DMS-6310

Joint Sealants and Fillers

Effective Date: December 2023

1. DESCRIPTION

This Specification establishes the requirements for the various types of joint sealants, backing materials, and joint fillers suitable for use in pavements structures.

2. UNITS OF MEASUREMENTS

The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

3. MATERIAL PRODUCER LIST

The Materials and Tests Division (MTD) maintains the Material Producer List (MPL) of all joint sealant materials conforming to the requirements of this Specification. Materials appearing on the MPL, entitled "Joint Sealers," require no further sampling and testing before use, unless deemed necessary by the Project Engineer or MTD.

Please note that there is no MPL for backing materials or joint fillers.

4. BIDDERS' AND SUPPLIERS' REQUIREMENTS

For Joint Sealers, the Department will only purchase or allow on projects those products listed by producer and product code or designation shown on the MPL.

Use of pre-qualified product does not relieve the Contractor of the responsibility to provide product that meets this Specification. The Department may inspect or test material at any time and reject any material that does not meet the specifications.

5. JOINT SEALANTS

This Specification defines the following types.

- Class 1—two-component polyurethane, rapid curing, self-leveling
- Class 2—two-component synthetic polymer, self-leveling
- Class 3—hot-poured rubber
- Class 4—low-modulus silicone, non-sag
- Class 5—low-modulus silicone or polyurethane, self-leveling
- Class 6—preformed seals
- Class 7—low-modulus silicone, rapid curing, self-leveling
- Class 8—low-modulus silicone or polyurethane, self-leveling, concrete only

5.1. Material Description and Properties.

Table 1 summarizes the materials, application requirements, and material requirements of the various classes. Each of the classes listed in Table 1 consists of a one- or two-component liquid or semisolid compound that is applied to fill the joint space and solidifies after application.

Table 1
Joint Sealant Applicability and Material Requirements

Features		Material	Components	Self-Leveling (SL) or Non-Sag (NS)	Primer Required	Backer Rod Required	Joint Type[2]	Specification	Specification Exceptions
Classes	1	**Polyurethane** [1]	2	SL	No	No	H	ASTM C920 Type M, Grade P, Class 50 [4]	
	2	**Synthetic Polymer** [1]	2	SL	No	No	ACS	ASTM D5893, Type SL	Two-component; Synthetic Polymer
	3	**Asphalt**	1	N/A	No	No	AC	ASTM D6690, Type II	
	4	**Silicone**	1	NS	No	Yes	ACS	ASTM D5893, Type NS	Tack Free time, max. 75 min.
	5	**Silicone or Polyurethane**	1	SL	No	Yes[3]	AC	ASTM D5893, Type SL	May be polyurethane
	6	**Preformed Elastomeric**	1	NA	No	NA	CS	ASTM D2628, ASTM D3542	Specification depends on size. Exceptions listed below.
	7	**Silicone** [1]	1 or 2	SL	Yes[5]	Yes	CSH	ASTM D5893, Type SL [4]	One- or Two-component; Tack Free time, max. 60 min.
	8	**Silicone or Polyurethane**	1	SL	No	Yes[3]	C	ASTM D5893, Type SL	May be polyurethane

1. These materials must cure by chemical reaction and not by evaporation of solvent or fluxing of harder particles.
2. Joint Types: A = asphalt-to-concrete; C = concrete-to-concrete; S = steel or armored; H = header-type. Use with joint types other than the ones listed only after evaluating the sealant for the proposed application.
3. Unless otherwise shown on the plans.
4. For Header-type application, adhesion and cohesion under cyclic movement and adhesion-in-peel tests, the substrate will be the elastomeric header material corresponding to the header-type joint system that utilizes the sealant.
5. No primer needed if it is one-component.

6. ACCEPTANCE OF JOINT SEALANT CLASSES 1, 2, 3, 4, 5, 7, AND 8

Accept Classes 1, 2, 3, 4, 5, 7, and 8 that are listed on the MPL with no further sampling and testing required, less deemed necessary by the Engineer.

