

SSPC: The Society for Protective Coatings

PAINT SPECIFICATION NO. 37

Waterborne Epoxy Coating for Cementitious Substrates Performance-Based

1. Scope

1.1 This specification covers the requirements for an ambient temperature cure, two-component waterborne epoxy coating that is intended for use as a coating for concrete.

1.2 Coatings meeting this specification are suitable for exposures in environmental zones 1A (interior, normally dry), 1B (exterior, normally dry), 2A (frequently wet by fresh water), 2B (frequently wet by salt water), and 3C (chemical exposure, alkaline).

1.3 The specified coating is intended for application by brush, roller, and spray over surfaces prepared in accordance with the manufacturer's written recommendations.

2. Description

2.1 COMPONENTS

2.1.1 This coating is typically based on a reactive epoxy functional resin with an amine or acid functional curing agent (see Section 4.2).

2.1.2 The major volatile component by weight is water (see Section 4.3).

3. Referenced Standards

3.1 The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern, unless otherwise specified. Those documents marked with an asterisk (*) are referenced only in the Notes or the Appendix, which are not requirements of this specification.

3.2 If there is a conflict between the requirements of any of the cited reference standards and this specification, the requirements of this specification shall prevail.

3.3 SSPC STANDARDS AND JOINT STANDARDS:¹

Guide 13	Guide for the Identification and Use of Industrial Coating Material in Computerized Product Databases
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SSPC-PA 7

Procedure for Applying Thin Film Coatings to Concrete

SP 13/NACE No. 6

Surface Preparation of Concrete

*TU 2/NACE 6G197

Informational Report and Technology Update on Design, Installation, and Maintenance of Coating Systems for Concrete Used in Secondary Containment

3.4 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS:²

D 523	Test Method for Specular Gloss
D 562	Test Method for Consistency of Paint Measuring Krebs Unit (KU) Viscosity Using a Stormer-type Viscometer
D 660	Test Method for Evaluating Degree of Checking of Exterior Paints
D 661	Test Method for Evaluating Degree of Cracking of Exterior Paints
D 714	Test Method for Evaluating Degree of Blistering of Paints
D 968	Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
* D 1296	Test Method for Odor of Volatile Solvents and Diluents
D 1308	Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
* D 1475	Test Method for Density of Liquid Coatings, Inks, and Related Products
* D 1535	Practice for Specifying Color by the Munsell System
* D 1640	Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
D 1734	Practice for Making Cementitious Panels for Testing Coatings
D 2196	Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer
D 2243	Test for Freeze-Thaw Resistance of Waterborne Coatings
D 2244	Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates
D 2369	Test Method for Volatile Content of Coating

¹ NACE standards may be obtained from NACE International at <http://nace.org>

² ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or online at <http://www.astm.org>

- * **D 2371** Test Method for Pigment Content of Solvent-Reducible Paints
- D 2574** Test Method for Resistance of Emulsion Paints in the Container to Attack by Microorganisms
- * **D 2621** Test Method for Infrared Identification of Vehicle Solids from Solvent-Reducible Paints
- D 3359** Test Methods for Measuring Adhesion by Tape Test
- D 3363** Test Method for Film Hardness by Pencil Test
- D 3723** Test Method for Pigment Content of Water-Emulsion Paints by Low-Temperature Ashing
- D 3792** Test Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph
- D 3925** Practice for Sampling Liquid Paints and Related Pigmented Coatings
- D 4017** Test Method for Water in Paints and Paint Materials by Karl Fischer Method
- D 4585** Practice for Testing the Water Resistance of Coatings Using Controlled Condensation
- D 6132** Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Over Concrete Using an Ultrasonic Gage

3.5 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARD:³

- Z129.1** Hazardous Industrial Chemicals—
Precautionary Labeling

3.6 FEDERAL SPECIFICATIONS AND STANDARDS:⁴

- FED-STD-141:** Paint, Varnish, Lacquer and Related Materials: Methods of Inspection, Sampling, and Testing
- * **Method 3011** Condition in Container
 - Method 4321** Brushing Properties
 - Method 4331** Spraying Properties
 - Method 4541** (canceled) Working Properties and Appearance of Dried Film

4. Composition Requirements

4.1 The manufacturer is given wide latitude in the selection of materials and manufacturing processes (see Note 12.1).

4.2 EPOXY RESIN REQUIREMENT: The epoxy resin together with the curing agent, as described in Section 2.1.1, shall constitute at least 40% by weight of total solids. Determine the weight percent nonvolatile solids (TS) in accordance with ASTM D 2369. Determine the weight percent pigment (P) of the mixed coating in accordance with ASTM D 3723. Allow the mixed coating to air dry for 24 hours prior to ashing. Calculate the percent vehicle solids (VS) as follows:

$$VS = \frac{TS - P}{TS} \cdot 100\%$$

4.3 WATER REQUIREMENT: Water shall constitute at least 70% of the weight and volume of volatile solvent. The water content shall be determined in accordance with ASTM D 3792 or ASTM D 4017.

5. Standard Testing Conditions

5.1 SUBSTRATE: The concrete test panels shall conform to ASTM D 1734. Surface preparation shall conform to "Light Service" as described in Table 1 of SSPC-SP 1 (see Note 12.2).

5.2 APPLICATION: Thoroughly mix together both components of the coating following the manufacturer's written instructions. Allow the mixture to stand for the manufacturer's specified induction time, if stated. Apply the coating in accordance with manufacturer's written instructions.

5.3 DRY FILM THICKNESS: The dry film thickness (DFT) shall be within the manufacturer's written recommended range. If there is no recommended film thickness, then the minimum thickness shall be 50 micrometers (2.0 mils). The film thickness shall be measured in accordance with ASTM D 6132.

5.4 CURE: All coated panels to be tested will be allowed to cure for a minimum of seven days under ambient laboratory conditions before physical testing is to begin.

6. Requirements for the Liquid Coating

6.1 RESISTANCE TO MICROORGANISMS IN CONTAINER: The liquid coating shall be resistant to attack by microorganisms when tested in accordance with ASTM D 2574.

6.2 FREEZE-THAW RESISTANCE: Test both components of the two-pack system separately in accordance with ASTM D 2243. At the end of three cycles there shall be no gelling, coagulation, lumps, or coarse particles. The change in viscosity shall not exceed 10% of original viscosity as run by ASTM D 562 or ASTM D 2196.

6.3 PACKAGE STABILITY: Measure the viscosity of both components of the two-pack coating separately in accordance with ASTM D 562 or ASTM D 2196. Then place each component in an appropriate closed container (i.e., a lined metal or plastic can) in an oven at $52 \pm 1^\circ\text{C}$ ($125 \pm 2^\circ\text{F}$). After 30 days, remove the coating from the oven and measure the viscosity of each component of the coating. The change in viscosity shall not exceed 10% of original viscosity. After mixing the

³ American National Standards Institute, Suite 600, 1819 L Street, NW, Washington DC 20036, or online at <http://www.ansi.org>

⁴ FED STD 141 can be obtained from <http://astimage.daps.dla.mil/online.new>.