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Paint and Protective Coatings

GP 19-01-01

Scope

- 1) [I] This Global Practice (GP) covers the selection and application of exterior paint and Protective Coating Systems for structures and equipment. Requirements for protective wrapping systems and galvanizing of structures are also covered.
 - 2) * [I] An asterisk (*) indicates that a decision by the Purchaser is required, or that additional information is furnished by the Purchaser.
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1. Required References

- 1) [I] This Section lists Practices and Standards that are generically referenced and assumed to be a part of this document. Unless otherwise specified herein, use the latest edition.
- 2) * [I] Other National Standards or Codes may be substituted for those listed as directed by the Purchaser.

1.1. Global Practices–ExxonMobil Engineering Practices

GP 14-01-01	External Insulation
GP 04-07-01	Piles and Sheet Piling

1.2. AWS–American Welding Society

AWS C2.18	Guide for the Protection of Steel with Thermal Sprayed Coatings of Aluminum and Zinc and Their Alloys and Composites
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1.3. AWWA–American Water Works Association

AWWA C203	Coal-Tar Protective Coatings and Linings for Steel Water Pipelines - Enamel and Tape - Hot Applied
AWWA C215	Extruded Polyolefin Coatings for the Exterior of Steel Water Pipelines

1.4. ASTM–American Society for Testing and Materials

ASTM A 123/A 123M	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM D 2240	Standard Test Method for Rubber Property - Durometer Hardness
ASTM D 2583	Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
ASTM D 3363	Standard Test Method for Film Hardness by Pencil Test
ASTM D 4263	Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method
ASTM D 4417	Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
ASTM D 4752	Standard Test Method for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub
ASTM D 5402	Standard Practice for Assessing the Solvent Resistance of Organic

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	Coatings Using Solvent Rubs
ASTM F 1869	Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

1.5. NACE–National Association of Corrosion Engineers

NACE RP0274	High-Voltage Electrical Inspection of Pipeline Coatings
NACE RP0287	Field Measurement of Surface Profile of Abrasive Blast Cleaned Steel Surfaces Using a Replica Tape
NACE RP0188	Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
NACE RP0198	Control of Corrosion Under Thermal Insulation and Fireproofing Materials - A Systems Approach
NACE RP0394	Application, Performance, and Quality Control of Plant-Applied, Fusion-Bonded Epoxy External Pipe Coating; Errata

1.6. SSPC–The Society for Protective Coatings

SSPC PA 1	Shop, Field, and Maintenance Painting (Steel Structures Painting Manual, Ch 5 - Paint Application Specs.)
SSPC PA 2	Measurement of Dry Coating Thickness with Magnetic Gages (Steel Structures Painting Manual, Ch 5 - Paint Application Specs.)
SSPC PA GUIDE 3	Guide to Safety in Paint Application (Steel Structures Painting Manual, Ch 5 - Paint Application Specs.)
SSPC PS GUIDE 8.00	Guide to Topcoating Zinc-Rich Primers
SSPC AB 1	Mineral and Slag Abrasives
SSPC AB 2	Cleanliness of Recycled Ferrous Metallic Abrasives
SSPC AB 3	Newly Manufactured or Re-Manufactured Steel Abrasives
SSPC SP 1	Solvent Cleaning (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)
SSPC SP 3	Power Tool Cleaning (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)
SSPC SP 5	White Metal Blast Cleaning NACE No. 1-2000 (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)
SSPC SP 6	Commercial Blast Cleaning NACE No. 3-2000 (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)
SSPC SP 8	Pickling (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)

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SSPC SP 10	Near-White Metal Blast Cleaning NACE No.2-2000 (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)
SSPC SP 11	Power Tool Cleaning to Bare Metal
SSPC SP 13	Surface Preparation of Concrete
SSPC VIS 1	Visual Standard for Abrasive Blast Cleaned Steel (Standard Reference Photographs) Editorial Changes September 1,2000 (Steel Structures Painting Manual, Ch 2 - Surface Preparation Specs.)
SSPC VIS 3	Visual Standard for Power- and Hand-Tool Cleaned Steel (Standard Reference Photographs)

- 3) * [R] Vendor shall prepare a detailed Painting Schedule including (but not limited to) the information listed below, for approval by the Owner's Engineer.
- Detailed scope
 - Surface preparation
 - Materials
 - Application
 - Inspection procedures and documentation
 - Provisions for handling and storage of paints and coatings at the site
 - Plans for conformance to national, state, and local environmental law

2. Definitions

- [I] Bare surfaces as referred to in this GP shall be defined as surfaces, equipment, or structures that are not insulated or fireproofed.
- [I] Marine atmosphere as referred to in this GP shall be defined as containing a high concentration of chlorides and water in the air.
- [I] Intermittent service (see Table 7) is one in which the process temperature cycles on a recurrent basis, into and out of the 25°F to 300°F (−4°C to 150°C) range.

3. Documentation

- [R] Coatings application contractor shall submit proof of certification by the Society for Protective Coatings (SSPC) to SSPC QP1 or QP3 as applicable, or equivalent.
- [R] Coatings application contractor shall submit a list of its most recent industrial experience plus names and telephone numbers of people who can verify this experience.
- [R] Coatings application contractor shall submit plans for Quality Assurance and Quality Control, the names of their coating inspectors and the degree of their training.

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4. Selection of Paint and Coating Systems

4.1. Painting Service Category

- 1) * [O] The paint system to be used for external surface protection of individually purchased equipment items, shop assembled sections (modular or package units furnished as subassemblies or complete), and other field erected facilities as shown in Table 4 of this GP shall be based on the type of atmospheric exposure. Category designation shall be according to Table 5.
- 2) [I] Selection requirements for other painting and coating systems shall be according to the following Tables and other requirements of this Practice.
 - a) Table 8: Special Service Paint and Coating Systems Carbon Steel Construction
 - b) Table 9: External Coating and Wrapping Systems for Underground and Underwater Piping (to 120°F) - Metallic and Nonmetallic Construction
 - c) Table 10: Coating Systems for Concrete
 - d) Table 11: Coating Systems for Steel Piles and Sheet Piling
 - e) Table 12: Paint and Coating System for Mooring Buoys and Other Floating Structures
 - f) Table 13: Use of Thermal Spray Aluminum

4.2. Use of Galvanizing

[I] Hot-dip galvanizing may be substituted for Category I and II painting systems when the evaluated cost is equivalent. Galvanizing on steel products, including fasteners, shall be according to ASTM A 123/A 123M. High strength bolting (>150,000 psi [1100 MPa] ultimate tensile strength) shall not be hot-dip galvanized, but shall be coated by mechanical galvanizing or with an inorganic zinc rich primer.

4.3. Types and Brands of Paints and Coatings

- 1) * [R] A listing of acceptable brands of paints and protective coatings, conforming to the generic descriptions according to Table 3 and Table 4, shall be developed by Contractor and approved by Owner's Engineer. The selection shall take into account the following:
 - a) Paint and protective coating brands selected on the basis of availability and cost per mil per ft² per year of life.
 - b) Primers, finish and topcoats for any particular system from the same manufacturer to assure compatibility and to minimize potential liability issues.
 - c) Local or federal legislation concerning pigments, volatile organic content (VOC), or other materials restrictions.
- 2) * [I] Except where manufacturer standard is permitted, Vendor proposal to use paints and coatings alternative to those specified shall be submitted to Purchaser for approval.

5. Surface Preparation

- 1) [I] Surface preparation methods and materials for carbon steel shall take into account the following:

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- a) Surface preparation, either in the shop or field, may be employed based upon an economic evaluation including local, state, or federal legislation concerning blast cleaning abrasives.
 - b) Equipment and structures to be painted in the field: Where surface preparation alternatives are permitted, Purchaser shall make a surface preparation cost study and specify the optimum method to be used, taking into account:
 - i) Local rules or regulations governing hygiene, environment and safety.
 - ii) Proximity of adjacent structures and equipment liable to damage from abrasives.
 - iii) Proximity of designated operating areas where personnel may be present.
 - iv) Any effect on coating performance.
 - c) Purchaser shall submit the results of evaluations according to Items 1a) or 1b) of this Section to the Owner's Engineer.
 - d) Surfaces contaminated by oil and grease shall be solvent cleaned according to SSPC SP 1 prior to any blast cleaning.
 - e) Blasting abrasive quality shall be according to SSPC AB 1, SSPC AB 2, or SSPC AB 3, as applicable.
 - f) Abrasive material for blast cleaning, consisting solely of steel shot shall not be used for surfaces to be coated with inorganic zinc-rich primers or fusion-bonded epoxy coatings. A mixture consisting of steel shot and at least 25 percent (wt) steel grit is acceptable.
 - g) SSPC SP 11 is suitable surface preparation for small repair areas or for field welds where SSPC SP 10 or better had been originally specified and/or performed. SSPC SP 11 provides good surface cleanliness, roughly equivalent to SSPC SP 10, and it ensures a minimum surface profile of 1.0 mil.
- 2) [I] New concrete surfaces to be coated (other than concrete fireproofing) shall be prepared according to the following:
- a) Concrete shall have cured for at least 30 days. Surfaces above grade shall be tested according to ASTM D 4263 and have no moisture detected. On-grade slabs and surfaces below grade, shall be tested according to ASTM F 1869 and have a moisture vapor emission of ≤ 3 lbs (per 1000 ft² over 24 hours).
 - b) Surface preparation of concrete shall be according to SSPC SP 13.
 - c) Surface defects shall be patched with a material recommended by the coating manufacturer to provide a smooth surface suitable for the coating application.

6. Application of Paint, Coating, and Wrapping Systems

6.1. Manufacturer's Recommendations

- 1) [R] Manufacturer recommendations for the application of paints and coatings and SSPC PA 1 shall be followed unless modified by this Practice.
- 2) [R] Spray application shall be used with inorganic zinc-rich primers, with the exception of small areas for touch-up.

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