



Designation: D 5249 – 95 (Reapproved 2000)

## Standard Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints<sup>1</sup>

This standard is issued under the fixed designation D 5249; 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.

### 1. Scope

1.1 This specification covers backer material for cold- and hot-applied joint sealant for use in portland-cement concrete or asphalt-pavement joints.

1.2 This specification establishes basic requirements for sealant-backer material either in rod or strip form, that can withstand the temperature of hot- or cold-applied sealants without excessive deformation.

1.3 Sealant backer material serves one or more of the following purposes:

1.3.1 Limits the amount and depth of sealant applied to a joint,

1.3.2 Acts as a barrier interface to prevent backside adhesion (bondbreaker), and

1.3.3 Provides a form to assist the sealant in developing a shape factor.

1.4 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information purposes only.

1.5 The following safety hazards caveat pertains only to the test methods described in this specification. *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:

C 670 Practice for Preparing Precision and Bias Statements for Test Methods of Construction Materials<sup>2</sup>

C 1016 Test Method for Determination of Water Absorption of Sealant Backing (Joint Filler) Material<sup>3</sup>

C 1253 Test Method for Determining the Outgassing Potential of Sealant Backing<sup>3</sup>

D 545 Test Methods for Preformed Expansion Joint Fillers for Concrete Construction (Nonextruding and Resilient Types)<sup>4</sup>

D 1622 Test Method for Apparent Density of Rigid Cellular Plastics<sup>5</sup>

D 1623 Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics<sup>5</sup>

D 5535 Terminology Relating to Formed-in-Place Sealants for Joints and Cracks in Pavement<sup>4</sup>

E 1 Specification for ASTM Thermometers<sup>6</sup>

### 3. Terminology

3.1 For definitions, refer to Terminology D 5535.

### 4. Classification

4.1 Sealant backer material is available in three types:

4.1.1 *Type 1*, shall be round rods of various diameters intended for use with cold- and hot-applied sealants.

4.1.2 *Type 2*, shall be sheets or strips of various thicknesses, laminated or skived by the manufacturer but capable of being field laminated and used with cold- and hot-applied sealants.

4.1.3 *Type 3*, shall be round rods of various diameters limited for use with cold-applied sealants.

4.2 Type 1 and Type 3 rod materials are intended for use primarily where there is a reservoir, either already existing or formed, such as a contraction joint, where the rod will limit the sealant depth and prevent the sealant from bonding to the bottom of the joint reservoir (bond-breaker) thus eliminating bottom-side adhesion.

4.3 Type 2 strip material is intended primarily for use where there is an opening the full depth of the pavement, such as an expansion joint for which it is desirable to have a filler material completely fill the opening and prevent or minimize the accumulation of water or incompressible materials below the sealant.

### 5. Ordering Information

5.1 Types 1, 2, and 3 backer material are available in a range of sizes, lengths, and diameters; they are available on reels, in

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<sup>2</sup> Annual Book of ASTM Standards, Vol 04.02.

<sup>3</sup> Annual Book of ASTM Standards, Vol 04.07.

<sup>4</sup> Annual Book of ASTM Standards, Vol 04.03.

<sup>5</sup> Annual Book of ASTM Standards, Vol 08.01.

<sup>6</sup> Annual Book of ASTM Standards, Vol 14.03.

coils, or in straight lengths. Consult the manufacturer for information on how to order.

5.2 Backer material must be ordered by diameter or size in relation to the joint opening, usually 25 to 35 % larger than the joint width.

## 6. Materials

6.1 Sealant backer material shall be easily compressed and installed in the joint reservoir. This material shall be heat resistant when used with hot-applied sealants.

## 7. Physical Properties

7.1 Physical properties of the sealant backer material shall conform to the requirements of Table 1.

## 8. Workmanship, Finish, and Appearance

8.1 The product shall be clean, free of scale or foreign matter, oil, or water which could wipe off on a joint sidewall and interfere with the proper cure or adhesion of the sealant.

## 9. Test Methods

9.1 *Water Absorption*— Tests for water absorption of the Types 1 and 3 backing material shall be made in accordance with Test Method C 1016, Procedure B. Type 2 material shall be tested in accordance with Test Method D 545.

