



Designation: D6297 – 20

Standard Specification for Asphaltic Plug Joints for Bridges¹

This standard is issued under the fixed designation D6297; 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, testing, and application requirements for a field-molded asphaltic plug joint (APJ) used in expansion joint sealing on asphalt concrete overlay and portland cement concrete decks. The scope of this specification is limited to field-molded APJ. This molded element can consist of multilayer or single layer, or both, application systems depending upon individual manufacturing requirements. The details of this specification are limited to the materials used in the application of APJ. It is recommended that a practical means of testing the watertightness aspects of the individual systems, either in the field or at the testing laboratory, be developed. When used on highway bridges, limits on maximum joint movements shall be specifically identified for each type of APJ. APJs should not be used for movement applications exceeding ± 25 mm from the installation width.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.3 The text of this standard references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables and figures) shall not be considered as requirements of 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.*

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. Referenced Documents

2.1 ASTM Standards:²

- A36/A36M Specification for Carbon Structural Steel
- D5/D5M Test Method for Penetration of Bituminous Materials
- D8 Terminology Relating to Materials for Roads and Pavements
- D36/D36M Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
- D113 Test Method for Ductility of Asphalt Materials
- D217 Test Methods for Cone Penetration of Lubricating Grease
- D3666 Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
- D5167 Practice for Melting of Hot-Applied Joint and Crack Sealant and Filler for Evaluation
- D5249 Specification for Backer Material for Use with Cold- and Hot-Applied Joint Sealants in Portland-Cement Concrete and Asphalt Joints
- D5329 Test Methods for Sealants and Fillers, Hot-Applied, for Joints and Cracks in Asphalt Pavements and Portland Cement Concrete Pavements

3. Terminology

3.1 For definitions of general terms, refer to Terminology D8.

3.2 Acronyms:

- 3.2.1 APJ—asphaltic plug joint
- 3.2.2 AB—asphaltic binder

4. Significance and Use

4.1 This specification describes test methods and procedures for determining specification conformance for asphaltic plug joints for bridges.

NOTE 1—The quality of the results produced by this standard are dependent on the competence of the personnel performing the procedure and the capability, calibration, and maintenance of the equipment used. Agencies that meet the criteria of Specification D3666 are generally

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.

considered capable of competent and objective testing, sampling, inspection, etc. Users of this standard are cautioned that compliance with Specification **D3666** alone does not completely ensure reliable results. Reliable results depend on many factors; following the suggestions of Specification **D3666** or some similar acceptable guideline provides a means of evaluating and controlling some of those factors.

5. Material

5.1 The AB shall be a thermoplastic polymeric-modified asphalt conforming to the physical properties in **Table 1**.

5.2 Type of aggregate shall be one of the following: granite, basalt, gabbro, porphyry, or gritstones. The specified aggregate shall be crushed, washed, and dried. Specific size and gradations of aggregate shall be agreed upon by the purchaser and APJ manufacturer. The aggregate shall be preweighed and packaged to avoid confusion on the job site. It shall be noted that specific sizes of aggregate may be proprietary to certain manufacturers.

5.3 The closed-cell foam expansion joint filler shall be nongassing and capable of withstanding the elevated installation temperature (199 °C) of the AB and meet Specification **D5249**.

5.4 The steel bridging plate shall conform to Specification **A36/A36M** for mild steel.

6. Physical Properties

6.1 The thermoplastic polymeric-modified asphalt samples shall be melted for sample preparation in accordance to Practice **D5167**.

6.2 The thermoplastic polymeric-modified asphalt shall conform to the physical properties prescribed in **Table 1**.

7. Dimensions and Tolerances

7.1 The size, shape, and dimensional tolerance shall be agreed upon by the purchaser and the producer or supplier. These tolerances shall be in compliance with the field construction specifications. The standard minimum blockout dimensions are 50 mm by 500 mm; however, it should be noted that values fluctuate depending on existing field conditions.

8. Procedure

8.1 The AB shall be heated to a temperature as specified by the manufacturer. The melter must be supplied with a continuous agitation system and calibrated thermometers.

8.2 The specified aggregate shall be heated to the manufacturer's prescribed temperature in a manufacturer's recommended mixer. The temperature of the specified aggregate shall be controlled by a digital temperature sensor.

8.3 The AB shall be blended with the heated aggregate at a ratio of aggregate to AB as specified by the manufacturer. The blend tolerance shall be $\pm 5\%$ by weight. The minimum aggregate content shall be 68 % by weight.

8.4 Alternately, the AB and specified aggregate can be premeasured and prepackaged, heated on-site in a manufacturer's recommended mixing unit.

8.5 The specified aggregate shall be coated completely with binder prior to placement in the blockout.

8.6 The closed-cell foam expansion joint filler shall be placed into the expansion gap at a depth of not greater than the width of the gap. Where the gap is greater than 25 mm, the minimum depth shall be 25 mm. The joint opening shall then be filled with AB until it runs into the corresponding blockout to ensure a watertight joint below the bridging plate.

8.7 The bridging plate shall be mild steel or aluminum a minimum of 6 mm thick and 200 mm wide, cut in minimum 1.2 m lengths, centered over the entire length of the expansion joint gap when specified. When specified, the bridging plate shall have predrilled holes at 300 mm on center for the locating pins.

8.8 The blended heated AB and heated specified aggregate shall be placed in a prepared blockout in accordance with the manufacturer's recommended installation procedures.

8.9 When specified, the locating spikes used to position the bridging plate shall be galvanized 16 d column nails or larger.

8.10 The blended heated AB and heated coated specified aggregate shall be compacted longitudinal and transverse to the joint using a roller or plate compactor, which delivers a minimum centrifugal force of 15 kN.

8.11 Where an antiskid/antitracking surface is required, the surface of the APJ shall be heated prior to broadcasting the antiskid material in accordance with the manufacturer's written instructions.

9. Sampling

9.1 Samples of the thermoplastic polymeric-modified asphalt shall be taken at random prior to the shipment of material. If the shipment consists of more than one batch, a sample from each batch shall be taken.

9.2 A minimum of 1.4 kg of the thermoplastic polymeric-modified asphalt taken from the manufacturer's facility shall constitute one sample for testing purposes.

9.3 Samples of the specified aggregate shall be taken at random from each shipment of material. If the shipment consists of more than one batch, a sample from each batch shall be taken.

TABLE 1 Physical Properties

	ASTM Standards	Required Physical Properties
Softening point, min	D36/D36M	83 °C
Tensile adhesion with 12.5 ± 0.2 mm opening between the blocks, min	D5329	700 %
Ductility, min at 25 °C	D113	400 mm
Penetration	D5329	
Max at 25 °C, 150 g, 5 s		75 1/10 mm units
Low temperature penetration	subsection 10.1	
Min at -18 °C, 200 g, 60 s		10 1/10 mm units
Flow, max 5 h at 60 °C	D5329	3.0 mm
Resiliency, min-max at 25 °C	D5329	40-70 %
Asphalt compatibility	D5329	Pass
Recommended application heating		182 °C-199 °C
Temperature range		
Bond 3 cycles at -7 °C	D5329	Pass
100 % elongation with 12.5 ± 0.2 mm opening between the blocks		
Flexibility at -23 °C, 10 s, 90° bend	subsection 10.2	Pass