

°C (0 °F) or lower are considered acceptable test liquids, and may be considered equivalent to water for test purposes. IBCs conditioned in this way are not required to be conditioned in accordance with § 178.802.

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

(d) *Drop height.* (1) For all IBCs, drop heights are specified as follows:

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

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

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

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

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

(A) Packing Group I: $SG \times 1.5$ m (4.9 feet).

(B) Packing Group II: $SG \times 1.0$ m (3.3 feet).

(C) Packing Group III: $SG \times 0.67$ m (2.2 feet).

(e) *Criteria for passing the test.* For all IBC design types there may be no loss of contents. A slight discharge from a closure upon impact is not considered to be a failure of the IBC provided that no further leakage occurs. A slight discharge (e.g., from closures or stitch holes) upon impact is not considered a failure of the flexible IBC provided that

no further leakage occurs after the IBC has been raised clear of the ground.

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended at 66 FR 45386, Aug. 28, 2001; 69 FR 76186, Dec. 20, 2004; 71 FR 78635, Dec. 29, 2006]

§ 178.811 Bottom lift test.

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

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

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

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

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended at 66 FR 45386, Aug. 28, 2001]

§ 178.812 Top lift test.

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

(b) *Special preparation for the top lift test.* (1) Metal, rigid plastic, and composite IBC design types must be loaded to twice the maximum permissible gross mass with the load being evenly distributed.

(2) Flexible IBC design types must be filled to six times the maximum net mass, the load being evenly distributed.

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

(2) Rigid plastic and composite IBC design types must be:

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

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

(3) If not tested as indicated in paragraph (c)(1) of this section, a flexible IBC design type must be tested as follows:

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

(ii) Suspend the flexible IBC by its lifting devices.

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

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

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

(d) *Criteria for passing the test.* For all IBC design types designed to be lifted from the top, there may be no permanent deformation which renders the IBC, including the base pallets when applicable, unsafe for transportation, and no loss of contents.

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended at 66 FR 33452, June 21, 2001; 66 FR 45386, Aug. 28, 2001; 68 FR 45042, July 31, 2003]

§ 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 equip-

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ment. 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, 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.

[Amdt. 178-103, 59 FR 38074, July 26, 1994, as amended at 64 FR 10782, Mar. 5, 1999; 66 FR 45185, 45386, Aug. 28, 2001]

§ 178.814 Hydrostatic pressure test.

(a) *General.* The hydrostatic pressure test must be conducted for the qualification of all metal, rigid plastic, and composite IBC design types intended to contain solids that are loaded or discharged under pressure or intended to contain liquids.

(b) *Special preparation for the hydrostatic pressure test.* For metal IBCs, the test must be carried out before the fitting of any thermal insulation equipment. For all IBCs, pressure relief devices and vented closures must be removed and their apertures plugged or rendered inoperative.

(c) *Test method.* Hydrostatic gauge pressure must be measured at the top of the IBC. The test must be carried out for a period of at least 10 minutes applying a hydrostatic gauge pressure not less than that indicated in paragraph (d) of this section. The IBCs may not be mechanically restrained during the test.

(d) *Hydrostatic gauge pressure applied.* (1) For metal IBC design types, 31A, 31B, 31N: 65 kPa gauge pressure (9.4 psig).