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Standard Test Method for Drop Test for Loaded Cylindrical Containers¹

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^{ε1} NOTE—Figure 1, which was inadvertently omitted in 1981, was reinstated in December 1989.

1. Scope

1.1 This test method covers drop tests on loaded, substantial cylindrical containers such as barrels, drums, kegs, or pails (metal, fiber, plastic, or wood) to measure their ability to withstand rough handling.

1.2 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 585 Method for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, or Related Product²
- D 644 Test Method for Moisture Content of Paper and Paperboard by Oven Drying²
- D 685 Method of Conditioning Paper and Paper Products for Testing²
- D 775 Test Method for Drop Test for Loaded Boxes²

3. Significance and Use

3.1 Materials shipped in cylindrical containers vary from solids of varied particle size and shape (powders, granules, etc.) to liquids of all densities. Even the solids are to some degree capable of flowing. The rupture of any of these containers will cause material to escape easily from the container resulting not only in an economic loss but in the possible creation of hazards such as health, fire, house-keeping, etc. This test method is to evaluate the ability of the container to withstand sudden shock resulting from a free fall. This test method may also be used to design or redesign suitable containers.

4. Apparatus

4.1 Drop Test Apparatus, consisting of:

- 4.1.1 Chain hoist or other appropriate lifting device,

4.1.2 Rope or belt sling for placing around the container for lifting,

4.1.3 Tripping devices similar to that shown in Figs. X1 through X4 of X1.

4.1.4 Solid surface of concrete, stone, or steel of sufficient mass to absorb all shock without deflection, and

4.1.5 A 4 by 4-in. (102 by 102-mm) timber (about 4 ft (1.2 m) in length) having the edges rounded to a radius of not more than 1/4 in. (6.4 mm).

4.1.6 For small containers, the apparatus described in Section 4 of Test Method D 775 may be used.

4.2 *Conditioning Apparatus*—Adequate facilities for conditioning test specimens at proper humidity and temperature prior to test, in accordance with the requirements of the specifications covering the container to be tested.

4.3 *Miscellaneous Equipment*—Drying oven, scales, knife, saw, micrometer caliper, etc., for use in the determination of the moisture content or for making other supplementary tests of the materials from which the containers are made.

5. Sampling

5.1 Any convenient or specified sampling plan may be used. For accepting fiberboard drums, samples should be selected in accordance with Method D 585.

5.2 In the absence of any specific sampling plan, performance shall be based on not less than three representative specimens of a given size and type of a container.

6. Test Specimens

6.1 Pack the container to be tested with the actual contents for which it was designed or with a dummy load simulating these contents. Close and seal the container in the normal manner and dry and age sufficiently so that any adhesives, protective coatings, sealing tape, etc., will have reached their final normal condition.

6.2 The procedure for the identification of the component parts as well as point of impact upon drop testing shall be as follows (See Fig. 1): The quarter points around the top of the container shall be designated as points 1, 3, 5, and 7 for diagonal cover chime drops. The quarter points around the bottom of the container shall be designated as 2, 4, 6, and 8 for diagonal bottom chime drops. The lines between 1 and 2, 3 and 4, 5 and 6, and 7 and 8 shall be designated 12, 34, 56, and 78, respectively, for flatwise sidewall drops.

7. Conditioning

7.1 Depending on the purpose of the test, the containers may be conditioned prior to the drop test by either water

¹ This test method is under the jurisdiction of ASTM Committee D-10 on Packaging and is the direct responsibility of Subcommittee D10.22 on Handling and Transportation.

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² Annual Book of ASTM Standards, Vol 15.09.