

SSPC: The Society for Protective Coatings

PAINTING SYSTEM GUIDE NO. 20.00

Guide for Selecting Painting Systems for Boottoppings¹

1. Scope

1.1 This guide covers painting systems for the protection of the exterior boottop areas (the area from the light load line to the deep load line) of steel ships. It should be noted that boottops are rarely used with today's commercial ships and bottom systems may extend up to the deep load line. In general, the anti-corrosive and antifouling paints covered in SSPC-PS Guide 19.00 are applicable to boottop areas.

2. Description

2.1 This guide outlines the components of a complete painting system for the protection of the exterior boottop areas of steel ships operating primarily in salt or brackish waters. It consists of surface preparation for both new construction and for maintenance and repair of existing ships, prime coats, build or intermediate anti-corrosive coats and finishes.

3. Referenced Standards

3.1 The latest issue, revision, or amendment of the referenced standards in effect on the date of invitation to bid shall govern, unless otherwise specified. Standards marked with an asterisk (*) are referenced only in the Notes, which are not requirements of this specification.

3.2 If there is a conflict between the requirements of any of the cited referenced standards and this specification, the requirements of this specification shall prevail.

3.3 SSPC STANDARDS AND JOINT STANDARDS:

PA 1	Shop, Field, and Maintenance Painting of Steel
PA 2	Measurement of Dry Coating Thickness With Magnetic Gages
Paint 17	Chlorinated Rubber Primer
Paint 18	Chlorinated Rubber Intermediate Coat Paint
Paint 19	Chlorinated Rubber Topcoat Paint
Paint 20	Zinc-Rich Primers (Type I - Inorganic and Type II - Organic)
Paint 27¹	Basic Zinc Chromate - Vinyl

*Paint 29

PS Guide 19.00

PS Guide 22.00

SP 5/NACE No. 1

SP 7/NACE No. 4

SP 10/NACE No. 2

Butyral Wash Primer

Zinc Dust Sacrificial Primer, Performance-Based

Guide for Selecting Painting Systems for Ship Bottoms

Guide for Selecting One-Coat Preconstruction or Prefabrication Painting Systems

White Metal Blast Cleaning

Brush-Off Blast Cleaning

Near-White Blast Cleaning

3.4 AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARD:

D 3925

Standard Practice for Sampling Liquid Paints and Related Pigmented Coatings

3.5 FEDERAL SPECIFICATIONS AND STANDARDS:

MIL-PRF-23236C

Coating Systems for Ship Structures (Formerly MIL-P-23236 or DoD-P23236)

MIL-DTL-24441

Paint, Epoxy Polyamide, General Specification (Formerly MIL-P-24441)

4. Surface Preparation

4.1 NEW CONSTRUCTION: The surface should be abrasive blast cleaned as specified in SSPC-SP 10, "Near-White Blast Cleaning." If specified in the procurement documents, a better degree of blast cleaning shall be substituted (SSPC-SP 5). If preconstruction primers are to be used, refer to SSPC-Guide 22.00, "Guide for Selecting One-Coat Preconstruction or Pre-Fabrication Painting Systems."

4.2 MAINTENANCE AND REPAIR OF EXISTING SHIPS: Immediately upon docking, the entire boottop area should be washed with fresh water at high pressure to remove marine fouling, loosely adhering paint, salt deposits, and calcareous deposits from cathodic protection. High pressure water cleaning equipment should operate at approximately 14 to 21 Mpa (2,000 to 3,000 psi) for proper removal.

¹ This paint contains chromate pigments. Users are urged to follow all health, safety, and environmental requirements in applying, handling or disposing of these materials.

COMMENT: Once the hull has been cleaned and has dried, the entire boottop area should be carefully inspected for coating system breakdown. For large areas of breakdown, abrasive blasting to the degree required by the coating system is recommended. For tenaciously adhering fouling, SSPC-SP 7, "Brush-Off Blast Cleaning," may be required. SSPC-SP 7 may also be required for proper adhesion of the new coating to certain aged coatings, e.g., epoxy, etc.

5. Paints

A boottop coating system consists of anti-corrosive and/or barrier coatings overcoated with appropriate finish coats. The following outlines accepted coating systems, recommended number of coats, appropriate antifouling paint, and maintenance and repair procedures. Special notations and comments follow for each boottop coating system. Table 1 summarizes these recommendations.

