

SSPC: The Society for Protective Coatings

PAINT SPECIFICATION NO. 29

Zinc Dust Sacrificial Primer, Performance-Based

1. Scope

1.1 This specification covers highly pigmented primers that contain zinc dust as the major pigment component (minimum 65% by weight in the dry film) and are defined by their ability to protect ferrous substrates.

1.2 The vehicle type may be inorganic (Type I) or organic (Type II).

1.3 Each primer type (I and II) is classified according to the level of exterior performance at a severe marine site. Laboratory performance criteria are also included.

1.4 This specification does not cover weldable preconstruction primers such as SSPC-Paint 30.

1.5 Zinc-rich coatings, both topcoated and untopcoated, have been used successfully in a wide variety of environmental zones. For a detailed breakdown of applicability of various types of zinc-rich coatings in different environmental zones, refer to SSPC-PS Guide 12.00. Consult the coating manufacturer for specific exposure recommendations (see Note 13.1).

1.6 This coating is intended for application by spray for use by itself or as a primer in a multi-coat system.

2. Description

2.1 USE OF SPECIFICATION

2.1.1 Primers meeting this specification are categorized according to vehicle type and performance level.

2.1.2 If no vehicle type is specified, either Type I, inorganic, or Type II, organic, is acceptable (see Section 2.3).

2.1.3 If no performance level is specified, Level 1 is assumed (see Section 2.5).

2.2 COMPOSITION: The coating described in this specification consists of zinc dust, functional additives, and an organic or inorganic binder with appropriate solvents (see Note 13.2).

2.3 VEHICLE TYPES

2.3.1 Type I-A, inorganic post-curing vehicles—water soluble, include materials such as alkali metal silicates, phosphates, and modifications thereof which must be subsequently cured by application of heat or a solution of a curing compound (or curing solution).

2.3.2 Type I-B, inorganic self-curing vehicles—water-reducible, include water soluble alkali metal silicates, quaternary ammonium silicates, phosphates, and modifications thereof. These coatings cure by a reaction among the zinc, silicate, steel substrate, and naturally occurring carbon dioxide during and after evaporation of water from the coating.

2.3.3 Type I-C, inorganic self-curing vehicles—solvent reducible, include titanates, organic silicates, and polymeric modifications of these silicates. These systems are dependent upon moisture from the atmosphere to complete hydrolysis, forming the titanate- or polysilicate-zinc reaction product.

2.3.4 Type II, organic vehicles covered by this specification, may be chemically cured or may dry by solvent evaporation (see Note 13.3). Under certain conditions, heat may be used to facilitate or accelerate drying and curing.

2.4 COMPONENTS: These zinc dust primers may consist of one, two, or three components.

2.5 EXTERIOR PERFORMANCE: The primer shall be classified as follows according to the minimum number of months of successful performance at a severe marine site (see Section 9.3):

- Level 1: 12 months
- Level 2: 30 months

The performance requirements of the coated test panels are summarized in Table 1.

3. Referenced Standards

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

TABLE 1
PERFORMANCE REQUIREMENTS

Test	No. of Specimens	Exposure Time	Rust Rating, SSPC-VIS 2/ ASTM D610	Blister Rating, ASTM D 714	Scribe Undercutting, ASTM 1654
Salt Fog Resistance					
Type I (IOZ) primer	3	3000 hours	All 10	All 10	Slight rust in scribe, no undercutting
Type II (OZ) primer	3	1000 hours	All 10	All 10	Slight rust in scribe, no undercutting
Exterior Exposure					
Type I (IOZ)					
Level 1	3	12 months	10, 10, 9*	All 10	0.8 mm (1/32 inch) max.
Level 2	3	30 months	9 min.	All 10	1.6 mm (1/16 inch) max.
Type II (OZ)					
Level 1	3	12 months	10, 10, 9 ¹	All 10	0.8 mm (1/32 inch) max.
Level 2	3	30 months	9 min.	All 10	3.2 mm (1/8 inch max.)
Adhesion (ASTM D3359) Types I and 2					
Unaged Primer	3	---	Minimum rating of 4B	---	---
Salt Fog Aged Primer	3	---	Minimum rating of 3B	---	---

¹ Two of three panels must have 10 ratings, third panel can be a 9.

