



Designation: A972/A972M – 00 (Reapproved 2004)

Standard Specification for Fusion Bonded Epoxy-Coated Pipe Piles¹

This standard is issued under the fixed designation A972/A972M; 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 pipe piles with protective fusion-bonded epoxy powder coating applied by the electrostatic spray, flocking, or fluidized bed process.

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

1.2 Other organic coatings may be used provided they meet the requirements of this specification.

1.3 Requirements for the powder coating are contained in Annex A1.

1.4 This specification is applicable for orders in either SI units (as Specification A972M) or inch-pound units [as Specification A972]. The values stated in either SI or inch-pound units are to be regarded as standard. Within the text, the inch-pound units are shown in brackets.

1.5 The following precautionary statement refers to the test method portion only, Section 8, of this standard: *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

A252 Specification for Welded and Seamless Steel Pipe Piles

B117 Practice for Operating Salt Spray (Fog) Apparatus

D4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

G8 Test Methods for Cathodic Disbonding of Pipeline Coatings

G12 Test Method for Nondestructive Measurement of Film Thickness of Pipeline Coatings on Steel

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

G20 Test Method for Chemical Resistance of Pipeline Coatings

2.2 *American Petroleum Institute Specification:*

API RP 5L7 Recommended Practice for Internal Fusion-Bonded Epoxy Coating of Line Pipe³

2.3 *National Association of Corrosion Engineers Standards:*

TM0175 Visual Standard for Surfaces of New Steel Centrifugally Blast Cleaned with Steel Shot or Steel Grit (NACE No. 2)⁴

RP0490 Holiday Detection of Fusion-Bonded Epoxy External Pipeline Coatings of 250 to 750 μm (10 to 30 mils)⁴

2.4 *Steel Structures Painting Council Standards:*

SSPC VIS 1 Visual Standards⁵

SSPC-SP1 Surface Preparation Specification No. 1: Solvent Cleaning⁵

SSPC-SP10 Near White Blast Cleaning⁵

3. Ordering Information

3.1 Orders for pipe piles under this specification may include the following information:

3.1.1 Specification for designation and year of issue,

3.1.2 Size (pipe pile outside diameter and nominal wall thickness),

3.1.3 Quantity.

3.1.4 Length,

3.1.5 Portions to be coated (full length or distance from end),

3.1.6 Requirements for certifications (see 4.1 and 12.1),

3.1.7 Requirements for material samples (see 4.3),

3.1.8 Requirements for patching material (see 4.4),

3.1.9 Requirements for visual standards for surface cleaning comparison (see 5.1),

3.1.10 Requirements for test frequency (see 8.1, 8.2), and

3.1.11 Requirements for inspections at the manufacturing plant (see 10.1).

¹ This specification is under the jurisdiction of ASTM Committee A01 on Steel, Stainless Steel and Related Alloys and is under the direct responsibility of Subcommittee A01.09.

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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 the American Petroleum Institute (API), 1220 L St., Washington DC 20005.

⁴ Available from the National Association of Corrosion Engineers (NACE), 1440 South Creek, Houston, TX 77084.

⁵ Available from Society for Protective Coatings (SSPC), 40 24th St., 6th Floor, Pittsburgh, PA 15222-4656.

4. Materials and Manufacture

4.1 Steel pipe piles to be coated shall meet the requirements of Specification **A252** as ordered.

NOTE 2—Surface conditions such as slivers, gouges, laminations, pits, and sharp edges may cause coating application difficulties and effort should be made to hold these conditions to a minimum.

4.2 The powder coating shall meet the requirements listed in Annex A1 and shall be approved by the purchaser.

4.2.1 If specified in the order, a written certification shall be furnished to the purchaser that properly identifies the supplied powder coating, batch designation of each batch used in the order, quantity represented, date of manufacture, name and address of manufacturer, and states that the powder coating, meets the requirements of **Annex A1**.

4.3 If specified in the order, a representative 0.2 kg [8 oz.] sample from each batch of the powder coating shall be supplied to the purchaser. The sample shall be packaged in an airtight container and identified by batch designation.

