COATING SYSTEMS FOR STEEL TANKS AND PIPES

1. GENERAL

1.1 Work Included

.1 Supply and installation of coatings for and steel tanks and pipes as indicated in the Contract Documents.

.2 Stainless steel tanks and piping shall not be coated.

1.2 References

.1 The following is a list of standards which may be referenced in this Section:

.1 NSF: 61, Drinking Water System Components-Health Effects.

.2 SSPC:

.1 SP 1, Solvent Cleaning.

.2 SP 2, Hand Tool Cleaning.

.3 SP 3, Power Tool Cleaning.

.4 SP 5, White Metal Blast Cleaning.

.5 SP 6, Commercial Blast Cleaning.

.6 SP 7, Brush-Off Blast Cleaning.

.7 SP 8, Pickling.

.8 SP 10, Near-White Blast Cleaning.

.9 SP 11, Power Tool Cleaning to Bare Metal.

.10 SP 12, Surface Preparation and Cleaning of Metals by Water Jetting Prior to Recoating.

.3 AWWA:

.1 C210, Liquid-Epoxy Coating Systems for the Interior and Exterior of Steel Water Pipelines.

.4 NACE:

.1 RP0188-99 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates

1.3 Definitions

.1 Terms used in this Section:

.1 Coverage: Total minimum dry film thickness in mil, or m^2/L.

.2 MDFT: Minimum Dry Film Thickness, mm.

.3 MDFTPC: Minimum Dry Film Thickness per Coat, mm.

.4 Mil: Thousandth of an inch.

.5 PSDS: Paint System Data Sheet.

.6 SP: Surface preparation.

1.4 Submittals

.1 Action Submittals:

.1 Data Sheets:

.1 For each paint system used, furnish a painting system data sheet, and paint colours available (where applicable) for each product used in the paint system, except for products applied by equipment manufacturers.

.2 Submit required information on a system-by-system basis.

.3 Provide copies of paint system submittals to coating applicator.

.4 Indiscriminate submittal of Manufacturer's literature only is not acceptable.

.2 Detailed chemical and gradation analysis for each proposed abrasive material.

.3 Samples: Proposed Abrasive Materials: 2 kg minimum Sample for each proposed.

.2 Informational Submittals:

.1 Anticipated tank coating sequence.

.2 Coating Manufacturer's letter or certificate stating that the proposed product, material, or service complies with that specified. Attach supporting reference data, affidavits, and certifications as appropriate.

.3 Copy of applicable NSF listings.

.4 Applicator's Qualification: List of references substantiating experience.

.5 Manufacturer's written instructions for applying each type of coating.

.6 Field Testing: Inspection and test reports.

.7 Certificate of Satisfactory Installation, Form 102.

1.5 Quality Assurance

.1 Applicator Qualifications: Minimum five (5) years' experience in application of specified products.

.2 Regulatory Requirements:

.1 Meet federal, provincial, and local requirements limiting the emission of volatile organic compounds.

.2 Perform surface preparation and painting in accordance with recommendations of the following:

.1 Paint Manufacturer's instructions.

.2 SSPC-PA Guide No. 3, Guide to Safety in Paint Applications.

.3 Federal, provincial, and local agencies having jurisdiction.

.3 Mockup:

.1 Before proceeding with Work under this Section, finish one complete space or item of each colour scheme required showing selected colours, finish texture, materials, quality of Work, and special details.

.2 After approval, sample spaces or items shall serve as a standard for similar work throughout the Work.

1.6 Delivery, Storage, and Handling

.1 Deliver materials to Site in unopened containers labeled with designated name, date of manufacture, colour, and Manufacturer.

.2 Store paints in a protected area that is heated or cooled as required to maintain temperatures within the range recommended by paint Manufacturer.

.3 Shipping:

.1 Protect precoated items from damage. Batten coated items to prevent abrasion.

.2 Use nonmetallic or padded slings and straps in handling.

1.7 Environmental Requirements

.1 Do not apply paint in temperatures outside of Manufacturer's recommended maximum or minimum allowable, or in dust, smoke-laden atmosphere, damp or humid weather.

.2 Do not perform abrasive blast cleaning whenever relative humidity exceeds 85%, or whenever surface temperature is less than 3°C above dewpoint of ambient air.

2. PRODUCTS

2.1 Manufacturers

.1 Ameron Protective Coatings, Brea, CA.

.2 Benjamin Moore Paints, New York, NY.

.3 Carboline Coatings Company, St. Louis, MO.

.4 ICI Devoe, Louisville, KY.

.5 DuPont Chemical Co., Wilmington, DE.

.6 Hempel/Reliance Paints, Houston, TX.

.7 Keeler and Long, Inc., Watertown, CT.

.8 Master Builders, Inc., Cleveland, OH.

.9 Plas-Chem Coatings, St. Louis, MO.

.10 International Protective Coatings, Houston, TX.

.11 Sherwin-Williams, Cleveland, OH.

.12 Tnemec Coatings, Kansas City, MO.

.13 Plasite Protective Coatings, Green Bay, WI.

.14 Cloverdale Paint, Surrey, BC.

.15 Enviroline, Pompano Beach, FL.

2.2 Materials

.1 Quality: Manufacturer's highest quality products and suitable for intended use.

.2 Abrasives: As recommended by paint Manufacturer to produce surface profile recommended for specific paint system.

.3 Materials Including Primer and Finish Coats: Produced by same paint Manufacturer.

.4 Thinners, Cleaners, Driers, and Other Additives: As recommended by paint Manufacturer of the particular coating.

.5 Polyamide Epoxy: Polyamide epoxy coatings approved for potable water contact conforming to NSF 61.

.6 Polyurethane Enamel: Two-component, aliphatic or acrylic based polyurethane; high gloss finish.

.7 Wash Primer: Vinyl butyral acid.

.8 Rust Inhibitive Primer: Single package steel primer with anticorrosive pigment loading.

.9 Alkyd Enamel: Gloss finish, medium oil length.

2.3 Colours

.1 Formulate with colorants free of lead and lead compounds.

.2 Furnish as selected by Contract Administrator.

.3 Proprietary identification of colours is for identification only; selected manufacturer may supply matches.

2.4 Mixing

.1 Multiple-Component Coatings:

.1 Prepare using all the contents of the container for each component as packaged by paint Manufacturer.

.2 No partial batches will be permitted.

.3 Do not use multiple-component coatings that have been mixed beyond their pot life.

.4 Furnish small quantity kits for touchup painting and for painting other small areas.

.5 Mix only components specified and furnished by paint Manufacturer.

.6 Do not intermix additional components for reasons of colour or otherwise, even within the same generic type of coating.

.2 Keep paint material containers sealed when not in use.

3. EXECUTION

3.1 General

.1 Coatings and linings on steel piping shall be applied in strict accordance with AWWA C210.

3.2 Preparation

.1 Notify the Contract Administrator at least seven (7) days prior to start of shop blast cleaning to allow for inspection of the Work during surface preparation and shop application of paints. Work shall be subject to the Contract Administrator approval before shipment to Site.

.2 Items such as structural steel, metal floor doors, manways, and frames, metal louvers, and similar fabricated items may be shop prepared and primed. Centrifugal wheel blast cleaning is an acceptable alternative to shop blast cleaning.

.3 Remove, mask, or otherwise protect hardware, machined surfaces, nameplates on machinery, and other surfaces not intended to be painted.

.4 Protect all surfaces adjacent to, or downwind of Work area from overspray. Contractor shall be responsible for any damage resulting from overspray.

3.3 Preparation of Surfaces

.1 Metal Surfaces:

.1 Meet requirements of the following SSPC Specifications as referenced in specific coating systems:

.1 Solvent Cleaning: SP 1.

.2 Hand Tool Cleaning: SP 2.

.3 Power Tool Cleaning: SP 3.

.4 White Metal Blast Cleaning: SP 5.

.5 Commercial Blast Cleaning: SP6

.6 Brush-Off Blast Cleaning: SP 7.

.7 Near-White Blast Cleaning: SP 10.

.8 Power Tool Cleaning to Bare Metal: SP 11.

.9 High Pressure Water Jetting: SP 12.

.2 Wherever the words “solvent cleaning”, “hand tool cleaning”, “wire brushing”, or “blast cleaning”, or similar words of equal intent are used in these Specifications or in paint Manufacturer’s specifications, they shall be understood to refer to the applicable SSPC Specifications listed above.

.3 Hand tool clean areas that cannot be cleaned by power tool cleaning.

.4 Preblast Cleaning Requirements:

.1 Remove oil, grease, welding fluxes, and other surface contaminants prior to blast cleaning.

.2 Cleaning Methods: Steam, open flame, hot water, or cold water with appropriate detergent additives followed with clean water rinsing.

.3 Clean small isolated areas as above or solvent clean with suitable solvents and clean cloths.

.4 Round or chamfer sharp edges and grind smooth burrs, jagged edges, and surface defects.

