

Retest and Inspection Requirements for Intermediate Bulk Containers

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The purpose of this document is to provide the key details of complying with the Department of Transportation (DOT) regulations for the retest and inspection of intermediate bulk containers (IBCs). Please consult the full regulations for a complete understanding.

A retailer (or anyone) can conduct the leakproofness test and the required DOT inspections if he/she follows the procedure in the DOT regulations, marks the container and keeps the required records. In addition, people who do the testing or marking are hazmat employees¹ by DOT regulations and have to meet the DOT training requirements in 49 CFR 173.1 (general) and 172.704 (specific). According to 49 CFR 172.702(c), training may be provided by the hazmat employer or other public or private sources. DOT's web site has a lot of information about the required training and training modules:

- General Hazardous Materials web site: <http://www.phmsa.dot.gov/hazmat>
- Training and Outreach: <http://www.phmsa.dot.gov/hazmat/training-outreach>
- Training Requirements: <http://www.phmsa.dot.gov/hazmat/training/requirements>
- Training Modules: <http://www.phmsa.dot.gov/hazmat/training/publications/modules>

Intermediate bulk container is defined as a rigid or flexible portable packaging, other than a cylinder or portable tank, which is designed for mechanical handling. Standards for IBCs manufacturers in the United States are set forth in Subparts N and O of Part 178 of this subchapter. The body of an IBC is defined as the receptacle proper (including openings and their closures but not including service equipment), that has a volumetric capacity of not more than three cubic meters (3,000 L, 793 gallons, or 106 cubic feet) and not less than 0.45 cubic meters (450 L, 119 gallons, or 15.9 cubic feet) or a maximum net mass of not less than 400 kg (882 pounds).

§ 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 [see below] of this subchapter prior to its first use in transportation and every 2.5 years thereafter, starting from the date of manufacture or the date of a repair conforming to paragraph (d)(1) of this section. For this test, the IBC is not required to have its closures fitted.

¹ The definition of hazmat employee includes "an individual, employed on a full time, part time or temporary basis by a hazmat employer, or who is self employed, who during the course of employment...designs, manufactures, fabricates, inspects, marks, maintains, reconditions, repairs, or tests a package, container or packaging component that is represented, marked, certified, or sold as qualified for use in transporting hazardous materials in commerce." (49 CFR 171.8)

(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. ...*

(d) *Requirements applicable to repair of IBCs. ...*

(e) *Requirements applicable to routine maintenance of IBCs. ...*

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

(g) *Record retention*. (1) The owner or lessee of the IBC must keep records of periodic retests, initial and periodic inspections, and tests performed on the IBC if it has been repaired or remanufactured.

(2) 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 test or inspections, and test or inspection specifics and results.

(3) 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.

Key Sections Referred to in 49 CFR 180.352

178.703 Marking of IBCs.

(a) The manufacturer shall:

(1) Mark every IBC in a durable and clearly visible manner. The marking may be applied in a single line or in multiple lines provided the correct sequence is followed with the information required by this section in letters, numerals and symbols of at least 12 mm in height. This minimum marking size applies only to IBCs manufactured after October 1, 2001). The following information is required in the sequence presented:

(i) ... the United Nations symbol ...

(ii) The code number designating IBC design type ...

(iii) A capital letter identifying the performance standard under which the design type has been successfully tested ...

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

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

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

(vii) The stacking test load in kilograms (kg). ...

(viii) The maximum permissible gross mass in kg.

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

(b) *Additional marking.* In addition to markings required in paragraph (a) of this section, each IBC must be marked as follows in a place near the markings required in paragraph (a) of this section that is readily accessible for inspection. Where units of measure are used, the metric unit indicated (e.g., 450 L) must also appear.

(1) For each **rigid plastic and composite IBC**, the following markings must be included:

(i) Rated capacity in L of water at 20 °C (68 °F);

(ii) Tare mass in kilograms;

(iii) Gauge test pressure in kPa;

(iv) Date of last leakproofness test, if applicable (month and year); and

(v) Date of last inspection (month and year).

