



Designation: D999 – 08 (Reapproved 2023)

Standard Test Methods for Vibration Testing of Shipping Containers¹

This standard is issued under the fixed designation D999; 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 These test methods cover vibration tests of filled shipping containers. Such tests may be used to assess the performance of a container, with its interior packing and means of closure, both in terms of its strength and of the protection it provides its contents when it is subjected to vibration such as it experiences in transportation. These procedures are suitable for testing containers of any form, material, kind, design of interior packing, means of closure, and any size and weight. They are not intended for determining the response of products to vibration for product design purposes, nor are they intended for tests of products in their operational configuration as other more suitable procedures are available for these purposes.^{2,3}

1.2 The following methods appear:

Method A1—Repetitive Shock Test (Vertical Motion).

Method A2—Repetitive Shock Test (Rotary Motion).

Method B—Single Container Resonance Test.

Method C—Palletized Load, Unitized Load, or Vertical Stack Resonance Test.

1.3 For testing of intermediate bulk containers (IBCs) containing liquid hazardous materials, refer to Test Method [D7387](#).

1.4 These test methods fulfill the requirements of International Organization for Standardization standards ISO 8318 and ISO 2247. *The ISO standards may not meet the requirements for these methods.*

1.5 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 These test methods are under the jurisdiction of ASTM Committee [D10](#) on Packaging and are the direct responsibility of Subcommittee [D10.21](#) on Shipping Containers and Systems - Application of Performance Test Methods.

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² Military Standard Environmental Test Methods, MIL-STD-810F, Method 514, Vibration, available from www.dodssp.daps.mil/dodssp.htm.

³ International Electrotechnical Commission Recommendation, Publication 68-2-6, Part 2, Test F: Vibration, Basic Environmental Testing Procedures for Electronic Components and Electrical Equipment, available from American National Standards Institute, Inc., 25 W. 43rd St., 4th Floor, New York, NY 10036.

1.6 *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.* Specific precautionary statements are given in Section 6.

1.7 *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.*

2. Referenced Documents

2.1 ASTM Standards:⁴

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

[D3580](#) Test Methods for Vibration (Vertical Linear Motion) Test of Products

[D4169](#) Practice for Performance Testing of Shipping Containers and Systems

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

[D7387](#) Test Method for Vibration Testing of Intermediate Bulk Containers (IBCs) Used for Shipping Liquid Hazardous Materials (Dangerous Goods)

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

2.2 ISO Standards:

[ISO 2247](#) Packaging—Complete, Filled Transport Packages—Vibration Test at Fixed Low Frequency⁵

[ISO 8318](#) Packaging—Complete, Filled Transport Packages—Vibration Tests Using a Variable Frequency⁵

3. Terminology

3.1 Definitions:

⁴ 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.

⁵ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.