tests specified in §180.407(c) must—

(1) Be registered with the Department in accordance with part 107, subpart F of this chapter, and

(2) Be familiar with DOT specification cargo tanks and must be trained and experienced in use of the inspection and testing equipment needed.

(b) A person who only performs annual external visual inspections and leakage tests on a cargo tank motor vehicle, owned or operated by that person, with a capacity of less than 13,250 L (3,500 gallons) used exclusively for flammable liquid petroleum fuels, is not required to meet the educational and years of experience requirements set forth in the definition of “Registered Inspector” in §171.8 of this subchapter. Although not required to meet the educational and years of experience requirements, a person who performs visual inspections or leakage tests or signs the inspection reports must have the knowledge and ability to perform such inspections and tests and must perform them as required by this subchapter, and must register with the Department as required by subpart F of part 107 of this chapter.

(c) A person who performs only annual external visual inspections and leakage tests on a permanently mounted non-bulk tank, owned or operated by that person, for petroleum products as authorized by §173.8(c) of this subchapter, is not required to be registered in accordance with subpart F of part 107 of this chapter. In addition the person who signs the inspection report required by §180.417(b) of this subpart for such non-bulk tanks is not required to be registered. Although not required to register, a person who performs visual inspections or leakage tests or signs the inspection reports must have the knowledge and ability to perform such inspections and tests and must perform them as required by this subchapter.

(d) A motor carrier or cargo tank owner who meets the requirements of paragraph (a) of this section may use an employee who is not a Registered Inspector to perform a portion of the pressure retest required by §180.407(g).

(6) An owner of a cargo tank that no longer conforms with the minimum thickness prescribed for the maximum lading density marked on the specification plate may use the cargo tank to carry lading of lower density under the following conditions:

(i) A Design Certifying Engineer must certify that the cargo tank design and thickness is appropriate for the lower density lading, by issuance of a new manufacturer’s certificate, and

(ii) The tank’s nameplate must be changed to reflect the new service limits (maximum density of lading).

(7) An owner of a cargo tank that no longer conforms with the minimum thickness prescribed for the specification may not return the cargo tank to hazardous materials service. The tank’s specification plate must be removed, obliterated or covered in a secure manner.

(8) The inspector must record the results of the thickness test as specified in §180.417(b).

[Amdt. 180–2, 54 FR 25032, June 12, 1989, as amended at 55 FR 21038, May 22, 1990; 55 FR 37067, Sept. 7, 1990; 56 FR 27878, June 17, 1991; Amdt 180–3, 57 FR 45466, Oct. 1, 1992; Amdt. 180–4, 58 FR 51534, Oct. 1, 1993; Amdt. 180–6, 59 FR 49135, Sept. 26, 1994; Amdt. 180–7, 59 FR 55177, 55178, Nov. 3, 1994; 60 FR 17402, Apr. 5, 1995; Amdt. 180–9, 61 FR 27176, May 30, 1996; Amdt. 180–10, 61 FR 51342, Oct. 1, 1996; 64 FR 28051, May 24, 1999; 65 FR 58632, Sept. 29, 2000]

§ 180.409 Minimum qualifications for inspectors and testers.

(a) Except as otherwise provided in this section, any person performing or

External and internal visual inspections must be accomplished by a Registered Inspector, but the hydrostatic or pneumatic pressure test, as set forth in §180.407(g)(1)(viii) and (ix), respectively, may be done by an employee who is not a Registered Inspector provided that—

(1) The employee is familiar with the cargo tank and is trained and experienced in the use of the inspection and testing equipment used;

(2) The employer submits certification that such employee meets the qualification requirements to the Associate Administrator, Attn: (DHM-32), Research and Special Programs Administration, Department of Transportation, 400 Seventh Street, SW., Washington, DC 20590; and

(3) The employer retains a copy of the tester's qualifications with the documents required by §180.417(b).

[Amdt. 180-2, 55 FR 37069, Sept. 7, 1990, as amended by Amdt. 180-3, 56 FR 66287, Dec. 20, 1991; 57 FR 45466, Oct. 1, 1992; Amdt. 180-11, 62 FR 1217, Jan. 8, 1997; 66 FR 45391, Aug. 28, 2001]

§ 180.411 Acceptable results of tests and inspections.

(a) *Corroded or abraded areas.* The minimum thickness may not be less than that prescribed in the applicable specification.

(b) *Dents, cuts, digs and gouges.* (See CGA Pamphlet C-6 for evaluation procedures.)

(1) For dents at welds or that include a weld, the maximum allowable depth is $\frac{1}{2}$ inch. For dents away from welds, the maximum allowable depth is $\frac{1}{10}$ of the greatest dimension of the dent, but in no case may the depth exceed one inch.

(2) The minimum thickness remaining beneath a cut, dig, or gouge may not be less than that prescribed in the applicable specification.

(c) *Weld or structural defects.* Any cargo tank with a weld defect such as a crack, pinhole, or incomplete fusion, or a structural defect must be taken out of hazardous materials service until repaired.

(d) *Leakage.* All sources of leakage must be properly repaired prior to returning a tank to hazardous materials service.

(e) *Relief valves.* Any pressure relief valve that fails to open and reclose at the prescribed pressure must be repaired or replaced.

(f) *Liner integrity.* Any defect shown by the test must be properly repaired.

(g) *Pressure test.* Any tank that fails to meet the acceptance criteria found in the individual specification that applies must be properly repaired.

§ 180.413 Repair, modification, stretching, or rebarrelling of cargo tanks.

(a) *General.* For purposes of this section, "stretching" is not considered a "modification" and "rebarrelling" is not considered a "repair." Any repair, modification, stretching, or rebarrelling of a cargo tank must be performed in conformance with the requirements of this section.

(b) *Repair—(1) Non-ASME Code stamped cargo tanks.* Any work involving repair on an MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tank that is not ASME Code stamped must be performed by:

(i) A cargo tank manufacturer holding a valid ASME Certificate of Authorization for the use of the ASME "U" stamp and registered with DOT; or

(ii) A repair facility holding a valid National Board Certificate of Authorization for the use of the National Board "R" stamp and registered with DOT.

(2) *ASME Code stamped cargo tanks.* Any work involving repair on any ASME Code stamped cargo tank must be performed by a repair facility holding a valid National Board Certificate of Authorization for the use of the National Board "R" stamp and registered in accordance with subpart F of part 107 of subchapter B of this chapter.

(3) The following provisions apply to cargo tank repairs:

(i) DOT 406, DOT 407, and DOT 412 cargo tanks must be repaired in accordance with the specification requirements in effect either at the time of manufacture or at the time of repair;

(ii) MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 cargo tanks must be repaired in accordance with either the original specification or with the

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DOT 406 specification in effect at the time of repair;

(iii) MC 304 and MC 307 cargo tanks must be repaired in accordance with either the original specification or with the DOT 407 specification in effect at the time of repair;

(iv) MC 310, MC 311, and MC 312 cargo tanks must be repaired in accordance with either the original specification or with the DOT 412 specification in effect at the time of the repair;

(v) MC 338 cargo tanks must be repaired in accordance with the specification requirements in effect either at the time of manufacture or at the time of repair; and

(vi) MC 330 and MC 331 cargo tanks must be repaired in accordance with the repair procedures described in CGA Technical Bulletin TB-2 and the National Board Inspection Code—Provisions for Repair of Pressure Vessels. Each cargo tank having cracks or other defects requiring welded repairs must meet all of the requirements of §178.337–16 of this subchapter (in effect at the time of the repair), except that postweld heat treatment after minor weld repairs is not required. When any repair is made of defects revealed by the wet fluorescent magnetic particle inspection, including those by grinding, the affected area of the cargo tank must again be examined by the wet fluorescent magnetic particle method after hydrostatic testing to assure that all defects have been removed.

(4) Prior to any repair work, the cargo tank must be emptied of any hazardous material lading. Cargo tanks containing flammable or toxic lading must be purged.

(5) Any repair of a cargo tank involving welding on the shell or head must be certified by a Registered Inspector. Any repair of an ASME Code “U” stamped cargo tank must be in accordance with the National Board Inspection Code.

