



Standard Test Methods for Hot Seal Strength (Hot Tack) of Thermoplastic Polymers and Blends Comprising the Sealing Surfaces of Flexible Webs¹

This standard is issued under the fixed designation F1921/F1921M; 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.

^{ε1} NOTE—Designation was corrected editorially in October 2013.

1. Scope

1.1 These two test methods cover laboratory measurement of the strength of heatseals formed between thermoplastic surfaces of flexible webs, immediately after a seal has been made and before it cools to ambient temperature (hot tack strength).

1.2 These test methods are restricted to instrumented hot tack testing, requiring a testing machine that automatically heatseals a specimen and immediately determines strength of the hot seal at a precisely measured time after conclusion of the sealing cycle. An additional prerequisite is that the operator shall have no influence on the test after the sealing sequence has begun. These test methods do not cover non-instrumented manual procedures employing springs, levers, pulleys and weights, where test results can be influenced by operator technique.

1.3 Two variations of the instrumented hot tack test are described in these test methods, differing primarily in two respects: (a) rate of grip separation during testing of the sealed specimen, and (b) whether the testing machine generates the cooling curve of the material under test, or instead makes a measurement of the maximum force observed following a set delay time. Both test methods may be used to test all materials within the scope of these test methods and within the range and capacity of the machine employed. They are described in Section 4.

1.4 SI units are preferred and shall be used in referee decisions. Values stated herein in inch-pound units are to be regarded separately and may not be exact equivalents to SI units. Therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.5 *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.* The operator of the equipment is to be aware of pinch points as the seal jaws come together to make a seal, hot surfaces of the jaws, and sharp instruments used to cut specimens. It is recommended that the operator review safety precautions from the equipment supplier.

2. Referenced Documents

2.1 ASTM Standards:²

[D882 Test Method for Tensile Properties of Thin Plastic Sheeting](#)

[E171 Practice for Conditioning and Testing Flexible Barrier Packaging](#)

[E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method](#)

[F88 Test Method for Seal Strength of Flexible Barrier Materials](#)

[F2029 Practices for Making Heatseals for Determination of Heatsealability of Flexible Webs as Measured by Seal Strength](#)

3. Terminology

3.1 Definitions:

3.1.1 *adhesive failure, n*—a failure mode in which the seal fails at the original interface between the surfaces being sealed.

3.1.2 *breadth, n*—temperature range over which peel force of a seal is (relatively) constant.

3.1.3 *burnthrough, n*—a state or condition of a heatseal characterized by melted holes and thermal distortion.

3.1.3.1 *Discussion*—Burnthrough indicates that the sealing conditions (time or temperature, or both) were too high to produce an acceptable seal.

¹ These test methods are under the jurisdiction of ASTM Committee F02 on Flexible Barrier Packaging and are the direct responsibility of subcommittee F02.20 on Physical Properties.

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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.