



Designation: D3103 – 20

Standard Test Method for Thermal Insulation Performance of Distribution Packages¹

This standard is issued under the fixed designation D3103; 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 the determination of the thermal insulation quality of a package and the thermal stability of its contents when exposed to variable ambient temperature conditions. It is suitable for testing packages with various internal energy sources with or without product payloads.

1.2 *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 5.3.

1.3 *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

D996 Terminology of Packaging and Distribution Environments

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

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 Other Standards:

ISTA 7D Temperature Test for Transport Packaging³

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 *data acquisition unit and associated system*—single- or multi-channel recorder and its associated software and hardware utilizing thermocouples and thermistor sensors traceable to NIST (National Institute for Standards and Technology) that collects and date stamps time and temperature.

3.2.2 *draft-free atmosphere*—an atmosphere where the test specimens are isolated from direct air currents while surrounding air temperature is maintained uniformly throughout the chamber.

3.2.3 *eutectic system, n*—a mixture or compound in which pure solid phases changes occur at a well-defined specific temperature.

3.2.4 *exterior atmosphere*—the atmosphere surrounding the exterior surface of a package.

3.2.5 *interior atmosphere*—the atmosphere in contact or near the packaged item.

3.2.6 *mapping*—collecting temperature data at a wide range of locations inside a package or chamber to determine the variability of temperature range in the environment.

3.2.7 *package system*—the combination of exterior package, interior packaging, refrigerants, and product payload.

3.2.8 *product payload*—the product and any associated secondary packaging that is to be temperature controlled within the insulated test package.

3.2.9 *refrigerants*—eutectic materials, gel packs, ice, or other material that serves as an energy source or buffer medium within the package system.

3.2.10 *secondary package*—the package that contains the primary container/closure system(s).

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 International Safe Transit Association (ISTA), 1400 Abbott Rd., Suite 160, East Lansing, MI 48823-1900, <http://www.ista.org>.

*A Summary of Changes section appears at the end of this standard