(6) The suitability of any repair affecting the structural integrity of the cargo tank must be determined by the testing required either in the applicable manufacturing specification, or in §180.407(g)(1)(iv).

(c) *Maintenance or replacement of piping, valves, hoses or fittings.* In the event of repair, maintenance or replacement,

any piping, valve, or fitting must be properly installed in accordance with the provisions of the applicable specification before the cargo tank is returned to hazardous materials service. After maintenance or replacement which does not involve welding on the cargo tank wall, the repaired piping, valves or fittings, the replaced segment of the piping must be leak tested. After repair or replacement of piping, valves or fittings which involves welding on the cargo tank wall, the entire cargo tank, including the repaired or replaced piping, valve or fitting, must be pressure tested in accordance with the applicable specification. Hoses permanently attached to the cargo tank must be tested either before or after installation.

(d) *Modification, stretching, or rebarrelling.* Modification, stretching or rebarrelling of a cargo tank must conform to the following provisions:

(1) *Non-ASME Code stamped cargo tanks.* If the modification, stretching, or rebarrelling will result in a design type change, then it must be approved by a Design Certifying Engineer. Any work involving modification, stretching, or rebarrelling on an MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, or MC 312 cargo tank that is not ASME stamped must be performed by:

(i) A cargo tank manufacturer holding a valid ASME Certificate of Authorization for the use of the ASME “U” stamp and registered with DOT; or

(ii) A repair facility holding a valid National Board Certificate of Authorization for the use of the National Board “R” stamp and registered with DOT.

(2) *ASME Code stamped cargo tanks.* The modification, stretching, or rebarrelling on any ASME Code stamped cargo tank must be performed by a repair facility holding a valid National Board Certificate of Authorization for the use of the National Board “R” stamp and registered in accordance with subpart F of part 107 of subchapter B of this chapter. If the modification, stretching, or rebarrelling will result in a design type change, then it must be approved by a Design Certifying Engineer.

(3) Except as provided in paragraph (d)(3)(v) in this section, all new material and equipment, and equipment affected by modification, stretching or rebarrelling must meet the requirements of the specification in effect at the time such work is performed, and must meet the applicable structural integrity requirements (§§ 178.337-3, 178.338-3, or 178.345-3 of this subchapter). The work must conform to the requirements of the applicable specification as follows:

(i) For specification MC 300, MC 301, MC 302, MC 303, MC 305 and MC 306 cargo tanks, the provisions of either specification MC 306 or DOT 406 until August 31, 1995 and, thereafter to specification DOT 406 only;

(ii) For specification MC 304 and MC 307 cargo tanks, the provisions of either specification MC 307 or DOT 407 until August 31, 1995 and, thereafter to specification DOT 407 only;

(iii) For specification MC 310, MC 311, and MC 312 cargo tanks, the provisions of either specification MC 312 or DOT 412 until August 31, 1995 and, thereafter to specification DOT 412 only;

(iv) For specification MC 330 cargo tanks, the provisions of specification MC 331; and

(v) For Specification MC 338 cargo tanks, the provisions of specification MC 338. However, structural modifications to MC 338 cargo tanks authorized under § 180.405(d) may conform to applicable provisions of the ASME Code instead of specification MC 338, provided the structural integrity of the modified cargo tank is at least equivalent to that of the original cargo tank.

(4) The person performing the modification, stretching, or rebarrelling must:

(i) Have knowledge of the original design concept, particularly with respect to structural design analysis, material and welding procedures;

(ii) Assure compliance with the rebuilt cargo tank's structural integrity, venting, and accident damage protection requirements;

(iii) Assure compliance with all applicable Federal Motor Carrier Safety Regulations for any newly installed safety equipment;

(iv) Perform all retest procedures on each cargo tank in accordance with the applicable specification and § 180.407;

(v) Change the existing specification plate to reflect the cargo tank as modified, stretched or rebarrelled. This must include the name of the person doing the work, his DOT registration number, date, retest information, etc. A supplemental specification plate may be installed immediately adjacent to the existing plate(s), or the existing specification plate may be removed and replaced with a new plate; and

(vi) On a variable specification cargo tank, install a supplemental or new variable specification plate, and replace the specification listed on the original specification plate with the words "see variable specification plate".

(5) The design of the modified, stretched, or rebarrelled cargo tank must be approved by a Design Certifying Engineer registered in accordance with subpart F of part 107 of subchapter B of this chapter. The Design Certifying Engineer must certify that the modified, stretched, or rebarrelled cargo tank meets the structural integrity requirements of the applicable specification. The person performing the modifying, stretching or rebarrelling and a Registered Inspector must certify that the cargo tank is in compliance with this section and the applicable specification by issuing a supplemental manufacturer's certificate. The registration number of the Registered Inspector and the person performing the modification, stretching, or rebarrelling must be entered on the certificate. When a cargo tank is rebarrelled, it must be designed, constructed and certified in accordance with a cargo tank specification currently authorized for construction in part 178 of this subchapter.

(6) If the mounting of the cargo tank on the cargo tank motor vehicle involves welding on the cargo tank head or shell, then the mounting must be performed as follows:

(i) *Non-ASME Code stamped cargo tanks.* For a non-ASME Code stamped cargo tank—

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(A) By a cargo tank manufacturer holding an ASME “U” stamp, registered with DOT, and under the direction of a Design Certifying Engineer; or

(B) By a repair facility holding an ASME “U” stamp or a National Board “R” stamp, registered with DOT, and under the direction of a Design Certifying Engineer.

(ii) *ASME Code stamped cargo tank.* For an ASME Code stamped cargo tank, by a repair facility holding a National Board “R” stamp, registered in accordance with subpart F of part 107 of subchapter B of this chapter, and approved by a Design Certifying Engineer.

(7) If the mounting of a cargo tank on a cargo tank motor vehicle does not involve welding on the cargo tank head or shell, or a change or modification of the methods of attachment, then the mounting shall be in accordance with the original specification or with the specification in effect at the time of the mounting. If the mounting involves any change or modification of the methods of attachment, then the mounting must be approved by a Design Certifying Engineer.

(8) Prior to any modification, stretching, or rebarrelling a cargo tank must be emptied of any hazardous material lading. Cargo tanks containing flammable or toxic lading must be purged.

(9) Any modification, stretching, or rebarrelling on the cargo tank involving welding on the shell or head must be certified by a Registered Inspector. Any repair of an ASME Code “U” stamped cargo tank must be in accordance with the National Board Inspection Code.

(10) The suitability of any modification affecting the structural integrity of the cargo tank, with respect to pressure, must be determined by the testing required either in the applicable manufacturing specification, or in § 180.407(g)(1)(iv).

(e) *Records.* Each owner of a cargo tank must retain at its principal place of business all records of repair, modification, stretching, or rebarrelling made to each cargo tank during the time the cargo tank is in service and for one year thereafter. Copies of these records must be retained by a motor

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carrier, who is not the owner of the cargo tank, at its principal place of business during the period the cargo tank is in the carrier’s service. The seller of a specification cargo tank shall provide the purchaser a copy of the cargo tank Certificate of Compliance, and all repair, inspection and test reports upon sale as an MC or DOT cargo tank.

[Amdt. 180–7, 59 FR 55178, Nov. 3, 1994; 60 FR 17402, Apr. 5, 1995, as amended by Amdt. 180–10, 61 FR 51342, Oct. 1, 1996]

§ 180.415 Test and inspection markings.

(a) Each cargo tank successfully completing the test and inspection requirements contained in § 180.407 must be marked as specified in this section.

(b) Each cargo tank must be durably and legibly marked, in English, with the date (month and year) and the type of test or inspection performed. The date must be readily identifiable with the applicable test or inspection. The marking must be in letters and numbers at least 32 mm (1.25 inches) high, on the tank shell near the specification plate or anywhere on the front head. The type of test or inspection may be abbreviated as follows: V for external visual inspection and test; I for internal visual inspection; P for pressure test; L for lining inspection, K for leakage test; and T for thickness test. For example, the markings “10–95 P, V, L” would indicate that in October 1995 the cargo tank received and passed the prescribed pressure test, external visual inspection and test, and the lining inspection.

