
PART 1 - GENERAL

- 1.1 Related Sections
- .1 Section 01 33 00 - Submittal Procedures.
 - .2 Section 01 74 21 - Construction/Demolition Waste Management And Disposal.
- 1.2 References
- .1 American Society for Testing and Materials International, (ASTM).
 - .1 ASTM B 117, Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - .2 ASTM D 522, Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
 - .3 ASTM D 610-01, Test Method for Evaluating Degree of Rusting on Painted Steel Surfaces.
 - .4 ASTM D 1735, Standard Practice for Testing Water Resistance of Coatings Using Water Fog Apparatus
 - .5 ASTM D 2247, Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity.
 - .6 ASTM D 2369-03, Test Method for Volatile Content of Coatings.
 - .7 ASTM D 2832-92(R1999), Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
 - .8 ASTM D 3359, Standard Test Methods for Measuring Adhesion by Tape Test.
 - .9 ASTM D 4060, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
 - .10 ASTM D 4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - .11 ASTM D 5326-94a(2002), MPI-9 Test Method for Color Development in Tinted Latex Paints.
 - .2 Master Painters' Institute (MPI), Exterior Structural Steel and Metal Fabrications, 03.
 - .1 EXT 5.1, Alkyd.
 - .2 EXT 5.1G, Zinc Rich/Aliphatic Polyurethane.
 - .3 EXT 5.4, Aluminum.
 - .4 Architectural Painting Specification Manual.
 - .5 Maintenance/Repainting Guide.
 - .3 Environmental Choice Program (ECP).
 - .1 CCD-048-95, Recycled Water-borne Surface Coatings.
 - .2 CCD-047a-98, Paints - Surface Coatings.
 - .4 Federal Standard (FS).
 - .1 FS-595B-89, Paint Colours.
 - .5 Steel Structures Painting Council (SSPC).
 - .1 SSPC-SP-1-82, Solvent Cleaning.
 - .2 SSPC-SP-2-00, Hand Tool Cleaning.
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- .3 SSPC-SP-3-00, Power Tool Cleaning.
 - .4 SSPC-SP-12/NACE No 5, Surface Preparation and Cleaning of Metals by Waterjetting Prior to Recoating.
 - .5 SSPC-PA-02, Measurement of Dry Coat Thickness with Magnetic Gauges.
 - .6 SSPC Good Painting Practices, Volume 1, 4th Edition.
- 1.3 Submittals
- .1 Product Data.
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for paint.
 - .2 Samples.
 - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
 - .3 Paints that do not appear on MPI Approved Products List must be approved by Departmental Representative before use on project. When it is proposed to use non-qualified paint, submit one 2 L sample of paint to Departmental Representative at least 2 (two) weeks prior to commencement of painting for analysis and acceptance. Mark samples with name of project, its location, paint manufacturer's name and address, name of paint, MPI standard number and manufacturers paint code number.
 - .4 Enable Departmental Representative to take two 2 L samples of each paint delivered to site, one sample from manufacturer's containers and one sample from painters' pot.
 - .5 Test Reports:
 - .1 Provide certified copies of manufacturer's quality control testing records upon request.
 - .2 Submit test reports in accordance with Section 01 73 03 – Execution Requirements.
 - .6 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- 1.4 Quality Assurance
- .1 Single Source Responsibilities: Components for each coating system shall be from a single manufacturer.
 - .2 Perform Work in accordance with the requirements of SSPC Painting Manual, Volume 1.
 - .3 Testing: Measure air temperature, relative humidity, and other work area conditions that directly affect the application
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of coatings, immediately prior to the commencement of coating applications.

.1 Metal Temperature: Measure with Thermocouple/digital thermometer.

.2 Relative Humidity: Measure with a sling psychrometer.

.3 Dew Point: Calculate by comparing relative humidity with air temperature.

.4 Wet Film Thickness: Measure with a wet film thickness gauge.

.5 Dry Film Thickness Measure, Type 2 fixed probe or Type 1 magnetic gauge or an approved alternate. Calibrate and frequently monitor instruments for accuracy. Calibrate as per SSPC-PA-2.

.4 Inspection: Specific inspections are required at each work stage. Do not proceed beyond the stage requiring inspection until the Departmental Representative has completed or has waived the required inspection. Inspections are required after:

.1 Power tooling of all corroded areas.

.2 Hand sand and abrading of all steel surface.

.3 After surface preparation, grinding and feather edge sanding of existing coating edges.

.4 Prior to priming.

.5 Prior to stripe coating.

.6 Prior to intermediate coating.

.7 Prior to each base final (satin) coating.

.8 After each final coat (gloss) coating.

.9 After deficiency repairs, as per the Departmental Representative's instructions.

.10 Replacement of defective work as directed by the Departmental Representative.

.5 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.

.6 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

.7 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section: 01 00 10 - General Instructions.

