FINISHES GENERAL REQUIREMENTS

1. GENERAL

1.1 Summary

.1 This Section covers the finishes and coatings general requirements.

1.2 Submittals

.1 Provide submittals in accordance with Section 01300 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit exterior and interior materials and finishes design concept, complete with labelled samples in large sizes. Submit finalized exterior and interior material boards.

2. PRODUCT

2.1 Performance Criteria

.1 Refer to Schedule 18 Technical Requirement for Corrosion Study in the Design Build Agreement. Modify the coating within this Specification Section according to the Corrosion Study.

.2 In areas where water is expected to be present as part of cleaning or other procedures, allow water to collect and exit without damaging finishes or substrates.

.3 In areas subject to regular wetting, use durable finish materials able to withstand damage and that are easily replaceable or repairable in sections in case of damage.

.4 Select finishes and colours to prevent glare and minimize artificial lighting requirements.

.5 Select materials to promote sustainability by, for instance, having low-emissivity or comprising renewable resources.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

PLASTER AND GYPSUM BOARD

1. GENERAL

1.1 Summary

.1 This Section specifies plaster and gypsum board.

1.2 Standards

.1 American Society for Testing and Materials (ASTM):

.1 ASTM C475/C475M, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.

.2 ASTM C840, Standard Specification for Application and Finishing of Gypsum Board.

.3 ASTM C1047, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.

.2 Gypsum Association (GA) - GA-214, Recommended Levels of Gypsum Board Finish.

.3 Association of the Wall and Ceilings Industries International (AWCI) - Specification Standards Manual.

.1 Underwriters Laboratories of Canada (ULC).

.2 National Building Code (NBC).

1.3 Submittals

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit Shop Drawings for plaster and gypsum board.

2. PRODUCTS (NOT USED)

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer’s recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

3.2 Gypsum Board

.1 Gypsum board shall be minimum 16 mm thick.

.2 Apply Type X (fire rated) gypsum board where indicated, to obtain fire ratings as indicated or required. Indicate ULC rating classification for all fire separations.

.3 At door and window openings in fire-rated walls and partitions install gypsum board filler full width and length of opening to cover stud header as specified in NBC.

.4 Install shaft wall systems in accordance with Manufacturer's instructions and ULC requirements to obtain fire ratings indicated.

.5 Use cementitious backer board (tile backer board) behind ceramic wall tile in wet areas. Use glass mat water-resistant gypsum backing panels behind sinks.

.6 Use plywood backed gypsum board where required for increased resistance to abrasion, indentation, and penetration of interior walls and to provide additional structural stability and loading for wall-mounted equipment and artwork.

.7 Use glass mat-surfaced gypsum sheathing board wherever exterior gypsum sheathing is required at exterior walls.

3.3 Airborne Sound Isolation

.1 Provide airborne sound insulation for gypsum board and steel stud assemblies to eliminate air leaks and flanking paths by which noise can by-pass the assembly. Make assemblies airtight.

.2 Do not install recessed wall fixtures such as cabinets or electrical, telephone and television outlets, which perforate the gypsum board surface back-to-back.

.3 Cut any opening for fixtures to the proper size and appropriately seal piping penetration. Seal conduit, duct, and piping penetrations with tape and fill at the plenum barrier.

.4 Make the entire perimeter of a sound-insulating assembly airtight to prevent sound flanking.

.5 Use an acoustic caulking compound or acoustical sealant to seal between the assembly and all dissimilar surfaces (including at window mullions).

END OF SECTION

TILING

1. GENERAL

1.1 Summary

.1 This Section specifies tiles.

1.2 Standards

.1 Terrazzo Tile and Marble Association of Canada (TTMAC) specification guide 09300 Tile Installation Manual.

.2 American Society for Testing and Materials (ASTM).

1.3 Submittals

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Shop Drawings for all tiles.

