



Designation: D8139 – 23

# Standard Specification for Semi-Rigid, Closed-Cell Polypropylene Foam, Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction<sup>1</sup>

This standard is issued under the fixed designation D8139; 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 preformed expansion joint fillers made from closed-cell polypropylene foam materials having suitable compressibility, recovery from compression, nonextruding, and weather-resistant characteristics.

1.1.1 Type I, closed-cell polypropylene foam.

1.2 These joint fillers are intended for use in concrete pavements in full-depth joints. There are several variations in size with typical thicknesses of  $\frac{1}{2}$  in. (12.7 mm),  $\frac{3}{4}$  in. (19.05 mm), and 1 in. (25.4 mm); typical widths of  $3\frac{1}{2}$  in. (88.9 mm), 4 in. (101.6 mm), 5 in. (127 mm), 6 in. (152.5 mm), 7 in. (177.8 mm), 8 in. (203.2 mm), or 48 in. (1.2 m) sheet; and typical lengths of 5 ft (1.52 m) and 10 ft (3.05 m).

1.3 The values stated in inch-pound units are to be regarded as 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:*<sup>2</sup>

<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.

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<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.

[C666/C666M Test Method for Resistance of Concrete to Rapid Freezing and Thawing](#)

[D545 Test Methods for Preformed Expansion Joint Fillers for Concrete Construction \(Nonextruding and Resilient Types\)](#)

[D1623 Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics](#)

[D4329 Practice for Fluorescent Ultraviolet \(UV\) Lamp Apparatus Exposure of Plastics](#)

[D5249 Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland Cement Concrete and Asphalt Joints](#)

## 3. Materials and Manufacture

3.1 *Type I, Closed-Cell Polypropylene Foam*—These fillers shall be made from extruded foam polypropylene, and their preformed cross section shall be closed-cell.

## 4. Physical Properties

4.1 *Compressive Strength*—The load required to compress the test specimen to 50 % of its original thickness before test shall not be less than 30 psi nor greater than 60 psi.

4.2 *Recovery*—After compressing the test specimen to 50 % of its original thickness before test, the load shall be released; and 10 min after release of the load, the specimen shall have recovered to at least 80 % of its thickness before test.

4.3 *Extrusion*—When a  $\frac{1}{2}$  in. (12.7 mm) thick test specimen is compressed to 50 % of its original thickness with three of its edges restrained, the free edge shall extrude not more than 0.1 in. (2.54 mm).

4.4 *Density*—The density of air-dried filler material shall not be less than 3.5 lb/ft<sup>3</sup> (56.06 kg/m<sup>3</sup>).

4.5 *Water Absorption*—The standard expansion joint filler test specimen with four square-cut edges, when submerged horizontally under 1 in. (25.4 mm) water at 70  $\pm$  5 °F (21.1  $\pm$  3 °C), shall absorb not more than 1 % volume % in 24 h for nominal thickness of  $\frac{1}{2}$  in. (12.7 mm).

4.6 *Heat Resistance*—The material shall display no observable shrinkage or disintegration when tested per Specification [D5249](#).

4.7 *Freeze-Thaw Resistance*—The material shall display no visual change when tested per Test Method **C666/C666M** and less than 10 % change in tensile strength when tested per Test Method **D1623** after 300 cycles.

4.8 *UV Weathering*—The material shall display no observable change or cracks when tested per Practice **D4329**, 1000 h, Cycle A.

## 5. Dimensions, Mass, and Permissible Variations

5.1 Expansion joint filler units shall conform to dimensions as specified on plans within the following permissible variations:

5.1.1 *Thickness*,  $\pm 1/16$  in. ( $\pm 1.6$  mm).

5.1.2 *Width*,  $\pm 1/8$  in. ( $\pm 3.2$  mm).

5.1.3 *Length*,  $\pm 1/2$  in. ( $\pm 12.7$  mm).

## 6. Sampling

6.1 *Size of Samples*—Each sample shall consist of sufficient material to provide at least ten test specimens measuring 4 in. by 4 in. (101.6 mm by 101.6 mm), or as required by the user agency. Unless otherwise specified under applicable test method, test specimens shall be the same thickness as the expansion joint filler units to be installed.

6.2 *Number of Samples*—Select one representative sample from each shipment of 1000 ft<sup>2</sup> or fraction thereof.

## 7. Test Methods

7.1 *Scope*—Determine the physical requirements prescribed in this specification under **4.1 – 4.5** in accordance with Test Methods **D545**.

7.2 *Heat Resistance*—Determine the physical requirements prescribed in this specification under **4.6** in accordance with section 9.5 of Specification **D5249**.

7.3 *Freeze-Thaw Resistance*—Determine the physical requirements prescribed in this specification under **4.7** in accordance with Test Methods **C666/C666M** and **D1623**.

7.4 *UV Weathering*—Determine the physical requirements prescribed in this specification under **4.8** in accordance with section 7.2.1 of Practice **D4329**.

## 8. Inspection

8.1 Inspection of the material and selection of sample or samples to be tested may be made either at the point of shipment or at the point of delivery, as agreed upon.

## 9. Rejection and Rehearing

9.1 If a selected sample fails to conform to any of the requirements of this specification, select two additional samples from the same lot and test. Both retest samples shall meet the requirements of this specification or the lot will be rejected.

## 10. Keywords

10.1 cellular plastic; closed-cell; expansion joint; filler; joint; joint filler; polypropylene foam; preformed

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