



Designation: D4498 – 07 (Reapproved 2015)

Standard Test Method for Heat-Fail Temperature in Shear of Hot Melt Adhesives¹

This standard is issued under the fixed designation D4498; 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 is intended to determine the temperature at which specimens bonded with hot melt adhesive delaminate under static load in shear.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D907 Terminology of Adhesives

E28 Test Methods for Softening Point of Resins Derived from Pine Chemicals and Hydrocarbons, by Ring-and-Ball Apparatus

E145 Specification for Gravity-Convection and Forced-Ventilation Ovens

E171 Practice for Conditioning and Testing Flexible Barrier Packaging

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

3. Terminology

3.1 *Definitions*—Many of the terms found in this test method are defined in Terminology **D907**.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *heat-fail temperature, n*—the temperature at which delamination occurs under static loading in shear.

¹ This test method is under the jurisdiction of ASTM Committee **D10** on Packaging and is the direct responsibility of Subcommittee **D10.14** on Tape and Labels.

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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.

4. Significance and Use

4.1 Heat-fail temperature establishes a limiting temperature above which the adhesive is not to be exposed in service under shear load.

5. Apparatus

5.1 A device capable of producing adhesive films of uniform thickness with $\pm 25.4 \mu\text{m}$ (± 1 mil) tolerances.

5.2 *Standard Substrate*—NIST Standard Reference Material 1810 (Liner-Board)³

5.3 *Heat Sealing Device*—Sentinel heat sealer or equivalent capable of maintaining selected sealing temperature within $\pm 2.5^\circ\text{C}$ ($\pm 5^\circ\text{F}$).

5.4 *Forced-Ventilation Oven*, manual or programmed. Oven shall be capable of maintaining selected temperatures within $\pm 1\%$ of the differential between oven and ambient temperatures in accordance with Specification **E145**, with the programmable oven capable of attaining smooth temperature increases of 30°C/h over a range of 25 to 150°C .

5.5 *Thermometric Device*, for monitoring oven temperatures.

5.6 *TFE-fluorocarbon Cloth*, silicone release paper, 500 g weights and clamping devices for suspending weights and specimens in the oven.

6. Sampling, Test Specimens, and Test Units

6.1 The test sample is to be representative of the adhesive being tested.

6.2 Prepare test specimen films of representative adhesive at a thickness of $76 \pm 25 \mu\text{m}$ (3 ± 1 mil). Inspect the cooled films and reject any containing voids or other imperfections. Cut the films into pieces measuring 25.4 by 25.4 mm ± 1.6 mm (1 by 1 in. ± 0.0625 in.). Measure the thickness of the adhesive film to the nearest 0.013 mm (0.0005 in.). Cut strips of standard substrate measuring 25.4 ± 1.6 by 76 mm (1 ± 0.0625 by 3 in.) with 76-mm (3-in.) dimension in the machine direction.

6.3 Prepare a lap joint measuring 25.4 by 25.4 mm (1 by 1 in.) inside two strips of standard substrate. Place this assembly

³ Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, http://www.nist.gov.