



Designation: **D994/D994M – 11** **D994/D994M – 11 (Reapproved 2016)**

## Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)<sup>1</sup>

This standard is issued under the fixed designation D994/D994M; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

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

### 1. Scope

1.1 This specification covers bituminous preformed expansion joint filler for use in concrete construction.

NOTE 1—Attention is called to ASTM Specifications **D1751** and **D1752**.

1.2 *Units*—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

### 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

**C670** Practice for Preparing Precision and Bias Statements for Test Methods for Construction Materials

**D545** Test Methods for Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types)

**D1751** Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

**D1752** Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction

### 3. Manufacture

3.1 This product shall consist of a bituminous (asphalt or tar) mastic composition, formed and encased between two layers of bituminous impregnated felt or two layers of glass-fiber felt. The mastic shall comprise mineral fillers and reinforcing fibers and may contain thin strips of reinforcing sheet material.

### 4. General Requirements

4.1 Preformed strips of expansion joint filler shall be of such character as not to be deformed or broken by ordinary handling when exposed to atmospheric conditions and shall not become brittle in cold weather. Pieces of the joint filler that have been damaged shall be rejected.

### 5. Properties

5.1 *Distortion at 50°C [125°F]*—The joint filler shall not show a deflection of more than 1 in. (25 mm) when tested in accordance with **8.2.1**.

5.2 *Brittleness*—The joint filler shall not crack or shatter when tested in accordance with **8.2.2**.

NOTE 2—Expansion joint filler having a nominal thickness of 5 mm [ $\frac{1}{4}$  in.] or less shall not be subject to a requirement for brittleness.

5.3 *Water Absorption*—The water absorption of the joint filler, when tested in accordance with **8.2.3**, shall not exceed the following values:

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee **D04** on Road and Paving Materials and is the direct responsibility of Subcommittee **D04.34** on Preformed Joint Fillers, Sealers and Sealing Systems.

Current edition approved July 1, 2011; Oct. 1, 2016. Published August 2011; October 2016. Originally approved in 1948. Last previous edition approved in 2010 as **D994 – 98**/D994M – 11 (2010). DOI: 10.1520/D0994\_D0994M-11; 10.1520/D0994\_D0994M-11R16.

<sup>2</sup> 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.

Nominal Thickness of Joint, min, mm [in.]	Absorption, max, weight %
25 [1]	2.5
20 [¾]	3
15 [½]	4
10 [⅜]	5

NOTE 3—Expansion joint filler having a nominal thickness of less than 10 mm [⅜ in.] shall not be subject to a requirement for water absorption.

5.4 *Compression*—The load required to compress the test specimen to 50 % of its thickness before test shall not be less than nor more than the following values when the joint filler is tested in accordance with 8.2.4.

Nominal Thickness of Joint, mm [in.]	Load Requirements, min-max. kPa [psi]
25 [1]	700-5000 [100-754]
20 [¾]	700-6000 [100-841]
15 [½]	700-6500 [100-928]

NOTE 4—Expansion joint filler having a nominal thickness of less than 15 mm [½ in.] shall not be subject to a requirement for compression.

## 6. Dimensions and Permissible Variations

6.1 The preformed strips shall conform to the dimensions specified or shown on the plans. Strips of the joint filler that do not conform to the specified dimensions within the permissible variations of  $\pm 1$  mm [ $\frac{1}{16}$  in.] in thickness,  $\pm 2$  mm [ $\frac{1}{8}$  in.] in depth, and  $\pm 5$  mm [ $\frac{1}{4}$  in.] in length shall be rejected.

## 7. Sampling

7.1 *Size of Sample*—Each sample shall consist of sufficient material to provide at least three test specimens measuring 50 by 150 mm [2 by 6 in.] and at least one test specimen measuring 100 by 100 mm [4 by 4 in.].

7.2 *Number of Samples*—One representative sample shall be selected from each shipment of 100 m<sup>2</sup> [1000 ft<sup>2</sup>], or fraction thereof, of each thickness ordered.

7.3 Samples shall be packed for transportation in such a manner that there will be no danger of distortion or breakage.

## 8. Test Methods

### 8.1 Significance and Use:

8.1.1 The distortion and brittleness tests are used to determine the handling characteristic of the material. The water absorption and compression tests are used to determine the suitability of the material as an expansion joint filler.

### 8.2 Procedures:

8.2.1 *Distortion at 50°C [125°F]*—Cut a test specimen 50 by 150 mm [2 by 6 in.], substantially flat and straight, with the 150-mm [6-in.] dimension parallel to the machine direction of the strip. Clamp the specimen between two blocks so that the expansion joint forms a cantilever of 90-mm [3½-in.] length. Place the clamp and joint assembly in a forced-draft oven maintained at  $50 \pm 1$  C [ $125 \pm 2$  °F], with the specimen in a horizontal position, for 2 h. Measure the deflection of the specimen from the horizontal.

8.2.2 *Brittleness*—Cut a test specimen 50 by 150 mm [2 by 6 in.] with the 150-mm [6-in.] dimension parallel to the machine direction of the strip. Maintain the specimen at a temperature of  $5 \pm 1$  °C [39 to 43 °F] in water for at least 2 h before testing. Clamp the specimen between two boards so that the expansion joint forms a cantilever of 90 mm [3½ in.] in length and hold in a horizontal position by a suitable rigid support. Suspend a spherical cast iron ball weighing 0.40 kg [0.95 lb] and having a diameter of 50 mm [1⅞ in.] by a cord tied to an eyelet fastened to the ball. For specimens having a thickness of 15 mm [⅝ in.] or less,

**TABLE 1 Single-Operator Precision Statements SI Units Only<sup>A</sup>**

Property	Property as a function of Nominal Thickness				
	25.4	19.1	12.7	9.5	6.4
Thickness, Nominal, mm.	25.4	19.1	12.7	9.5	6.4
Distortion, max. mm.	25.4	25.4	25.4	25.4	25.4
Precision, max.accept.range.	2.93	2.30	5.92	6.03	6.84
Brittleness	Pass*	Pass*	Pass*	Pass*	----
Precision, max.accept.range	**	**	**	**	----
Water Absorption, wt % max.	2.5	3	4	5	----
Precision, max.accept.range.	0.057	0.087	0.400	1.187	----
Compression, kPa, min-max.	690–5200	690–5800	690–6400	----	----
Precision, max.accept.range.	204.2	180.1	416.5	----	----

NOTE—Precision, max.accept.range. Per Practice C670, Maximum acceptable range between high and low individual measurements.

Pass\* Not crack or shatter.

\*\* No precision statement is necessary for this attribute.

<sup>A</sup>All precision data was derived using inch-pound units.