.5 Welds and Adjacent Areas:

.1 Prepare such that there is:

.1 No undercutting or reverse ridges on weld bead.

.2 No weld spatter on or adjacent to weld or other area to be painted.

.3 No sharp peaks or ridges along weld bead.

.2 Grind embedded pieces of electrode or wire flush with adjacent surface of weld bead.

.6 Blast Cleaning Requirements:

.1 Type of Equipment and Speed of Travel: Design to obtain specified degree of cleanliness. Minimum surface preparation is as specified herein and takes precedence over coating manufacturer’s recommendations.

.2 Select type and size of abrasive to produce a surface profile that meets coating Manufacturer’s recommendations for particular primer to be used.

.3 Use only dry blast cleaning methods.

.4 Do not reuse abrasive, except for designed recyclable systems.

.5 Meet applicable federal, provincial, and local air pollution and environmental control regulations for blast cleaning and disposition of spent aggregate and debris.

.7 Post-Blast Cleaning and Other Cleaning Requirements:

.1 Clean surfaces of dust and residual particles from cleaning operations by dry (no oil or water vapor) air blast cleaning or other method prior to painting. Vacuum clean enclosed areas and other areas where dust settling is a problem and wipe with a tack cloth.

.2 Paint surfaces the same day they are blast cleaned. Reblast surfaces that have started to rust before they are coated.

3.4 Application

.1 General:

.1 The intention of these Specifications is for new interior and exterior metal and submerged metal surfaces to be painted, whether specifically mentioned or not, except as modified herein. Prime coat structural steel surfaces.

.2 Extent of Coating (Immersion): Coatings shall be applied to all internal vessel and pipe surfaces, nozzle bores, flange gasket sealing surfaces, carbon steel internals, and stainless steel internals, unless otherwise specified.

.3 For coatings subject to immersion, obtain full cure for completed system. Consult coatings Manufacturer's written instructions for these requirements. Do not immerse coating until completion of curing cycle.

.4 Apply coatings in accordance with paint manufacturer's Recommendations. Allow sufficient time between coats to assure thorough drying of previously applied paint.

.5 Paint units to be bolted together and to structures prior to assembly or installation.

.6 Where more than one (1) coat of a material is applied within a given system, alternate colour to provide a visual reference that the required number of coats have been applied.

.2 Shop Primed Surfaces:

.1 Schedule inspection with the Contract Administrator before shop primed items are delivered to Site.

.2 Hand or power sand areas of chipped, peeled, or abraded coating, feathering the edges. Follow with a spot primer using specified primer.

.3 For two-package or converted coatings, consult coatings Manufacturer for specific procedures as relates to Manufacturer's products.

.4 Prior to application of finish coats, clean shop primed surfaces free of dirt, oil, and grease and apply mist coat of specified primer, 1 mil dry film thickness.

.5 After welding, prepare and prime holdback areas as required for specified paint system. Apply primer in accordance with Manufacturer's instructions.

.3 Stripe Coating:

.1 Stripe coat all field welds, edges, angles, fasteners, and other irregular surfaces located inside tanks.

.2 Stripe coat shall consist of one coat, brush applied, to the coating thickness specified.

.3 Apply stripe coat between intermediate and final coats.

.4 Stripe coat colour shall contrast intermediate coat to allow visual verification of application.

.4 Film Thickness:

.1 Number of Coats: Minimum required without regard to coating thickness. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in Manufacturers' products, and atmospheric conditions.

.2 Maximum film build per coat shall not exceed coating Manufacturer's recommendations.

.3 Film Thickness Measurements and Electrical Inspection of Coated Surfaces:

.1 Perform with properly calibrated instruments.

.2 Recoat and repair as necessary for compliance with the Specifications.

.3 All coats are subject to inspection by the Contract Administrator and coating Manufacturer's representative.

.4 Give particular attention to edges, angles, flanges, and other similar areas, where insufficient film thicknesses are likely to be present, and ensure proper millage in these areas.

.5 Thickness Testing:

.1 After repaired and recoated areas have dried sufficiently, final tests will be conducted by the Contract Administrator.

.2 Measure coating thickness specified in mils with a magnetic type dry film thickness gauge.

.3 Test finish coat for holidays and discontinuities with an electrical holiday detector, low voltage, wet sponge type.

.4 Check each coat for correct millage. Do not make measurement before a minimum of eight (8) hours after application of coating.

.5 Damaged Coatings, Pinholes, and Holidays:

.1 Feather edges and repair in accordance with recommendations of paint Manufacturer.

.2 Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat in accordance with the Specifications. Depending on extent of repair and appearance, a finish sanding and topcoat may be required.

.3 Apply finish coats, including touchup and damage-repair coats in a manner that will present a uniform texture and colour-matched appearance.

.6 Unsatisfactory Application:

.1 If item has an improper finish colour, or insufficient film thickness, clean surface and topcoat with specified paint material to obtain specified colour and coverage. Obtain specific surface preparation information from coating manufacturer.

.2 Evidence of runs, bridges, shiners, laps, or other imperfections are causes for rejection.

.3 Repair defects in coating systems in accordance with written recommendations of coating manufacturer.

.4 Leave all staging up until the Contract Administrator has inspected surface or coating. Replace staging removed prior to approval by the Contract Administrator.

3.5 Field Quality Control

.1 Testing Gauges:

.1 Testing shall be conducted by the Contractor using a magnetic type dry film thickness gauge to test coating thickness specified in millimeters.

.2 Testing shall be conducted by the Contractor using an electrical holiday detector, low voltage, wet sponge type to test finish coat, except zinc primer, high-build elastomeric coatings, and galvanizing, for holidays and discontinuities.

.2 Test all coated surfaces with a holiday detector in accordance with NACE RP0188. Coated surfaces shall be free of holidays.

3.6 Manufacturer's Services

.1 The coating Manufacturer's Representative shall be present at shop or Site as follows:

.1 On the first day of application of any coating.

.2 A minimum of two (2) additional inspection visits, each for a minimum of four (4) hours, in order to provide Form 102 Certificate of Satisfactory Installation.

.3 As required to resolve field problems attributable to, or associated with the Manufacturers' product.

3.7 Cleanup

.1 Place cloths and waste that might constitute a fire hazard in closed metal containers or destroy at the end of each day.

.2 Upon completion of the Work, remove staging, scaffolding, and containers from the Site or destroy in a legal manner.

.3 Completely remove paint spots, oil, or stains upon adjacent surfaces and floors and leave entire job clean.

3.8 Protective Coatings Systems

.1 System No. 1 Submerged or Embedded Metal-Potable Water:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast (SP10)	Potable Grade, Polyamide Epoxy Coating	3 coats, 0.08 mm MDFTPC (3 mils MDFTPC)

.1 Application Schedule:

.1 Use this system on all metal surfaces inside piping and tanks, including, but not limited to, steel plates and structural steel; interior and exterior surfaces of the inlet, outlet, and overflow piping; manhole covers; hatches; ladders; landings; couplings; and vents.

.2 Use this system on the exposed surfaces of direct buried and concrete encased steel pipe.

.3 Coating is not required for the bottom side of the floor plates.

.4 Provide full coating thickness to the top of all structural steel that will be covered by the roof plates, or otherwise shielded from full coating thickness, before the structural steel members are installed. Remove coating in areas to be welded.

.2 System No. 5 Exposed Metal:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10)	Polyamide, Anticorrosive Epoxy Primer (Beige Colour)	1 coat, 0.064 mm MDFT (2.5 mils MDFT)
	Polyurethane Enamel	1 coat, 0.08 mm MDFT (3 mils MDFT)

.1 Application Schedule: Use this system on exposed exterior metal surfaces of piping and tanks. For galvanized surfaces to be coated, reference System No. 10.

.2 Tank Coating Sequence Anticipated:

.1 Shop prime all surfaces of shell plates and roof and floor plates and structural steel associated with the exterior of the tank; hold back shop primer where required for field welding.

.2 Shop priming of galvanized steel surfaces is not required.

.3 After tank erection, abrasive blast welds (SP 10) and damaged areas; apply primer.

.4 Clean primed surfaces and brush blast.

.5 Apply mist coat of primer.

.6 Apply finish coats.

.7 Touch up as required.

.3 System No. 6 Exposed Metal-Atmospheric:

Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 6)	Rust-Inhibitive Primer	1 coat, 0.05 mm MDFT (2 mils MDFT)
	Alkyd Enamel	2 coats, 0.1 mm MDFT (4 mils MDFT)

.1 Application Schedule: Use this system on exposed exterior metal surfaces of tanks. For galvanized surfaces to be coated, reference System No. 10.

.2 Tank Coating Sequence Anticipated:

.1 Shop prime all surfaces of shell plates and roof and floor plates and structural steel associated with the exterior of the tank; hold back shop primer where required for field welding.

.2 Shop priming of galvanized steel surfaces is not required.

.3 After tank erection, abrasive blast welds (SP 10) and damaged areas; apply primer.