2. PRODUCTS

2.1 Performance Criteria

.1 For installations on wet and exterior surfaces, use floor tiles that have the following static coefficients of friction as per the ASTM:

.1 Level surfaces: not less than 0.50 for wet and dry conditions.

.2 Stair treads: not less than 0.60 for wet and dry conditions.

.3 Ramp surfaces: not less than 0.60 for wet and dry conditions.

.2 For exterior installations, provide frost-resistant exterior tiles with a moisture absorption rating of 3.0 percent or less.

.3 Provide control joints and expansion joints as required by the Final Design.

.4 Provide a waterproof membrane under floor tile in showers and other wet areas. The membrane may be trowel-applied, built-up, liquid-applied or sheet-applied.

.5 Provide crack isolation membranes to resist crack transmission from the substrate due to lateral movement. Design for use in thin-set applications of tile over a cracked substrate. Use elastomeric sheets or trowel-applied materials suitable for subsequent bonding of tile.

.6 Set tile with latex-modified mortar and grout with epoxy grout.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

CEILING

1. GENERAL

1.1 Summary

.1 This Section specifies ceiling systems.

1.2 Submittals

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Shop Drawings for all ceiling products.

2. PRODUCTS

2.1 Performance Criteria

.1 Provide ceiling systems and ceiling finishes to comply with the following criteria, tailored to particular or specific functions of the space:

.1 Cleaning and maintenance.

.2 Flexibility and access to the spaces above.

.3 Compatibility with mechanical, plumbing, electrical, communications services and fixtures.

.2 Clear height requirements are as follows:

.1 Offices, meeting rooms, labs and janitorial rooms shall be a minimum of 3 m to the underside of ceiling.

.2 Corridors shall vary in height with relation to access routes and accessibility of equipment for the spaces to which they are connecting but should be a minimum 3 m to the underside of ceiling.

.3 Maintain ceiling heights of spaces designated with audio-visual equipment free of sight line intrusions including mechanical, electrical, projector equipment and other obstacles.

.3 Provide ceiling access at appropriate locations in areas such as storage rooms, closets and service spaces.

.4 Interior sound levels shall be controlled to meet noise requirements as set out in the Technical Requirements. Acoustic ceiling tiles shall be installed to meet the level set out in the Final Design.

.5 Acoustic tile ceilings and wood batten:

.1 Ceiling tiles and wood batten may be used in the following locations:

.1 Corridors and common areas.

.2 Offices.

.3 Meeting rooms.

.4 Lounges.

.5 Control rooms.

.6 Other Rooms as required by Final Design.

.2 Acoustic Panel and T-Bar: select regular medium-price panels in public areas and user rooms to fit a standard 15/16" T-bar grid panel size.

.3 Install acoustic ceiling tiles in the suspension system to attenuate sounds to the levels set out in the Technical Requirements and the Final Design.

.4 Provide accessibility to the ceiling spaces where required for mechanical, electrical or other service systems.

.5 Provide acoustical panels that are appropriate for the normal occupancy condition range of 15°C to 29°C and maximum 60 percent relative humidity. When the service use temperature and relative humidity are expected to exceed these ranges, use acoustical units specifically designed for such applications.

.6 Use tiles with scratch-resistant surfaces and sealed edges in any area where lay-in ceiling panels frequently need to be removed for mechanical access.

.6 Hard ceilings:

.1 Finish hard ceilings in accordance with the paint specifications in Section 09900.

.2 Provide hard ceilings for the following rooms:

.1 Janitorial and utility rooms.

.2 Washrooms.

.3 Change rooms and shower rooms.

.4 Other designated areas to support the function of the space.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

FLOORING

1. GENERAL

1.1 Summary

.1 This Section specifies flooring systems apart from tiling.

1.2 Standards

.1 National Floor Covering Association (NFCA) Floor Covering Reference Manual.

1.3 Submittal

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Submit resilient flooring products schedule for areas such as service corridors, service areas, staff work areas or other similar areas.