(c) For a cargo tank motor vehicle composed of multiple cargo tanks constructed to the same specification, which are tested and inspected at the same time, one set of test and inspection markings may be used to satisfy the requirements of this section. For a cargo tank motor vehicle composed of multiple cargo tanks constructed to different specifications, which are tested and inspected at different intervals, the test and inspection markings must appear in the order of the cargo tank’s

corresponding location, from front to rear.

[Amdt. 180-2, 56 FR 27879, June 17, 1991, as amended by Amdt. 180-3, 56 FR 66287, Dec. 20, 1991; 57 FR 45466, Oct. 1, 1992; Amdt. 180-6, 59 FR 49135, Sept. 26, 1994; Amdt. 180-10, 61 FR 51343, Oct. 1, 1996]

§ 180.416 Discharge system inspection and maintenance program for cargo tanks transporting liquefied compressed gases.

(a) *Applicability.* This section is applicable to an operator using specification MC 330, MC 331, and nonspecification cargo tanks authorized under § 173.315(k) of this subchapter for transportation of liquefied compressed gases other than carbon dioxide. Paragraphs (b), (c), (d)(1), (d)(5), (e), (f), and (g)(1) of this section, applicable to delivery hose assemblies, apply only to hose assemblies installed or carried on the cargo tank.

(b) *Hose identification.* By July 1, 2000, the operator must assure that each delivery hose assembly is permanently marked with a unique identification number and maximum working pressure.

(c) *Post-delivery hose check.* After each unloading, the operator must visually check that portion of the delivery hose assembly deployed during the unloading.

(d) *Monthly inspections and tests.* (1) The operator must visually inspect each delivery hose assembly at least once each calendar month the delivery hose assembly is in service.

(2) The operator must visually inspect the piping system at least once each calendar month the cargo tank is in service. The inspection must include fusible elements and all components of the piping system, including bolts, connections, and seals.

(3) At least once each calendar month a cargo tank is in service, the operator must actuate all emergency discharge control devices designed to close the internal self-closing stop valve to assure that all linkages operate as designed. Appendix A to this part outlines acceptable procedures that may be used for this test.

(4) The operator of a cargo tank must check the internal self-closing stop valve in the liquid discharge opening

for leakage through the valve at least once each calendar month the cargo tank is in service. On cargo tanks equipped with a meter, the meter creep test as outlined in appendix B to this part or a test providing equivalent accuracy is acceptable. For cargo tanks that are not equipped with a meter, appendix B to this part outlines one acceptable method that may be used to check internal self-closing stop valves for closure.

(5) After July 1, 2000, the operator must note each inspection in a record. That record must include the inspection date, the name of the person performing the inspection, the hose assembly identification number, the company name, the date the hose was assembled and tested, and an indication that the delivery hose assembly and piping system passed or failed the tests and inspections. A copy of each test and inspection record must be retained by the operator at its principal place of business or where the vehicle is housed or maintained until the next test of the same type is successfully completed.

(e) *Annual hose leakage test.* The owner of a delivery hose assembly that is not permanently attached to a cargo tank motor vehicle must ensure that the hose assembly is annually tested in accordance with § 180.407(h)(4).

(f) *New or repaired delivery hose assemblies.* Each operator of a cargo tank must ensure each new and repaired delivery hose assembly is tested at a minimum of 120 percent of the hose maximum working pressure.

(1) The operator must visually examine the delivery hose assembly while it is under pressure.

(2) Upon successful completion of the pressure test and inspection, the operator must assure that the delivery hose assembly is permanently marked with the month and year of the test.

(3) After July 1, 2000, the operator must complete a record documenting the test and inspection, including the date, the signature of the inspector, the hose owner, the hose identification number, the date of original delivery hose assembly and test, notes of any defects observed and repairs made, and an indication that the delivery hose assembly passed or failed the tests and

inspections. A copy of each test and inspection record must be retained by the operator at its principal place of business or where the vehicle is housed or maintained until the next test of the same type is successfully completed.

(g) *Rejection criteria.* (1) No operator may use a delivery hose assembly determined to have any condition identified below for unloading liquefied compressed gases. An operator may remove and replace damaged sections or correct defects discovered. Repaired hose assemblies may be placed back in service if retested successfully in accordance with paragraph (f) of this section.

(i) Damage to the hose cover that exposes the reinforcement.

(ii) Wire braid reinforcement that has been kinked or flattened so as to permanently deform the wire braid.

(iii) Soft spots when not under pressure, bulging under pressure, or loose outer covering.

(iv) Damaged, slipping, or excessively worn hose couplings.

(v) Loose or missing bolts or fastenings on bolted hose coupling assemblies.

(2) No operator may use a cargo tank with a piping system found to have any condition identified in this paragraph (g)(2) for unloading liquefied compressed gases.

(i) Any external leak identifiable without the use of instruments.

(ii) Bolts that are loose, missing, or severely corroded.

(iii) Manual stop valves that will not actuate.

(iv) Rubber hose flexible connectors with any condition outlined in paragraph (g)(1) of this section.

(v) Stainless steel flexible connectors with damaged reinforcement braid.

(vi) Internal self-closing stop valves that fail to close or that permit leakage through the valve detectable without the use of instruments.

(vii) Pipes or joints that are severely corroded.

[64 FR 28051, May 24, 1999]

§ 180.417 Reporting and record retention requirements.

(a) *Vehicle certification.* (1) Each owner of a specification cargo tank must retain the manufacturer's certificate, the manufacturer's ASME U1A

data report, where applicable, and related papers certifying that the specification cargo tank identified in the documents was manufactured and tested in accordance with the applicable specification. This would include any certification of emergency discharge control systems required by §173.315(n) of this subchapter or §180.405(m). The owner must retain the documents throughout his ownership of the specification cargo tank and for one year thereafter. In the event of a change in ownership, the prior owner must retain non-fading photo copies of these documents for one year.

(2) Each motor carrier who uses a specification cargo tank motor vehicle must obtain a copy of the manufacturer's certificate and related papers or the alternative report authorized by paragraph (a)(3)(i) or (ii) of this section and retain the documents as specified in this paragraph (a)(2). A motor carrier who is not the owner of a cargo tank motor vehicle must also retain a copy of the vehicle certification report for as long as the cargo tank motor vehicle is used by that carrier and for one year thereafter. The information required by this section must be maintained at the company's principal place of business or at the location where the vehicle is housed or maintained. The provisions of this section do not apply to a motor carrier who leases a cargo tank for less than 30 days.

(3) *DOT Specification cargo tanks manufactured before September 1, 1995—(i) Non-ASME Code stamped cargo tanks—* If an owner does not have a manufacturer's certificate for a cargo tank and he wishes to certify it as a specification cargo tank, the owner must perform appropriate tests and inspections, under the direct supervision of a Registered Inspector, to determine if the cargo tank conforms with the applicable specification. Both the owner and the Registered Inspector must certify that the cargo tank fully conforms to the applicable specification. The owner must retain the certificate, as specified in this section.

(ii) *ASME Code Stamped cargo tanks.* If the owner does not have the manufacturer's certificate required by the specification and the manufacturer's data report required by the ASME, the

owner may contact the National Board for a copy of the manufacturer's data report, if the cargo tank was registered with the National Board, or copy the information contained on the cargo tank's identification and ASME Code plates. Additionally, both the owner and the Registered Inspector must certify that the cargo tank fully conforms to the specification. The owner must retain such documents, as specified in this section.

(b) *Test or inspection reporting.* Each cargo tank which is tested or re-inspected as specified in §180.407 must have a written report, in English, prepared in accordance with this paragraph.

(1) The test or inspection report must include the following:

(i) Type of test or inspection performed and a listing of all items either tested or inspected (a checklist is acceptable);

(ii) Owner's and manufacturer's serial numbers;

(iii) DOT Specification;

(iv) Test Date (Month and year);

(v) Location of defects found and method used to repair each defect;

(vi) Name and address of person performing the test, the DOT registration number of the facility or the person performing the test;

(vii) Disposition statement, such as "Cargo tank returned to service" or "Cargo tank withdrawn from service"; and

(viii) DOT registration number of the inspector, and dated signature of inspector and owner.