1.5 Visible Emissions

.1 Method for Assessing the Quality of Emissions, SSPC Guide 6, Method A. General surveillance, Level 2.

.2 Visible emissions are permitted at a given frequency or duration provided they do not extend beyond an established boundary line. Random emissions of accumulative duration

of not more than 5% of the work day. (e.g., 24 minutes in an eight hour work day.)

1.6 Waste Management and Disposal

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Divert unused coating materials from landfill through disposal at a special wastes depot.
- .3 Burying of rubbish and waste materials is prohibited.
- .4 Disposal of waste, volatile materials, mineral spirits, oil and paint thinner into waterways, storm, or sanitary sewers is prohibited.

PART 2 - PRODUCTS

2.1 Materials

- .1 Coating System 1 - Galvanized Metal: MPI REX 5.3:
 - .1 Primer: 2 component, anti-corrosive epoxy primer MPI 101 to REX 5.3c or REX 5.3k.
 - .2 Topcoat: High performance, 2 component aliphatic polyurethane MPI 72 to REX 5.3D 2. The color of the top coat is to be chosen by the Departmental Representative.
- .2 Coating System 2 - Pre-painted Steel: 3 coat system.
 - .1 Spot primer and penetrating sealer
 - .1 Performance Data:
 - .1 Service condition - up to 79 degrees C.
 - .2 Percent Solids 99% +/-1.
 - .3 Existing paint to achieve a 3B rating under ASTM D3359 - "X-Scribe" adhesion test.
 - .3 High performance urethane:
 - .1 Performance Data:
 - .1 Adhesion to ASTM D4541 - Excellent
 - .2 Salt Spray Resistance to ASTM B117 - Excellent
 - .3 Abrasion Resistance to ASTM D4060 - Excellent
 - .4 Humidity Resistance to ASTM D2247 - Excellent
 - .5 Exterior Exposure - Excellent
 - .6 Percent Solids by Volume 55% - 73%
 - .7 Colour - high gloss white.
- .4 Sealant: Refer to Section 07 92 10 - Joint Sealing.

PART 3 - EXECUTION

<u>3.1 Manufacturer's Instructions</u>	.1	Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.
<u>3.2 SITE EXAMINATION</u>	.1	Precaution should be taken when removing loose and rusted existing paint from metal surfaces.
	.2	If lead exists stop work and report findings to Departmental Representative.
<u>3.3 Protection</u>	.1	Contain all debris from cleaning operations. .1 Protect adjacent areas, roof drains and mechanical systems from debris and contamination. .2 Enclose area of paint application and preparation in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.
<u>3.4 Paint Preparation</u>	.1	New metal surfaces. .1 Clean surfaces of new metal to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and foreign substances in accordance with the following: .1 Solvent cleaning: SSPC-SP-1. .2 Hand tool cleaning: SSPC-SP-2. .3 Power tool cleaning: SSPC-SP-3.
	.2	Metal surfaces to be repainted. .1 Clean surfaces by removing loose, cracked, brittle or non-adherent paint, rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with following. .1 Solvent cleaning: SSPC-SP-1. .2 Hand tool cleaning: SSPC-SP-2. .3 Power tool cleaning: SSPC-SP-3. .2 Scrape edges of old paint back to sound material where remaining paint is thick and sound, feather exposed edges.
	.3	Compressed air to be free of water and oil before reaching nozzle.
	.4	Do not apply paint until prepared surfaces have been accepted by Departmental Representative.
	.5	Prior to commencing paint application the degree of cleanliness of surfaces to be in accordance with SSPC-Vis1.
	.6	Protection of surfaces.

