



Designation: D642 – 20

Standard Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads¹

This standard is issued under the fixed designation D642; 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 compression tests on shipping containers (for example, boxes and drums) or components, or both. Shipping containers may be tested with or without contents. The procedure may be used for measuring the ability of the container to resist external compressive loads applied to its faces, to diagonally opposite edges, or to corners. This test method covers testing of multiple containers or unit loads, in addition to individual shipping containers, components, materials, or combination thereof.

1.2 The test method of applying load may be used to compare the characteristics of a given design of container with a standard, or to compare the characteristics of containers differing in construction.

1.3 This test method is related to TAPPI T 804. This test method fulfills the requirements of International Organization for Standardization (ISO) Test Method 12048. The ISO standards may not meet the requirements for this test method.

1.4 The test may be conducted with the container loaded with contents and interior packaging in cases where the contents share the load.

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.

1.6 *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.*

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:²

- D685 Practice for Conditioning Paper and Paper Products for Testing**
- D996 Terminology of Packaging and Distribution Environments**
- D1968 Terminology Relating to Paper and Paper Products**
- D4169 Practice for Performance Testing of Shipping Containers and Systems**
- D4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing**
- D4442 Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials**
- D4577 Test Method for Compression Resistance of a Container Under Constant Load**
- E4 Practices for Force Verification of Testing Machines**
- E122 Practice for Calculating Sample Size to Estimate, With Specified Precision, the Average for a Characteristic of a Lot or Process**

2.2 TAPPI Standards:³

- T 412 Moisture in Pulp, Paper and Paperboard**
- T 804 Compression Testing of Fiberboard Shipping Containers**

2.3 ISO Standard:⁴

- ISO 12048 Packaging—Complete, Filled Transport Packages—Compression and Stacking Test Using Compression Tester**

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.

³ Available from the Technical Association of the Pulp and Paper Industry, 15 Technology Parkway South, Atlanta, GA 30092.

⁴ Available from American National Standards Institute, 25 W. 43rd St., 4th Floor, New York, NY 10036.