(2) The owner and the motor carrier, if not the owner, must each retain a copy of the test and inspection reports until the next test or inspection of the same type is successfully completed. This requirement does not apply to a motor carrier leasing a cargo tank for less than 30 days.

(c) *Additional requirements for Specification MC 330 and MC 331 cargo tanks.*

(1) After completion of the pressure test specified in §180.407(g)(3), each motor carrier operating a Specification MC 330 or MC 331 cargo tank in anhydrous ammonia, liquefied petroleum gas, or any other service that may cause stress corrosion cracking, must

make a written report containing the following information:

(i) Carrier's name, address of principal place of business, and telephone number;

(ii) Complete identification plate data required by Specification MC 330 or MC 331, including data required by ASME Code;

(iii) Carrier's equipment number;

(iv) A statement indicating whether or not the tank was stress relieved after fabrication;

(v) Name and address of the person performing the test and the date of the test;

(vi) A statement of the nature and severity of any defects found. In particular, information must be furnished to indicate the location of defects detected, such as in weld, heat-affected zone, the liquid phase, the vapor phase, or the head-to-shell seam. If no defect or damage was discovered, that fact must be reported;

(vii) A statement indicating the methods employed to make repairs, who made the repairs, and the date they were completed. Also, a statement of whether or not the tank was stress relieved after repairs and, if so, whether full or local stress relieving was performed;

(viii) A statement of the disposition of the cargo tank, such as "cargo tank scrapped" or "cargo tank returned to service"; and

(ix) A statement of whether or not the cargo tank is used in anhydrous ammonia, liquefied petroleum gas, or any other service that may cause stress corrosion cracking. Also, if the cargo tank has been used in anhydrous ammonia service since the last report, a statement indicating whether each shipment of ammonia was certified by its shipper as containing 0.2 percent water by weight.

(2) A copy of the report must be retained by the carrier at its principal place of business during the period the cargo tank is in the carrier's service and for one year thereafter. Upon a written request to, and with the approval of, the Field Administrator, Regional Service Center, Federal Motor Carrier Safety Administration for the region in which a motor carrier has its principal place of business, the carrier

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may maintain the reports at a regional or terminal office.

(3) The requirement in paragraph (c)(1) of this section does not apply to a motor carrier leasing a cargo tank for less than 30 days.

(d) *Supplying reports.* Each carrier offering a DOT Specification cargo tank for sale or lease must make available for inspection a copy of the most recent report made under this section to each purchaser or lessee. Copies of such reports must be provided to the purchaser, or the lessee if the cargo tank is leased for more than 30 days.

[Amdt. 180-2, 54 FR 25032, June 12, 1989, as amended at 55 FR 21038, May 22, 1990; 55 FR 37069, Sept. 7, 1990; 56 FR 27879, June 17, 1991; 58 FR 12905, Mar. 8, 1993; Amdt. 180-2, 59 FR 1786, Jan. 12, 1994; Amdt. 180-10, 61 FR 51343, Oct. 1, 1996; 63 FR 52850, Oct. 1, 1998; 64 FR 28052, May 24, 1999; 65 FR 50463, Aug. 18, 2000; 67 FR 61016, Sept. 27, 2002]

Subpart F—Qualification and Maintenance of Tank Cars

SOURCE: Amdt. 180-8, 60 FR 49079, Sept. 21, 1995, unless otherwise noted.

§ 180.501 Applicability.

(a) This subpart prescribes requirements, in addition to those contained in parts 107, 171, 172, 173, and 179 of this subchapter, applicable to any person who manufactures, fabricates, marks, maintains, repairs, inspects, or services tank cars to ensure continuing qualification.

(b) Any person who performs a function prescribed in this part shall perform that function in accordance with this part.

[Amdt. 180-8, 60 FR 49079, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33256, June 26, 1996]

§ 180.503 Definitions.

The definitions contained in §§171.8 and 179.2 of this subchapter apply.

§ 180.505 Quality assurance program.

The quality assurance program requirements of §179.7 of this subchapter apply.

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§ 180.507 Qualification of tank cars.

(a) Each tank car marked as meeting a “DOT” specification or any other tank car used for the transportation of a hazardous material must meet the requirements of this subchapter or the applicable specification to which the tank was constructed.

(b) *Tank car specifications no longer authorized for construction.* (1) Tank cars prescribed in the following table are authorized for service provided they conform to all applicable safety requirements of this subchapter:

Specification prescribed in the current regulations	Other specifications permitted	Notes
105A200W	105A100W	1
105A200ALW	105A100ALW	1
105A300W	ICC-105, 105A300.	
105A400W	105A400.	
105A500W	105A500.	
105A600W	105A600.	
106A500X	ICC-27, BE-27, 106A500.	
106A800X	106A800.	
107A * * *	2

Note 1: Tanks built as Specification DOT 105A100W or DOT 105A100ALW may be altered and converted to DOT 105A200W and DOT 105A200ALW, respectively.

Note 2: The test pressures of tanks built in the United States between January 1, 1941 and December 31, 1955, may be increased to conform to Specification 107A. Original and revised test pressure markings must be indicated and may be shown on the tank or on a plate attached to the bulkhead of the car. Tanks built before 1941 are not authorized.

(2) For each tank car conforming to and used under an exemption issued before October 1, 1984, which authorized the transportation of a cryogenic liquid in a tank car, the owner or operator shall remove the exemption number stenciled on the tank car and stamp the tank car with the appropriate Class DOT-113 specification followed by the applicable exemption number. For example: DOT-113D60W-E * * * * (asterisks to be replaced by the exemption number). The owner or operator marking a tank car in this manner shall retain on file a copy of the last exemption in effect during the period the tank car is in service. No person may modify a tank car marked under this paragraph unless the modification is in compliance with an applicable requirement or provision of this subchapter.

(3) Specification DOT-113A175W, DOT-113C60W, DOT-113D60W, and DOT-113D120W tank cars may continue in use, but new construction is not authorized.

(4) Class DOT 105A and 105S tank cars used to transport hydrogen chloride, refrigerated liquid under the terms of DOT-E 3992 may continue in service, but new construction is not authorized.

§ 180.509 Requirements for inspection and test of specification tank cars.

(a) *General.* (1) Each tank car facility shall evaluate a tank car according to the requirements specified in §180.511.

(2) Each tank car that successfully passes a periodic inspection and test must be marked as prescribed in §180.515.

(3) A written report as specified in §180.517(b) must be prepared for each tank car that is inspected and tested under this section.

(b) *Conditions requiring inspection and test of tank cars.* Without regard to any other periodic inspection and test requirements, a tank car must have an appropriate inspection and test according to the type of defect and the type of maintenance or repair performed if:

(1) The tank car shows evidence of abrasion, corrosion, cracks, dents, distortions, defects in welds, or any other condition that makes the tank car unsafe for transportation. An example is if maintenance is performed to replace a fitting, then only a leakage pressure test needs to be performed.

(2) The tank car was in an accident and damaged to an extent that may adversely affect its capability to retain its contents.

(3) The tank bears evidence of damage caused by fire.

(4) The Associate Administrator for Safety, FRA, requires it based on the existence of probable cause that a tank car or a class or design of tank cars may be in an unsafe operating condition.

(c) *Frequency of inspection and tests.* Each tank car shall have an inspection and test according to the requirements of this paragraph.

(1) For Class 107 tank cars and tank cars of riveted construction, the tank car must have a hydrostatic pressure test and visual inspection conforming to the requirements in effect prior to July 1, 1996, for the tank specification.

(2) For Class DOT 113 tank cars, see §173.319(e) of this subchapter.

(3) For fusion welded tank cars, each tank car must have an inspection and test in accordance with paragraphs (d) through (k) of this section.

(i) For cars transporting materials not corrosive to the tank, every 10 years for the tank and service equipment (i.e., filling and discharge, venting, safety, heating, and measuring devices).

