Tex-739-I, Sampling and Testing Epoxy Coated Reinforcing Steel

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Section 1

Overview

Effective Dates: August 1999–June 2012.

This method outlines the procedure for sampling and testing the fusion bonded epoxy coating on epoxy coated reinforcing steel.

Units of Measurement

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.

Section 2

Definitions

The following terms and definitions are referenced in this test method:

- epoxy coated reinforcing steel - Epoxy coated reinforcing steel is steel (bar, fabric, wire) coated with a fusion bonded epoxy powder.
- applicator. - An applicator is a facility that performs the epoxy coating of reinforcing steel bar, fabric, or wire.

Section 3
Sampling & Testing Information

Sampling

Samples shall be selected by an authorized representative of TxDOT, from material furnished by applicators approved by CST/M&P.

Sampling shall be performed at the Applicator.

Testing

Samples obtained at the Applicator's facility shall be tested at the Applicator and witnessed by an authorized representative of TxDOT.

Each sample shall be tested for coating thickness, continuity, and adhesion as outlined in 'Testing Procedures.' All test results shall be recorded on Form D9-ECR-1, "Epoxy Coated Reinforcing Steel Worksheet."

Section 4
Procedures

Sampling

The following detail the procedures for sampling.

Epoxy Coated Reinforcing Steel Bar

Obtain a minimum of one full length bar sample per 9000 kg (10 tons) or fraction thereof for each size and grade.

Epoxy Coated Cold Drawn Steel Wire

Obtain a minimum of one 1.5 m (5 ft.) length sample per 1800 kg (2 tons) or fraction thereof of each size (diameter).

Epoxy Coated Welded Wire Fabric

Obtain a minimum of one sample per 1400 m^2 (15,000 $ft.^2$) or fraction thereof for each size and style of fabric. The sample should be 0.6 m (2 ft.) in length by the entire fabric width.

Testing

The following detail the procedures for testing samples.

Coating Thickness Testing

Measure the thickness of the coating on a straight length of the sample, between any deformation or ribs, using an approximating magnetic thickness gauge according to Test Method "Tex-728-I, Measurements of Dry Film Coating Thickness on Steel." Take fifteen evenly spaced readings on each side of the test sample.

The thickness range must be as specified in TxDOT Standard Specification "Item 440, Reinforcing Steel." No more than ten percent of the total number of readings per sample may fall outside the specified range.

Continuity Testing

Determine the continuity of the coating using a hand-held 67.5-volt DC holiday detector on the same sample selected for thickness determination. The Applicator shall furnish a properly functioning hand-held holiday detector and any assistance needed for the TxDOT representative to perform the test.

The continuity test shall be performed as follows:

- Firmly attach the holiday detector lead to bare metal of the sample

- Wet the holiday detector sponge according to the manufacturer's recommendations
- Run the wetted sponge along the entire surface of the coated reinforcing steel at a rate not to exceed 150 mm (6 in.) per second
- If audible beep or light flash detects a holiday, check 0.3 linear meters (one linear foot) in all directions from the detected location to determine the presence of other holidays. The total number of holidays found shall not exceed the maximum allowable values stated in TxDOT Standard Specification "Item 440, Reinforcing Steel."

NOTE: A holiday is defined as a pinhole in the coating that is not visually discernible. Chips or cracks in the coating shall not be considered holidays and must be repaired.

If the sample fails to meet the specification requirements, two retests must be conducted on random samples taken from the same material representing the first sample. The TxDOT representative will choose the retest samples. The results of both retests must meet the specification requirements, or the epoxy coated reinforcing steel represented by the samples will not be accepted.

Adhesion Testing

All test samples must be fully cured, stored, and tested at a temperature of between 20 and 29 °C (68 and 85 °F).

Perform the Bend Test on full-size samples and the Peel Test on bar less than 760 mm (30 in.) in length. The Peel Test may also be performed on full-size samples at the discretion of the engineer.