.4 Clean primed surfaces and brush blast.

.5 Apply mist coat of primer.

.6 Apply finish coats.

.7 Touch up as required.

.4 System No. 10 Galvanized Metal Conditioning:

Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1) Followed by Hand Tool (SP 2), Power Tool (SP 3), or Brushoff Blast (SP 7)	Wash primer or coating manufacturers' recommended primer followed by System No. 5	1 coat, 0.01 mm MDFT (0.4 mils MDFT)

.1 Application Schedule: Use on galvanized surfaces, including handrails and gratings, before application of System No. 5.

.2 Coating Sequence Anticipated:

.1 Clean galvanized surfaces.

.2 Apply primer.

.3 Apply intermediate and finish coats (See System No. 5).

END OF SECTION

FINISH PAINTING - BUILDINGS

1. GENERAL

1.1 Summary

.1 Finish painting defined under this Section is to specify the general requirements of the Work and is applicable to items not covered under other Sections of this Specification.

1.2 Quality Assurance/Submittals

.1 Perform painting work by applicator with minimum five (5) years of proven, satisfactory and successful painting experience on projects of similar size and nature. Provide qualified crew of painters and full time review of work by qualified supervisor for duration of work.

.2 Submit in writing list of proposed materials prepared by paint Manufacturer, for approval at least sixty (60) days before materials are required. List shall bear Manufacturer's official certification that materials listed meet or exceed requirements specified herein. List shall contain following for record:

.1 Manufacturer's product number and application instructions

.2 Finish formula

.3 Product type

.4 CGSB number

.5 Colour number

.6 Maximum VOC classification

.7 Ecologo certification where applicable

.3 Samples: Submit at least fifteen (15) days prior to painting Work commencing at the Site (and resubmit until approved), two (2) identified (with Project Name, the finish, colour name and number, sheen and gloss values) samples of the following:

.1 Each specified colour in each specified finish coat material on minimum 150 mm x 300 mm coated stock card

.2 Each natural wood finish on minimum 150 mm x 300 mm samples of each specified wood species to receive the finish

.4 Have the paint Manufacturer's Representative visit Site prior to the commencement of painting operation to discuss painting and finishing procedures to be used, to analyze surface conditions, and to propose alternative recommendations should adverse conditions exist.

.5 Have the paint Manufacturer visit Site at intervals during surface preparation and painting operations to ensure that proper surface preparation is performed, specified paint products are being used, proper number of coats are being applied, agreed finishing procedures are being used.

.6 Product Manufacturer's Approval of Surfaces To Be Painted: Submit, prior to painting Work commencing, letters signed by the respective manufacturer(s) of products to be used stating that the Manufacturer's Representative has examined the various surfaces prior to application and that the surfaces and the environmental conditions are suitable to receive the specified finishes.

.7 Product Manufacturer's Certification of Paint Application: Submit, on completion of painting, a letter or letters, signed by the respective manufacturer(s) of products, stating that a Manufacturer's Representative has inspected (at intervals) the preparation of surfaces and the application of paint products and that paint products have been applied satisfactorily and to the required coverage.

1.3 Environmental Requirements

.1 Comply with requirements of WHMIS regarding use, handling, storage, and disposal of hazardous materials; and material safety data sheets acceptable to Ministry of Labour.

.2 Provide paint products certified to meet the requirements of the Environmental Choice Program, Department of the Environment. Provide CSA Certification Reports that products proposed for use are certified under the Environmental Choice Program. Water based paints to be certified to ECP-07-89. Solvent based paints to be certified to ECP-12-89.

.3 Arrange for ventilation system to be operated during application of paint. Ventilate area of work by use of approved portable supply and exhaust fans. Provide continuous ventilation during and after application of paint. Run ventilation system twenty four (24) hours per day during installation; provide continuous ventilation for seven (7) days after completion of application of paint. Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within Manufacturers recommendations. Substrate and ambient temperature shall be within limits prescribed by Manufacturer.

.4 Maintain minimum interior temperature of 18°C (65°F) during application and drying of paint and maintain until building occupancy occurs. Do not undertake exterior painting if air and surface temperature are expected to fall below 10°C (50°F) before coating has dried. Avoid painting during winds, weather conditions which may affect paint application or following rain. Wait until frost, dew or condensation has evaporated.

.5 Provide heating to maintain minimum temperatures recommended by manufacturers.

.6 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface. Apply paint only when surface to be painted is dry, properly cured and adequately prepared.

.7 Protect floors of storage areas by means of tarpaulins and metal pans.

.8 Provide a fully charged, ULC 10:BC rated, 9 kg carbon dioxide fire extinguisher immediately adjacent to the storage area for the entire time materials are stored in the area.

.9 Deposit waste rags in metal containers with tight fitting metal lids and remove from the building at the end of each working shift.

.10 Keep solvents for brush and roller cleaning in tightly sealed containers when not in use. Do not allow brushes and rollers to stand in solvents in open containers overnight.

1.4 Painting and Finishing Work Standards

.1 The best practices specified or recommended in CAN/CGSB-85.100 are to govern for painting methods and procedures, unless specified otherwise in this Section.

1.5 Colour Selections

.1 The Contract Administrator will issue a schedule indicating colour(s), gloss value and sheen. Colour may be selected from the lines of up to three (3) Manufacturers and an unlimited number of colours and gloss and sheen.

1.6 Extra Stock

.1 Prior to Total Performance, Supply and deliver to a designated storage area at the Site, sealed, original, fresh containers of each paint and finish product applied, and in each colour, all labelled as specified in this Section.

.2 Supply 1 litre of extra stock for products for which less than 45 litres were used, 4 litres of extra stock when from 45 to 180 litres were used, and 10 litres of extra stock when in excess of 180 litres were used.

2. PRODUCTS

2.1 Painting, Finishing, and Coating Products

.1 Unless otherwise specified, painting and protective coating products are specified in PART 3 of this Section and are the products of ICI/Glidden.

.2 Painting and protective coating products fully equivalent to the ICI/Glidden products specified and supplied by the following manufacturers are acceptable:

.1 Sherwin Williams

.2 Benjamin Moore

.3 Pittsburgh Paints

.3 Finishing products such as oils or putties not specified in this Section are to be premium quality and as recommended by the Manufacturer of the paint or finish product it is associated with.

.4 Unless otherwise specified, paint is to be ready-mixed. Where site mixing is required for certain products, mix in strict accordance with the Manufacturer's instructions to produce smooth flowing materials with an easy-brushing consistency.

.5 Gloss value will be determined in accordance with ASTM D523, Tentative Method of Test For 60 Deg. Specular Gloss. Gloss values for terminology specified are as follows:

.1 Flat - less than 8

.2 Eggshell - 25 to 35

.3 Semi-gloss - 45 to 55

.4 Gloss - in excess of 85

.6 On walls no defects shall be visible from a distance of 1000 mm at 90° to surface. On ceilings no defects shall be visible from floor to surface when viewed using final lighting source. Final coat shall exhibit uniformity of colour and uniformity of sheen across full surface area.

.7 Paint colours will be selected by Contract Administrator from the Manufacturer's full colour range, including light, dark and accent tones, and the Contract Administrator will issue a schedule indicating the colours, locations, gloss value and sheen. Note that products of more than one Manufacturer may be selected.

3. EXECUTION

3.1 Examination of Substrate

.1 Examine surfaces to receive paint or protective coating to ensure that they are in the proper condition to be painted or coated. Commencement of painting and protective coating Work will be interpreted as acceptance of the surface to receive the Work. Correction of defective painting or protective coating Work resulting from application to unsatisfactory surfaces will be the responsibility of the painting contractor.

3.2 Special Conditions

.1 Post "No Smoking" signs and ensure that spark-proof electrical equipment is used in areas where flammable painting products are applied or stored.

.2 Post "Wet Paint" signs throughout freshly finished areas and remove when finishes are dry.

.3 Prohibit traffic where possible, from areas where painting is being carried out until paint is cured.

.4 Provide adequate ventilation. Where building is occupied, provide necessary air barrier to prevent fumes from entering occupied areas.

.5 Prior to the application of special finishes, arrange for a meeting at the Site with the Contract Administrator and a representative of the special finishes Manufacturers to discuss the condition of surfaces to receive painting, special finish, and application procedures.

3.3 Protection

.1 Cover or mask surfaces adjacent to those receiving treatment and finishing to protect the Work of others from damage and soil. Mask instruction and specification plates and controls attached to equipment being painted.

.2 Take particular care in storage and mixing areas to ensure that tarpaulins and metal pans protect floors.

.3 Co-ordinate with the appropriate trades for the removal from finished surfaces, storage and reinstallation after finish Work is completed of finish hardware, switch and receptacle plates, escutcheons, luminarie frames, and similar items.

3.4 Preparation of Surfaces

.1 General:

.1 Vacuum clean areas inside the building(s) immediately prior to commencing finishing Work.

