



Designation: ~~D545~~—19 D545 – 23

Standard Test Methods for Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types)¹

This standard is issued under the fixed designation D545; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 These test methods cover the physical properties associated with preformed expansion joint fillers. The test methods include:

Property	Section
Expansion in Boiling Water	7.1
Recovery and Compression	7.2
Extrusion	7.3
Boiling in Hydrochloric Acid	7.4
Asphalt Content	7.5
Water Absorption	7.6
Density	7.7

NOTE 1—Specific test methods are applicable only to certain types of joint fillers, as stated herein.

1.2 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.

1.3 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of the standard.

1.4 *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.*

1.5 *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

D1037 Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials

¹ These test methods are under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and are the direct responsibility of Subcommittee D04.34 on Preformed Joint Fillers, Sealers and Sealing Systems.

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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.

[D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials](#)
[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](#)

3. Significance and Use

3.1 The compression resistance perpendicular to the faces, the resistance to the extrusion during compression, and the ability to recover after release of the load are indicative of a joint filler's ability to continuously fill a concrete expansion joint and thereby prevent damage that might otherwise occur during thermal expansion. The asphalt content is a measure of the fiber-type joint filler's durability and life expectancy. In the case of cork-type fillers, the resistance to water absorption and resistance to boiling hydrochloric acid are relative measures of durability and life expectancy.

NOTE 2—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Specification **D3666** are generally considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Specification **D3666** alone does not completely ensure reliable results. Reliable results depend on many factors; following the suggestions of Specification **D3666** or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.

4. Apparatus

4.1 *Balance*, for weighing joint fillers capable of weighing test specimens within 0.01 g.

4.2 *Mechanical Convection Oven*, capable of maintaining 220 ± 5.0 °F (104 ± 3 °C).

4.3 *Desiccator*, of sufficient size to accommodate the test specimens.

4.4 *Vernier Caliper*, for measuring length and width of specimens with accuracy within ± 0.01 in. (0.25 mm).

4.5 *Dial Micrometer*, or other measuring device, graduated to read in ~~0.001 in. (0.02 mm)~~ 0.001 in. (0.02 mm) units.

4.6 *Extrusion Mold*—Three-sided steel mold to confine lateral movement of specimens under compression to one side only. Interior dimensions shall be 4 by 4 in. (102 by 102 mm) with permissible variations in length and width of ± 0.015 in. (0.38 mm). Mold sides shall be of such height as to extend at least 0.5 in. (13 mm) above the test specimens. A typical mold can be made from a steel base $\frac{1}{2}$ by 4 by 4 ± 0.015 in. (13 by 102 by 102 ± 0.3 mm) and three bolted steel side plates $\frac{1}{4}$ in. (6.35 mm) thick, extending approximately $1\frac{1}{2}$ in. (38 mm) above the base plate, thus forming a three-sided, open-top box.

4.7 *Template*—One steel template 4 by 4 in. (102 by 102 mm), machined from ~~$\frac{1}{2}$ -in. (12.7 mm)~~ in. (12.7 mm) steel plate to fit the extrusion mold. The template shall fit the mold within -0.005 in. (0.13 mm) in length and width.

4.8 *Metal Plate*, $4\frac{1}{2}$ by $4\frac{1}{2}$ in. ± 0.1 in. (114 by 114 ± 2.5 mm) with parallel faces machined from ~~$\frac{1}{2}$ -in. (12.7 mm)~~ in. (12.7 mm) steel plate.

4.9 *Compression Tester*, either ~~hydraulic-hydraulic~~ or screw-type equipment with sufficient opening between ~~upper and lower bearing~~ upper and lower bearing surfaces to permit the use of verifying apparatus. The load applied to the test specimen shall be indicated with an accuracy of ± 1.0 %. The ~~upper-bearing~~ upper bearing device shall be a spherically seated, hardened metal block firmly attached at the center of the upper head of the machine. The center of the sphere shall lie at the center of the surface of the block in contact with the specimen. The block shall be closely held in its spherical seat, but free to tilt in any direction. Load shall be applied without shock at 0.05 in. (1.3 mm) per min.

4.10 *Extractor Apparatus*, Soxhlet Extractor with thermostatically controlled heating element.

5. Sampling

5.1 One representative sample approximately 2 ft²/1000 ft² of joint filler shall be obtained and properly packaged for safe transporting to the testing agency.