Designation: A882/A882M – 20

Standard Specification for Filled Epoxy-Coated Seven-Wire Steel Prestressing Strand[1]

This standard is issued under the fixed designation A882/A882M; 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 seven-wire steel prestressing strand with protective fusion-bonded epoxy powder coating applied by the electrostatic deposition method or other suitable method, with the interstices of the seven wires filled with epoxy to minimize migration of corrosive media, either by capillary action or other hydrostatic forces.

NOTE 1—The manufacturer as identified throughout this specification is the coating applicator.

1.2 A supplementary requirement (S1) is provided for use where bond strength testing of 0.600-in. [15.24-mm] diameter grade 270 [1860] epoxy-coated strand for applications in prestressed ground anchors is required by the purchaser. The supplementary requirement applies only when specified in the purchase order or contract.

1.3 Requirements for epoxy powder coatings are contained in Annex A1.

1.4 The text of this specification references notes and footnotes which provide explanatory material. These notes and footnotes (excluding those in tables) shall not be considered as requirements of the specification.

1.5 This specification is applicable for orders in either inch-pound units (as Specification A882) or SI units [as Specification A882M].

1.6 The values stated in either SI units or inch-pound units are to be regarded separately as standard. Within the text, the SI units are shown in brackets. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the specification.

1.7 *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]

A416/A416M Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete

A981/A981M Test Method for Evaluating Bond Strength for 0.600-in. [15.24-mm] Diameter Steel Prestressing Strand, Grade 270 [1860], Uncoated, Used in Prestressed Ground Anchors

A1061/A1061M Test Methods for Testing Multi-Wire Steel Prestressing Strand

B117 Practice for Operating Salt Spray (Fog) Apparatus

D968 Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive

D7091 Practice for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to Ferrous Metals and Nonmagnetic, Nonconductive Coatings Applied to Non-Ferrous Metals

G14 Test Method for Impact Resistance of Pipeline Coatings (Falling Weight Test)

G20 Test Method for Chemical Resistance of Pipeline Coatings

2.2 *Federal Highway Administration Report:*[3]

FHWA-RD-74-18 Nonmetallic Coatings for Concrete Reinforcing Bars (February 1974)

2.3 *SSPC Specification:*[4]

SSPC-PA 2 Procedure for Determining Conformance to Dry Coating Thickness Requirements

2.4 *U.S. Military Standard:*[5]

MIL-STD-129 Marking for Shipment and Storage

[1] This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is the direct responsibility of Subcommittee A01.05 on Steel Reinforcement.

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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.

[3] Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, http://www.ntis.gov.

[4] Available from Society for Protective Coatings (SSPC), 800 Trumbull Dr., Pittsburgh, PA 15205, http://www.sspc.org.

[5] Available from DLA Document Services, Building 4/D, 700 Robbins Ave., Philadelphia, PA 19111-5094, http://quicksearch.dla.mil.

2.5 *U.S. Federal Standard:*[5]
Fed. Std. No. 123 Marking for Shipment (Civil Agencies)

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *batch, n*—epoxy powder or patching material contained in an individual shipping release or shipping order.

3.1.2 *disbonding, n*—loss of adhesion between the fusion-bonded epoxy coating and the steel strand wires.

3.1.3 *fusion-bonded epoxy coating, n*—a product containing pigments, thermo-setting epoxy resins, cross-linking agents, and other substances, which is applied in the form of powder onto a clean, heated metallic substrate and fuses to form a continuous barrier coating.

3.1.4 *grit, n*—inert particles impregnated on the outer surface of the epoxy coating for improving bond with cement grout.

3.1.5 *holiday, n*—a flaw, void, crack, thin spot, foreign inclusion, or contamination in the coating film that significantly lowers the dielectric strength of the coating film. A holiday may also be identified as a pinhole.

3.1.6 *lot, n*—epoxy-coated strand of one size contained in an individual shipping release or shipping order.