.2 Scrub mildewed surfaces with a solution of trisodium phosphate, bleach with a solution of one part sodium hydrochlorite (Javex) to three parts water, and rinse with clear water.

.3 Arrange for finishing hardware, electrical plates, accessories, and similar removable fittings on surfaces to be finished to be removed. Mask any other Work that is not removable.

.4 Prepare surfaces to be painted or coated such that the surfaces are thoroughly dry and free of chemicals, mortar splatters, organic matter, oil, grease, rust, scale, loose paint, and any other material, and such that the surfaces are in a proper condition to receive paint, stain, or other specified coating.

.2 Cleaning Procedures:

.1 Surface preparation methods shall remove any contaminant that will interfere with full adhesion of protective painting and coating systems. Level of cleaning shall be based on SSPC, recommended designations of metal cleaning procedures specified.

.2 SSPC-SP1 (Solvent Cleaning): Use of solvents (such as mineral spirits, xylene, toluene) or cleaning action to remove oil, grease, and soil drawing and cutting compounds or similar solvent soluble contaminants. Do not use gasoline or benzene.

.3 SSPC-SP2 (Hand Tool Cleaning for mild exposure conditions): Use of scrapers, sandpaper, wire brushing or hand impact tools to remove loose mill scale, non-adherent rust and scaling paint or other foreign matter. Do not use hand tool cleaning procedure for areas subject to corrosive environment or on surfaces for vinyl chloride top coating. Remove weld flux and spatter to avoid localized paint failure.

.4 SSPC-SP3 (Power Tool Cleaning for use under severe exposure conditions or immersion applications): Use power sanders and wire brushes, impact tools, grinders and power chipping hammers to remove loose mill scale, loose rust, paint or other foreign matter. Do not allow excessive power tool cleaning.

.5 SSPC-SP5 (White Metal Blast Cleaning): Use when protective coating or environment is such that no rust, mill scale or other foreign matter can be tolerated on steel surface. Prime cleaned surfaces before any rusting occurs.

.6 SSPC-SP6 (Commercial Blast Cleaning): Use for moderate exposure conditions where high but not perfect degree of blast cleaning is required. Prime blast cleaned surfaces as soon as possible.

.7 SSPC-SP7 (Brush-Off Blast Cleaning): Use for ordinary exposure where environment is mild to permit tight mill scale, paint and minor amounts of rust to remain on surface. An effective means to clean rusty galvanized metal siding and old finishes in poor condition.

.3 Perform surface preparation work as follows:

.1 Surfaces Subjected to High Heat Condition (140°C and Up): SSPC-SP5.

.2 Interior Concrete Block, Poured and/or Precast Concrete: CAN/CGSB-85.100.

.3 Woodwork for Painting: Seal all knots and sapwood in surfaces to receive paint with alcohol-based primer-sealer. Sand smooth rough surfaces of all woodwork to be finished and clean surfaces free of dust before applying first coat. Fill nail holes, splits and scratches with non-shrinking filler after first coat are dry. Remove salt deposits that may appear on wood surfaces treated with fire retarder.

.4 Concrete Horizontal Surfaces: If concrete is less than twenty six (26) weeks old or has been previously painted, clean surface and etch with muriatic acid with extenders. Rinse out etching compound with clean water and tri-sodium-phosphate (TSP) to neutralize acidity of surface (pH 6.5-7.5). Rinse out with clean water 2 to 3 times and allow to dry. Verify that moisture content is less than 12% before proceeding with painting.

.5 Concrete Vertical Surfaces: Use sand blasting, high pressure water blasting, high pressure water blasting with abrasives, vacuum blasting with abrasives or alternatively,

needle guns or power grinders equipped with suitable grinding stone, to remove concrete, loose mortar, fins, projections and surface contaminants. Vacuum or blow down and remove dust and loose particles from surface.

.6 Concrete Floors: Prepare in accordance with CAN/CGSB-85.100.

.7 Concrete Block Masonry: Fill voids and cracks in masonry block wall to provide uniform surface for subsequent coats.

3.5 General Application of Paint and Finishes

.1 Verify by review of other Sections of this Specification, the extent of surfaces primed as part of the Work of other Sections, and include for priming of unprimed surfaces which are scheduled or specified to be painted.

.2 Back prime fitments and similar Work as soon as it is delivered and before it is installed. Use exterior primer compatible with the finish coat for exterior Work, and enamel undercoat for interior Work to receive paint or enamel finishes. Prevent primer from running over faces.

.3 Unless otherwise specified, apply paint by brush or rollers. Spray paint ceilings and exposed areas above the ceiling only when requested or approved by the Contract Administrator, and in other areas only when restricted to access and approved by the Contract Administrator. Discontinue spaying if prohibited by the Contract Administrator, became of inadequate coverage, overspray, paint fog drift, or disturbance to other work.

.4 Use only brushes for enamels for painting wood.

.5 Provide finish uniform in sheen, colour and texture, free from streaks, shiners and brush or roller marks or other defects. Apply materials in accordance with Manufacturer' directions and Specifications. Do not use adulterants.

.6 Finishes and number of coats specified hereinafter in Finish Schedule are intended as minimum requirements guide only. Refer to Manufacturer’s recommendations for exact instructions for thickness of coating to obtain optimum coverage and appearance. Some materials and colours may require additional coats and deeper colours may require use of Manufacturers' special tinted primers. Unless otherwise specified, provide three (3) coats finish as minimum finish. Obtain colour chart giving colour schemes and gloss value for various areas from the City. Colour chart shall give final selection of colours and surface textures of all finishes, and whether finishes are transparent (natural) or opaque (paint).

.7 Advise when each applied paint coat can be inspected. Do not recoat without inspection. Tint each coat slightly to differentiate between applied coats. Sand smooth enamel and varnish undercoats prior to recoating. Apply primer coat soon after surface preparation is completed to prevent contamination of substrate.

.8 Read Mechanical and Electrical Specifications for instruction on painting Mechanical and Electrical work and perform such work under supervision of respective Mechanical and

Electrical Divisions. Finish paint primed mechanical equipment: heaters, convectors, radiators, wall fin perimeter induction units, fan coil units, and similar items. Prime and paint exposed, unfinished electrical raceways, fittings, outlet boxes, junction boxes, pull boxes, and similar items. Keep sprinkler heads free of paint. Take steps to protect gauges, identification plates and similar items from being painted over or paint splattered. Remove grilles, covers, and access panels for mechanical and electrical systems from installed location and paint separately, if these items are not factory finished, Paint work to match surfaces they are seen against unless directed otherwise. Paint interior surfaces of air ducts visible through grilles and louvres, with one (1) coat of flat black metal paint to limit of sight line.

.9 Maintain at the site at all times until the Work is completed, a moisture meter, hygrometer, and thermometer to verify surface and environmental conditions.

.10 Perform painting and coating Work under supervision of an experienced foreman using clean equipment designed for the purpose used.

.11 Unless otherwise specified, follow the specific instructions of the manufacturer(s) of the products used.

.12 Apply finishing products to provide full coverage at a rate not to exceed that stated by the manufacturer for applicable surface, free from perceptible defects, and with even colour, sheen and texture. Vary the tone of each coat slightly to permit supervision identity.

.13 Make clean, true junctions with no overlap between adjoining applications of finish coatings.

.14 Leave all parts of mouldings and ornaments clean and true to details with no undue amount of coating in corners and depressions.

.15 Use products of a single Manufacturer in each coating application.

.16 Apply each coat only after the preceding coat is dry and hard, or as otherwise directed by the product Manufacturer.

.17 Sand wood and metal surfaces lightly with No. 00 sandpaper between coats.

.18 Use paint or finish thinners only where specified or directed by the paint Manufacturer.

.19 Apply paint and coatings only when the ambient temperature and the temperature of the surface to be painted exceed 4.4°C, except for materials and locations listed below where ambient and surface temperatures must exceed the temperatures stated:

.1 Latex paint for surfaces inside the building - 7°C.

.2 Latex paint for surfaces outside the building - 10°C.

.3 Enamels for all surfaces - 21°C.

.20 Do not:

.1 Apply finishes in direct sunlight that raises surface temperature above that required for proper application and drying.

.2 Apply exterior finishes in rainy, foggy, or windy weather.

.3 Apply exterior finishes when relative humidity exceeds 85%, when condensation has formed or is likely to form on the surface, nor immediately following rain, frost, or formation of dew.

.4 Apply finishes when dust is being raised.

.5 Apply finishes to cement board products, pipe and/or duct and/or equipment insulation, concrete or masonry surfaces that contain in excess of 12% moisture, or to wood products that contain in excess of 15% moisture except where the wood product would normally contain in excess of 15% moisture.

.21 Paint the following items where indicated:

.1 Areas and surfaces indicated to be painted on finish schedules.

.2 Areas and surfaces indicated to be painted on detail drawings.

.3 Exposed exterior and interior ferrous metal including hollow metal doors and frames, conduit and similar metal raceway.