4.4 Patching material shall be compatible with the powder coating and recommended by the manufacturer of the powder coating. If specified in the order, patching material shall be supplied to the purchaser.

5. Surface Preparation

5.1 Prior to blast cleaning, the surfaces of steel pipe piles to be coated shall be precleaned, as required, in accordance with SSPC-SP1. Steel surfaces shall be cleaned by abrasive blast cleaning to near-white metal in accordance with SSPC-SP10. The cleaning media used shall produce an anchor pattern profile of 38–100 μm [1.5–4.0 mils]. Either of the following visual standards of comparison shall be used to define the final surface condition: SSPC-VIS 1 or NACE TM0175. Expanded blasting media debris and dust shall be removed from blasted surfaces prior to applying the powder coating.

5.2 Prior to application of the fusion-bonded epoxy powder coating, raised slivers, scabs, laps, sharp edges, or seams shall be removed using abrasive grinders. No individual area of grinding shall exceed 230 cm^2 [36 in.^2]. The total area of grinding shall not exceed 1 % of the total surface area.

NOTE 3—Pipe piles with excessive grinding should be reblasted prior to coating to establish a suitable anchor pattern in the ground area.

6. Coating Application

6.1 The powder coating shall be applied to the cleaned steel surfaces before visible oxidation occurs, but not exceeding 3 h after cleaning.

6.2 To achieve the required coating thickness (see 7.1), the steel shall be preheated prior to applying the powder coating in accordance with the powder coating manufacturer's written recommendations. The heat source shall not leave a residue or contaminant on the steel surfaces. If oxidation occurs, the steel shall be cooled to ambient temperature and recleaned before applying the powder coating.

6.3 The powder coating shall be applied and cured in accordance with the powder coating manufacturer's written recommendations.

6.4 Areas of pipe piles not requiring coating to allow for welding or other purposes shall be specified by the purchaser and shall be blocked-out during the coating application.

7. Requirements for Coated Pipe Piles

7.1 Coating Thickness:

7.1.1 The minimum coating thickness after curing on the pipe piles shall be 300 μm [12 mils].

7.1.2 The coating thickness shall be measured in accordance with Test Method **G12** following the instructions for calibration and use recommended by the thickness gage manufacturer.

7.2 Coating Continuity:

7.2.1 Holiday detection shall be performed on each coated pipe pile in accordance with NACE RP0490 or a 67.5 V direct current, 80-k Ω wet-sponge holiday detector in conjunction with a wetting agent.

7.2.2 Holidays detected shall be patched in accordance with the patching material manufacturer's written recommendations.

8. Test Frequency

8.1 Measure the coating thickness on a minimum of every 10th pipe pile.

8.2 Test the coating continuity over the entire coated surface of each pipe pile.

9. Permissible Coating Damage and Repair of Damaged Coating

9.1 Coating damage to pipe piles due to handling or other causes shall be repaired in the manufacturer's plant with patching material prior to shipment.

9.2 The areas of coating damage shall be prepared for the application of patching material by cleaning the damaged area, removing the damaged coating using grinders or other suitable means, feathering the adjacent coating, and removing all remaining residue or dust.

9.3 The application of the patching materials to the damaged areas shall be in accordance with the patching material manufacturer's written recommendation.

10. Inspection

10.1 The purchaser's representative (inspector) shall be allowed entry to the area of the manufacturer's plant where work on the purchaser's order is being performed during times of operation. The manufacturer shall afford the inspector all reasonable facilities to satisfy that the material is being furnished in accordance with this specification.

10.2 The inspector shall be allowed to select completed pipe piles randomly for inspection and testing in the manufacturer's plant. Such inspections and tests conducted by the inspector shall not interfere unnecessarily with the manufacturer's operation.

11. Rejection

11.1 Coated pipe piles represented by test specimens that do not meet the requirements of this specification shall be rejected. At the manufacturer's option, rejected sections shall be replaced, or may be stripped of coating, cleaned, recoated, and