(ii) For non-lined or non-coated tank cars transporting materials corrosive to the tank, an interval based on the following formula, but in no case shall the interval exceed 10 years for the tank and 5 years for service equipment:

$$i = \frac{t_1 - t_2}{r}$$

Where:

i is the inspection and test interval.

t₁ is the actual thickness.

t₂ is the allowable minimum thickness under paragraph (g) of this section.

r is the corrosion rate per year.

(iii) For lined or coated tank cars transporting a material corrosive to the tank, every 10 years for the tank, 5 years for the service equipment.

(A) When a lining or coating is applied to protect the tank shell from the lading, the owner of the lining or coating shall determine the periodic inspection interval, test technique, and acceptance criteria for the lining or coating. The owner must maintain at its principal place of business all supporting documentation used to make such a determination, such as the lining or coating manufacturer's recommended inspection interval, test technique, and acceptance criteria. The supporting documentation must be made available to FRA upon request.

(B) The owner of the lining or coating shall provide the periodic inspection interval, test technique, and acceptance criteria for the lining or coating to the person responsible for qualifying the lining and coating.

(d) *Visual inspection.* At a minimum, each tank car facility must visually inspect the tank externally and internally as follows:

(1) An internal inspection of the tank shell and heads for abrasion, corrosion, cracks, dents, distortions, defects in welds, or any other condition that

makes the tank car unsafe for transportation, and except in the areas where insulation or a thermal protection system precludes it, an external inspection of the tank shell and heads for abrasion, corrosion, cracks, dents, distortions, defects in welds, or any other condition that makes the tank car unsafe for transportation;

(2) An inspection of the piping, valves, fittings, and gaskets for indications of corrosion and other conditions that make the tank car unsafe for transportation;

(3) An inspection for missing or loose bolts, nuts, or elements that make the tank car unsafe for transportation;

(4) An inspection of all closures on the tank car for proper securement in a tool tight condition and an inspection of the protective housings for proper securement;

(5) An inspection of excess flow valves having threaded seats for tightness; and

(6) An inspection of the required markings on the tank car for legibility.

(e) *Structural integrity inspections and tests.* At a minimum, each tank car facility shall inspect the tank car for structural integrity as specified in this section. The structural integrity inspection and test shall include all transverse fillet welds greater than 0.64 cm (0.25 inch) within 121.92 cm (4 feet) of the bottom longitudinal center line; the termination of longitudinal fillet welds greater than 0.64 cm (0.25 inch) within 121.92 cm (4 feet) of the bottom longitudinal center line; and all tank shell butt welds within 60.96 cm (2 feet) of the bottom longitudinal center line

by one or more of the following inspection and test methods to determine that the welds are in proper condition:

- (1) Dye penetrant test;
- (2) Radiography test;
- (3) Magnetic particle test;
- (4) Ultrasonic test; or
- (5) Optically-aided visual inspection

(e.g., magnifiers, fiberscopes, borescopes, and machine vision technology).

(f) *Thickness tests.* (1) Each tank car facility shall measure the thickness of the tank car shell, heads, sumps, domes, and nozzles on each tank car by using a device capable of accurately measuring the thickness to within ±0.05 mm (±0.002 inch).

(2) After repairs, alterations, conversions or modifications of a tank car that result in a reduction to the tank car shell thickness, the tank car facility shall measure the thickness of the tank car shell in the area of reduced shell thickness to ensure that the shell thickness conforms to paragraph (g) of this section.

(g) *Service life shell thickness allowance.* (1) A tank car found with a shell thickness below the required minimum thickness after forming for its specification, as stated in part 179 of this subchapter, may continue in service if:

(i) Construction of the tank car shell and heads is from carbon steel, stainless steel, aluminum, nickel, or manganese-molybdenum steel; and

(ii) Any reduction in the required minimum thickness of the tank shell or head is not more than that provided in the following table:

ALLOWABLE SHELL THICKNESS REDUCTIONS

Damage type	Class DOT 103, 104, 111, and 115 tank cars		Class DOT 105, 109, 112, and 114 tank cars	
	Top shell and tank head	Bottom shell	Top shell and tank head	Bottom shell
Corrosion	3.17 mm (0.125 inch)	1.58 mm (0.063 inch)	0.79 mm (0.031 inch)	0.79 mm (0.031 inch).
Corrosion and mechanical	3.17 mm (0.125 inch)	1.58 mm (0.063 inch)	0.79 mm (0.031 inch)	0.79 mm (0.031 inch).
Corrosion, local	4.76 mm (0.188 inch)	3.17 mm (0.125 inch)	1.58 mm (0.063 inch)	1.58 mm (0.063 inch).
Mechanical, local	3.17 mm (0.125 inch)	1.58 mm (0.063 inch)	1.58 mm (0.063 inch)	1.58 mm (0.063 inch).
Corrosion and mechanical, local.	4.76 mm (0.188 inch)	3.17 mm (0.125 inch)	1.58 mm (0.063 inch)	1.58 mm (0.063 inch).

Notes:

1. The perimeter for a local reduction may not exceed a 60.96 cm (24 inch) perimeter. Local reductions in the top shell must be separated from other reductions in the top shell by at least 40.64 cm (16 inches). The cumulative perimeter for local reductions in the bottom shell may not exceed 182.88 cm (72 inches).

2. Any reduction in the tank car shell may not affect the structural strength of the tank car so that the tank car shell no longer conforms to Section 6.2 of the AAR Specifications for Tank Cars.

3. Any reduction applies only to the outer shell for Class DOT 115 tank cars.

4. For Class DOT 103 and 104 tank cars, the inside diameter may not exceed 243.84 cm (96 inches).

(h) *Safety system inspections.* At a minimum, each tank car facility must inspect:

(1) Tank car thermal protection systems, tank head puncture resistance systems, coupler vertical restraint systems, and systems used to protect discontinuities (i.e., skid protection and protective housings) to ensure their integrity.

(2) Reclosing pressure relief devices by:

(i) Removing the reclosing pressure relief device from the tank car for inspection; and

(ii) Testing the reclosing pressure relief device with air or another gas to ensure that it conforms to the start-to-discharge pressure for the specification or hazardous material in this subchapter.

(i) *Lining and coating inspection and test.* When this subchapter requires a lining or coating, at a minimum, each tank car facility must inspect the lining or coating installed on the tank car according to the inspection interval test technique, and acceptance criteria established by the owner of the lining or coating in accordance with paragraph (c)(3)(iii) of this section.

(j) *Leakage pressure test.* (1) After re-assembly of a tank car or service equipment, a tank car facility must perform a leak test on the tank or service equipment to detect leakage, if any, between manway covers, cover plates, and service equipment. The test may be conducted with the hazardous material in the tank. When the test pressure exceeds the start-to-discharge or burst pressure of a pressure relief device, the device must be rendered inoperative. The written procedures and test method for leak testing must ensure for the sensitivity and reliability of the test method and for the serviceability of components to prevent premature failure.

(2) Interior heater systems must be tested hydrostatically at 13.87 Bar (200 psig) and must show no signs of leakage.

(k) *Alternative inspection and test procedures.* In lieu of the other requirements of this section, a person may use an alternative inspection and test procedure or interval based on a damage-tolerance fatigue evaluation (that in-

cludes a determination of the probable locations and modes of damage due to fatigue, corrosion, or accidental damage), when the evaluation is examined by the Association of American Railroads Tank Car Committee and approved by the Associate Administrator for Safety, FRA.

(1) *Inspection and test compliance date for tank cars.* After July 1, 2000, each tank car with a metal jacket or with a thermal protection system shall have an inspection and test conforming to this section no later than the date the tank car requires a periodic hydrostatic pressure test (i.e., the marked due date on the tank car for the hydrostatic test).

(2) After July 1, 1998, each tank car without a metal jacket shall have an inspection and test conforming to this section no later than the date the tank car requires a periodic hydrostatic pressure test (i.e., the marked due date on the tank car for the hydrostatic test).