.4 Exterior and interior wood surfaces where exposed.

.5 Interior surfaces of poured concrete where exposed.

.6 Interior surfaces of concrete block masonry work.

.7 Back surfaces of aluminium and stainless steel when in contact with concrete and/or steel.

.8 All existing surfaces disturbed by work of this contract or contractor's forces.

.9 Prime paint as minimum walls etc. before installing electrical panels.

.22 Unless otherwise specified, DO NOT apply paint or finish to the following:

.1 Finishing hardware.

.2 Equipment nameplates and other such identification.

.3 Switch, receptacle and other electrical device faceplates except if constructed of prime coat painted or galvanized steel, in which case they are to be painted.

.4 Exposed copper, brass, plastic, and FRP unless otherwise specified.

.5 Lighting fixtures.

.6 Stainless steel.

.7 Chrome plated surfaces, and polished or lacquered brass or bronze surfaces.

.8 Underground piping and accessories.

.9 Surfaces factory coated with baked epoxy or enamel.

.10 Plastic laminate surfaces.

.11 Manhole and catch basin covers.

.12 Covers or strainers associated with floor drains, cleanout terminations, and similar equipment.

.13 Recessed electrical boxes and similar recessed equipment unless they are not prime coat painted or galvanized.

.14 Exterior poured concrete and masonry surfaces.

.15 Valve handles.

.16 Control panels.

.17 Electrical panels.

.18 Circuit breakers, switches, receptacles, and similar electrical devices.

.19 Caulked joints.

.20 Prefinished sheet metal flashing.

.21 Prefinished exterior wall louvres.

.22 Prefinished exterior metal soffit.

3.6 Paint Formula:

.1 Apply paint to surfaces with the following:

.1 Concrete Block and Poured Concrete Inside Building:

.1 One coat Glidden Ultra Block # 36250.

.2 Two coats DevGuard 4308 Alkyd Industrial Gloss Enamel at 1.5 to 2.0 mils DFT.

.2 Wood, Including Plywood for Paint Finish:

.1 One coat Glidden Alkyd Enamel Undercoat # 9431 at 1.0 to 1.5 mils DFT.

.2 Two coats DevGuard 4308 Alkyd Industrial Gloss Enamel at 1.5 to 2.0 mils DFT.

.3 Concrete Floor Slab and Inside Vertical Surfaces of Fuel Tank Curbed Enclosure: Prime and paint as follows:

.1 One prime coat of 78-D-7 "Hi Build" epoxy (buff colour), to a 50 µ DFT.

.2 One finish coat of 78-W-3 "Hi-Build" epoxy (white colour), to a 100 µ DFT.

.3 One finish coat of 78-D-7 "Hi-Build" epoxy (buff colour), to a100 µ DFT.

3.7 Adjustment and Cleaning

.1 Touch up and refinish minor defective Work. Refinish the entire surface where the finish is damaged or not acceptable, including areas exhibiting incomplete or unsatisfactory coverage. Patching will not be permitted.

.2 Remove spilled or splattered finish materials from surfaces of Work performed under other Sections. Do not mar surfaces while removing.

.3 Clean and make good surfaces soiled or otherwise damaged in connection with work of this Section. Pay the cost of replacing finishes or components that cannot be satisfactorily cleaned.

.4 Upon completion, remove masking and clean adjacent surfaces free of over spray spatters, drips, smears and over spray.

3.8 Disposal of Paint Waste

.1 Be responsible for removal and disposal of material and waste generated by this Section.

.2 Remove empty and partly used containers from Site and recycle or dispose of as Hazardous Waste in accordance with local municipal, provincial and federal environmental regulations. Provide proof of such action in form of receipts of tipping fees, disposal fees or bills of lading, as applicable.

.3 Remove from Site peripheral items, such as clean up solvents, paintbrushes, rags, and similar items and dispose of where necessary in accordance with local municipal, provincial and federal environmental regulations.

.4 Do not rinse off of latex paints from brushes and rags under running water tap. While work is ongoing, whether using latex or alkyd products, rinse off all brushes and rags in container with appropriate solvent (water or paint thinner). Leave such container in well-lit and well-ventilated area, away from any flammable conditions. Dispose of emulsion created in accordance with local municipal, provincial and federal environmental regulations.

.5 Wipe or drain clean empty containers. Allow remaining film to dry before disposal. Recycle metal containers and dispose of containers which are not recyclable. Ensure non-recyclable containers are acceptable to disposal recipient authority.

.6 Dispose paint that cannot be recycled as hazardous waste. Generators of Hazardous Waste shall be registered and disposal shall be in accordance with regulations of authorities. When handling coating materials, approved vapour/particulate respirator shall be worn as protection from solvent vapours; dust respirators are not acceptable.

.7 Remove cleanup solvents and recycle if possible.

.8 Treat non-recyclable thinners and paint sludge as hazardous waste.

3.9 Extended Warranty

.1 Warrant Work against defects in material and quality of performance for a period of two (2) years.

END OF SECTION

PAINTING AND FINISHING
PROCESS MECHANICAL

1. GENERAL

1.1 Summary

.1 Comply with Division 1 - General Requirements.

.2 Refer to Colour Schedule in this Section for items to be painted.

1.2 References

.3 ASTM D 523-85 Test Method for Specular Gloss.

.4 Steel Structures Painting Manual Vol. 2 - Systems and Specifications published by SSPC, 1982.

1.3 Submittals

.1 List of materials: Prior to commencement of work, submit three copies of list with name of Manufacturer, number, grade and quality of materials proposed for use on the Work.

.2 Product and safety data sheets: Submit three copies of data sheets for each product.

.3 Submit paint colour samples for approval.

1.4 Quality Assurance

.1 Prior to commencement of painting operations meet at Site with Manufacturer's Representative and with the Contract Administrator to review these Specifications, painting work to be done and following related items:

.1 Equipment use and servicing

.2 Material storage and application techniques

.3 Surface preparation and ambient temperature

.4 Inspection requirements

.5 Inspection reports

.6 Hold points or check points

.7 Safety requirements during application

.8 Mock-ups or samples of coatings in highly corrosive environment

.2 Submit report of alternative recommendations for adverse conditions encountered.

.3 Arrange with the paint Manufacturer to visit the Site at intervals during the surface preparation and painting operations to insure that the proper surface preparation has been completed, the specified paint products are being used, the proper number of coats are being applied and the agreed finishing procedures are being used, and that the paint manufacturer regularly submits written reports.

.4 Field Sample:

.1 A sample area located in the building will be designated by the Contract Administrator.

.2 Apply samples of finishes in the sample area in the presence of the Contract Administrator, Contractor and paint manufacturer. Apply the samples with the correct material, number of coats, colour, texture and degree of gloss required. Refinish if required, until acceptance is obtained.

.3 Leave test areas undisturbed until completion of the work. Accepted work in the test area will serve as a standard for similar work throughout the Work.

1.5 Site Conditions

.1 Do not paint exterior surfaces at temperatures below 10°C nor in rainy or high humidity weather. Avoid painting surfaces exposed to direct sun.

.1 Do not paint interior surfaces at temperatures under 10°C or on surfaces where condensation has or will form due to presence of high humidity and lack of proper ventilation.

.2 Comply with manufacturer's recommendations.

2. PRODUCTS

2.1 Materials

.1 Paint and related materials: Glidden Paints by ICI Paints (Canada) Inc.

.2 Protective coating system is based on materials manufactured by ICI Paints (Canada) Inc and represents standard of quality. Comparable systems by PPG Canada Inc., Sherwin-Williams Company are acceptable.

3. EXECUTION

3.1 Examination

.1 Examine surfaces which are to be finished.

.2 Report surfaces which are defective, or which cannot be prepared by usual sanding and cleaning. Report unsatisfactory Site and environmental conditions.

.3 Commence work after corrective work has been completed.

3.2 Preparation

.1 Commencement of work means acceptance of Site and substrate conditions.

.2 Protect work performed under separate Sections from paint splatter, overspray and accidental spill.

.3 Remove soiled and used rags, waste and empty containers from the building daily.

.4 Take precautions to prevent fire.

.5 Comply with instructions on paint Manufacturer's Safety Data Sheets.

.6 Provide surface preparation in accordance with SSPC Manual Volume 2 - "Systems and Specifications", Chapter 2.

.7 Apply primer within 4 hours after surface preparation or as recommended by paint manufacturer. Comply with SSPC-PA-1 for application techniques, requirements and precautions.

.8 Comply with CAN/CGSB 85.10 and CAN/CGSB 85.100.

.9 Remove cover plates of service devices, surface hardware, frames of lighting fixtures and other obstructions and reinstall them after painting work is completed. Replace units damaged while performing work under this Contract.

.10 Clean surfaces to be finished from machine, tool or sanding marks, dust, grease, soiling, or any extraneous matter.