3.1.7 *patching material, n*—a liquid two-part epoxy coating used to repair damaged coating, to coat the locations of holidays on a coated strand, or to coat uncoated areas on the surface of a coated strand.

4. Ordering Information

4.1 Orders for epoxy-coated seven-wire steel prestressing strand under this specification shall contain the following information:

4.1.1 Nominal diameter of uncoated strand in accordance with Specification A416/A416M,

4.1.2 Grade of uncoated strand in accordance with Specification A416/A416M (5.1),

4.1.3 Smooth or grit-impregnated coating (7.3).

4.1.4 Quantity (in feet [metres]), and

4.1.5 ASTM designation A882 [A882M] and year of issue.

4.2 The purchaser shall have the option to specify additional requirements, including but not limited to, the following:

4.2.1 Certification of each batch of epoxy powder coating (5.2.1),

4.2.2 Representative sample of epoxy powder coating (5.3),

4.2.3 Requirements for patching material (5.4),

4.2.4 Additional pull-out tests (9.1)

4.2.5 Requirements for inspection (11.1),

4.2.6 Manufacturer's quality control tests (13.1),

4.2.7 Load-elongation curve (13.2),

4.2.8 Packaging and package marking (Section 14),

4.2.9 Supplementary Requirement S1, and

4.2.10 Other special requirements, if any.

5. Materials

5.1 Seven-wire steel prestressing strand to be coated shall conform to Specification A416/A416M. The strand grade shall be specified by the purchaser and shall be free of contaminants such as oil, grease, or paint.

5.1.1 Filled epoxy-coated strand shall not exhibit relaxation losses of more than 6.5 % after 1000 hours, when initially loaded to 70 % of the specified minimum breaking strength of the strand and tested under the conditions of Test Methods A1061/A1061M.

5.2 The epoxy powder coating shall meet the requirements listed in Annex A1. The epoxy powder coating shall be of organic composition except for the pigment, or grit if applicable, which may be inorganic if used.

5.2.1 A written certification shall be furnished to the purchaser that properly identifies the number of each batch of epoxy powder coating used in the purchase order, material quantity represented, date of manufacture, name and address of epoxy powder coating manufacturer, and a statement that the supplied epoxy powder coating is the same composition as that qualified in accordance with Annex A1.

5.3 If specified in the purchase order or contract, a representative 8-oz [0.2-kg] sample of the epoxy powder coating shall be supplied to the purchaser from each batch. The sample shall be packaged in an airtight container and identified by batch number.

5.4 If specified in the purchase order or contract, patching material for repairing damaged epoxy coating shall be supplied to the purchaser. The patching material shall be compatible with the coating and inert in concrete. The manufacturer of the patching material shall specify the steel and epoxy surface preparation, the minimum coating thickness, and the procedures for application of the patching material.

6. Surface Preparation

6.1 The surface of the steel strand to be coated shall be cleaned chemically or by another method that will impart the same cleanliness to ensure that the coated strand meets the requirements of Section 8.

7. Application of Coating

7.1 The epoxy powder coating shall be applied to the cleaned surface as soon as possible after cleaning and before oxidation of the surface visible to a person with normal or corrected vision occurs.

7.2 The epoxy powder coating shall be applied by the electrostatic deposition method, or other method that will meet the coating requirements in Section 8, and fully cured in accordance with the recommendations of the manufacturer of the epoxy powder coating.

7.3 The epoxy coating on the surface of the strand shall be smooth or grit-impregnated, as specified by the purchaser.

7.3.1 For grit-impregnated coated strand, inert particles (grit) shall be impregnated into the surface of the coating. Such particles shall not cause the coating to fail the requirements of Section 8. The particles shall be inert in concrete and non-reactive with concrete additives and soluble salts.

7.3.2 The epoxy coating on the surface of grit-impregnated strand shall be capable of reaching a temperature of 150°F