Pipeline and Hazardous Materials Safety Administration, DOT

§ 178.956 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 °C (0 °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 °C (0 °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) Paper or fiberboard Large Packagings must be conditioned for at least 24 hours immediately prior to testing in an atmosphere maintained—

(1) At 50 percent ±2 percent relative humidity, and at a temperature of 23 °C (73 °F ± 4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±5 percent relative humidity without significant impairment of test reproducibility;

(2) At 65 percent ±2 percent relative humidity, and at a temperature of 20 °C (68 °F ± 4 °F), or 27 °C ±2 °C (81 °F ±4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±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 height.

(1) For all Large Packagings, drop heights are specified as follows:

(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 °C (0 °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 °C (0 °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) Paper or fiberboard Large Packagings must be conditioned for at least 24 hours immediately prior to testing in an atmosphere maintained—

(1) At 50 percent ±2 percent relative humidity, and at a temperature of 23 °C (73 °F ± 4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±5 percent relative humidity without significant impairment of test reproducibility;

(2) At 65 percent ±2 percent relative humidity, and at a temperature of 20 °C (68 °F ± 4 °F), or 27 °C ±2 °C (81 °F ±4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±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.

§ 178.956 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 °C (0 °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 °C (0 °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) Paper or fiberboard Large Packagings must be conditioned for at least 24 hours immediately prior to testing in an atmosphere maintained—

(1) At 50 percent ±2 percent relative humidity, and at a temperature of 23 °C (73 °F ± 4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±5 percent relative humidity without significant impairment of test reproducibility;

(2) At 65 percent ±2 percent relative humidity, and at a temperature of 20 °C (68 °F ± 4 °F), or 27 °C ±2 °C (81 °F ±4 °F). Average values should fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary by up to ±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.
§ 178.970 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.

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

§ 178.975 Top lift test.

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

(b) Special preparation for the top lift test. (1) Metal and rigid plastic Large Packagings design types must be loaded to twice its maximum permissible gross mass.

(2) Flexible Large Packaging design types must be filled to six times the maximum permissible gross mass, the load being evenly distributed.

(c) Test method. (1) A Large Packaging 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 Large Packaging design types must be:

(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 Large Packaging design type must be tested as follows:

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

(ii) Suspend the flexible Large Packaging by its lifting devices.

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

(iv) The combination of the mass of the filled flexible Large Packaging and the force applied through the platen must be a minimum of six times the maximum net mass of the flexible Large Packaging. 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) Criterion for passing the test. For all Large Packagings design types designed to be lifted from the top, there may be no permanent deformation which renders the Large Packagings unsafe for transport and no loss of contents.

§ 178.980 Stacking test.

(a) General. The stacking test must be conducted for the qualification of all Large Packagings design types intended to be stacked.

(b) Special preparation for the stacking test. (1) All Large Packagings except flexible Large Packaging design types must be loaded to their maximum permissible gross mass.

(2) Flexible Large Packagings must be filled to not less than 95 percent of their capacity and to their maximum net mass, with the load being evenly distributed.