.11 Test surfaces for moisture content. Do not apply materials to substrate when moisture content, exceeds 12% as determined by accepted moisture testing device.

.12 Ferrous metal surfaces - Prepare in accordance with surface preparation specifications outlined by the "Steel Structures Painting Council". Use method indicated in appropriate Protective Coating System.

.13 Manufacturer's bituminous protective coating: Sandblast SSPC-SP-6 and shop prime with same primer specified for coating system.

.14 Shop welds: Sandblast in accordance with SSPC commercial type blasting SP-6. Remove weld flux and other surface contaminants.

.15 Field welds: Use hand wire brush followed by cleaning with solvent swab.

.16 Unpassivated galvanized metal and plain aluminum surfaces: Wash thoroughly with Trisodium Phosphate or Oakite 31 by Oakite Corp., Oakville, Ont., solution mixed in accordance with Manufacturers printed instructions. Rinse thoroughly. Follow instructions on Product Data sheets.

.17 Galvanized surfaces that have been passivated: On small areas use abrasive buffing with bronze wool pad SP-2 or power wire-brush SP-3 and clean with solvent. On large areas use brush-off blast SP-7 and clean with solvent.

.18 Concrete surfaces: Remove mold release oil with Xylol. If smooth etch for better adhesion. Follow instructions on Product Data sheets.

.19 Surfaces primed by item Manufacturer: Prepare in accordance with Manufacturer's recommendations.

.20 Factory finished surfaces: Sand down for adhesion.

.21 Copper surfaces: Solvent clean and buff.

.22 Fabric jacketted surfaces: Clean of dust. Follow Manufacturer's instructions.

.23 PVC Pipe: Sand by hand surfaces to be coated to provide tooth for the coating system. Use a medium grit sandpaper. Clean with detergent solution prior to painting and allow to dry. Apply PVC cleaner/primer liberally with brush or soft lint-free cloth. Allow 15 minutes to dry and then paint immediately.

3.3 Application

.1 Apply paint materials free from defects.

.2 Mask surfaces where necessary, to prevent contamination or marring of adjacent material, or different protective coating system.

.3 Prevent overspray onto adjacent surfaces or properties.

.4 Do not apply paint over sealant.

.5 Verify that fabric jacketted pipes and ducts have been sized prior to painting.

.6 Confirm piping and ducting systems have successfully passed tests specified, prior to painting.

.7 For PVC piping, do not paint flanges, unions, coupling and valves.

3.4 Application Over Shop Painted Metal Surfaces and Touch-Up

.1 Check existing paint coatings for compatibility with paint with which they are to be overcoated.

.2 Clean areas to be painted using appropriate method.

.3 Minimum coating requirements for touch-up painting:

.1 No rusting but prime coat exposed: Sand lightly and feather edges. Apply 1 to 2 finish coats to regain specified minimum dry film thickness.

.2 No rusting but prime coat damaged: Clean area to base material, sand lightly and feather edges. Apply prime and finish coats. Sand and feather edges between coats.

.3 Rust areas: Clean to original standard of surface preparation. Apply coats as per 2. above. Apply spot finish coat(s) to uniform appearance.

3.5 Items to be Painted

.1 Equipment Items:

.1 Paint all shop-primed items installed by Contractor.

.2 Do not paint bronze or brass surfaces.

.3 Do not paint stainless steel and aluminum surfaces unless called for in Colour Schedule.

.2 Piping (Process and Service):

.1 Paint piping, pipe supports, valves, valve operator and appurtenances except:

.1 Aluminum jacket

.2 PVC jacket

.3 Stainless steel

.4 Do not paint copper piping in concealed areas such as ceiling spaces.

.2 Do not paint FRP ducts.

.3 Ductwork (HVAC)

.1 Do not paint HVAC ductwork.

.2 Do not paint canvas jacketed insulation.

.4 Touch up factory-painted surfaces on equipment and piping damaged during construction.

3.6 Application - General

.1 Apply finish coats of paint in thickness per coat specified.

.2 If minimum DFT in micrometres (microns) is not achieved, apply additional coat(s) until required thickness is obtained.

.3 Apply paint in accordance with SSPC Manual Volume 2 - "Systems and Specifications", Chapter 5.1.

.4 Sand semi-gloss, medium and high gloss finishes lightly between coats, unless otherwise approved by the coating manufacturer.

.5 Gloss terms of following values when tested in accordance with ASTM D523 Test for Specular Gloss:

Gloss Term	Gloss Value
Flat	5 to 20
Eggshell	20 to 40
Semi-gloss	40 to 60
Gloss, medium	60 to 80
Gloss, high	80 to 90

.6 Finish work uniformly as to sheen, gloss, colour and texture free from sags, runs and other defects and under adequate illumination.

.7 Apply materials in accordance with directions and instructions of manufacturers of materials. Do not use adulterants.

.8 Do not paint sprinkler heads, over ULC or other fire rating labels on doors and frames, nor over identification labels on mechanical and electrical equipment.

.9 Corrosive material concentration: chemically corrosive atmosphere applies to following area(s):

.1 Sodium Hypochlorite Generating and Storage Room

.2 Ferric Chloride Storage Room

.3 Sulphuric Acid Storage Room

.4 Sodium Hydroxide (Caustic Soda) Storage Room

.5 Ammonium Hydroxide (Aqua Ammonia) Storage Room

3.7 Schedule – Protective Coating Systems

By Glidden Paints By ICI Paints (Canada) Inc.

	SERVICE USE	PROTECTIVE COATING SYSTEM	SURFACE PREPA—RATION	NO. OF COATS	MIN. D.F.T. PER COAT IN MICRONS
.1	STRUCTURAL STEEL				
.1	Not receiving full protective coating system, concealed exposure	PRIME: Devguard 4160 (Red) Universal Primer	SP-6	1	50
		Devguard 4160 (Grey) Universal Primer		1	50
.2	STEEL & CAST IRON - EXTERIOR				
.1	Exterior exposure	PRIME: Devflex 4020 Acrylic Primer	SP-6	1	50-75
		FINISH: Devflex 4208 Series		2	38-50
.3	STEEL & CAST IRON				
.1	Low chemical, moisture and sulfide fume exposure	PRIME: Devguard 4160 (Red) Universal Primer	SP-6	1	50-60
		FINISH: Devguard 4308 Series Alkyd Modified Enamel		2	50
.2	High humidity, moisture, condensation, spray exposure	PRIME: Devguard 4160 (Red) Universal Primer	SP-6	1	50-60
		FINISH: Devshield 4328 Series Alkyd Modified Enamel		2	50

.3	Chemically corrosive exposure	PRIME: Bar-Rust 235 Epoxy FINISH: Truglaze Epoxy 4508 Series	SP-10	1 1	125-175 75-100
.4	Ground conditions - buried	COAT: Devtar 5A Epoxy	SP-6	2	150-200

.4 STEEL & CAST IRON - HIGH TEMPERATURE

.1	Service temperature up to 233°C	PRIME: Devoe HT-4 Aluminum FINISH: Devoe HT-4 (Grey)	SP-5	1 1	38-50 38-50
.2	Service temperature 150°C to 495°C	COAT: Devoe HT-10 Aluminum	SP-10	2	25
.3	Steel, cast iron pipe under insulation - up to 83°C	COAT: Catha-Coat 302 Zinc-rich Primer	SP-6	1	75-100
.4	Steel, cast iron up to 150°C	COAT: Catha-Coat 336 Zinc-organic FINISH: Devoe HT-4 (Light Colours only)	SP-6	1 1	75 38-50

.5 DUCTILE IRON

.1	Low chemical, moisture and sulfide fume exposure	PRIME: Devguard 4160 (Red) Universal Primer FINISH: Devguard 4308 Series Alkyd Gloss Enamel	SP-6	1 2	50-60 50

.2	High humidity, moisture, condensation, spray exposure	PRIME: Devguard 4160 (Red) Universal Primer FINISH: Devshield 4328 Series Alkyd Modified Enamel	SP-2/SP-3	1 2	50-60 50
.3	Ground conditions - buried	COAT: Bar-Rust 235 Epoxy	SP-10	1	150-200
.4	Chemically corrosive atmosphere, fumes, and spills exposure	PRIME: Bar-Rust 235 Epoxy FINISH: Thruglaze Epoxy 4508 Series	SP-10	1 1	125-175 75-100

.6 GALVANIZED STEEL - INTERIOR

.1	Low chemical, moisture and sulfide fume exposure	PRIME: Devguard 4160 (Red) Universal Primer FINISH: Devguard 4308 Series Alkyd Gloss Enamel	SP-7	1 2	50-60 50
.2	High humidity, moisture, condensation, spray exposure	PRIME: Devran 4170 Epoxy Primer FINISH: Truglaze Epoxy 4508 Series	SP-7	1 2	75-100 50-75
.3	Chemically corrosive exposure	PRIME: Bar-Rust 235 Epoxy FINISH: Truglaze Epoxy 4508 Series	SP-7	1 1	125-150 75-100

