

SSPC: The Society for Protective Coatings

PAINT SPECIFICATION NO. 40

Zinc-Rich Moisture-Cure Polyurethane Primer, Performance-Based

1. Scope

1.1 This specification contains performance requirements for an organic zinc-rich moisture-cure polyurethane primer with a thermoset binder. SSPC PS 12.00 describes this primer as a Type II B zinc-rich primer.

2. Description

2.1 This zinc-rich moisture-cure polyurethane primer is characterized by the presence of free polyisocyanate groups capable of reacting with atmospheric moisture in order to form a film. Either single or two-component packaging is acceptable. Zinc loading requirements are given in Section 4.2.1. Appendix A provides additional information for slip critical applications.

2.2 This primer is available in two Types. Type I formulations, applied over properly prepared carbon steel surfaces, are suitable for use on parts or structures exposed in Environmental Zones 1A—interior, normally dry; 1B—exterior, normally dry; 2A—frequently wet by fresh water, excluding immersion, 2B—frequently wet by salt water, excluding immersion, and 3B—chemical exposure, neutral (with suitable topcoat). Type II formulations, applied over properly prepared carbon steel surfaces, are suitable for exposure in Environmental Zone 2C—fresh water immersion. Type II primers meet the requirements of Section 7.4 for fresh water immersion in addition to the requirements for Type I.

2.3 Primers described by this standard provide corrosion resistance and accept application of suitable topcoats. Unless a Type I primer is specified, the primer described by this standard is intended to comply with Type II requirements.

2.4 This primer is intended for application by spray directly to a steel substrate, with the allowance for small area touch-up by brush (see Note 11.1).

3. Reference Standards

3.1 The latest issue, revision, or amendment of the reference documents 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 documents and this standard, the requirements of this standard shall prevail.

3.3 SSPC STANDARDS AND JOINT STANDARDS:

Guide 13	Guide for the Identification and Use of Industrial Coating Materials in Computerized Product Databases
SP 1	Solvent Cleaning
SP 5/NACE No. 1	White Metal Blast Cleaning
PA 2	Measurement of Dry Coating Thickness with Magnetic Gages
PS 12.00	Guide to Zinc-Rich Coating Systems

3.4 ASTM INTERNATIONAL STANDARDS:¹

A 572	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
D 185	Standard Test Methods for Coarse Particles in Pigments, Pastes, and Paints
D 520	Standard Specification for Zinc Dust Pigment
* D 562	Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer
D 714	Standard Test Method for Evaluating Degree of Blistering of Paints
* D 1475	Standard Test Method for Density of Liquid Coatings, Inks, and Related Products
* D 1640	Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
D 1654	Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

¹ ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Standards are available online at <http://www.astm.org>

- * **D 2369** Standard Test Method for Volatile Content of Coatings
- * **D 2371** Standard Test Method for Pigment Content of Solvent-Reducible Paints
- D 2794** Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
- D 3278** Standard Test Methods for Flash Point of Liquids by Small Scale Closed-Cup Apparatus
- D 4417** Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
- D 4541** Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers
- D 5894** Standard Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
- D 6580** Standard Test Method for the Determination of Metallic Zinc Content in Both Zinc Dust Pigment and in Cured Films of Zinc-Rich Coatings

3.5 FEDERAL SPECIFICATIONS AND STANDARDS:²

- FED-STD 141** Paint, Varnish, Lacquer and Related Materials: Methods of Sampling, Inspection, and Testing
- * **Method 3011** Condition in Container
- Method 4331** Spraying Properties

3.6 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARD:³

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

3.7 American Association of Highway and Transportation Officials (AASHTO) Specification⁴

- * Standard Specifications for Highway Bridges, Division 1, Section 10.32.3.2.3, Appendix A, Testing Method to Determine the Slip Coefficient for Coatings Used in Bolted Joints

4. Composition Requirements

4.1 The manufacturer is given wide latitude in the selection of materials and manufacturing processes.

4.2 PIGMENT REQUIREMENT

4.2.1 The major pigment component in this coating is zinc dust. The paint shall contain a minimum of 65% zinc dust pigment by weight in the dry film per ASTM D 6580 (see Notes 11.2 and 11.3).

4.2.2 Other optional pigment components include extenders, curing aids, tinting colors, and suspension and pot life control agents.

4.3 RESIN REQUIREMENT: The resin used in the coating shall be a polyisocyanate-based product that cures through a chemical reaction with atmospheric moisture. Use of other resins or modifiers shall be minimal and limited to products necessary for formula ingredient compatibility and to improve recoating properties. See Note 11.4 for information on modifying resins and Note 11.5 for information on volatile organic compound (VOC) content.

5. Standard Testing Conditions

5.1 TEST PANELS: The hot rolled steel test panels shall conform to ASTM A 572. Panel size shall be 100 mm x 150 mm x 3.2 mm (4 inch x 6 inch x 1/8 inch). Test panels shall be solvent cleaned in accordance with SSPC-SP 1 prior to blast cleaning. The test panels shall be blast cleaned in accordance with SSPC-SP 5. The blast profile shall be 44 to 57 micrometers (1.75 to 2.25 mils) as measured in accordance with ASTM D 4417, Method C.

5.2 APPLICATION: The primer shall be spray applied as a single coat in accordance with manufacturer's written recommendations. The primer shall show no streaking, running, sagging, or other defects during application or while drying.

5.3 DRY FILM THICKNESS: The dry film thickness (DFT) on the test panels shall meet the manufacturer's written recommended range. The DFT shall be measured in accordance with SSPC-PA 2, Appendix 5.

5.4 CURE: The primer shall be dried and cured in accordance with manufacturer's written recommendations. Before any testing, all coated panels shall be aged for a minimum of 7 days in an environment with a minimum relative humidity of 55%, and at a temperature of 23 ± 2 °C (73.5 ± 3.5 °F).

5.5 SCRIBING: Scribe two parallel lines on the face of the coated panels so as to expose the underlying metal

² FED STD 141 is available from <http://assist.daps.dla.mil/online/start/> (or search for 'assist' through your web browser).

³ American National Standards Institute, 1819 L Street, NW, Suite 600, Washington, DC 20036. Standards are available online at www.ansi.org

⁴ American Association of State Highway and Transportation Officials, 444 North Capitol Street, NW, Suite 249, Washington DC 20001. Standards are available online at <https://bookstore.transportation.org>.