

GDT 58

A. Scope

For a complete list of GDTs, see the Table of Contents.

Use these test methods to evaluate all types of epoxy resin adhesives except for when you follow those test procedures referenced in the specifications as being ASTM or AASHTO procedures.

B. Apparatus

The apparatus consists of the following:

1. Unwaxed Paper Cups: Use 6 oz (177 ml) cups, with a 3 in (76 mm) diameter base (OC-12-3).
2. Unwaxed Paper Cups: Use 3 oz (89 ml) cups with a 1-1/2 in (38 mm) diameter base (OC-12-1).
3. Wooden Tongue Depressors
4. Stainless Steel Spatula: Use a spatula with a blade 6 in x 1 in (150 mm x 25 mm) with the end cut square (WS-10 or WS-10-1).
5. Balance: Use at least a balance with a 0.44 lbs (200 g) capacity, accurate to 0.002kg (1 g).
6. Stopwatch: Use a watch with 1-second divisions (WS-15).
7. Briquet Molds: Use the same molds as specified in AASHTO T 132.
8. Riehle Briquet Tester: Use an equivalent equipment meeting the requirements of AASHTO T 132.
9. Diamond Tooth Saw: Use a saw or other cutting tool capable of producing clean, smooth faces.
10. Coupon Molds: Use molds as shown in ASTM A 370, but modified to make 1/8 in (3 mm) thick coupons.
11. Wax or Lubricant: Use wax to coat inside of molds (nonreactive).
12. Testing Machine: Use the machine specified in ASTM D 638, equipped with a drive mechanism to allow speed of testing to be 0.20 in (5 mm) per minute.
13. Self-Aligning Grips: Use a set of self-aligning grips for holding the test specimen between the fixed member and the movable member of the testing machine.
14. Scale: Use a suitable scale for determining the distance between two fixed points of the specimen at any time during the test.

C. Sample Size and Preparation

1. Prior to test, let the epoxy components reach a room temperature of 75 °F (24 °C).
2. Conduct the laboratory tests at 77 °F (25 °C).
3. After conditioning, stir each component to re-disperse any settled material. Be careful not to contaminate one component with the other.

D. Procedures

1. Pot Life
 - a. Using the 3 oz (89 ml) cups, measure each component in the proper ratio.
 - b. Use the stainless steel spatula to scrape all of one of the components into the 6 oz (177 ml) cup. Be sure to remove all the material from the 3 oz (89 ml) cup.
 - c. Add all of the other component to the 6 oz (177 ml) cup.
 - d. Immediately start the stopwatch and use the spatula in a vigorous circular motion to thoroughly mix the two components. Be sure to scrape the sides and bottom of the cup periodically.
 - e. Mix the components for at least 30 seconds. Mixing time will vary depending on the viscosity of the components.
 - f. Weigh out 3.5 oz (100 g) of the mixed epoxy into another 6 oz (480 ml) cup. Place the epoxy in the bottom of the cup so that the 3.5 oz (100 g) will be one mass.
 - g. Place the sample on a wooden surface free of excessive drafts.

- h. Determine the pot life by probing the mass at the bottom center of the cup with a wooden tongue depressor.
 - 1) Begin probing at least 5 minutes prior to the minimum specified pot life.
 - 2) Continue probing frequently enough to accurately determine when a stringy mass develops in the bottom center of the cup.
 - 3) Record the time it takes for a soft stringy mass to form as the pot life.
2. Bond Strength (Old to Old)
 - a. Prepare cement mortar briquets in accordance with AASHTO T 132. Use Type I or Type III cement that meets the requirements of AASHTO M 85, and 20-30 Standard Sand that meets the requirements of ASTM C 190.
 - b. Allow the briquets to cure at least 7 days.
 - c. Saw the briquets in half at the centerline, perpendicular to the long axis.
 - d. Dry the briquets and clean the sawed faces thoroughly. Make sure you keep the matching halves of each briquet together.
 - e. Mix the two epoxy components according to [Procedures, step 1](#).
 - f. Apply a thin film to the cut faces of both halves of at least three briquets.
 - g. Rejoin the faces using light pressure.
 - h. Remove the excess adhesive from the edges of the bonded area.
 - i. Allow the specimens to cure according to Section 886, Table 1 of the Standard Specifications.
 - j. After the required curing time, break the three specimens in the briquet tester at a loading rate of 600 lbs \pm 25 lbs (2700 \pm 110 N) per minute.
 - k. Report the average bond strength obtained on the three specimens. Discard any erratic results.
3. Elongation Test
 - a. Prepare three specimens by filling the coupon molds with the mixed epoxy adhesive. Try to minimize air bubbles in the molded specimens.
 - b. Smooth the adhesive flush with the top of the mold.
 - c. Let the specimens cure for 24 hours at 77 °F (25 °C).
 - d. Remove the specimens from the mold and let them cure for 7 days, or as specified by the manufacturer.
 - e. Test the three specimens according to ASTM D 638 with the testing machine set to test the specimens at 0.20 in (5 mm) per minute.
 - f. Stretch each specimen until it fails.
 - g. Measure elongation based on the length of the stretched specimen.
4. Physical Requirements

All the applicable physical requirements, along with additional test methods, are specified in Section 886, Table 1 of the Standard Specifications on the applicable Special Provision covering Epoxy Resin Adhesives. Look for the Special Provisions in the Project Contract.

E. Calculations

No calculation is necessary for this test.

F. Report

Report the pot life, the bond strength, and the average elongation on Form 168.