7. JOINT SEALANT MPL QUALIFICATION PROCEDURE (CLASSES 1, 2, 3, 4, 5, 7, AND 8)

7.1. Qualification Request.

Submit a written request for qualification to the Texas Department of Transportation, Materials and Tests Division, 125 East 11th Street, Austin, TX, 78701-2483. Include the following information with the request:

- company name;
- physical and mailing addresses;
- product name;
- product documentation, including material safety data sheets (MSDS);
- contact person with telephone number and email address; and
- qualification documentation.

7.2. **Qualification Documentation**

Submit, on annual basis, one of the two following types of materials specification conformance documentation to Texas Department of Transportation, Materials and Tests Division electronically to MTD_Asphalt@txdot.gov or by mail to, Texas Department of Transportation, Materials and Tests Division, 6230 E. Stassney ln, Austin, TX 78744.

- Submit a summary report showing the latest AASHTO Product Evaluation & Audit Solutions test data, comparing the data with the material requirements in Table 1 (ASTM specifications and any exceptions), and showing that the material conforms to all requirements. Exceptions include the type of material (some types allow polyurethane in addition to silicone) and other limitations on material properties. AASHTO Product Evaluation & Audit Solutions publishes test data and does not report pass or fail. The report should include the AASHTO Product Evaluation & Audit Solutions test data, compared with the ASTM requirements and any applicable exception in Table 1, showing the material conforms to all requirements.
- Submit a materials test report from a material testing laboratory showing test data from testing a sample of the joint sealant material, comparing the data with the material requirements in Table 1 (ASTM specifications and any exceptions), and showing that the material conforms to all requirements.

7.3. **MPL Listing.**

Materials meeting the above requirements will be listed on the MPL for Joint Sealers which can be found at:

https://ftp.txdot.gov/pub/txdot-info/cmd/mpl/jtsealrs.pdf

Any changes to the product formulation will require re-evaluation.

7.4. **Disqualification.**

The Department may at any time sample material from projects for evaluation. If the material does not meet the requirements of this Specification or if test results are substantially different from the original submitted test results, MTD may remove the material from the MPL.

8. CLASS 6 - PREFORMED SEALS.

Class 6 preformed joint seal consists of a preformed extruded elastomeric material having a multi-channeled shape. Install this type with the aid of a lubricant adhesive. The size shown on the plans is the nominal width.

8.1. **Material Properties.**

8.1.1. If the nominal width is smaller than 1.625 in. (41 mm), the material must conform to the requirements of ASTM D2628, except that the oil swell must be a maximum of 60%.

8.1.2. If the nominal width is 1.625 in. (41 mm) or greater, the material must conform to the requirements of ASTM D3542, with the following exceptions.

- The oil swell must be a maximum of 60%.
- The uncompressed depth must be greater than or equal to the width.

Determine compression-deflection properties using Tex-613-J rather than ASTM D575. The limits on the lateral pressure must be a minimum of 3 psi (21 kPa) at 15% compression and a maximum of 100 psi (690 kPa) at 50% compression, and the specimen must maintain complete contact with the loading plates throughout the test.

8.1.3. Lubricant adhesive must:

- conform to the requirements of ASTM D4070,
- be compatible with concrete, and
- be unaffected by the normal moisture in the concrete.

8.2. **Acceptance.**

8.2.1. Accept Class 6 with nominal widths of less than 1.625 in. (41 mm) and all lubricant adhesive based on manufacturers' certification, according to the requirements of their respective specifications.

8.2.2. Accept Class 6 with nominal widths of 1.625 in. (41 mm) or more according to the following procedure.

The Department will list materials meeting the requirements of this Specification on the MPL.

8.2.3. The Department reserves the right to randomly sample and test materials.

8.3. **Pre-Qualification.** For each size and configuration proposed for use, submit a sample of at least 6 ft. (2 m) in length for pre-qualification well in advance of anticipated use. Submit certified test results with the sample indicating compliance with the specifications to Texas Department of Transportation, Materials and Tests Division, Laboratory Building, 6230 E. Stassney ln, Austin, TX 78744.