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- .1 Protect surfaces not to be painted and if damaged, clean and restore such surfaces as directed by Departmental Representative.
 - .2 Apply primer, paint, or pretreatment after surface has been cleaned and before deterioration of surface occurs.
 - .3 Clean surfaces again if rusting occurs after completion of surface preparation.
 - .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
 - .5 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.
- .7 Mixing paint.
- .1 Do not dilute or thin paint for brush application; use as received from manufacturer.
 - .2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
 - .3 Do not mix or keep paint in suspension by means of air bubbling through paint.
 - .4 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Departmental Representative.
- .8 Number of paint coats.
- .1 New metal surfaces.
 - .1 Shop: Two primer coats to minimum dry film thickness of 35 microns per coat.
 - .2 Field: Two alkyd enamel aluminum paint coats to minimum dry film thickness of 25 microns per coat.
 - .2 Repainting existing metal surfaces.
 - .1 One primer coat to minimum dry film thickness of 35 microns to bare and commercial sand blasted areas.
 - .2 Two alkyd enamel aluminum paint coats to minimum dry film thickness of 25 microns per coat.
- 3.5 Application
- .1 Do not apply paint until prepared surfaces have been accepted by Departmental Representative.
 - .2 Prior to commencing paint application the degree of cleanliness of surfaces to be in accordance with SSPC-SP-COM.
 - .3 Protection of surfaces:
 - .1 Protect surfaces not to be painted and if damaged, clean and restore such surfaces as directed by Departmental Representative.
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- .2 Apply primer as soon as possible after surface has been cleaned and before deterioration of surface occurs.
 - .3 Clean surfaces again if rusting occurs after completion of surface preparation.
 - .4 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemical, grease, oil and between applications of remaining coats of paint. Remove contaminants from surface and apply paint immediately.
 - .5 Protect cleaned and freshly painted surfaces from dust to approval of Departmental Representative.
- .4 Mixing Paint:
- .1 Do not dilute or thin paint for brush application; use as received from manufacturer.
 - .2 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
 - .3 Do not mix or keep paint in suspension by means of air bubbling through paint.
- .5 Apply paint by roller coating method, brushing, or combination of both in successive coats to attain the required DFT for each coat. Use sheepskins or daubers only when no other method is practical in places of difficult access.
- .6 Remove runs, sags and brush marks from finished work and repaint.
- .7 Where surface to be painted, do not apply paint when:
- .1 Steel temperature is below 5C or when temperature is expected to drop to 0°C before paint has dried.
 - .2 Temperature of surface is over 50°C unless paint is specifically formulated for application at high temperatures.
 - .3 Fog or mist occur at site; it is raining or snowing; there is danger of rain or snow; relative humidity is above 85%.
 - .4 Surface to be painted is wet, damp or frosted.
 - .5 Previous coat is not dry.
 - .6 Surface is less than 3 degrees C above dew point temperature.
 - .7 Follow manufacturer's published drying schedule for steel temperatures, rather than ambient temperatures.
- .8 Provide cover when paint must be applied in damp or cold weather. Protect, shelter, or heat surface and surrounding air to comply with temperature humidity conditions specified above. Protect until paint is dry or weather conditions are suitable.
- .9 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
- .10 Apply each coat of paint as continuous film of uniform
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thickness. Repaint thin spots or bare area before next coat of paint is applied.

- .11 Coat all brackets, anchor bolts, irregular surfaces, etc., coated first and blend the surrounding regular surfaces into these areas.
- .12 Apply spot primer to exposed steel. Allow the primer to dry a minimum of 24 hours before recoating, or as specified by manufacturer. Overlap onto remaining feathered coating for distance of 75 - 150 mm.
- .13 Apply full stripe coat of intermediate epoxy coating to detailed steel edges, seams, rivets, threads and all faying surfaces. Ensure the connections have complete coating coverage.
- .14 Feather sand all layered paint edges. Ensure all layered coatings are feathered and tightly adhered for overcoating.
- .15 Fully sand intermediate and top coats between coats to ensure proper bond between coats.
- .16 Apply full intermediate coat of intermediate epoxy coating to all surfaces. Colour to be specified by the Departmental Representative. Allow intermediate coat to dry a minimum of 24 hours, or as specified by manufacturer.
- .17 Apply two (2) coats of urethane topcoat to all steel surfaces. Ensure proper hiding power is achieved on the final finish coat. Should shadowing be evident, a third coat will be required.
- .18 Apply fillet sealant bead to splice plates, brackets and connection points. Seal four (4) sides and leave a control bleed location at the bottom section of each detail. One 25 mm opening per metre.

3.6 Inspection

- .1 Inspection will be performed by the Departmental Representative, or a third party selected by Departmental Representative.
- .2 Inspection will be made of the materials being used, of the surfaces prior to performance of any work, during and after surface preparation, and during and after application of the overcoating system.

3.7 Field Quality Control

- .1 Site Tests, Inspections.
 - .1 Upon completion of the painting procedures test for dry film reading and evaluate the results as per SSPC PA 2.
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3.8 Cleaning

- .1 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.
- .2 Areas where oil, grease or smoke staining are present shall be cleaned in accordance with the requirements of Steel Structures Painting Council Surface Preparation Specification No. 1 (SSPC-SP1) Solvent Cleaning. The solvent shall be water soluble, be effective in removing the contaminants, leave the surface suitable for overcoating after a thorough rinsing with water.
- .3 All steel surfaces which may have been subjected to salt action and salt accumulation shall be pressure washed at a minimum pressure of 20 MPa prior to cleaning by other means.
- .4 Hand cleaning with wire brushes, grinders and scraping tools shall be done on surfaces as an alternative to blasting.
- .5 Compressed air, from which oil and water have been removed, shall be used to remove dust and all traces of blast products from the surfaces immediately prior to the application of each coat of paint. Where necessary, the surface shall also be wiped with a dry cloth.
- .6 Surface imperfections in the form of slivers or laminations shall be removed by grinding or another means acceptable to the Department Representative.
- .7 Cleaned surfaces shall be painted as soon as possible following completion of the cleaning operations.

END OF SECTION