

§ 178.985

49 CFR Ch. I (10–1–11 Edition)

maximum permissible gross mass of the number of similar Large Packaging that may be stacked on top of the Large Packaging during transportation.

(d) *Periodic Retest.* (1) The package must be tested in accordance with §178.980(c) of this subpart; or

(2) The packaging may be tested using a dynamic compression testing machine. The test must be conducted at room temperature on an empty, unsealed packaging. The test sample must be centered on the bottom platen of the testing machine. The top platen must be lowered until it comes in contact with the test sample. Compression must be applied end to end. The speed of the compression tester must be one-half inch plus or minus one-fourth inch per minute. An initial preload of 50 pounds must be applied to ensure a definite contact between the test sample and the platens. The distance between the platens at this time must be recorded as zero deformation. The force "A" to then be applied must be calculated using the applicable formula:

Liquids: $A = (1.8)(n - 1) [w + (s \times v \times 8.3 \times .98)] \times 1.5;$

or

Solids: $A = (1.8)(n - 1) [w + (s \times v \times 8.3 \times .95)] \times 1.5$

Where:

- A = applied load in pounds.
- n = maximum number of Large Packagings that may be stacked during transportation.
- w = maximum weight of one empty container in pounds.
- s = specific gravity (liquids) or density (solids) of the lading.
- v = actual capacity of container (rated capacity + outage) in gallons.
- and:
- 8.3 corresponds to the weight in pounds of 1.0 gallon of water.
- 1.5 is a compensation factor that converts the static load of the stacking test into a load suitable for dynamic compression testing.

(e) *Criterion for passing the test.* (1) For metal or rigid plastic Large Packagings, there may be no permanent deformation which renders the Large Packaging unsafe for transportation and no loss of contents.

(2) For flexible Large Packagings, there may be no deterioration which

renders the Large Packaging unsafe for transportation and no loss of contents.

(3) For the dynamic compression test, a container passes the test if, after application of the required load, there is no permanent deformation to the Large Packaging which renders the whole Large Packaging; including the base pallet, unsafe for transportation; in no case may the maximum deflection exceed one inch.

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

§ 178.985 Vibration test.

(a) *General.* All rigid Large Packaging and flexible Large Packaging design types must be capable of withstanding the vibration test.

(b) *Test method.* (1) A sample Large Packaging, selected at random, must be filled and closed as for shipment. Large Packagings intended for liquids may be tested using water as the filling material for the vibration test.

(2) The sample Large Packaging must be placed on a vibrating platform that has a vertical or rotary double-amplitude (peak-to-peak displacement) of one inch. The Large Packaging must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(3) The sample Large Packaging must be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The Large Packaging must be constrained horizontally to prevent it from falling off the platform, but must be left free to move vertically and bounce.

(4) The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1.6-mm (0.063-inch) in thickness (such as steel strapping or paperboard) can be passed between the bottom of the Large Packaging and the platform. Other methods at least equally effective may be used (see §178.801(i)).

(c) *Criterion for passing the test.* A Large Packaging passes the vibration test if there is no rupture or leakage.

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