.3 Provide 150 mm x 150 mm finished sample of each different floor type to be used. Sample to display sheen, texture and smoothness.

2. PRODUCTS

2.1 General

.1 Seal all penetrations to prevent the entrance of air, insects, and rodents.

.2 Where epoxy flooring is used in wet areas, use water- and slip-resistant grade epoxy and prevent water or moisture transmission to the substrate. Provide integral cove base with the floor in wet areas.

.3 Use heavy-duty materials for flooring where wheeled equipment traffic is expected and where wear and damage may result.

.4 Use anti-static flooring material for telecommunication rooms.

.5 Floating floors may be used for acoustic isolation where required or specified.

.6 Stair covering:

.1 Where not using concrete finish, use coordinated one-piece treads, sheet risers and nosings.

2.2 Performance Criteria

.1 Floor finishes shall comply with the following criteria:

.1 Ergonomic comfort, cleaning and maintenance including a minimized frequency of joints, and ease of replacement if and when required.

.2 Imperviousness to concentrations of moisture expected to be present and duration of that moisture.

.3 Permanence, durability and resistance to high traffic.

.4 Aesthetic and design qualities.

.5 Compatibility of textures with pedestrian safety.

2.3 Polished Concrete

.1 Where polished concrete flooring is used, provide a motorized steel trowel finish with sealer.

.2 Provide integral conduit grids at uniform levels in polished concrete floors.

.3 Provide slip coefficient, as required for the Final Design.

2.4 Resilient Flooring

.1 If used, provide rubber flooring tile formulated with 100 percent virgin elastomers, reinforcing agents, soil-resisting agents, and migrating waxes compounded to create durability, excellent cleaning characteristics, and exceptional slip resistance.

.2 Hot-weld all seams.

.3 Use solvent-based low-odour flooring adhesive.

.4 Finish flooring with high-speed buffing in accordance with Manufacturer's specifications.

.5 Provide tactile warning strips and stair nosings as part of an integral product system to assist the visually impaired.

2.5 Seamless Quartz Epoxy Flooring

.1 Seamless quartz epoxy flooring may be used.

.2 If used, provide seamless epoxy flooring with 100 percent solids, zero volatile organic compounds (VOCs), solvent-free comprised of a two-component epoxy primer, a two-component epoxy resin and curing agent, coloured quartz aggregate broadcast into both primer and undercoat, and a high-performance, UV-resistant two-component, clear epoxy sealer. Provide appropriate bases.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

ACOUSTIC TREATMENT

1. GENERAL

1.1 Summary

.1 This Section specifies acoustic treatment systems.

1.2 Submittal

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Provide acoustic report indicating reverberation time for rooms necessary to create a safe and comfortable environment.

2. PRODUCTS

2.1 Performance Criteria

.1 Provide acoustic treatment where sound attenuation, soundproofing or other sound control measure is required to create a safe and comfortable environment.

.2 Design partition and ceiling construction to provide approximately the same degree of sound control through each assembly. When a partition is used for sound isolation, extend the sound control construction from floor to floor.

.3 Maintain best sound isolation by minimizing degradation to the integrity of partitions and ceilings (mass) by vent or grille cut-outs or by recessed cabinets, light fixtures, and other variations in the wall structure profile.

.4 Where penetrations are necessary, do not placing them back-to-back or adjacent to each other. Stagger electrical boxes by at least one stud space. Use mineral fibre insulation to seal joints around all cut-outs such as electrical, television and telephone outlets, behind plumbing escutcheons and recessed cabinets.

.5 Minimize constructions such as ducts, rigid conduits, or corridors that act as speaking tubes to transmit sound from one area to another. At common supply and return ducts, provide sound attenuation liners at the diffuser or grill to maintain assembly’s sound transmission class. Seal around conduits.

