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Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars¹

This standard is issued under the fixed designation D 3963/D 3963M; 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 fabrication and jobsite requirements for deformed and plain steel reinforcing bars with protective epoxy coating applied in accordance with Specification A 775/A 775M.

1.2 This specification is applicable for orders in either SI units (as Specification D 3963M) or inch-pound units (as Specification D 3963).

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

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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:²

A 775/A 775M Specification for Epoxy-Coated Reinforcing Steel Reinforcing Bars

B 117 Practice for Operating Salt Spray (Fog) Apparatus

D 374 Test Methods for Thickness of Solid Electrical Insulation

D 2967 Test Method for Corner Coverage of Powder Coatings

E 177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E 691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

G 20 Test Method for Chemical Resistance of Pipeline Coatings

2.2 Federal Highway Administration Report

FHWA-RD-74-18 Nonmetallic Coatings for Concrete Reinforcing Bars³ (2007)

3. Coating Repair Materials

3.1 The patching or repair material shall be compatible with the coating, inert in concrete, and feasible for repairs at the applicator, fabricator, or in the field. This material shall be approved in accordance with Annex A1 prior to use.

3.2 The manufacturer shall specify the method of metal surface preparation, and the patching application procedures to be used in the field.

4. Handling and Identification

4.1 Coated bars shall be transported and handled with care. All systems for handling coated bars shall have padded contact areas. All bundling bands shall be padded, or suitable banding shall be used to prevent damage to the coating. All bundles of coated bars shall be lifted with a strong back, spreader bar, multiple supports, or a platform bridge to prevent bar-to-bar abrasion from sags in the bundles. The bars or bundles shall not be dropped or dragged.

¹ This specification is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.36 on Bridge Deck Protective Systems.

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² 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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³ 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*, Vol 01.04, volume information, refer to the standard's Document Summary page on the ASTM website.

⁴ Annual Book of ASTM Standards, Vol 03.02.

⁵ Available from National Technical Information Service (NTIS), 5285 Port Royal Rd., Springfield, VA 22161, <http://www.ntis.gov>.

4.2 The identification (including heat number, mill test results, date and type of coating system used, etc.) of all reinforcing bars shall be maintained throughout the coating and fabrication processes to the point of shipment.

5. Fabrication of Steel Reinforcing Bars After Coating

5.1 The steel reinforcing bars to be fabricated after application of the coating shall meet the requirements of this specification.

5.2 Handling and storage of coated bars at the fabricator's facility shall meet the requirements of Section 4 and 6.3.

5.3 Drive rolls on shear beds, and back-up barrels on benders shall be protected with a suitable covering to minimize damage during the fabrication process.

6. Storage, Handling and Placement at the Jobsite

6.1 The finished, installed coated steel reinforcing bars to be used in the construction shall meet the requirements of this specification.

6.2 All systems for handling the coated bars at the jobsite shall have padded contact areas. Coated bars or bundles shall not be dropped or dragged.

6.3 Coated steel reinforcing bars shall be off-loaded as close as possible to their points of placement or under the crane so that the bars can be hoisted to the area of placement to minimize rehandling.

6.4 Coated bars or bundles shall be stored above the ground on wooden or padded supports with timbers placed between bundles when stacking is necessary. Space the supports sufficiently to prevent sags in the bundles.

6.5 Coated and uncoated steel reinforcing bars shall be stored separately.

6.6 Long-term storage shall be minimized and material delivery scheduled to suit construction progress.

6.7 Coated bars shall be tied with tie wire coated with epoxy, plastic, nylon or other non-conductive material that will not damage or cut the coating.

6.8 Bar supports and spacers shall be coated with or made of a non-conductive material compatible with concrete.

6.9 Placed coated bars shall be covered with opaque polyethylene or other suitable protective material if cumulative environmental exposure of the coated bars, including previous uncovered storage time, of greater than two months prior to concrete embedment is expected. Provisions shall be made for adequate ventilation to minimize condensation under the cover.

NOTE 1—Extended storage of the bars at the job site should be avoided. It is recommended that coated bars be covered immediately upon arrival at the job site.

6.10 After placing, walking on coated steel reinforcing bars shall be minimized. The placement of mobile equipment shall be planned to avoid damage to the coated bars.

NOTE 2—Research has shown that steel-headed vibrators cause damage to epoxy-coated steel reinforcing bars when used to consolidate concrete. When consolidating concrete reinforced with epoxy-coated bars, it is recommended that vibrators with heads made of rubber or other resilient material approved for concrete consolidation be used.

7. Repairs

7.1 Repair of Damage Incurred During Fabrication:

7.1.1 All coating damage due to fabrication or handling at the fabricator's facility shall be repaired with patching material meeting the requirements of 3.1. The patching shall be performed in accordance with the written recommendations of the patching material manufacturer.

7.1.2 Visible cracks, including hairline cracks without bond loss (the coating cannot be easily removed with a peeling action by the fingers of the inspector), and damage to the coating within each fabricated area of the reinforcing bar shall be repaired. All disbanded areas of coating shall be removed, cleaned and repaired. The cleaning shall remove loose or deleterious material, or both. In cases where rust is present, the rust shall be removed by a thorough cleaning prior to the repair. This cleaning shall be done by blast cleaning, filing, power brushing or other method recommended by the patching material manufacturer and approved by the purchaser in a manner that minimizes damage to the sound coating.

7.1.3 When coated bars are sheared, saw-cut or cut by other means during the fabrication process, the cut ends shall be patched.

7.1.4 The repairs shall be performed as soon as possible and before visible oxidation appears on the steel surface and prior to shipment to the jobsite.

7.1.5 The fabricator shall be responsible for repair to the coating due to damage during fabrication and handling at the fabricator's facility.

7.2 Repair of Damage Incurred During Shipment and Handling at the Jobsite:

7.2.1 Coating damage, visible to a person with normal or corrected vision, incurred during shipment, storage or placement of epoxy-coated bars at the jobsite shall be repaired with patching material meeting the requirements of 3.1.

7.2.2 The contractor shall be responsible for repair to the coating due to damage during shipment, storage, or placement at the jobsite.

7.2.3 The patching shall be performed in accordance with the written recommendations of the patching material manufacturer. The patching material shall be dry to the touch prior to concrete placement.

7.3 The total damaged surface area (prior to repair with patching material), shall not exceed 2 % in any given 0.3 m [1 ft] section of coated reinforcement. The total bar surface area covered by patching material shall not exceed 5 % in any given 0.3 m [1 ft]