COMMENT: For boottop areas which see only partial immersion or no immersion service, the following systems are appropriate. Finishing can be done with either an appropriate antifouling paint or other finish, depending on service. Special consideration should be given to the use of organo-tin antifouling coatings, as they offer the greatest potential to eliminate weed growth. For boottop coatings that are in continuous immersion service, use the coating systems recommended in SSPC-PS Guide 19.00, "Guide for Selecting Painting Systems for Ship Bottoms."

An inorganic zinc silicate coating described in Section 5.1 is the preferred primer coat for boottop coating systems described in Sections 5.2 through 5.7. If an inorganic zinc silicate primer is not used, an additional coat should be added to the systems as the first coat. The coating should be an acceptable anti-corrosive primer, preferably of the same generic class as the intermediate or build coats.

5.1 SSPC-PAINT 20, "Zinc-Rich Primers (Type I, Inorganic and Type II, Organic)," and MIL-PRF-23236, "Paint Coating System, Steel Ship Tank, Fuel and Salt Water Ballast," Type I, "General Use," Class 3, "Silicate, Phosphate, or Silicone Zinc" (See Note 9.2):

COMMENT: Of all anti-corrosive coatings, inorganic zinc silicates alone provide cathodic protection. Inorganic silicate vehicles may contain some organic modifications, but these modifications should not exceed 30 percent of the total binder composition. The cured binder should contain at least 70 percent silicate, calculated as silicone dioxide. As there are many levels and types of pigmentation, including zinc metal and extenders, the coatings supplier should supply specific performance data.

For partially immersed or non-immersed areas, the preferred base coat is a single coat of an inorganic zinc silicate applied at a dry film thickness of 63 to 88 micrometers (2.5 to 3.5 mils).

Inorganic zinc silicates should not be used below the flake-glass epoxy or polyester coating system described in Section

5.3 as the silicate coating may interfere with the effectiveness of these highly abrasion resistant coatings.

For the application of a complete new coating of inorganic zinc during the maintenance and repair of existing ships, the surface should be abrasive blast cleaned as specified in SSPC-SP 10, "Near-White Blast Cleaning."

5.2 CATALYZED EPOXY: MIL-DTL-24441, "Paint, Epoxy Polyamide, General Specification for,":

COMMENT: These are polyamide epoxies unmodified with hydrocarbon resins, tars, or other vehicle extenders. They can be chemically cured with amine or polyamide resins. (MIL-DTL-24441 has replaced MIL-P-24441.)

For maximum performance on fast ships that are expected to see long service, unmodified epoxy will also offer excellent abrasion resistance. Generally, these are high-build products which minimize the number of coats necessary to meet thickness requirements.

Generally, epoxy systems have poor curing characteristics at temperatures below 10°C (50°F). Below this temperature, intercoat adhesion is only poor to fair with most epoxy coatings; after long-term exposure, surface preparation in the maintenance and repair of these systems must be handled under close supervision.

5.3 FLAKE GLASS EPOXY OR POLYESTER:

COMMENT: These pure or hydrocarbon modified epoxy or polyester resins are filled with hammer milled fiberglass flakes. Polyesters may contain a large percentage of styrene monomer and are cured with cobalt and peroxides. Epoxies are cured with polyamine or polyamide resins.

This system is designed for very specialized applications where the maximum abrasion resistance is required. It is generally used on keel plates, rudders, skegs, and areas of high abrasion and turbulence.

Generally, flake glass epoxy or polyester systems have poor curing characteristics at temperatures below 10°C (50°F). Because intercoat adhesion is only poor to fair with most flake glass epoxy or polyester anti-corrosives after long-term exposures, surface preparation in the maintenance and repair of these systems must be handled under close supervision.

5.4 VINYL SYSTEM: After cleaning, the steel shall be pretreated with a wash primer to improve adhesion. Apply the first coat of vinyl primer as soon as practical and preferably within 24 hours after the application of the wash primer.

COMMENT: The greatest attribute of a vinyl anti-corrosive system is the rate of cure achieved at low temperatures. They are also single-package for ease of application. As these are thermoplastic in nature, intercoat adhesion after long service times is excellent when overcoating clean, dry, aged vinyls with new vinyl systems. This property makes these systems very good for maintenance and repair.

These systems have low volume solids and require multiple coats to achieve the proper dry film thicknesses. High-build produces are possible, but care must be taken to ensure that