



Designation: **D8138—18** **D8138 – 23**

Standard Specification for Preformed Silicone Joint Sealing System for Bridges¹

This standard is issued under the fixed designation D8138; 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 (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers the material requirements for preformed silicone joint seals for bridges. The seal consists of a silicone rubber gland preformed to a continuous length. Its design shall prevent any tension from occurring in the seal or bonding point during normal movement. The seal is installed by bonding it to the joint header with a silicone-based adhesive and is designed to seal the joint, preventing liquid intrusion.

1.2 The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *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.*

1.4 *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

- C639 Test Method for Rheological (Flow) Properties of Elastomeric Sealants
- C679 Test Method for Tack-Free Time of Elastomeric Sealants
- C793 Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants
- D395 Test Methods for Rubber Property—Compression Set
- D412 Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension
- D573 Test Method for Rubber—Deterioration in an Air Oven
- D624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers
- D2240 Test Method for Rubber Property—Durometer Hardness

3. Materials and Manufacture

3.1 The seals shall be preformed to a continuous length, and the material shall be silicone rubber.

3.2 The adhesive shall be a silicone-based adhesive.

¹ This specification is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.32 on Bridges and Structures.

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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.

4. Physical Requirements

- 4.1 The materials for the seal shall conform to the physical properties prescribed in **Table 1**.
- 4.2 The materials for the adhesive shall conform to the physical properties prescribed in **Table 2**.
- 4.3 In the applicable requirements of **Table 1** and the test method, all deflection shall be based on the nominal width.

5. Dimensions and Working Parameters

- 5.1 The size, shape, and dimensional tolerances shall be as outlined in **5.2**.
- 5.2 Measurements used for physical laboratory testing shall be taken to the nearest 0.01 in. (0.3 mm) and reported/recorded to the nearest 0.1 in. (3 mm) as the average of the measurements. The measured width shall be greater than or equal to the nominal width. Measurements shall be taken at quarter points of the sample.
- 5.3 The lengths of samples for performance testing purposes shall be 2 ft ± 0.25 in. (601 ± 6 mm) length for the seal and appropriate amount of silicone-based adhesive per manufacturer’s recommendation.

6. Sampling

- 6.1 Samples shall be taken at random from each shipment of material. If the shipment consists of more than one lot, each lot shall be sampled.
- 6.2 A lot shall consist of the quantity for each copious section agreed upon between the purchaser and the supplier.

7. Specimen Preparation

- 7.1 All tests in **Tables 1 and 2** shall be done in accordance with the referenced ASTM test method.
- 7.2 All performance test specimens cut shall be square to within 2° and smooth, with no roughness visible to the naked eye and cleaned of debris. This process will eliminate irregularities. The 2-ft (601 mm) long test specimens shall be fully installed with the adhesive per manufacturer recommendations on a steel or concrete surface, or both, simulating a bridge joint.

8. Test Methods

- 8.1 Compliance with the requirements of **Tables 1 and 2** shall be determined by tests conducted in accordance with the methods specified.
- 8.2 Performance tests shall be run at a sliding speed of 2.50 in./min in accordance with the manufacturer’s suggested minimum and maximum openings.

TABLE 1 Physical Requirements for Preformed Silicone Joint Seal Gland

	Requirements	ASTM Test Method
Resistance to accelerated weathering, 5000 h	No cracking or degradation	C793 – Fluorescent UV accelerated weathering tester (QUV)
Tensile strength, min, psi	1000	D412
Elongation at break, min, %	400	D412
Hardness, type A durometer, points	55 ± 5	D2240
Tear strength, min, ppi	100	D624 – Die B
Compression set, max		
At 212 °F, 70 h, %	30	D395 Method B – Specimen 1 or 2
Heat-aged properties, 70 h at 212 °F		
Durometer, max, points lost	5	D573
Tensile strength, max, % loss	10	
Elongation, max, % loss	10	

TABLE 2 Physical Requirements for Silicone-Based Adhesive

	Requirements	ASTM Test Method
Tensile strength, min, psi	200	D412
Elongation at break, min, %	450	D412
Sag/flow, max, in.	3/16	C639
Tack-free time, max, minutes	30	C679
Resistance to UV, 5000 h	No cracking or degradation	C793
Cure through to 1/4 in. thickness, max, hours	24	at 75 °F / 50 % RH
Cure through to 1/4 in. thickness, max, hours	24	at 75 °F / 50 % RH

8.3 The joint seal shall be set at its median opening, which is defined as halfway between the claimed maximum closure and maximum opening. Maximum joint opening shall be a minimum of 50 % higher than the median joint opening. It will be subject to cyclic loading at a 45° skew angle for 200 cycles with movements ± median design × 50 % × 1.414 displacement at room temperature. A typical cyclic load apparatus is shown in Fig. 1.