.7 GALVANIZED STEEL - EXTERIOR

.1	Exterior conditions	PRIME: Devguard 4160 (red) Universal Primer	SP-7	1	50-60
		FINISH: Devguard 4308 Alkyd Gloss Enamel		2	50
		or Devflex 4208 Series		2	38-50
.2	Chemically corrosive exposure	PRIME: Devran 4170 Epoxy Primer	SP-7		75-100
		INTERMEDIATE:Devran 224 HS Epoxy 75% Solids – Grey		1	75-100
		FINISH: Devran 224 HS Epoxy 75% Solids – Tinted		1	75-100

.8 BITUMINOUS COATED SURFACES

.1	Non-submerged and non-severe service exposure	PRIME: Ultra Hide 275 Stain Stopper	SP-2/SP-3	2	25
		FINISH: Devguard 4308 Series Alkyd Gloss Enamel		2	50
.2	Non-submerged, high humidity, moisture, condensation, spray	PRIME: Ultra Hide 275 Stain Stopper	SP-2/SP-3	2	25
		FINISH: Devshield 4328 Series Alkyd Modified Enamel		2	50

.3	Submerged service in wastewater	PRIME: Bar-Rust 235 Epoxy Off-White FINISH: Bar-Rust 235 Epoxy Grey	SP-10	1 1	150-200 150-200

.9 FABRIC JACKET & POROUS INSULATION SURFACES

.1	Non-submerged and non-severe service	PRIME: Insul-Aid 5116 Primer-Sealer FINISH: Devguard 4308 Series Alkyd Gloss Enamel	See Art. 3.2	1 2	38 50
.2	High humidity, moisture, condensation, spray	PRIME: Insul-Aid 5116 Primer-Sealer FINISH: Devguard 4328 Series Alkyd Modified Enamel	See Art. 3.2	1 2	38 50

.10 MISCELLANEOUS SURFACES

.1	Exposed copper piping and tubing	Guardsman 6550-00390 clear lacquer	SP-1 and buff	1	38
.2	Plywood, wood, wood fiber panels, wood doors	PRIME: Ultra 9431-0 Undercoater FINISH: Ultra 9440-0 Series Alkyd Enamel Semi-gloss or Lifemaster 2000 Series 10 800 Series Semi-gloss	See Art. 3.2	1 2*	38-50 38-50

* apply minimum of three coats in a cross-hatch pattern on wood fibre panels.

.3	Wood exterior	PRIME: Ultra 9421-0 Wood primer	Sand	1	38-50
		FINISH: Devflex 4208 Series		2	38-50
.4	Wood - natural finish	FINISH: Urethane Varnish 334 333 Semi-gloss 332 Gloss	See Art. 3.2	2	38
.5	Factory finished steel items - non-severe service	PRIME: Devguard 4160 (Red) Universal Primer	See Art. 3.2	1	50-60
		FINISH: Devguard 4308 Series Alkyd Gloss Enamel		2	50
.6	Factory finished items - high humidity exposure	PRIME: Devguard 4160 (Red) Universal Primer	See Art. 3.2	1	50-60
		FINISH: Devguard 4328 Series Alkyd Modified Enamel		2	50
.7	Aluminum sheet and aluminum closures and trim	PRIME: Devguard 4160 (White) Universal Primer	SP-6	1	50-60
		FINISH: Devguard 4308 Series Alkyd Gloss Enamel		2	50
.8	FRP ducts	FINISH: Devran 224 HS Epoxy 75% Solids – Tinted 79-18	Light Sanding	1	75-100

.9	Aluminum surfaces unless prefinished for corrosive exposure	PRIME: Devran 4170 Epoxy Primer	SP-1/ SP-7	1	75-100
		FINISH: Tru-Glaze Epoxy 4508 Series		1	75-100
		OR			
		PRIME: Devguard 4160 (Red) Universal Primer	SP-6	1	50-60
		FINISH: Devflex 4208 Series		2	38-50
.10	PVC Piping	PRIME: Devran 4170 Epoxy Primer	See Art. 3.2	1	75-100
		FINISH: Devguard 4308 Series Alkyd Gloss Enamel Applied 24 Hours After Epoxy Primer		2	50

3.8 Colour Schedule - General

.1 Colour numbers shown are from current brochures of manufacturers of materials.

.2 Unless otherwise indicated, colour for:

.1 Items subjected to elevated temperatures in service (valves, expansion joints, exposed parts of insulated piping, exposed parts of insulated equipment and similar items): Standard colour in appropriate protective coating system.

.2 Items totally or partially submerged: Standard colour in appropriate protective coating system.

.3 Items buried: Standard colour in appropriate protective coating system.

3.9 Colour Schedule – Equipment Items

.1 Aluminum cable trays: Unfinished.

.2 Electrical panels: Prefinished ANSI/ASA #61 Grey.

.3 Galvanized steel conduit: Prefinished ANSI/ASA #61 Grey.

3.10 Colour Schedule – Piping (Process and Building Service)

.1 Ferrous, bituminous coated, PVC, galvanized and fabric jacketted substrates: Paint full surface of pipe and accessories in accordance with the colour scheduled to be provided by the Contract Administrator. Piping requiring painting include the following:

Service
Natural Gas
Aqua Ammonia
Chilled Water
Compressed Air
Ferric Chloride
Fire Protection
Heating Water
Plant Service Water
Plumbing Vents
Potable Water
Process Drain
Process Overflows
Sample
Sanitary Drain
Sodium Hydroxide
Sodium Hypochlorite
Storm Water
Sulphuric Acid

3.11 Colour Schedule – Miscellaneous

.1 Fan guards and motor guards: Red machinery enamel.

.2 Mechanical supports, piping supports: Black.

.3 Main and secondary control panels, factory finish acceptable.

END OF SECTION

SPECIALTY COATINGS

1. GENERAL

1.1 Work Included

.1 Supply and installation of specialty coatings for concrete and steel used on the liquid-retaining side of structures.

.2 Supply and installation of specialty coatings for concrete and steel used for other areas as indicated on the Drawings.

1.2 Qualification

.1 Installation is to be done by an established firm having at least ten (10) years of proven, satisfactory experience in this trade and employing skilled personnel. The firm is to be authorized by the coating manufacturer to install the specified product and product line.

.2 The coating manufacturer is to have a minimum of ten (10) years proven, satisfactory experience in the manufacturing of chemical containment coating systems that are recommended by the Manufacturer.

.3 Each coating system is to have a proven minimum one (1) full year containment with exposure to the chemical in which it is intended to contain, with no detrimental effects and staining on the coating system after spills of 72 hour duration.

.4 Submit proof of qualifications and authorization in writing to the Contract Administrator, four weeks prior to commencement of Work.

1.3 Design Standards, Code Requirements

.1 Conform to requirements of SSPC Publications and visual standards, explanatory notes, comments and appendices:

.1 SSPC-PA-1 Shop, field and maintenance painting

.2 SSPC-SP-1 Solvent cleaning

.3 SSPC-SP-2 Hand cleaning

.4 SSPC-SP-3 Power tool cleaning

.5 SSPC-SP-5 White Metal Blast Cleaning

.6 SSPC-SP-6 Commercial blast cleaning

.7 SSPC-SP-7 Brush off blast cleaning

.8 SSPC-SP-10 Near white metal blast cleaning

.9 SSPC-SP-13 Surface Preparation of Concrete

1.4 Submittals

.1 Submit Submittals in accordance with Section 01300 - Submittals.

.2 The coatings Manufacturer shall certify in writing that the recommended system for containment coating has been used for ten (10) years in such containment, and that the Manufacturer's warranty includes intended chemical service and crack-bridging.

.3 Submit colour samples of coating, minimum colour sample size 50 mm x 100 mm with finish indicated.

.4 Indicate location of where the specific coating is to be applied.

.5 Indicate specific coating sequence for each coating system and substrate.

.6 Indicate dry film thickness requirements for each coating layer within the coating system.

.7 Submit manufacturer's product data sheets and installation guides. A minimum of one (1) copy of the reviewed product data sheets and installation guides shall remain on Site at all times for all to view.

.8 Prepare 300 mm x 200 mm samples of each coating type to Contract Administrator. Apply finishes on identical type materials to which they will be applied.

.9 Submit manufacturer's preferred keyed-in coating termination detail for review by the Contract Administrator. Modify the termination detail as requested by the Contract Administrator at no additional cost.

1.5 Inspection and Testing

.1 Allow ample time for notification, review, and corrective Work, if required, before scheduling coating installation.

.2 Inspection, and testing is to be performed by a third party CSA and SSPC certified inspection and testing firm. Testing of substrate required to be preformed prior to the application of the coating and while the coating is being applied and curing is to be paid for by the Contractor. Testing of coating once the coating is cured, will be paid for by the City. Provide unencumbered access to all portions of Work and cooperate with appointed firm.

.3 Notify the Contract Administrator at least 48 hours in advance of any coating installation or final substrate preparation.

