

## § 178.965

vary by up to  $\pm 5$  percent relative humidity without significant impairment of test reproducibility; or

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

### § 178.965 Drop test.

(a) *General.* The drop test must be conducted for the qualification of all Large Packaging design types and performed periodically as specified in § 178.955(e) of this subpart.

(b) *Special preparation for the drop test.* Large Packagings must be filled in accordance with § 178.960.

(c) *Conditioning.* Rigid plastic Large Packagings and Large Packagings with plastic inner receptacles must be conditioned for testing by reducing the temperature of the packaging and its contents to  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or lower. Test liquids must be kept in the liquid state, if necessary, by the addition of anti-freeze. Water/anti-freeze solutions with a minimum specific gravity of 0.95 for testing at  $-18^{\circ}\text{C}$  ( $0^{\circ}\text{F}$ ) or lower are considered acceptable test liquids, and may be considered equivalent to water for test purposes. Large Packagings conditioned in this way are not required to be conditioned in accordance with § 178.960(d).

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

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

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

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

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

## 49 CFR Ch. I (10–1–11 Edition)

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

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

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

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

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

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

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

[75 FR 5400, Feb. 2, 2010, as amended at 75 FR 60339, Sept. 30, 2010]

### § 178.970 Bottom lift test.

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

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

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