Standard Practice for

Evaluation of Protective Coating Systems for Structural Steel

AASHTO Designation: R 31-09 (2019)

Technical Subcommittee: 4c, Markings and Coatings

Release: Group 2 (June)

AASHTO

American Association of State Highway and Transportation Officials
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1. SCOPE

1.1. This standard practice covers testing criteria for evaluation of protective coating systems for use on iron and steel surfaces. It is not recommended for the evaluation of hot-dip galvanizing or metalizing.

1.2. The protective coating systems are intended for use on bridges, similar structural steel, and other ferrous metal surfaces, both new and existing, prepared by abrasive blast cleaning, which are subject to corrosive atmospheric environments, such as marine, industrial, deicing chemicals, and high humidity.

1.3. The values stated in SI units are to be regarded as the standard.

1.4. *This standard practice may involve hazardous materials, operations, and equipment. It does not purport to address all safety problems associated with its use. It is the responsibility of the user of this standard practice to establish the appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

Note 1—The testing format for this standard practice has been developed around a three-coat system consisting of a zinc primer, epoxy or urethane intermediate, and an aliphatic urethane finish coat.

2. REFERENCED DOCUMENTS

2.1. Reference to standard specifications, testing procedures, and other standard procedures contained in this document shall be the latest edition of the published document at the date of this specification.

2.1.1. *AASHTO Standards*:

- T 337, Non-Instrumental Determination of Metallic Zinc in Zinc-Rich Primers
- T 338, Analysis of Structural Steel Coatings for Hindered Amine Light Stabilizer (HALS)
- T 339, Analysis of Structural Steel Coatings for Isocyanate Content
- *Standard Specifications for Highway Bridges*

2.1.2. *ASTM Standards*:

- A36/A36M, Standard Specification for Carbon Structural Steel
- A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength

- A490, Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength (withdrawn 2016)
- A572/A572M, Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
- B117, Standard Practice for Operating Salt Spray (Fog) Apparatus
- D476, Standard Classification for Dry Pigmentary Titanium Dioxide Products
- D512, Standard Test Methods for Chloride Ion in Water
- D520, Standard Specification for Zinc Dust Pigment
- D521, Standard Test Methods for Chemical Analysis of Zinc Dust (Metallic Zinc Powder)
- D523, Standard Test Method for Specular Gloss
- D562, Standard Test Method for Consistency of Paints Measuring Krebs Unit (KU) Viscosity Using a Stormer-Type Viscometer
- D610, Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces
- D714, Standard Test Method for Evaluating Degree of Blistering of Paints
- D1475, Standard Test Method For Density of Liquid Coatings, Inks, and Related Products
- D1640/D1640M, Standard Test Methods for Drying, Curing, or Film Formation of Organic Coatings
- D1652, Standard Test Method for Epoxy Content of Epoxy Resins
- D1654, Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- D2073, Standard Test Methods for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines, Amidoamines, and Diamines by Referee Potentiometric Method (withdrawn 2007)
- D2196, Standard Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational Viscometer
- D2240, Standard Test Method for Rubber Property—Durometer Hardness
- D2244, Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates
- D2369, Standard Test Method for Volatile Content of Coatings
- D2371, Standard Test Method for Pigment Content of Solvent-Reducible Paints
- D2697, Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings
- D3335, Standard Test Method for Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
- D3718, Standard Test Method for Low Concentrations of Chromium in Paint by Atomic Absorption Spectroscopy
- D3723, Standard Test Method for Pigment Content of Water-Emulsion Paints by Low-Temperature Ashing
- D3960, Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
- D4017, Standard Test Method for Water in Paints and Paint Materials by Karl Fischer Method
- D4060, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
- D4400, Standard Test Method for Sag Resistance of Paints Using a Multinotch Applicator
- D4417, Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
- D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers