

SSPC: The Society for Protective Coatings

PAINTING SYSTEM GUIDE 22.00

Guide for Selecting One-Coat Preconstruction or Prefabrication Painting Systems

1. Scope

1.1 This guide covers those shop primers used in today's modern commercial shipyards for preconstruction and pre-fabrication priming of abrasive blast cleaned structural steel and steel plates. To maximize efficiency in new construction, all ships' steel plates, shapes, and angles are abrasive blast cleaned, shop primed, and stored for future use in preparation of sections of ships, called modules or units. Shop primers are covered by generic classification.

COMMENT: Automatic abrasive blast cleaning and coating with preconstruction primer is common practice in ship-building today. The reason for the popularity of this practice is the reduction of costly hand abrasive blasting after unit or module construction. Some of the attributes of good preconstruction primers include:

- Weldability with minimal effect on weld integrity;
- Adequate corrosion protection for the steel prior to overcoating;
- Compatibility with topcoats to be used;
- Ability to be applied in thin films using automatic spray equipment;
- Minimum health hazard when burning, cutting, and welding through the primer;
- Drying to handle in 4 to 7 minutes to minimize damage from rollers and cranes.

2. Description

2.1 Generally, there are two classifications of preconstruction primers, organic resin based primers and inorganic silicate based primers. Within these two classes many variations and modifications exist. Primers for use in the shipyard must be very carefully evaluated and close consideration given to the characteristics of the products which are important to the individual shipyard's production procedures.

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.

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
SP 10/NACE No. 2	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
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4. Surface Preparation

4.1 The surface should be abrasive blast cleaned as specified in SSPC-SP 10, "Near-White Blast Cleaning."

COMMENT: It should be noted that the surface profile of the steel after cleaning is extremely important in preconstruction priming. As the thickness of these products is quite low in comparison to the thickness of the final coating system, the surface profile must be carefully controlled. In general, a profile of 1.0 to 1.5 mils (25 to 38 micrometers) is appropriate for most applications.

5. Paints

The following outlines acceptable preconstruction primers. Special notations and comments follow each type of primer. Table 1 summarizes these recommendations.

COMMENT: Before a preconstruction primer can be chosen for any facility, several aspects of the shipyard's requirements and production procedures must be taken into consideration. The prime objective in using a preconstruction primer is to afford steel corrosion protection of plates and shapes during fabrication and unit storage prior to overcoating. This storage period ranges from three months to several years.

Consideration of which preconstruction primer is best suited should be a result of extensive testing at the individual shipyard as well as discussions with coatings suppliers. The extensive testing performed should include corrosion resistance, topcoat compatibility, applicability at required thickness, welding and burning characteristics, toxicity and safety characteristics, and drying characteristics. Other properties which should be investigated before final selection is made include cost per

gallon (including any thinning requirements), volume solids content, and whether the material is a single- or two-package product.

In determining the cost per gallon of these types of products, care should be exercised that the calculation is based on the film thickness required at the length of corrosion protection afforded (including thinning requirements), so that true cost comparisons can be made.

5.1 INORGANIC ZINC SILICATES:

COMMENT: Generally, inorganic zinc silicate coatings offer the maximum corrosion protection at the lowest film thickness because of the sacrificial characteristics of the metallic zinc. Because they are inorganic, they usually do not adversely affect welding and burning as greatly as the organic primers do. This is partly due to the higher film thickness required for equivalent corrosion protection for organic primers and partly due to the high vaporization temperature of the inorganic primers. The single-package products offer ease of application, reduced mixing time, increased pot life, and reduced storage space. These products also have good abrasion resistance and are compatible with all topcoats with the proper surface preparation and/or with the use of a suitable tiecoat.

Because of the metallic zinc particles present in films of these coatings, porosity exists in dried films which upon exposure become filled with zinc corrosion products, grease, oil, and other foreign contaminants. An abrasive brush-off blast is usually the most effective method for removing dirt and zinc corrosion products. Heavy deposits of oil or grease can be removed with degreasing solvents. Since inorganic zinc silicate primers require moisture to further cure (hydrolysis) the silicate polymers, drying oven temperatures should not exceed 71° to 82°C (160° to 180°F).

5.2 MODIFIED WASH PRIMERS:

COMMENT: These are vinyl butyral phosphoric acid wash primers generally modified with phenolic resins.

These coatings have good corrosion protection combined with fast dry. They are compatible with most generic topcoats. However, whenever inorganic zinc is to be used, they must be removed by abrasive blast cleaning.

Generally these are two-package products with a limited pot life. To facilitate fast dry, most have rather low flash points. Low volume solids require maximum ventilation. Check the decomposition products of these coatings before welding, burning, or cutting.

5.3 CATALYZED EPOXY:

COMMENT: May be amine or polyamide cured. May be modified with other resins. May contain zinc metal. Has good corrosion resistance. Can be formulated for fast dry, but ovens will be needed for thorough cure.

These coatings are two package and have a limited pot life. They are not generally used in automatic application equipment due to their slow cure characteristics. Low flash solvents are required for fast drying. If zinc metal is used, the

zinc corrosion products should be removed prior to topcoating. Topcoat compatibility and decomposition products should be evaluated.

5.4 HIGH MOLECULAR WEIGHT EPOXY:

COMMENT: These paints generally are based on either singular epoxy resins or modified with other phenolic or hydrocarbon resins.

These are single package, generally easily applied, fast drying coatings with good corrosion resistance. These coatings are compatible with most generic topcoats; however, wherever inorganic zinc is to be used, they must be removed by abrasive blast cleaning.

To facilitate fast drying, these coatings have low flash solvents. Overcoatability should be checked with the coating supplier. Check decomposition products before welding, burning, or cutting. Solvent sensitivity may limit topcoat selection.

5.5 ALKYD:

COMMENT: This coating may be modified to facilitate harder films and faster dry. It is single package and easy to apply. Heat is usually required even with the quick drying types.

These materials are solvent sensitive and are not compatible with most high performance marine coatings. They must be removed by abrasive blast cleaning before subsequent coatings are applied.

5.6 PROPRIETARY COATING SYSTEMS:

COMMENT: A proprietary coating system of the above generic types with proven performance capability may be used if desired by the specifier. Specify the manufacturer, trade name, and product number of the desired proprietary paints. The paint manufacturer should furnish a typical label analysis.

6. Paint Application

6.1 PAINT APPLICATION: Follow requirements SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel."

6.2 NUMBER OF COATS: One.

6.3 DRY FILM THICKNESS: Measure in accordance with SSPC-PA 2, "Measurement of Dry Coating Thickness with Magnetic Gages." The dry film thickness should be as follows for each coating type discussed in Section 5:

Primer	mils	micrometers
Inorganic Zinc Silicate	0.6 to 1.0	15 to 25
Modified Wash Primers	1.0 to 1.5	25 to 38
Catalyzed Epoxies	1.0 to 1.5	25 to 38
High Molecular Weight Epoxies	1.0 to 1.5	25 to 38
Alkyds	1.5 to 2.0	38 to 50

7. Inspection



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