

T 800 cm-06

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Drum test for fiberboard shipping containers (revolving hexagonal drum)

1. Scope

1.1 This method describes two procedures for testing loaded fiberboard shipping containers by means of a revolving drum tester.

1.1.1 *Procedure A:* to determine the ability of the container to withstand rough handling by subjecting it to a variety of shocks and impact stresses simulating those which may be expected in some handling and shipping cycles, and

1.1.2 *Procedure B:* to determine the relative ability of a package (shipping container and interior packaging material, if any) to provide protection to its contents when subjected to a variety of shocks and impact stresses simulating some handling and shipping conditions.

1.2 The procedures described in this method are for a 2.13-m (7-ft) (internal dimensions at intersection of faces) revolving hexagonal drum and may be used to test containers whose gross weight does not exceed 113 kg (250 lb), and whose maximum dimension does not exceed 510 mm (20 in.). This drum is unsuitable for containers exceeding the above size or for shapes that do not move and fall freely when the drum is rotated.

1.3 Also in use is a 4.27-m (14-ft) diameter drum, described in ASTM D 782. It is rarely used for containers whose greatest dimension is less than 510 mm (20 in.). It is used for testing containers whose weight does not exceed 272 kg (600 lb) and whose greatest dimension does not exceed 1020 mm (40 in.).

NOTE 1: The drum test is best suited to obtain the net effect of an unpredictable variety or random combination of shocks and stresses. When the effects of specific types of shocks and stresses are to be determined or isolated, consideration should be given to using another method which provides definite control of the cycle of events, such as the incline impact test TAPPI T 801 "Impact Resistance of Fiberboard Shipping Containers" or TAPPI T 802 "Drop Test for Fiberboard Shipping Containers."

Approved by the Standard Specific Interest Group for this Test Method
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2. Summary

The revolving drum subjects the container and its contents to a series of random falls onto the inner faces of the drum and against the baffles arranged around the inner periphery of the drum. The baffles are designed to cause the container to fall on different corners, edges, and faces and to present various impact hazards.

3. Significance

3.1 The drum test is usually made to compare various container designs of the same size for carrying the same load by simulating an unpredictable, uncontrolled type of rough handling expected in actual shipment as, for example, when packages are handled individually. The test permits observing the progressive destruction or failure of the container and interior packaging material and aids in making improvements to their design.

3.2 The series of falls is unpredictable; probably no two containers will fall or tumble in exactly the same sequence. Hence, the drum test results may be expected to vary more than the results of a test not containing this random characteristic (see Section 9, Precision).

3.3 Comparative tests between containers of substantially different proportions or dimensions (even if of the same weight and carrying the same contents) are not reliable because of the difference of the action in the drum, height of fall, etc.

4. Apparatus

4.1 *Testing machine*, consisting of the following components:

4.1.1 *Revolving drum* (see Fig. 1), in the form of a prism whose bases are regular hexagons and whose lateral faces are rectangles. The axis of rotation is horizontal. The drum rotates at $2 \pm \frac{1}{6}$ rpm. Faces and rigidity of structural members conform to the approved drawings of the USDA Forest Products Laboratory (see Appendix A.1).



Fig. 1 Testing drum.

4.1.2 *Baffles or hazards* fixed on the inside faces of the drum. Location and construction of baffles conform to the approved drawings of the USDA Forest Products Laboratory (see Appendix A.1). The inner faces and hazards are kept smooth, clean, polished, and in good repair so that if an ordinary No. 2½ food can (“packers” 410 x 411) or the equivalent, filled with water, with a gross weight of 950 ± 45 g (2.1 ± 0.1 lb) rests on its bottom on the drum face, it will just slide when the face is at an angle of $15 \pm 2^\circ$ from the horizontal.

NOTE 2: When prescribed for a specific test, a conical projection may be positioned on one face of the drum to simulate a puncture hazard. Its use is to be prominently noted in the report.

4.1.3 *Automatic counting device*, to record each individual fall as each drum face passes the counter.