

SSPC: The Society for Protective Coatings

Coating Standard No. 43

Direct-To-Metal Aliphatic Polyurea Coating, Performance-Based

1. Scope

This standard contains performance requirements for a two-component direct-to-metal aliphatic polyurea coating with a dry-to-handle time ranging from 30 minutes to 2 hours as determined using ASTM D 1640.

2. Description

2.1 The coating is a self-priming aliphatic polyurea coating intended for single-coat direct-to-metal application, primarily in fabrication shops. The coating can be touched-up in the field (see Sections 7.2, 7.3, and Note 11.1). Depending upon individual formulation properties, either single-component airless spray or plural-component equipment is used for coating application.

2.2 The coating is generally suitable for exposures in SSPC 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), 3B (chemical atmospheric exposure, neutral), and 3C (chemical atmospheric exposure, alkaline).¹

3. Referenced Standards

3.1 The latest issue, revision, or amendment of the referenced standards in effect at the time of invitation to bid shall govern, unless otherwise specified. A standard marked with an asterisk (*) is referenced only in the Notes or the Appendix, which are not requirements of this standard.

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:

Guide 13	Guide for the Identification and Use of Industrial Coating Materials in Computerized Product Databases
PA 2	Measurement of Dry Coating Thickness with Magnetic Gages
VIS 2/ ASTM D 610	Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces
SP 1	Solvent Cleaning

SP 5/NACE No. 1 White Metal Blast Cleaning

3.4 ASTM INTERNATIONAL STANDARDS:²

A 572	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
D 523	Standard Test Method for Specular Gloss
* 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 1014	Standard Practice for Conducting Exterior Exposure Tests of Paints on Steel
* 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
D 1849	Standard Test Method for Package Stability of Paint
D 2244	Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates
* D 2369	Standard Test Method for Volatile Content of Coatings
* D 2621	Standard Test Method for Infrared Identification of Vehicle Solids from Solvent-Reducible Paints
D 2794	Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
* D 4060	Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser

¹ SSPC Environmental Zones are defined in "About SSPC Standards and Guides" available online from <<http://www.sspc.org>>.

² 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.

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 4587	Standard Practice for Fluorescent UV-Condensation Exposures of Paint and Related Coatings
* D 4940	Standard Test Method for Conductimetric Analysis of Water Soluble Ionic Contamination of Blasting Abrasives
D 5402	Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs
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)
* G 101	Standard Guide for Estimating the Atmospheric Corrosion Resistance of Low-Alloy Steels

3.5 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS:³

ANSI Z129.1	Hazardous Industrial Chemicals—Precautionary Labeling
ANSI B94.50	Basic Nomenclature and Definitions for Single-Point Cutting Tools

3.6 FEDERAL SPECIFICATIONS AND STANDARDS:⁴

FED-STD-141:	Paint, Varnish, Lacquer and Related Materials: Methods of Inspection, Sampling and Testing
Method 4331.2	Spraying Properties

4. Composition Requirements

4.1 This is a performance-based specification. Individual coatings meeting performance requirements of this standard vary in formulation, raw materials, and application characteristics. See Note 11.2 for information on VOC content.

4.2 The reactive components used in the coating shall be comprised primarily of polyamine and polyisocyanate resins to form a polyurea.

4.3 The weathering properties of the coating shall comply with requirements defined in Sections 8.1.1.1 and 8.1.1.2. Corrosion inhibitive pigments that are incorporated into direct-to-metal, single-coat formulations to enhance corrosion resistance properties shall not affect the weathering properties of the coating.

4.4 ANALYTICAL TEST DATA: If required, the coating manufacturer shall provide certificates of analysis for coating batches qualified by independent testing to meet this standard for use in verifying batch-to-batch consistency of material (see Note 11.3 and subsections).

5. Standard Testing Requirements

5.1 TEST PANELS: Triplicate panels shall be used for each test. Unless otherwise specified, the hot-rolled steel test panels shall conform to ASTM A 572 (see Appendix A). Panel size shall be 100 x 150 x 6 millimeters (4 x 6 x 1/4 inches). 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. When measured in accordance with ASTM D 4417 or other specified method, the blast profile shall be 44 to 57 micrometers (1.75 to 2.25 mils).

5.2 APPLICATION: The coating shall be applied by spray in accordance with manufacturer's instructions. The coating shall exhibit no streaking, running, sagging, or other defects during application or while drying.

5.3 DRY FILM THICKNESS (DFT): The DFT of the direct-to-metal coating on the test panels shall meet the manufacturer's written recommended range (see Note 11.1). The DFT shall be measured in accordance with SSPC-PA 2, Appendix 5.

5.4 CURE: The coating shall be dried and cured in accordance with manufacturer's written recommendations unless otherwise specified (for example, for preparing panels for testing according to AASHTO R-31)⁵. After application of the coating in accordance with product data sheets, the coating shall be aged for a minimum of 14 days in an environment with a minimum relative humidity of 50% and a temperature of 23 ± 2 degrees C (73 ± 4 degrees F) as described in paragraph 5.1 of ASTM D 1640.

5.5 SCRIBING: Two vertical parallel lines shall be scribed on the face of the coated panels so as to expose the underlying metal before testing. The lines shall be a minimum of 2.5 cm (1 inch) from the edge, the top, and the bottom of each panel and at least 5 cm (2 inches) from each other. The scribes shall run parallel to the long axis of the panel so that they are positioned vertically when subjected to the specified exposure. Each scribe shall be 6 cm (2.4 inches) long. Scribes shall be made using a straight-shank tungsten carbide tip lathe cutting tool (ANSI B94.50, Style E) following the procedure in Section 4.1 of ASTM D 1654.

5.6 BACKS AND EDGES: The edges and the back of each panel shall be coated or sealed with a non-sacrificial coating or other sealant that will provide the necessary protection to these surfaces.

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

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

⁵ AASHTO Reference Standard R-31, "Evaluation of Protective Coatings for Structural Steel," is available from <<http://global.inss.com/>> as a downloadable pdf.