.6 Isolate structure-borne vibrations and sound with resilient mountings on vibrating equipment to dampen sound transfer to the structure. Provide ducts, pipes, and conduits with resilient, non-rigid boots or flexible couplings where they leave vibrating equipment. Isolate these services from the structure with resilient gaskets and sealant where they pass through walls, floors, or other building surfaces.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

COATING SYSTEMS

1. GENERAL

1.1 Summary

.1 This Section specifies coating systems, surface preparation, and application requirements, in accordance with Section 09905.

1.2 Standards

.1 American National Standards Institute (ANSI):

.1 ANSI/NSF 61 - Drinking Water System Components Health Effects.

.2 ANSI B74.18 - Grading of Certain Abrasive Grain on Coated Abrasive Material.

.2 American Society for Testing and Materials (ASTM):

.1 ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

.2 ASTM D2200 (SSPC-VIS1) - Pictorial Surface Preparation Standards for Painting Steel Surfaces.

.3 ASTM D3930 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.

.4 ASTM D4262 - Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.

.5 ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.

.6 ASTM D4414 - Standard Practice for Measurement of Wet Film Thickness by Notch Gages.

.7 ASTM D4417 - Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel.

.8 ASTM D4541 - Standard Test Methods for Pull-Off Strength of Coatings on Metal Substrates Using Portable Adhesion Testers.

.9 ASTM D4787 - Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates.

.10 ASTM D5162 - Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates.

.11 ASTM D7234 - Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Adhesion Testers.

.12 ASTM E337 - Standard Test Method for Measuring Humidity with a Psychrometer.

.13 ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

.3 FS 595b - Federal Standard Colors.

.4 ICRI 03732 - Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

.5 National Association of Corrosion Engineers (NACE):

.1 NACE Publication 6D-163 - A Manual for Painter Safety.

.2 NACE Publication 6F-163 - Surface Preparation of Steel or Concrete Tank/Interiors.

.3 NACE Publication 6G-164 A - Surface Preparation Abrasives for Industrial Maintenance Painting.

.4 NACE Standards - January 1988 Edition of the National Association of Corrosion Engineers, TPC.

.5 NACE Standard RP0188 - Standard Recommended Practice – Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.

.6 NACE Standard RP0288 - Standard Recommended Practice, Inspection of Linings on Steel and Concrete.

.7 NACE Standard RP0892 - Standard Recommended Practice, Linings Over Concrete in Immersion Service.

.8 NACE Publication TPC2 - Coatings and Linings for Immersion Service.

.6 National Association of Pipe Fabricators (NAPF):

.1 NAPF 500-03 - Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings.

.2 NAPF 500-03-04 - Abrasive Blast Cleaning for Ductile Iron Pipe.

.3 NAPF 500-03-05 - Abrasive Blast Cleaning for Cast Ductile Iron Fittings.

.7 The Society for Protective Coatings (SSPC):

.1 SSPC - Paint Application Specification No. 1.

.2 SSPC-AB 1 - Mineral and Slag Abrasives.

.3 SSPC-PA 1 - Shop, Field, and Maintenance Painting of Steel.

.4 SSPC-PA 2 - Measurement of Dry Coating Thickness with Magnetic Gages.

.5 SSPC-PA 9 - Measurement of Dry Coating Thickness on Cementitious Substrates Using Ultrasonic Gages.

.6 SSPC-PA Guide 1 - Guide for Illumination of Industrial Painting Project.

.7 SSPC-PA Guide 3 - A Guide to Safety in Paint Application.

.8 SSPC-PA Guide 6 - Guide for Containing Debris Generated During Paint Removal Operations.

.9 SSPC-PA Guide 11 - Guide for Coating Concrete.

.10 SSPC SP1 - Solvent Cleaning.

.11 SSPC SP2 - Hand Tool Cleaning.

.12 SSPC SP3 - Power Tool Cleaning.

.13 SSPC SP5 - White Metal Blast Cleaning.

.14 SSPC SP6 - Commercial Blast Cleaning.

.15 SSPC SP7 - Brush-Off Blast Cleaning.

