



Designation: D 5094 – 90 (Reapproved 2003)

Standard Test Methods for Gross Leakage of Liquids from Containers with Threaded or Lug-Style Closures¹

This standard is issued under the fixed designation D 5094; 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 the determination of gross leaks in rigid and semi-rigid containers (up to 4 L (1.06 gal)) with threaded or lug-style closures. Such tests may be used to indicate the ability of a liquid container to survive the distribution environment without leaking. These test methods may not be suitable to determine the leak resistance of containers intended for transport of hazardous materials.

1.2 Test Methods:

1.2.1 *Test Method A, Shipping Container Vibration and Storage Test*, covers the ability of a shipping container and its interior packaging to protect the contents from leakage after transportation induced vibration and high-temperature storage.

1.2.2 *Test Method B, Shipping Container Vibration and Vacuum Chamber Test*, is suitable for individual containers and is usually less severe than Test Method A. The advantage of Test Method B is the shortness of the test.

1.3 *This standard does not purport to address the safety concerns 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:²

- D 996 Terminology of Packaging and Distribution Environments
- D 999 Test Methods for Vibration Testing of Shipping Containers
- D 3198 Test Method for Application and Removal Torque of Threaded or Lug-Style Closures
- D 3474 Practice for the Calibration and Use of Torque Meters Used in Packaging Applications

¹ This test method is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.32 on Consumer Packages.

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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.

D 4169 Practice for Performance Testing of Shipping Containers and Systems

D 4332 Practice for Conditioning Containers, Packages, or Packaging Components for Testing

3. Terminology

3.1 General definitions for packaging are found in Terminology D 996.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *gross leak*—any opening in the container or closure seal that produces visible leakage such that the container would not be suitable for transport or subsequent distribution.

3.2.2 *leak*—any opening in a container which, contrary to intention, either lets contents escape or permits substances to enter.

3.2.3 *leakage*—that which passes through a leak.

4. Summary of Test Methods

4.1 *Method A, Shipping Container Vibration and Storage Test*—Test specimens are filled to their expected fill capacity with product or liquid simulating product and the closure is applied to the container. Closures should be applied with the same torque as would be encountered in production. The specimens are packed into shipping containers and vibrated. The specimens, stored on their sides, are subjected to 40°C (104°F) (or other conditions as appropriate) for four weeks. Each specimen is examined for leakage.

4.2 *Method B, Container Vibration and Vacuum Chamber Test*—Test specimens are partially filled with product or liquid simulating product and the closure is applied to the container. Closures should be applied with the same torque as would be encountered in production. The specimens are packed into shipping containers and vibrated. Following vibration, the individual specimens are removed from the shipping container and subjected to 10 in. Hg (33.7 kPa) vacuum for 10 min and examined for leakage.

NOTE 1—Other levels of vacuum, or time, or both may be appropriate.

5. Significance and Use

5.1 These test methods are used to indicate the integrity of the container and closure system in the distribution environment.