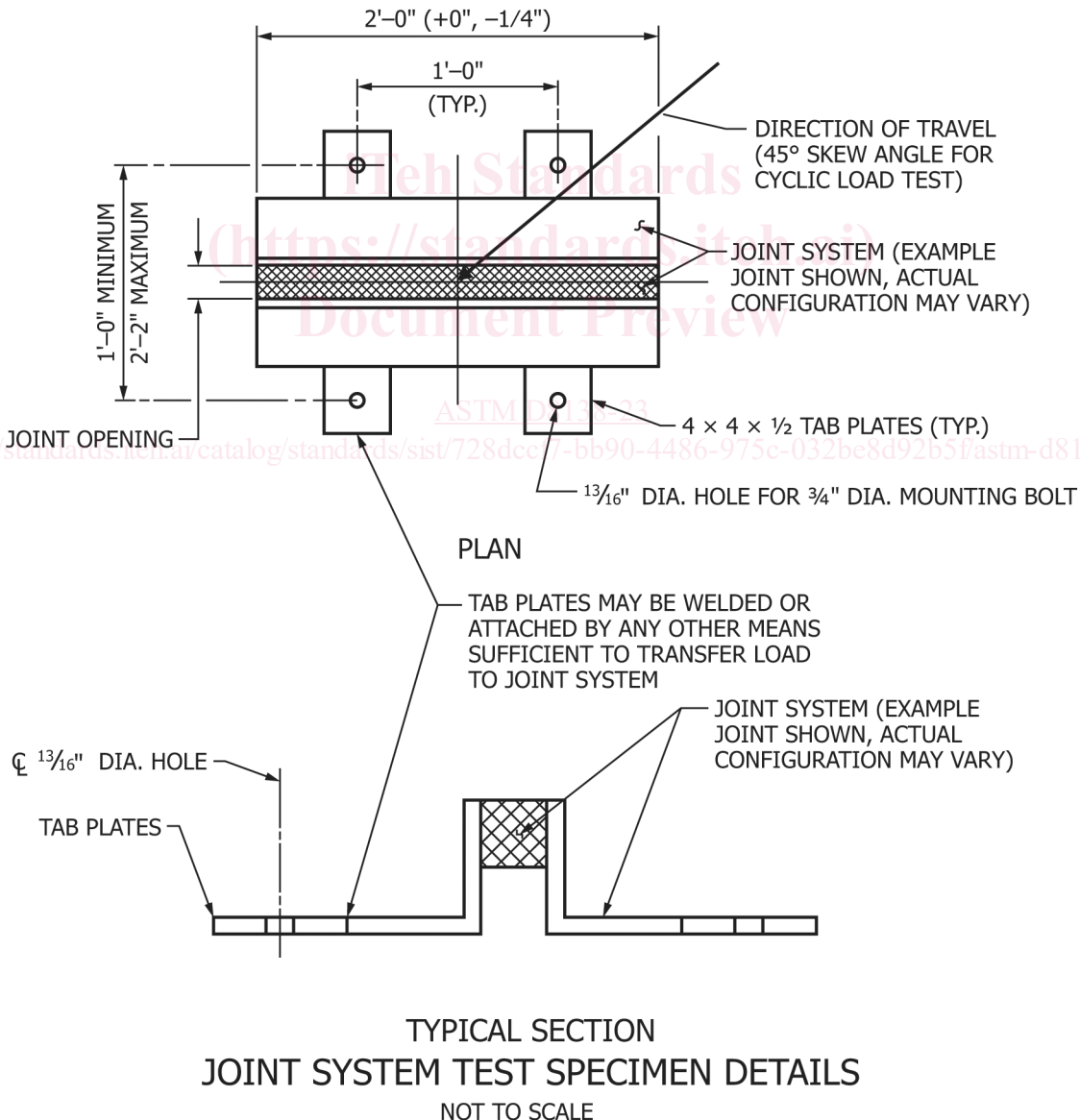


FIG. 1 Typical Performance Testing Apparatus for Cyclic Load Test