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 referenced documents 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 Material in Computerized Product Databases
PA 2	Measurement of Dry Coating Thickness with Magnetic Gages
Paint 9	White (or Colored) Vinyl Paint

*Paint 20	Zinc-Rich Coating—Type I (Inorganic) and Type II—(Organic)
Paint 30	Weld-Through Inorganic Zinc Primer
PS Guide 12.00	Guide to Zinc-Rich Coating Systems
*PS 12.01	One-Coat Zinc-Rich Painting System
SP 1	Solvent Cleaning
SP 5/NACE No. 1	White Metal Blast Cleaning
VIS 2	Guide and Visual Reference Photographs for Evaluating Degree of Rusting on Painted Steel Surfaces

3.4 ASTM INTERNATIONAL STANDARDS:¹

A 572	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
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- B 117** Practice for Operating Salt Spray (Fog) Apparatus
- D 185** Test Methods for Coarse Particles in Pigments, Pastes, and Paints
- D 520** Specification for Zinc Dust Pigment
- * **D 562** Test Method for Consistency Measuring Krebs Unit (KU) Viscosity of Paints Using a Stormer-type Viscometer
- D 714** Test Method for Evaluating Degree of Blistering of Paints
- * **D 1141** Standard Practices for Substitute Ocean Water
- * **D 1296** Test Method for Odor of Volatile Solvents and Diluents
- * **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 1654** Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments
- * **D 2369** Test Method for Volatile Content of Coatings
- * **D 2371** Test Method for Pigment Content of Solvent-Reducible Paints
- * **D 2621** Test Method for Infrared Identification of Vehicle Solids from Solvent-Reducible Paints
- D 3278** Test Methods for Flash Point of Liquids by Small-Scale Closed-Cup Apparatus
- D 3359** Test Methods for Measuring Adhesion by Tape Test
- D 3925** Practice for Sampling Liquid Paints and Related Pigmented Coatings
- D 4417** Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
- * **D 5894** Practice for Cyclic Salt Fog/UV Exposure of Painted Metal, (Alternating Exposures in a Fog/Dry Cabinet and a UV/Condensation Cabinet)
- G 92** Practice for Characterization of Atmospheric Test Site
- * **G 154** Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
- * **G 155** Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials

3.5 FEDERAL SPECIFICATIONS AND STANDARDS:²

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

- * **Method 3011** Condition in Container
- Method 4331** Spraying Properties
- Method 4541** (Canceled) Working Properties and Appearance of Dried Film

3.6 AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) STANDARD:³

- * **M300** Inorganic Zinc Rich Primer

3.7 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARD:⁴

Z129.1 Hazardous Industrial Chemicals—
Precautionary Labeling

4. Composition Requirements

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

4.2 PIGMENTATION

4.2.1 The major pigment component in these coatings is zinc dust of the type described in ASTM D 520 (see Note 13.4). The paint shall contain a minimum of 65% zinc dust pigment by weight in the dry film.

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

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 x 3.2 mm (4 x 6 x 1/8 inches) or greater. 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 and have a blast profile of 44 to 57 micrometers (1.75 to 2.25 mils). Measure the blast profile in accordance with ASTM D 4417, Method C.

5.2 APPLICATION: The coating shall be spray-applied as a single coat in accordance with the manufacturer's written recommendations.

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

² FED STD 141 Available from USA Information Systems, Inc. 1092 Laskin Road, Suite 208, Virginia Beach, Va. 23451. This standard is available on-line from www.usainfo.com.

³ American Association of State Highway & Transportation Officials, 444 North Capitol Street N.W., Suite 249, Washington DC 20001.

⁴ American National Standards Institute, 1819 L Street, NW, Suite 600, Washington, DC 20036. Standards downloadable from www.anisi.org