



Standard Specification for Adhesive Lubricant for Installation of Preformed Elastomeric Bridge Compression Seals in Concrete Structures¹

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^{ε1} NOTE—Keywords were added editorially in July 1996.

1. Scope

1.1 This specification covers an adhesive lubricant for facilitating the insertion and positioning of preformed elastomeric bridge compression seals in either concrete or steel-faced joints, and which bonds the seal to the joint faces to waterproof the joint.

2. Referenced Documents

- 2.1 *ASTM Standards:*
D 1084 Test Methods for Viscosity of Adhesives²

3. General Requirements

3.1 The adhesive lubricant shall be a one-component, moisture-curing, polyurethane compound extended with aromatic hydrocarbon solvent. The compound shall provide adequate lubrication for insertion of the seal into the joint and, in the actual field application, shall bond the seal to the joint face throughout repeated cycles of expansion and contraction, effectively sealing the joint against infiltration of moisture.

4. Physical Requirements

4.1 The material shall conform to the physical properties described in Table 1.

5. Sampling

5.1 Samples of the adhesive lubricant shall be 1 L (1 qt) consisting of a composite taken from three or more separate containers chosen at random from the same batch. A batch or lot shall be considered as all finished material that was manufactured simultaneously or continuously as a unit prior to packaging. Each of the containers sampled shall be resealed and marked for identification.

5.2 Samples shall be taken at the point of manufacture or warehouse prior to delivery, or at the point of delivery from each lot.

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² *Annual Book of ASTM Standards*, Vol 15.06.

TABLE 1 Physical Requirements

Property	Requirements	Test Method Section
Solids content, min %	60	9.1
Homogeneity	shall be uniform, no lumps or agglomerates, no settlement in the container	None
Viscosity, cP	20 000 to 300 000	9.2
Shear ratio, min, for viscosity in the range of:		9.2
20 000 to 100 000 cP	1.5	
100 001 to 200 000 cP	2.0	
200 001 to 300 000 cP	2.5	
Shear ratio, max	4.0	9.2
Lubricating life, min, h	2	9.3
Sag	no sagging	9.4
Peel strength test	maximum length peeled from concrete within 3 min	9.5
500-g load	none	
1000-g load	12 mm (½ in.)	
Shelf life	for 6 months after manufacture, no skinning over and settling in the container to the extent that it cannot be brought to a smooth uniform product by stirring	

6. Test Conditions

6.1 Tests shall be conducted at standard laboratory conditions of 23 ± 2°C (73.4 ± 3.6°F). All materials and equipment shall be held at these conditions prior to test for a sufficient time to assure equilibrium.

7. Specimen Preparation

7.1 Using a square-tipped spatula, thoroughly hand-mix approximately 500 mL (1 pt) of lubricant adhesive in a round can for 1 min.

8. Apparatus

8.1 *Oven*—The oven shall be a circulating air oven capable of maintaining temperature of 105 ± 2°C (221 ± 4°F).

8.2 *Viscometer*—It shall be a Brookfield Model RVT viscometer with helipath stand and, TA, TB, TC, TD and TE spindles.

8.3 *Rubber Strips*—The rubber strips shall be 150 mm (6 in.) long, 25 mm (1 in.) wide and 1.5 mm (1/16 in.) thick, and

shall be obtained from an outside wall of preformed elastomeric bridge seal representative of the seal to be bonded with the adhesive lubricant.

8.4 *Concrete Blocks*, 200 by 200 by 75 mm (8 by 8 by 3 in.) and made of concrete similar to the concrete to which the seal is to be bonded. The blocks shall be cured for at least 14 days in a moisture room followed by at least 7 days at normal laboratory air condition. The test surface shall be smooth, freshly sandblasted before testing.

8.5 *Steel Roller*—A suitable 50 mm (2 in.) wide roller weighing 4.5 kg (10 lb).

8.6 *Steel Blocks*, 165 mm (6½ in.) long by 50 mm (2 in.) wide weighing 4.5 kg (10 lb).

8.7 *Weights*—A 500-g and a 1000-g weight shall be provided.

8.8 *Glass Plates*, or smooth-surface paper test charts.³

8.9 *Paint Film Applicator* (doctor blade).

9. Test Methods

9.1 Solids Content:

9.1.1 Place approximately 20 g of the adhesive in a covered weighing bottle.

9.1.2 Weigh a small aluminum foil drying dish together with a small glass stirring rod to the nearest 1 mg. Weigh out to the nearest 1 mg approximately 1½ g of the adhesive by difference from the weighing bottle into the dish, keeping the bottle covered as much as possible. Distribute the adhesive uniformly over the bottom of the dish in as thin a layer as possible by means of the stirring rod.

9.1.3 Place the dish with the rod and contents in a circulating air oven at $105 \pm 2^\circ\text{C}$ ($221 \pm 3.6^\circ\text{F}$) for $3 \text{ h} \pm 5 \text{ min}$ or until a constant weight is reached.

9.1.4 Place the warm dish with rod and contents immediately into a desiccator and allow to cool to room temperature before weighing to the nearest 1 mg.

9.1.5 Calculate the percent solids content as follows:

$$\text{Solids content, \%} = (W_r/W_s) \times 100 \quad (1)$$

where:

W_r = weight of residue, g, and

W_s = weight of specimen, g.

9.2 Viscosity and Shear Ratio:

9.2.1 *Viscosity*—Determine the Brookfield viscosity of the material at $23 \pm 2^\circ\text{C}$ ($73.4 \pm 3.6^\circ\text{F}$) in accordance with Method B of Test Methods D 1084. Use Brookfield Viscometer with the helipath stand and TA, TB, TC, TD, or TE spindles at 5 rpm. Record viscosity in mPa.s (cP).

9.2.2 *Shear Ratio*—With the spindle used for the viscosity determination, measure the viscosity of the material at 2.5 rpm; and then at 0.5 rpm. Calculate shear ratio as follows:

$$\text{Shear Ratio} = \text{viscosity at 0.5 rpm} / \text{viscosity at 2.5 rpm} \quad (2)$$

9.3 *Lubricating Life*—Apply a 65 to 78 mm wide, by 150 mm long, by 0.75 ± 0.10 mm thick (2½ to 3 in. by 6 in. by 0.030 ± 0.004 in.) strip of the lubricant adhesive to a glass

plate or smooth-surface paper test chart using a film applicator. Test lubricating life by rubbing finger on coated chart at 30-min intervals. Record lubricating life as the time at which drag or friction increases noticeably and material starts to thicken or become tacky.

9.4 *Sag*—Apply a 0.75 ± 0.01 mm (0.030 ± 0.004 -in.) thick film of material to a glass plate or smooth-surface paper test chart in the manner as described in 10.3. Support glass plate or chart vertically with the 150-mm (6-in.) axis of the strip horizontal. After 1 h, check for sagging or running.

9.5 Peel Strength Test:

9.5.1 Roughen one side of a 25-mm (1-in.) rubber strip with a coarse grinding wheel or other suitable means. Apply a brush coat of the freshly mixed lubricant adhesive to the roughened surface of the rubber strip and to the concrete block surface.

9.5.2 Immediately place the coated surfaces together and roll down the rubber strip with a 50-mm (2-in.) steel roller weighing 4.5 kg (10 lb), making six single passes, each pass requiring about 2 s. Wipe excess material away from the edges of the rubber strip. Place the 50 mm (2 in.) wide side of the steel block on the strip. Cure specimen for 48 h.

9.5.3 After curing, remove the steel block. Separate about 25 mm (1 in.) of an end of the rubber strip from the concrete. Support the specimen with the surface of the concrete block to which the rubber strip is attached horizontal and facing downward. Suspend a 500-g weight from the free end of the rubber strip for 3 min. Remove the weight and carefully measure to the nearest 1 mm ($1/16$ in.), the distance the rubber strip was peeled from the concrete. Repeat using the 1000-g weight.

9.5.4 Report results in millimetres (or inches or fraction thereof) peeled in 3 min. Should the specimen peel completely in less than 3 min, report as 100 % peeled and record the time.

10. Certification and Acceptance

10.1 The acceptance of the adhesive lubricant shall be based upon one of the following procedures as specified by the purchaser:

10.1.1 A certification indicating conformance to the test requirements. This shall consist of a copy of the manufacturer's test report or a statement by the seller, accompanied by a copy of the test results, that the material has been sampled, tested, and inspected in accordance with the provisions of the specification. Each certification so furnished shall be signed by an authorized agent of the seller or manufacturer.

10.1.2 A certification by an independent testing agency of test results indicating the material has been sampled, tested, and inspected in accordance with the provisions of the specification. Each certification so furnished shall be signed by an authorized agent of the testing agency.

10.1.3 Testing by the purchaser of any or all properties in accordance with the provisions of the specification.

10.1.4 Any alternative method agreed upon by the purchaser and seller.

11. Shelf Life

11.1 Determination of a six month shelf life shall be left to the examination by the purchaser in the field. If material does

³ Smooth-surface paper test charts, available from Morest Co., 211 Centre St., New York, NY 10013; and Leneta Co., P.O. Box 576, Ho Ho Kus, NJ 07423, have been found suitable.

not meet requirements of Table 1 in the field at the time of use, it shall be rejected.

12. Packaging and Package Marking

12.1 *Packaging*—The material shall be packaged in 5 and 25-L (1 and 5-gal) containers, so constructed as to ensure acceptance by common carrier.

12.2 *Package Marking*—Containers, and shipping containers, shall be marked with the following information:

12.2.1 Manufacturer's name, address, product name,

specification designation, manufacturer's batch or lot number, date of manufacture, application instructions, special precautions required because of product toxicity or flammability, and other such information pertinent to the proper storage and use of the product.

13. Keywords

13.1 adhesive lubricant; bridge compression seals; concrete structures

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