



Designation: D1596 – 14 (Reapproved 2023)

Standard Test Method for Dynamic Shock Cushioning Characteristics of Packaging Material¹

This standard is issued under the fixed designation D1596; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers a procedure for obtaining dynamic shock cushioning characteristics of packaging materials through acceleration-time data achieved from dropping a falling guided platen assembly onto a motionless sample. This test method does not address any effects or contributions of exterior packaging assemblies.

1.2 The data acquired may be used for a single point or for use in developing a dynamic cushion curve for the specific material being tested. Such data may be used for comparison among different materials at specific input conditions, or qualifying materials against performance specifications. Caution should be used when attempting to compare data from different methods or when using such data for predicting in-package performance. Depending upon the particular materials of concern, correlation of such data (from among differing procedures or for predicting in-package performance) may be highly variable.

NOTE 1—Alternative and related method for possible consideration is Test Method [D4168](#).

1.3 The values stated in inch-pound units are to be regarded as the standard. The SI units given in parentheses are for information only.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This test method is under the jurisdiction of ASTM Committee [D10](#) on Packaging and is the direct responsibility of Subcommittee [D10.13](#) on Interior Packaging.

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2. Referenced Documents

2.1 ASTM Standards:²

[D996 Terminology of Packaging and Distribution Environments](#)

[D4168 Test Methods for Transmitted Shock Characteristics of Foam-in-Place Cushioning Materials](#)

[D4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing](#)

[E105 Guide for Probability Sampling of Materials](#)

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

3. Terminology

3.1 *Definitions*—General definitions for packaging and distribution environments are found in Terminology [D996](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *acceleration, n*—the rate of change of velocity of a body with respect to time, measured in in./s² (m/s²).

3.2.2 *displacement, n*—the magnitude of movement of a body, point, or surface from a fixed reference point, measured in inches (metres).

3.2.3 *dynamic cushion curve, n*—a graphic representation of dynamic shock cushioning or transmitted shock (in G 's) over a variety of static loading conditions (psi or kg/square m) for a specific cushioning material thickness (or structure) at a specific equivalent free fall drop height.

3.2.3.1 *Discussion*—Such representations can encompass the average response readings in G 's of a number of drops, the average of drops, two to five for each test phase, or represent a single, specific drop number in a drop sequence (that is, first or third drop data).

3.2.4 *equivalent free-fall drop height, n*—the calculated height of free fall in vacuum required for the dropping platen to attain a measured or given impact velocity.

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.