(3) For tank cars on a 20-year periodic hydrostatic pressure test interval (i.e., Class DOT 103W, 104W, 111A60W1, 111A100W1, and 111A100W3 tank cars), the next inspection and test date is the midpoint between the compliance date in paragraph (1)(1) or (2) of this section and the remaining years until the tank would have had a hydrostatic pressure test.

[Amdt. 180-8, 60 FR 49079, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33256, June 26, 1996; 62 FR 51561, Oct. 1, 1997; 63 FR 52851, Oct. 1, 1998; 66 FR 45391, Aug. 28, 2001]

§ 180.511 Acceptable results of inspections and tests.

Provided it conforms with other applicable requirements of this subchapter, a tank car is qualified for use if it successfully passes the following inspections and tests conducted in accordance with this subpart:

(a) *Visual inspection.* A tank car successfully passes the visual inspection when the inspection shows no structural defect that may cause leakage from or failure of the tank before the next inspection and test interval.

(b) *Structural integrity inspection and test.* A tank car successfully passes the structural integrity inspection and test when it shows no structural defect that

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may initiate cracks or propagate cracks and cause failure of the tank before the next inspection and test interval.

(c) *Service life shell thickness.* A tank car successfully passes the service life shell thickness inspection when the tank shell and heads show no thickness reduction below that allowed in §180.509(g).

(d) *Safety system inspection.* A tank car successfully passes the safety system inspection when each thermal protection system, tank head puncture restraint system, coupler vertical restraint system, and system used to protect discontinuities (e.g., breakage grooves on bottom outlets and protective housings) on the tank car conform to this subchapter.

(e) *Lining and coating inspection.* A tank car successfully passes the lining and coating inspection and test when the lining or coating conforms to the owner's acceptance criteria.

(f) *Leakage pressure test.* A tank car successfully passes the leakage pressure test when all product piping, fittings and closures show no indication of leakage.

(g) *Hydrostatic test.* A Class 107 tank car or a riveted tank car successfully passes the hydrostatic test when it shows no leakage, distortion, excessive permanent expansion, or other evidence of weakness that might render the tank car unsafe for transportation service.

[Amdt. 180-8, 60 FR 49079, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33256, June 26, 1996; 66 FR 45187, Aug. 28, 2001]

§ 180.513 Repairs, alterations, conversions, and modifications.

(a) In order to repair tank cars, the tank car facility must comply with the requirements of appendix R of the AAR Specifications for Tank Cars.

(b) Unless the exterior tank car shell or interior tank car jacket has a protective coating, after a repair that requires the complete removal of the tank car jacket, the exterior tank car shell and the interior tank car jacket must have a protective coating applied to prevent the deterioration of the tank shell and tank jacket.

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§ 180.515 Markings.

(a) When a tank car passes the required inspection and test with acceptable results, the tank car facility shall mark the date of the inspection and test and the due date of the next inspection and test on the tank car in accordance with appendix C of the AAR Specifications for Tank Cars. When a tank car facility performs multiple inspection and test at the same time, one date may be used to satisfy the requirements of this section. One date also may be shown when multiple inspection and test have the same due date.

(b) Pressure converted tank cars must have the new specification and conversion date permanently marked in letters and figures at least 0.95 cm (0.375 inch) high on the outside of the manway nozzle or the edge of the manway nozzle flange on the left side of the car. The marking may have the last numeral of the specification number omitted (e.g., "DOT 111A100W" instead of "DOT 111A100W1").

(c) When pressure tested within six months of installation and protected from deterioration, the test date marking of a reclosing pressure relief device is the installation date on the tank car.

[Amdt. 180-8, 60 FR 49079, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33256, June 26, 1996; 63 FR 52851, Oct. 1, 1998; 66 FR 45391, Aug. 28, 2001]

§ 180.517 Reporting and record retention requirements.

(a) *Certification and representation.* Each owner of a specification tank car shall retain the certificate of construction (AAR Form 4-2) and related papers certifying that the manufacture of the specification tank car identified in the documents is in accordance with the applicable specification. The owner shall retain the documents throughout the period of ownership of the specification tank car and for one year thereafter. Upon a change of ownership, the requirements of Section 1.3.15 of the AAR Specifications for Tank Cars apply.

(b) *Inspection and test reporting.* Each tank car that is inspected as specified in §180.509 must have a written report, in English, prepared according to this

paragraph. The owner must retain a copy of the inspection and test reports until successfully completing the next inspection and test of the same type. The inspection and test report must include the following:

- (1) Type of inspection and test performed (a checklist is acceptable);
- (2) The results of each inspection and test performed;
- (3) Owner's reporting mark;
- (4) DOT Specification;
- (5) Inspection and test date (month and year);
- (6) Location and description of defects found and method used to repair each defect;
- (7) The name and address of the tank car facility and the signature of inspector.

§ 180.519 Periodic retest and inspection of tank cars other than single-unit tank car tanks.

(a) *General.* Unless otherwise provided in this subpart, tanks designed to be removed from cars for filling and emptying and tanks built to a Class DOT 107A specification and their safety relief devices must be retested periodically as specified in Retest Table 1 of paragraph (b)(5) of this section. Retests may be made at any time during the calendar year the retest falls due.

(b) *Pressure test.* (1) Each tank must be subjected to the specified hydro-

static pressure and its permanent expansion determined. Pressure must be maintained for 30 seconds and for as long as necessary to secure complete expansion of the tank. Before testing, the pressure gauge must be shown to be accurate within 1 percent at test measure. The expansion gauge must be shown to be accurate, at test pressure, to within 1 percent. Expansion must be recorded in cubic cm. Permanent volumetric expansion may not exceed 10 percent of total volumetric expansion at test pressure and the tank must not leak or show evidence of distress.

(2) Each tank, except tanks built to specification DOT 107A, must also be subjected to interior air pressure test of at least 100 psig under conditions favorable to detection of any leakage. No leaks may appear.

(3) Safety relief valves must be retested by air or gas, must start-to-discharge at or below the prescribed pressure and must be vapor tight at or above the prescribed pressure.

(4) Rupture discs and fusible plugs must be removed from the tank and visually inspected.

(5) Tanks must be retested as specified in Retest Table 1 of this paragraph (b)(5), and before returning to service after repairs involving welding or heat treatment:

RETEST TABLE 1

Specification	Retest interval—years		Minimum Retest pressure—psig		Pressure relief valve pressure—psig	
	Tank	Pressure relief devices ^d	Tank hydrostatic expansion ^c	Tank air test	Start-to-discharge	Vapor tight
DOT 27	5	2	500	100	375	300
106A500	5	2	500	100	375	300
106A500X	5	2	500	100	375	300
106A800	5	2	800	100	600	480
106A800X	5	2	800	100	600	480
106A800NCI	5	2	800	100	600	480
107A * * * *	^d 5	^d 2	(^b)	None	None	None
110A500-W	5	2	500	100	375	300
110A600-W	5	2	600	100	500	360
110A800-W	5	2	800	100	600	480
110A1000-W	5	2	1,000	100	750	600
BE-27	5	2	500	100	375	300

Notes:
^aIf DOT 107A * * * * tanks are used for transportation of flammable gases, one rupture disc from each car must be burst at the interval prescribed. The sample disc must burst at a pressure not exceeding the marked test pressure of the tank and not less than 70 percent of the marked test pressure. If the sample disc does not burst within the prescribed limits, all discs on the car must be replaced.
^bThe hydrostatic expansion test pressure must at least equal the marked test pressure.
^cSee § 180.519(b)(1).
^dSafety relief valves of the spring-loaded type on tanks used exclusively for fluorinated hydrocarbons and mixtures thereof which are free from corroding components may be retested every 5 years.

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(6) The month and year of test, followed by a "V" if visually inspected as described in paragraph (c) of this section, must be plainly and permanently stamped into the metal of one head or chime of each tank with successful test results; for example, 01-90 for January 1990. On DOT 107A**** tanks, the date must be stamped into the metal of the marked end, except that if all tanks mounted on a car have been tested, the date may be stamped into the metal of a plate permanently applied to the bulkhead on the "A" end of the car. Dates of previous tests and all prescribed markings must be kept legible.