(2) For each **metal IBC**, the following markings must be included on a metal corrosion-resistant plate:

(i) Rated capacity in L of water at 20 °C (68 °F);

(ii) Tare mass in kilograms;

(iii) Date of last leakproofness test, if applicable (month and year);

(iv) Date of last inspection (month and year);

(v) Maximum loading/discharge pressure, in kPa, if applicable;

(vi) Body material and its minimum thickness in mm; and

(vii) Serial number assigned by the manufacturer.

(3) Markings required by paragraph (b)(1) or (b)(2) of this section may be preceded by the narrative description of the marking, e.g. "Tare Mass: * * *" where the " * * *" are replaced with the tare mass in kilograms of the IBC.

(4) ...

§ 178.813 Leakproofness test.

(a) *General.* The leakproofness test must be conducted for the qualification of all IBC design types and on all production units intended to contain solids that are loaded or discharged under pressure or intended to contain liquids.

(b) *Special preparation for the leakproofness test.* Vented closures must either be replaced by similar non-vented closures or the vent must be sealed. For metal IBC design types, the initial test must be carried out before the fitting of any thermal insulation equipment. The inner receptacle of a composite IBC may be tested without the outer packaging provided the test results are not affected.

(c) *Test method and pressure applied.* **The leakproofness test must be carried out for a suitable length of time using air at a gauge pressure of not less than 20 kPa (2.9 psig). Leakproofness of IBC design types must be determined by coating the seams and joints with a heavy oil, a soap solution and water, or other methods suitable for the purpose of detecting leaks.** Other methods, if at least equally effective, may be used in accordance with appendix B of this part [see below], or if approved by the Associate Administrator, as provided in §178.801(i)).

(d) *Criterion for passing the test.* For all IBC design types intended to contain solids that are loaded or discharged under pressure or intended to contain liquids, there may be no leakage of air from the IBC.

Appendix B to Part 178—Alternative Leakproofness Test Methods

In addition to the method prescribed in §178.604 of this subchapter, the following leakproofness test methods are authorized:

(1) *Helium test.* The packaging must be filled with at least 1 L inert helium gas, air tight closed, and placed in a testing chamber. The testing chamber must be evacuated down to a pressure of 5 kPa which equals an over-pressure inside the packaging of 95 kPa. The air in the testing chamber must be analyzed for traces of helium gas by means of a mass spectrograph. The test must be conducted for a period of time sufficient to evacuate the chamber and to determine if there is leakage into or out of the packaging. If helium gas is detected, the leaking packaging must be automatically separated from non-leaking drums and the leaking area determined according to the method prescribed in §178.604(d) of this subchapter. A packaging passes the test if there is no leakage of helium.

(2) *Pressure differential test.* The packaging shall be restrained while either pressure or a vacuum is applied internally. The packaging must be pressurized to the pressure required by §178.604(e) of this subchapter for the appropriate packing group. The method of restraint must not affect the results of the test. The test must be conducted for a period of time sufficient to appropriately pressurize or evacuate the interior of the packaging and to determine if there is leakage into or out of the packaging. A packaging passes the pressure differential test if there is no change in measured internal pressure.

(3) *Solution over seams.* The packaging must be restrained while an internal air pressure is applied; the method of restraint may not affect the results of the test. The exterior surface of all seams and welds must be coated with a solution of soap suds or a water and oil mixture. The test must be conducted for a period of time sufficient to pressurize the interior of the packaging to the specified air pressure and to determine if there is leakage of air from the packaging. A packaging passes the test if there is no leakage of air from the packaging.

(4) *Solution over partial seams test.* For other than design qualification testing, the following test may be used for metal drums: The packaging must be restrained while an internal air pressure of 48 kPa (7.0 psig) is applied; the method of restraint may not affect the results of the test. The packaging must be coated with a soap solution over the entire side seam and a distance of not less than eight inches on each side of the side seam along the chime seam(s). The test must be conducted for a period of time sufficient to pressurize the interior of the packaging to the specified air pressure and to determine if there is leakage of air from the packaging. A packaging passes the test if there is no leakage of air from the packaging. Chime cuts must be made on the initial drum at the beginning of each production run and on the initial drum after any adjustment to the chime seamer. Chime cuts must be maintained on file in date order for not less than six months and be made available to a representative of the Department of Transportation on request.