



Standard Test Method for Impact Testing for Shipping Containers and Systems¹

This standard is issued under the fixed designation D880; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers two procedures for conducting impact tests on loaded containers or shipping units (pallet loads), as follows:

1.1.1 *Procedure A*, to test the ability of a container or shipping unit to withstand impacts, and

1.1.2 *Procedure B*, to test the ability of a container or shipping unit or interior packing, or both, to provide protection to the contents, when subjected to impacts.

1.2 Either of these two procedures may be used to evaluate different designs of containers of the same size and carrying the same load. These procedures are suitable for testing various types of containers such as boxes, crates, barrels, drums, kegs, bags, sacks, or pails made of various materials or combinations of materials and for shipping units such as pallet loads or palletized units.

1.3 The procedures described in this test method are particularly suitable for testing large or heavily loaded containers.

1.4 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.5 *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.* Specific precautionary statements are given in **Note 1** and **Section 7**.

2. Referenced Documents

2.1 ASTM Standards:²

D996 Terminology of Packaging and Distribution Environments

¹ This test method is under the jurisdiction of ASTM Committee **D10** on Packaging and is the direct responsibility of Subcommittee **D10.21** on Shipping Containers and Systems - Application of Performance Test Methods.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

D4003 Test Methods for Programmable Horizontal Impact Test for Shipping Containers and Systems

D4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing

D5277 Test Method for Performing Programmed Horizontal Impacts Using an Inclined Impact Tester

E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process

2.2 ISO Standard:

ISO 2244 Horizontal Impact Test (Horizontal or Incline Plane Test: Pendulum Test)³

3. Terminology

3.1 *Definitions*—For definitions of terms applicable to this test method see Terminology **D996**.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *hazard*—removable solid object of any size or shape placed on an impact surface (backstop) so as to contact a test specimen at any desired location during the impact of the specimen into the impact surface (backstop).

4. Summary of Test Method

4.1 An apparatus having a guided carriage capable of holding a test container or shipping unit impacts into a rigid impact surface (backstop) with or without hazards at a predetermined impact velocity. When testing the ability of a container or shipping unit to withstand impact (Procedure A) multiple tests with the same impact velocity or increasing impact velocities may be conducted until failure occurs. When testing the ability of the container, shipping unit, or interior packing, or combination thereof, to provide protection to the contents (Procedure B), a predetermined number of impacts, at predetermined velocities, are applied and the container(s) and contents are then inspected.

5. Significance and Use

5.1 The impact test has been found useful in laboratory simulation of impacts such as those encountered in manual and

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.