(c) *Visual inspection.* Tanks of Class DOT 106A and DOT 110A-W specifications (§§ 179.300 and 179.301 of this subchapter) used exclusively for transporting fluorinated hydrocarbons and mixtures thereof, and that are free from corroding components, may be given a periodic complete internal and external visual inspection in place of the periodic hydrostatic retest. Visual inspections shall be made only by competent persons. The tank must be accepted or rejected in accordance with the criteria in CGA Pamphlet C-6.

(d) *Written records.* The results of the pressure test and visual inspection must be recorded on a suitable data sheet. Completed copies of these reports must be retained by the owner and by the person performing the pressure test and visual inspection as long as the tank is in service. The information to be recorded and checked on these data sheets are: Date of test and inspection; DOT specification number; tank identification (registered symbol and serial number, date of manufacture and ownership symbol); type of protective coating (painted, etc., and statement as to need for refinishing or re-coating); conditions checked (leakage, corrosion, gouges, dents or digs, broken or damaged chime or protective ring, fire, fire damage, internal condition); test pressure; results of tests; and disposition of tank (returned to service, returned to manufacturer for repair, or scrapped); and identification of the per-

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son conducting the retest or inspection.

[Amdt. 180-8, 60 FR 49079, Sept. 21, 1995, as amended by Amdt. 179-50, 61 FR 33257, June 26, 1996; 65 FR 58633, Sept. 29, 2000; 66 FR 45187, 45392, Aug. 28, 2001]

Subpart G—Qualification and Maintenance of Portable Tanks

SOURCE: 66 FR 33453, June 21, 2001, unless otherwise noted.

§ 180.601 Applicability.

This subpart prescribes requirements, in addition to those contained in parts 107, 171, 172, 173, and 178 of this subchapter, applicable to any person responsible for the continuing qualification, maintenance or periodic retesting of a portable tank.

§ 180.603 Qualification of portable tanks.

(a) Each portable tank used for the transportation of hazardous materials must be an authorized packaging.

(b) To qualify as an authorized packaging, each portable tank must conform to the requirements of this subchapter and the applicable design specification to which the portable tank was constructed.

(c) The following portable tanks are authorized for use provided they conform to all applicable safety requirements of this subchapter: 51, 56, 57, 60, IM 101, IM 102 and UN portable tanks.

(d) A portable tank that also meets the definition of "container" in 49 CFR 450.3(a)(3) must conform to the requirements in parts 450 through 453 of this title for compliance with Annex II of the Convention for Safe Containers (CSC).

(e) *Exemption portable tanks based on DOT 51 portable tanks.* The owner of a portable tank constructed in accordance with and used under an exemption issued prior to August 31, 1996, which was in conformance with the requirements for Specification DOT 51 portable tanks with the exception of the location of fill and discharge outlets, shall examine the portable tank and its design to determine if it meets the

outlet requirements in effect on October 1, 1996. If the owner determines that the portable tank is in compliance with all requirements of the DOT 51 specification, the exemption number stenciled on the portable tank shall be removed and the specification plate (or a plate placed adjacent to the specification plate) shall be durably marked "DOT 51-E*****" (where ***** is to be replaced by the exemption number). During the period the portable tank is in service, and for one year thereafter, the owner of the portable tank must retain on file, at its principal place of business, a copy of the last exemption in effect.

§ 180.605 Requirements for periodic testing, inspection and repair of portable tanks.

(a) A portable tank constructed in accordance with a DOT specification for which a test or inspection specified in this subpart has become due, must be tested or inspected prior to being returned for transportation.

(b) *Conditions requiring test and inspection of portable tanks.* Without regard to any other test or inspection requirements, a Specification or UN portable tank must be tested and inspected in accordance with this section prior to further use if any of the following conditions exist:

(1) The portable tank shows evidence of dents, corroded or abraded areas, leakage, or any other condition that might render it unsafe for transportation service.

(2) The portable tank has been in an accident and has been damaged to an extent that may adversely affect its ability to retain the hazardous material.

(3) The portable tank has been out of hazardous materials transportation service for a period of one year or more.

(4) The portable tank has been modified from its original design specification.

(5) The portable tank is in an unsafe operating condition based on the existence of probable cause.

(c) *Schedule for periodic inspections and tests.* Each Specification portable tank must be tested and inspected in

accordance with the following schedule:

(1) Each IM or UN portable tank must be given an initial inspection and test before being placed into service, a periodic inspection and test at least once every 5 years, and an intermediate periodic inspection and test at least every 2.5 years following the initial inspection and the last 5 year periodic inspection and test.

(2) Each Specification 51 portable tank must be given a periodic inspection and test at least once every five years.

(3) Each Specification 56 or 57 portable tank must be given a periodic inspection and test at least once every 2.5 years.

(4) Each Specification 60 portable tank must be given a periodic inspection and test at the end of the first 4-year period after the original test; at least once every 2 years thereafter up to a total of 12 years of service; and at least once annually thereafter. Re-testing is not required on a rubber-lined tank except before each relining.

(d) *Intermediate periodic inspection and test.* For IM and UN portable tanks the intermediate 2.5 year periodic inspection and test must include at least an internal and external examination of the portable tank and its fittings taking into account the hazardous materials intended to be transported; a leakage test; and a test of the satisfactory operation of all service equipment. Sheathing, thermal insulation, etc. need only be removed to the extent required for reliable appraisal of the condition of the portable tank. For portable tanks intended for the transportation of a single hazardous material, the internal examination may be waived if it is leakage tested in accordance with the procedures in paragraph (h) of this section prior to each filling, or if approved by the Associate Administrator. Portable tanks used for dedicated transportation of refrigerated liquefied gases that are not fitted with inspection openings are excepted from the internal inspection requirement.

(e) *Periodic inspection and test.* The 5 year periodic inspection and test must include an internal and external examination and, unless excepted, a pressure test as specified in this section.

Sheathing, thermal insulation, etc. need only to be removed to the extent required for reliable appraisal of the condition of the portable tank. Except for DOT Specification 56 and 57 portable tanks, reclosing pressure relief devices must be removed from the tank and tested separately unless they can be tested while installed on the portable tank. For portable tanks where the shell and equipment have been pressure-tested separately, after assembly they must be subjected together to a leakage test and effectively tested and inspected for corrosion. Portable tanks used for the transportation of refrigerated, liquefied gases are excepted from the requirement for internal inspection and the hydraulic pressure test during the 5-year periodic inspection and test, if the portable tanks were pressure tested to a minimum test pressure of 1.3 times the design pressure using an inert gas as prescribed in §178.338–16(a) and (b) of this subchapter before putting the portable tank into service initially and after any exceptional inspections and tests specified in paragraph (f) of this section.

(f) *Exceptional inspection and test.* The exceptional inspection and test is necessary when a portable tank shows evidence of damaged or corroded areas, or leakage, or other conditions that indicate a deficiency that could affect the integrity of the portable tank. The extent of the exceptional inspection and test must depend on the amount of damage or deterioration of the portable tank. It must include at least the inspection and a pressure test according to paragraph (e) of this section. Pressure relief devices need not be tested or replaced unless there is reason to believe the relief devices have been affected by the damage or deterioration.

(g) *Internal and external examination.* The internal and external examinations must ensure that:

(1) The shell is inspected for pitting, corrosion, or abrasions, dents, distortions, defects in welds or any other conditions, including leakage, that might render the portable tank unsafe for transportation;

(2) The piping, valves, and gaskets are inspected for corroded areas, defects, and other conditions, including

leakage, that might render the portable tank unsafe for filling, discharge or transportation;

(3) Devices for tightening manhole covers are operative and there is no leakage at manhole covers or gaskets;

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

(5) 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;

(6) Required markings on the portable tank are legible and in accordance with the applicable requirements; and

(7) The framework, the supports and the arrangements for lifting the portable tank are in satisfactory condition.