.4 Repair all areas where the substrate surfaces and coatings were tested.

.5 Testing of concrete will be performed in accordance with the indicated SSPC design standards. Test results are to be issued to the Contractor, the Contract Administrator, and the City.

.6 The Contractor is to pay costs for required retesting due to defective materials or workmanship.

.7 A minimum of two (2) complete SSPC tests are to be performed on each concrete wall of each containment cell.

.8 A minimum of two (2) complete SSPC tests are to be performed on each concrete floor of each containment cell.

.9 A minimum of one (1) complete SSPC test is to be performed on each concrete housekeeping pad that a tank bears on, in each containment cell.

.10 A minimum of one (1) complete SSPC test is to be performed on each concrete sump pit in each containment cell.

.11 A minimum of one (1) complete SSPC test is to be performed on each concrete pipe trough in each containment cell.

.12 A minimum of one (1) complete SSPC visual review is to be performed on each steel or aluminum support structure within each containment cell.

1.6 Maintenance Data

.1 Provide maintenance data for coatings complete with pertinent details, data sheets, and warnings against harmful maintenance materials and practices for incorporation into maintenance manual.

2. PRODUCTS

.1 Quality: Manufacturer's highest quality products suitable and guaranteed for intended use.

.2 The same Manufacturer is to be used for the Work.

.3 Coating systems to be monolithic and pinhole free.

.4 Coating system used for different substrates within the same containment area are to be compatible to allow for full encapsulation of embedded items.

.5 Coating system to fully encapsulate column base plates and anchor bolts within the containment areas. Grouts and injection gel epoxy used for anchor bolt anchorage or support are not intended to provide secondary containment. Coating system is to be compatible grouts and injection gel epoxy.

.6 Coating system used on the floors of containment areas are to be slip resistant. Do not use sand or other abrasive minerals as a broadcasting girt to obtain slip resistance.

.7 Coating systems must be capable of bridging a 300 µ moving cracks, such as shrinkage cracks, in the concrete substrate, with no breach or damage of any kind to the coating

system. Coating must have memory and open or close with moving cracks without developing cracks or wrinkles. Manufacturer must show such crack-bridging of 300 µ in a mechanical demonstration unit as a submittal prior to an award.

.8 Coating systems at full extension of crack-bridging shall not be damaged and must be certified to withstand the chemicals listed at full extension of crack-bridging with no adverse effects of any kind.

.9 Coating Manufacturer shall certify and guarantee that the coating systems recommended shall be totally unaffected by UV light exposure on a 24 hour per day basis.

.10 Coatings shall be applied in containment areas to all concrete, miscellaneous steel fabrications, and structural steel surfaces from main floor elevation and down, except FRP and galvanized grating surfaces.

.11 Acceptable coating manufacturer's are:

.1 Carboline Coatings Company, St. Louis, MO

.2 KCC Corrosion Control Co. Ltd., Houston TX

.12 Colours to be selected by the City from submitted samples.

.13 Chemical Storage Building, Coating-1 design requirements:

.1 Chemical: 39% Ferric Chloride

.2 Containment period: 72 hours

.3 Temperature: +15°C to +40°C

.4 Exposed to ultraviolet light

.5 Neutralization chemical for spills: Sodium Hydroxide

.6 Minimum crack bridging capability: 300 µ

.14 Chemical Storage Building, Coating-2 design requirements:

.1 Chemical: 93% Sulphuric Acid

.2 Containment period: 72 hours

.3 Temperature: +15°C to +40°C

.4 Exposed to UV light

.5 Neutralization chemical for spills: Water and Caustic Soda, Lime, or Soda Ash.

.6 Minimum crack bridging capability: 300 µ

.15 Chemical Storage Building, Coating-3 design requirements:

.1 Chemical: 50% Sodium Hydroxide

.2 Containment period: 72 hours

.3 Temperature: +15°C to +40°C

.4 Exposed to ultraviolet light

.5 Neutralization chemical for spills: Water and Sulphuric Acid

.6 Minimum crack bridging capability: 300 µ

.16 Chemical Storage Building, Coating-4 design requirements:

.1 Chemical: 19% Aqua Ammonia

.2 Containment period: 72 hours

.3 Temperature: +15°C to +40°C

.4 Exposed to ultraviolet light

.5 Neutralization chemical for spills: Dilute Sulphuric Acid

.6 Minimum crack bridging capability: 300 µ

.17 Sodium Hypochlorite Building, Coating-5 design requirements:

.1 Chemical: 0.8% Sodium Hypochlorite.

.2 Containment period: 72 hours.

.3 Temperature: +15°C to +40°C

.4 Exposed to ultraviolet light

.5 Neutralization chemical for spills: Sodium Bisulphite

.6 Minimum crack bridging capability: 300 µ

3. EXECUTION

3.1 Pre-Installation Conference

.1 Pre-installation conference for specialty coating products: prior to installation of specialty coating products, conduct a meeting with applicator, installers of Work adjacent to or that

penetrates the specialty coating products, the Contract Administrator and Manufacturer's Representative to review the following:

.1 General project requirements.

.2 Manufacturer's product data sheets and installation guides.

.3 Substrate conditions, moisture content, procedures for substrate preparation, and product installations.

.4 The Manufacturer's Representative is to issue reports to the Contract Administrator confirming that the substrate conditions and installation procedures are being followed for each area were the specific product is being utilized.

.5 Responsibility and costs associated with verification and correlation of field dimensions, fabrication processes, techniques of construction, installation, and coordination of Work and Manufacturer's Representative for all parts of the Work rests with the Contractor.

3.2 General

.1 Notify the Contract Administrator of any conditions which would prejudice proper installation of this Work.

.2 Commencement of this Work implies acceptance of existing conditions.

.3 Steel substrates to be prepared to a SSPC-SP 5, White Metal Blast Cleaning.

.4 Concrete substrates to be prepared to SSPC-SP 13, Table 1, Severe Service.

.5 Apply each coat as a continuous film of uniform thickness. Recoat thin spots or bare areas before next coat of the coating is applied.

.6 Remove weld spatter, weld slag and flux from metal before coating.

.7 Remove concrete spatter and droppings before coating is applied.

.8 Remove defective or damaged coatings as required by the Contract Administrator. Cost for defective or damaged coating removal and replacement will be at the Contractor's expense.

.9 Relative humidity of the concrete surface for concrete substrates is to conform to SSPC-SP13 Table 1 Severe Service, using the ASTM F 2170 test method except that the relative humidity is to be less than 50 percent after surface preparation.

.10 Concrete surface tensile strength shall be 2.1 MPa minimum. Remediation of the concrete for values lower then 2.1 MPa will be at the Contractor's expense.

.11 pH readings following final rinse of a concrete substrate are not to be more than 1.0 pH unit lower or 2.0 pH units higher than the pH of the rinse water tested at the beginning and end of the final rinse cycle.

.12 Termination of coatings to be keyed into the concrete substrate.

3.3 Protection

.1 Protect other surfaces from substrate preparation, coatings and damage. Repair damage.

.2 Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.

.3 Collect waste, cloths and material which may constitute a fire hazard, place in closed metal containers and remove daily from Site.

3.4 Brush Application

.1 Where spray applications is not practical, work paint into cracks, crevices and corners and paint surfaces by brush.

.2 Brush out runs and sags.

.3 Remove runs, sags and brush marks from finished Work and repaint.

3.5 Spray Application

.1 Provide and maintain specialized equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.

.2 Provide traps or separators to remove oil and water from compressed air and drain periodically during operations.

.3 Test equipment for proper mixing proportion prior to application of coating following Manufacturer's written instructions.

.4 Apply paint in uniform layer, with overlapping at edges of spray pattern.

.5 Brush out immediately runs and sags.

.6 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray. In areas not accessible to spray gun, use brushes, daubers or sheepskins.

.7 Remove runs, sags and brush marks from finished Work and repaint.

3.6 Shop Painting

.1 Do shop painting after fabrication and before damage to surface occurs from weather or other exposure.

.2 Do not shop paint metal surfaces which are to be embedded in concrete.

.3 Copy previous erection marks and weight marks on areas that have been shop painted as required.

3.7 Field Painting

.1 Paint steel structures as soon as practical after erection.

.2 Touch up metal which has been shop coated with same type of paint and to same thickness as shop coat. This touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.3 Field paint surfaces which are accessible before erection but which are not to be accessible after erection.

.4 Do not apply specialty coatings until concrete Work is completed and cured as required by the coating manufacturer, except as directed by Contract Administrator. If concreting or other operations damage paint, clean and repaint damaged area.

3.8 Extended Warranty

.1 Provide a five (5) year warranty against delamination of the coating and coating system, delamination of the coating and coating system from the substrate, defective coating and coating system application, and defects in the coating and coating system. Defects in the coating system will also include staining of the coating or coating system from the specified chemicals and neutralization chemicals.

END OF SECTION