



Designation: D 6344 – 98

Standard Test Method for Concentrated Impacts to Transport Packages¹

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1. Scope

1.1 This test method covers procedures and equipment for testing complete filled transport packages for resistance against concentrated low-level impacts typical of those encountered in the distribution environment. The test is most appropriate for packages such as thin fluted/lighter grade corrugated boxes or stretch-wrapped packaging.

1.2 The test result is a pass/fail determination, based on acceptance criteria previously established, and a record of the energy dissipated by the complete filled transport package during a low level concentrated impact.

NOTE 1—This test method discusses the conduct of the test from a prescribed height that either meets or does not meet specific acceptance criteria. It may be possible to conduct this type of testing using modified procedures that provide a numerical response. These might include an incremental test where the drop height (or mass) is increased until a specific failure occurs or an up-and-down or staircase procedure used to find the average height to failure.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

- D 996 Terminology of Packaging and Distribution Environments²
- D 4169 Practice for Performance Testing of Shipping Containers and Systems²
- D 4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing²
- E 122 Practice for Choice of Sample Size to Estimate a Measure of Quality for a Lot or Process³

3. Terminology

3.1 *Definitions*—General definitions for the packaging and distribution environments are found in Terminology D 996.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *acceptance criteria*—the acceptable condition of package and contents that must be met after the shipping container has been tested.

4. Significance and Use

4.1 This test method is intended to evaluate the ability of packaging to resist the force of concentrated impacts from outside sources, such as those encountered in various modes of transportation and handling. These impacts may be inflicted by adjacent freight jostling against the package in a carrier vehicle, by accidental bumps against other freight when loaded or unloaded from vehicles, by packages bumping against one another during sorting on conveyors or chutes, or many other circumstances.

4.2 This test method is intended to determine the ability of packaging to protect contents from such impacts, and to evaluate if there is sufficient clearance or support or both between the package wall and its contents.

5. Apparatus

5.1 *Cylindrical Mass with Full Radius (Hemispherical) End*—Solid steel rod 32 mm \pm 2 mm (1.25 in. \pm 0.1 in.) in diameter, approximately 115 mm (4.5 in.) long, one end rounded to form a hemisphere, with a mass of 680 \pm 15 g (1.5 \pm 0.03 lb). A threaded eye-bolt may be attached to the end for positioning and support prior to guided free fall drop, but it must be included in the 680 g (1.5 lb) mass (see Fig. 1). Threaded eyebolts must be attached to the side for positioning and support when used as a pendulum, and must be included in the 680 g (1.5 lb) mass.

5.2 *Guided Free Fall* (see Fig. 2):

5.2.1 The cylindrical mass (rod) is held in a start position in a stiff tube of at least 38 mm (1.5 in.) diameter, such that the tube's main axis is perpendicular within 2 degrees. The end of the tube should be positioned 50 to 100 mm (2 to 4 in.) above the test specimen. The mass may be held in position, at the specified vertical distance, with either a string from the top of the tube, or by a support pin placed through the side of the tube.

5.2.2 The mass is allowed to fall freely when released to strike the test specimen with its rounded end. The free falling rod must strike the test surface within 10 mm (0.4 in.) of the desired point of impact. The test surface must be perpendicular to the direction of the falling mass.

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 Physical Test Methods.

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² *Annual Book of ASTM Standards*, Vol 15.09.

³ *Annual Book of ASTM Standards*, Vol 14.02.