- Bend Test
  - Perform the bend test at a uniform loading rate not to exceed 20 seconds in duration. There must be no evidence discernible to the unaided eye of cracking or splitting of the coating on the outside radius, or wrinkling of the coating on the inside radius of the bent sample.
  - If the sample fails to meet the specification requirements, two retests must be conducted on random samples taken from the same material representing the first sample. The retest samples will be chosen by the TxDOT representative. The results of both retests must meet the specification requirements, or the epoxy coated reinforcing steel represented by the samples will not be accepted.
  - For Plain or Deformed Bar, the samples must be bent with the longitudinal ribs in a vertical plane (see 'Correct Bar Placement') around a mandrel. The diameter of the mandrel and the bend angle shall be determined as shown in the 'Bend Test Requirements – Plain or Deformed Bar' table.

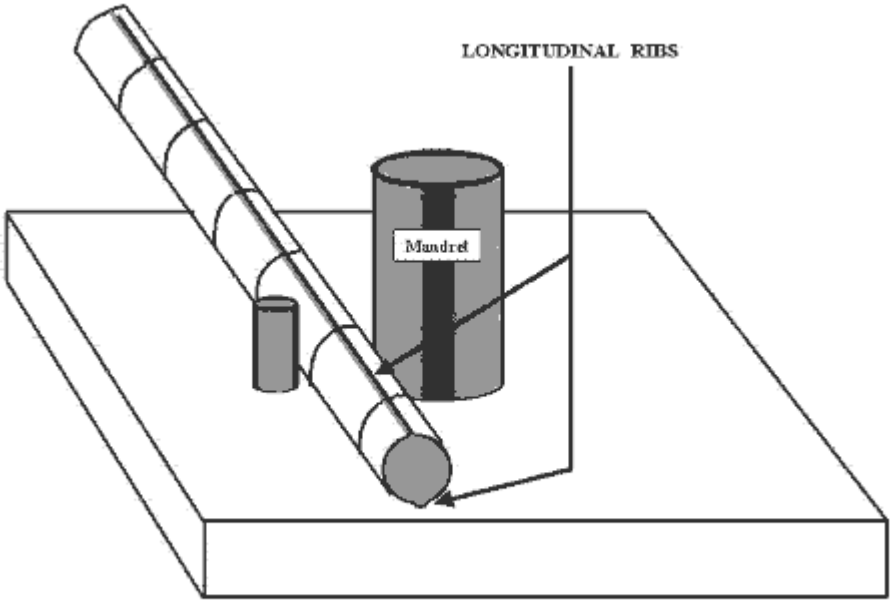

Figure 1. Correct Bar Placement.

Bend Test Requirements – Plain or Deformed Bar		
Bar Size	**Mandrel Size (± 6 mm)**	**Bend Angle Degrees (After Rebound)**
#10 through #25 (#3 through #8)	6d	180
#29, #32, #36 (#9, #10, #11)	8d	180
#43 and #57 (#14, #18)	10d	120

NOTE: "d" is the *nominal* diameter of the tested bar.

- For Plain or Deformed Wire fabric, the samples should be placed in a plane perpendicular to the mandrel radius and bent. The diameter of the mandrel shall be determined as shown in the 'Bend Test Requirements – Plain or Deformed Wire' table.

Bend Test Requirements – Plain or Deformed Wire		
Wire Size "W" or "D"	**Mandrel Size**	**Bend Angle Degrees (After Rebound)**
1 through 6	2d	135
6.1 and larger	4d	135

NOTE: "d" is the *nominal* diameter of the tested wire.

- Peel Test
  - Perform the Peel Test by cutting or prying with the edge of a stout knife, applied with considerable pressure in a manner tending to remove a portion of the coating.
  - Testing should not be carried out at edges or corners (points of lowest coating adhesion) to determine adhesion.
  - Adhesion will be considered inadequate if the coating can be removed in the form of a layer or skin so as to expose the base metal in advance of the knife-edge.
  - Removal of small particles of coating by paring or whittling will not be cause for failure.