8.4. **Certification.** Provide certification to the Engineer that all materials delivered to the jobsite meet the specification requirements. The Engineer will visually inspect the material to confirm size and configuration and to identify any possible defects and may reject or submit for retesting any suspect material.

8.5. **Testing.** Furnish at least one seal of each size with a minimum of 3 ft. (1 m) extra length. The Engineer will remove these extra lengths and forward to MTD for testing.

9. BACKER RODS AND BACKING MATERIAL

Backer rods consist of cylinders of compressible material, which hold the fluid sealant in place in open joints.

9.1. **Material Properties.**

The backer rod must not react with or bond to the sealant and must meet the requirements of the sealant manufacturer. The diameter of the backer rod must be at least 25% larger than the joint reservoir width.

Backer rods materials include closed-cell resilient foam; sponge rubber stock of vinyl, butyl, or neoprene; and polyethylene or polyurethane.

9.2. **Acceptance.** Accept backer rods and backing material based on certification by the supplier that the materials meet the sealant manufacturer's recommendations and on the Engineer's inspection.

10. JOINT FILLERS

Supply joint fillers in the shape, size, and type shown on the plans.

10.1. **Material Properties.**

10.1.1. **Timber Boards.** Timber boards must be of redwood, southern yellow pine, or Douglas fir. Redwood must be an all heart merchantable grade or better, free from the presence of sapwood. Southern yellow pine must be a lumber grade #3 or better. Douglas fir must be utility grade. All lumber grading must be in conformance with American Lumber Standard Committee (ALSC) grading rules. All boards except redwood must be treated with a preservative in accordance with Table 5. When oven dried at 230°F (110°C) to a constant weight, the density of the board (minus treatment) must be between 20 and 35 lb./ft.^{3} (320 and 560 kg/m^3).

Table 5
Acceptable Lumber Preservative for Timber Boards

Preservative	Min Retention (lb./cu. ft.)	Standard
Creosote	10	AWPA UC4A
Pentachlorophenol	0.5	AWPA UC4A
Micronized Copper Azole	0.15	AASHTO M 133

10.1.2. **Asphalt Boards.** These boards must meet the description, general requirements, and distortion testing requirements of ASTM D994.

10.1.3. **Preformed Fiber Sheets.** These sheets must meet the requirements of ASTM D1751. The requirements pertaining to bitumen content, density, and water absorption are not required for non-bituminous materials.

10.1.4. **Rebonded Neoprene Filler.** This filler consists of ground closed-cell neoprene particles, rebonded and molded into sheets of the required dimensions. These sheets must meet the requirements of ASTM D1752, Type I.

10.1.5. **Rebonded Recycled Tire Rubber.** This material consists of granular particles of rubber, made by grinding automobile and truck tires, securely bound together by a synthetic resin or plastic binder. The filler must be molded into sheets of the required dimensions and which meet the testing requirements of both ASTM D1751 and ASTM D1752, except that the requirements for asphalt content and expansion are waived. The density of the material must be at least 30 lb./ft.^{3} (440 kg/m^3).

10.1.6. **Polypropylene Foam.** This material is a semi-rigid, non-extruding, resilient type, closed-cell polypropylene foam, preformed joint filler with physical properties in accordance with Table 6.

Table 6
Closed-Cell Polypropylene Preformed Joint Filler

Property	Test Method	Min	Max
Expansion in boiling water, volume %	AASHTO T 42	–	1
Compression stiffness, psi	AASHTO T 42	35	50
Compression recovery, %	AASHTO T 42	80	–
Extrusion, in.	AASHTO T 42	–	0.1
Density, lb./ft^3	AASHTO T 42	3.5	–
Heat resistance, %	ASTM D5249	–	1
UV weathering, cycle A, 1,000 hr.	ASTM D4329	No visible change	

10.2. **Acceptance.** Accept all types of joint filler material based on the manufacturer's certification that it meets the stated requirements and the Engineer's inspection.

11. ARCHIVED VERSIONS

Archived versions are available.