

SSPC: The Society for Protective Coatings

Coating Application Standard No. 14

Application of Thick Film Polyurea and Polyurethane Coatings to Concrete and Steel Using Plural-Component Equipment

1. Scope

This standard provides requirements for the field application of polyurea, polyurethane, or polyurea/polyurethane hybrid thick film coatings to concrete or steel surfaces using plural component spray equipment. In this standard, thick film coatings are defined as coatings specified to have greater than 500 micrometers [μm] (20 mils) dry film thickness. Surface preparation, pretreatments, machinery requirements and parameters are addressed in this standard.

2. Referenced Standards

2.1 The latest issue, revision, or amendment of the referenced documents in effect on the date of invitation to bid shall govern unless otherwise specified.

2.2 If there is a conflict between the requirements of any of the referenced documents and this standard, the requirements of this standard shall prevail.

2.3 SSPC STANDARDS AND JOINT STANDARDS:

PA 9 Measurement of Dry Coating Thickness on Cementitious Surfaces Using Ultrasonic Gages

2.4 ASTM INTERNATIONAL STANDARDS¹

C 805 Standard Test Method for Rebound Number of Hardened Concrete

D 4138 Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross-Sectioning Means

D 4417 Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel

D 4787 Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates

D 6132 Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Gage

D 7091

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

2.5 NACE INTERNATIONAL STANDARDS:²

SP0188 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Surfaces

2.6 INTERNATIONAL CONCRETE REPAIR INSTITUTE GUIDELINE³

Guideline 310.2 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

3. Definitions

Concrete: A composite material that consists essentially of a binding medium within which are embedded particles or fragments of aggregate, usually a combination of fine aggregate and coarse aggregate; in Portland cement concrete, the binder is a mixture of Portland cement and water.

Outgassing: The spontaneous discharge of air or moisture vapor from concrete.

Pores: Small interconnected voids, such as in concrete, which allow fluids to penetrate an otherwise impervious material.

4. Qualifications of Craftworkers

The contractor shall provide documentation that the craftworker(s) applying the coating have received formal training on proper plural-component coating application techniques and that the operator(s) of the spray pump(s) have received formal training on material ratio, material viscosity, mixing, ambient conditions for application and curing, product data sheets, material safety data sheets, proper setup and monitoring of the plural-component pump(s) being used, and

¹ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. 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.

² NACE International, 1440 South Creek, Houston, TX 77084 phone: 281-228-6200. NACE standards may be obtained online from <http://www.nace.org>

³ ICRI International Concrete Repair Institute, 3166 S. River Road, Suite 132, Des Plaines, IL 60018, phone: 847-827-0830. ICRI standards may be obtained online from <http://www.icri.org>

troubleshooting basics (see Note 15.1). Formal training shall include a written exam and hands-on assessment.⁴

5. Surface Condition of Concrete Prior to Application of Coating

5.1 SURFACE SOUNDNESS: Before application of coating, the concrete substrate shall be sound and solid as determined by ASTM C 805 (see Note 15.2). Surface defects such as bugholes, voids, and cracks shall be repaired as specified prior to coating application.

5.2 SURFACE CLEANLINESS: When viewed without magnification, the concrete surface shall be free of visible dust, dirt, greases, and oils, contaminants, laitance, and loosely adhering concrete. See Note 15.3 for information regarding requirements for nonvisible contaminants.

5.3 PROFILE: Unless otherwise specified, the surface roughness shall be within CSP range 2-6 when evaluated in accordance with ICRI 310.2.

5.4 JOINTS: Unless otherwise specified, coatings and surfacings shall not be placed over functional joints (see Note 15.4).

6. Surface Condition of Steel Prior to Application of Coating

6.1 SURFACE CLEANLINESS

6.1.1 Visible Contaminants: Immediately prior to coating application, the steel surface shall meet specified requirements for visible surface cleanliness. The steel surface shall be prepared in accordance with project requirements for surface cleanliness. If these requirements are not provided in the project specification, the surface shall meet the requirements of the manufacturer's product data sheet for the coating to be applied.

6.1.2 Nonvisible Contaminants: Immediately prior to coating, the steel surface shall meet the specified requirements for maximum levels of nonvisible contaminants (see Note 15.3).

6.2 SURFACE PROFILE: Unless otherwise specified, a minimum profile of 76 μm (3 mils) measured in accordance with ASTM D 4417 Method B is required for thick film coatings⁵.

7. Coating Materials Handling

7.1 The proper PPE shall be utilized when handling the individual components of the system as well as during mixing and application. Polyurea and/or polyurethane coatings are formed from isocyanate and resin blend components. The

isocyanate components are known to be skin and respiratory irritants and sensitizers, and the aromatic amines are considered to be potential carcinogens. The resin blend component is frequently corrosive in nature, and capable of causing other adverse health effects. Refer to material manufacturer's Material Safety Data Sheets for information on proper PPE and additional safety information. SSPC-TU 8 also provides additional information.

7.2 All coating products shall be delivered to the work site in original, unopened containers with labels intact. Minor damage to containers is acceptable if the container has not been punctured or crimped or has had the lid seal broken. Each product shall have a readily accessible manufacturer's material safety data sheet.

7.3 Each container shall be clearly marked or labeled to show coating identification, date of manufacture, batch number, basic chemical composition, special instructions, and other information as needed to meet governmental requirements.

7.4 STORING: Coating materials shall be stored in accordance with applicable federal, state and local safety regulations. Storage temperatures shall be within the range specified in the material product data sheets. If product is exposed to temperature outside of specified range, the coating manufacturer shall be contacted. All containers of coating shall remain unopened until required for use. Containers shall be opened only as necessary to provide material to the painters. The data on the container label shall remain legible throughout the use of the contents.

7.5 MIXING

7.5.1 Each component of the coating shall be thoroughly mixed in accordance with the manufacturer's instructions and then applied by the plural component equipment in the ratio recommended by the manufacturer.

7.5.2 The mixing and application process shall comply with specified safety requirements for product use, including ventilation, dust control and protective personal equipment.

8. Pre-Application Checks

8.1 AMBIENT CONDITIONS: Coating shall not be applied in rain, wind, snow, fog, or mist. Coating shall not be applied to wet or damp surfaces unless the manufacturer has provided written documentation that permits application under these conditions. Coating shall not be applied on frosted or ice-coated surfaces.

8.2 TEMPERATURE: For both concrete and steel substrates, the surface temperature of the substrate, the temperature of the coating to be applied, and the ambient air temperature shall comply with the coating manufacturer's written requirements prior to and throughout the coating application and curing process. Coating shall not be applied when

⁴ Note that successful completion of SSPC's Marine Plural Component Program (MPCAC, C14) will satisfy this requirement. Other training courses covering the material listed in Section 4.1 may be available.

⁵ SSPC-PA 17, Method for Determining Conformance to Steel Profile/Surface Roughness/Peak Count Requirements, references ASTM D 4417 and contains additional acceptance criteria.