(h) *Pressure test procedures for specification 51, 57, 60, IM or UN portable tanks.* (1) Each Specification 57 portable tank must be leak tested by a minimum sustained air pressure of at least 3 psig applied to the entire tank. Each Specification 51 or 56 portable tank must be tested by a minimum pressure (air or hydrostatic) of at least 2 psig or at least one and one-half times the design pressure (maximum allowable working pressure, or re-rated pressure) of the tank, whichever is greater. The leakage test for portable tanks used for refrigerated liquefied gas must be performed at 90% of MAWP. Leakage tests for all other portable tanks must be at a pressure of at least 25% of MAWP. During each air pressure test, the entire surface of all joints under pressure must be coated with or immersed in a solution of soap and water, heavy oil, or other material suitable for the purpose of detecting leaks. The pressure must be held for a period of time sufficiently long to assure detection of leaks, but in no case less than five minutes. During the air or hydrostatic test, relief devices may be removed, but all the closure fittings must be in place and the relief device openings plugged. Lagging need not be removed from a lagged tank if it is possible to maintain the required test pressure at constant temperature with the tank disconnected from the source of pressure.

(2) Each Specification 60 portable tank must be retested by completely filling the tank with water or other liquid having a similar viscosity, the temperature of the liquid must not exceed 37.7 °C (100 °F) during the test, and applying a pressure of 60 psig. The portable tank must be capable of holding the prescribed pressure for at least 10 minutes without leakage, evidence of impending failure, or failure. All closures shall be in place while the test is made and the pressure shall be gauged at the top of the tank. Safety devices and/or vents shall be plugged during this test.

(3) Each Specification IM or UN portable tank, except for UN portable tanks used for non-refrigerated and refrigerated liquefied gases, and all piping, valves and accessories, except pressure relief devices, must be hydrostatically tested with water, or other liquid of similar density and viscosity, to a pressure not less than 150% of its maximum allowable working pressure. UN portable tanks used for the transportation of non-refrigerated liquefied gases must be hydrostatically tested with water, or other liquid of similar density and viscosity, to a pressure not less than 130% of its maximum allowable working pressure. UN portable tanks used for the transportation of refrigerated liquefied gases may be tested hydrostatically or pneumatically using an inert gas to a pressure not less than 1.3 times the design pressure. For pneumatic testing, due regard for protection of all personnel must be taken because of the potential hazard involved in such a test. The pneumatic test pressure in the portable tank must be reached by gradually increasing the pressure to one-half of the test pressure. Thereafter, the test pressure must be increased in steps of approximately one-tenth of the test pressure until the required test pressure has been reached. The pressure must then be reduced to a value equal to four-fifths of the test pressure and held for a sufficient time to permit inspection of the portable tank for leaks. The minimum test pressure for a portable tank is determined on the basis of the hazardous materials that are intended to be transported in the portable tanks. For liquid, solid and non-refrig-

erated liquefied gases, the minimum test pressure for specific hazardous materials are specified in the applicable T Codes assigned to a particular hazardous material in the §172.101 Table of this subchapter. While under pressure the tank shall be inspected for leakage, distortion, or any other condition which might render the tank unsafe for service. A portable tank fails to meet the requirements of the pressure test if, during the test, there is permanent distortion of the tank exceeding that permitted by the applicable specification; if there is any leakage; or if there are any deficiencies that would render the portable tank unsafe for transportation. Any portable tank that fails must be rejected and may not be used again for the transportation of a hazardous material unless the tank is adequately repaired, and, thereafter, a successful test is conducted in accordance with the requirements of this paragraph. An approval agency shall witness the hydrostatic or pneumatic test. Any damage or deficiency that might render the portable tank unsafe for service shall be repaired to the satisfaction of the witnessing approval agency. The repaired tank must be retested to the original pressure test requirements. Upon successful completion of the hydrostatic or pneumatic test, as applicable, the witnessing approval agency shall apply its name, identifying mark or identifying number in accordance with paragraph (k) of this section.

(i) *Rejection criteria.* When evidence of any unsafe condition is discovered, the portable tank may not be returned to service until it has been repaired and the pressure test is repeated and passed.

(j) *Repair.* The repair of a portable tank is authorized, provided such repairs are made in accordance with the requirements prescribed in the specification for the tank's original design and construction. In addition to any other provisions of the specification, no portable tank may be repaired so as to cause leakage or cracks or so as to increase the likelihood of leakage or cracks near areas of stress concentration due to cooling metal shrinkage in welding operations, sharp fillets, reversal of stresses, or otherwise. No field

welding may be done except to non-pressure parts. Any cutting, burning or welding operations on the shell of an IM or UN portable tank must be done with the approval of the approval agency and be done in accordance with the requirements of this subchapter, taking into account the pressure vessel code used for the construction of the shell. A pressure test to the original test pressure must be performed after the work is completed.

(k) *Inspection and test markings.* Each IM or UN portable tank must be durably and legibly marked, in English, with the date (month and year) of the last pressure test, the identification markings of the approval agency witnessing the test, when required, and the date of the last visual inspection. The marking must be placed on or near the metal identification plate, in letters not less than 3 mm (0.118 inches) high when on the metal identification plate, and 12 mm (0.5 inches) high when on the portable tank.

(l) *Record retention.* The owner of each portable tank or his authorized agent shall retain a written record of the date and results of all required inspections and tests, including an ASME manufacturer's date report, if applicable, and the name and address of the person performing the inspection or test, in accordance with the applicable specification. The manufacturer's data report, including a certificate(s) signed by the manufacturer, and the authorized design approval agency, as applicable, indicating compliance with the applicable specification of the portable tank, must be retained in the files of the owner, or his authorized agent, during the time that such portable tank is used for such service, except for Specifications 56 and 57 portable tanks.

[Amdt. 180-2, 54 FR 25032, June 12, 1989, as amended at 67 FR 15744, Apr. 3, 2002]

APPENDIX A TO PART 180—INTERNAL SELF-CLOSING STOP VALVE EMERGENCY CLOSURE TEST FOR LIQUEFIED COMPRESSED GASES

1. In performing this test, all internal self-closing stop valves must be opened. Each emergency discharge control remote actuator (on-truck and off-truck) must be operated to ensure that each internal self-closing

stop valve's lever, piston, or other valve indicator has moved to the closed position.

2. On pump-actuated pressure differential internal valves, the three-way toggle valve handle or its cable attachment must be activated to verify that the toggle handle moves to the closed position.

[64 FR 28052, May 24, 1999, as amended at 67 FR 15744, Apr. 3, 2002]

APPENDIX B TO PART 180—ACCEPTABLE INTERNAL SELF-CLOSING STOP VALVE LEAKAGE TESTS FOR CARGO TANKS TRANSPORTING LIQUEFIED COMPRESSED GASES

For internal self-closing stop valve leakage testing, leakage is defined as any leakage through the internal self-closing valve or to the atmosphere that is detectable when the valve is in the closed position. On some valves this will require the closure of the pressure by-pass port.

(a) *Meter Creep Test.*

1. An operator of a cargo tank equipped with a calibrated meter may check the internal self-closing stop valve for leakage through the valve seat using the meter as a flow measurement indicator. The test is initiated by starting the delivery process or returning product to the cargo tank through the delivery system. This may be performed at an idle. After the flow is established, the operator closes the internal self-closing stop valve and monitors the meter flow. The meter flow must stop within 30 seconds with no meter creep within 5 seconds after the meter stops.

2. On pump-actuated pressure differential internal self-closing stop valves, the valve must be closed with the remote actuator to assure that it is functioning. On other types of internal self-closing stop valves, the valve(s) may be closed using either the normal valve control or the discharge control system (e.g., remote).

3. Rejection criteria: Any detectable meter creep within the first five seconds after initial meter stoppage.

(b) *Internal Self-Closing Stop Valve Test.*

An operator of a cargo tank that is not equipped with a meter may check the internal self-closing stop valve(s) for leakage as follows:

1. The internal self-closing stop valve must be in the closed position.

2. All of the material in the downstream piping must be evacuated, and the piping must be returned to atmospheric temperature and pressure.

3. The outlet must be monitored for 30 seconds for detectable leakage.

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4. Rejection criteria. Any detectable leakage is considered unacceptable.

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[64 FR 28052, May 24, 1999]