9.1.1 For Type 2 material:

$$WA = \frac{W \times 100}{262t} \quad (1)$$

where:

WA = water absorption by volume, %,

W = weight of water absorbed, from tests made according to Test Methods D 545, g, and

t = thickness of 4 in. by 4 in. specimen, inches.

9.1.2 For the purposes of this calculation, 1 g of water occupies 0.061 in.<sup>3</sup> at test conditions.

9.2 *Density*—Tests for density of Types 1 and 3 materials shall be made in accordance with Test Method D 1622. Tests for density of Type 2 material shall be made in accordance with Test Methods D 545.

9.3 *Tensile Strength*— Tests for tensile strength of Types 1 and 3 materials shall be made in accordance with Test Method D 1623.

9.4 *Compression Deflection and Recovery*—Type 2 material shall be tested in accordance with Test Methods D 545. Type 1 and 3 materials shall be tested in accordance with the following procedure.

**TABLE 1 Physical Property Requirements**

Property	Type 1	Type 2	Type 3
Density, lb/ft <sup>3</sup> (kg/m <sup>3</sup> ), max	6 (96.1)	4 (64.1)	6 (96.1)
Tensile strength, psi (kgf/cm <sup>2</sup> ), min	20 (1.41)	N/A	20 (1.41)
Water absorption, by volume, % max	0.5	0.5	0.5
25 % Compression deflection force, psi (kgf/cm <sup>2</sup> ), max	15 (1.06)	15 (1.06)	15 (1.06)
Compression recovery, % min	90	90	90
Heat resistance, °F	392 ± 5	392 ± 5	N/A
°C	200 ± 2.8	200 ± 2.8	N/A
Maximum shrinkage, %	10 %	10 %	N/A

9.4.1 *Significance and Use*—This test method covers a procedure for measuring the force necessary to compress the backer material, and the percentage recovery of original dimensions after removal of the compression load.

9.4.2 *Apparatus*:

9.4.2.1 An apparatus shall be provided having a flat compression plate larger than the specimen to be tested, connected to a force measuring device, and mounted in such a manner that the specimen can be deflected (compressed) at a speed of 0.5 to 2 in./min. The apparatus shall be arranged to support the specimen on a level horizontal plate. The apparatus shall be capable of measuring the distance between the movable plate and the stationary plate.

9.4.2.2 *Calipers*, capable of measuring 0.001 in.<sup>7</sup>

9.4.3 *Test Specimens*:

9.4.3.1 Test specimens shall be 6 ± 0.125 in. lengths of the backer material.

9.4.3.2 Each test requires a minimum effective area of 3.0 in.<sup>2</sup> When the effective area of a single length is less than 3 in.<sup>2</sup>, multiple lengths shall be used in a single test. When rod-shaped backer material is less than 3/4 in. in diameter, multiple lengths are required for each test (see Table 2).

**TABLE 2 Multiple Specimen Requirements for Rod-Shaped Backer Materials for Compression Recovery Testing**

Rod Diameter	Specimens Required for Each Test
3/4 in. or larger	1
5/8 to 3/8 in.	2
< 3/8 in.	3

9.4.4 *Number of Test Specimens*—Test three specimens for each sample. The values reported shall be the mean of those observed.

9.4.5 *Procedure*:

9.4.5.1 Place the test specimen in the center of the supporting plate of the apparatus. Materials that are supplied in coils often have a tendency to curl. Place these samples between the plates in such a manner that the arc formed by the sample is in the vertical plane.

9.4.5.2 Bring the compression plate into contact with the specimen so that the entire length of the test specimen is in contact with both plates. No light should be visible anywhere between the rod and the plate, except within 1/2 in. of the end of the sample.

9.4.5.3 Measure the original diameter of the rod by measuring the separation of the plates of the apparatus with the calipers. Compress the rod 25 ± 0.5 % of this thickness at 0.5 in./min. Record the reading of the load immediately.

9.4.5.4 Hold the specimen at the specified deflection for 30 s.

9.4.5.5 Remove the load at a rate of 0.5 in./min. Carefully observe the specimen during the last 10 % of plate travel. Stop plate when contact is not maintained with the specimens. This may be observed when, except within 1/2 in. of the ends, light

<sup>7</sup> Brown and Sharp Model 579-1 or equivalent has been found suitable.