.16 SSPC SP10 - Near-White Blast Cleaning.

.17 SSPC SP11 - Power Tool Cleaning to Bare Metal.

.18 SSPC SP12 - Surface Preparation and Cleaning of Steel and Other Hard Materials by High and Ultra-High Pressure Water Jetting Prior to Recoating.

.19 SSPC SP13 - Surface Preparation of Concrete.

.20 SSPC-TR2 - Wet Abrasive Blast Cleaning.

.21 SSPC-TU-3 – Overcoating.

.22 SSPC-TU-4 - Field Methods for Retrieval and Analysis of Soluble Salts on Substrates.

.23 SSPC V2 - Systems and Specifications: Steel Structures Painting Manual, Volume 2.

.24 SSPC-VIS 1 - Visual Standard for Abrasive Blast Cleaned Steel.

.25 SSPC-VIS 3 - Visual Standard for Power and Hand – Tool Cleaned Steel.

.26 SSPC-VIS 4 - Visual Standards (Waterjetting).

.27 SSPC-VIS 5 - Visual Standards (Wet Abrasive Blast Cleaning).

.8 Workplace Safety and Health Act and Regulations (WHSA).

.9 WPCF Manual of Practice No. 17 - Paints and Protective Coatings for Wastewater Treatment Facilities, Guide and Paint Application Specifications.

1.3 Definitions

.1 Abrasive: Material used for blast cleaning, such as sand, grit or shot.

.2 Abrasive Blast Cleaning: Cleaning/surface preparation by abrasive propelled at high speed.

.3 Anchor Pattern: Profile or texture of prepared surface(s).

.4 Bug Holes: Small cavities, usually not exceeding 15 mm in diameter, resulting from entrapment of air bubbles in the surface of formed concrete during placement and compaction.

.5 Coating/Paint/Lining Thickness: The total thickness of primer, intermediate and/or finish coats.

.6 Coating System Applicator: A generic reference to the specialty subcontractor or subcontractors retained to install the coating systems specified in this Section.

.7 Coating System Manufacturer (CSM): Refers to the qualified coating system manufacturer.

.8 Coating System Manufacturer's Technical Representative(s) (CTR): Refers to the technical representative(s) of the Coating System Manufacturer and is abbreviated as CTR.

.9 Dew point: Temperature of a given air/water vapor mixture at which condensation starts.

.10 Dry Film Thickness (DFT): Depth of cured film, usually expressed in micron (0.001 mm).

.11 Drying Time: Time interval between application and curing of material.

.12 Dry to Recoat: Time interval between application of material and ability to receive next coat.

.13 Dry to Touch: Time interval between application of material and ability to touch lightly without damage.

.14 Feather Edging: Reducing the thickness of the edge of paint.

.15 Feathering: Operation of tapering off the edge of a point with a comparatively dry brush.

.16 Field Coat: The application or the completion of application of the coating system after installation of the surface at the Site.

.17 Hold Point: A defined point, specified in this Section, at which work is halted for inspection.

.18 Holiday: a discontinuity, skip, or void in coating or coating system film that exposes the substrate.

.19 Honeycomb: Segregated condition of hardened concrete due to non-consolidation.

.20 ICRI: International Concrete Repair Institute.

.21 Incompatibility: Inability of a coating to perform well over another coating because of bleeding, poor bonding, or lifting of old coating; inability of a coating to perform well on a substrate.

.22 Laitance: A layer of weak, non-durable concrete containing cement fines that is brought to the surface through bleed water because of concrete finishing and/or over-finishing.

.23 Micron: 0.001 mm.

.24 Overspray: Dry spray, particularly such paint that failed to strike the intended surface.

.25 Pinhole: A small diameter discontinuity in a coating or coating system film that is typically created by outgassing of air from a void in a concrete substrate resulting in exposure of the substrate or a void between coats.

.26 Pot Life: Time interval after mixing of components during which the coating can be satisfactorily applied.

.27 Resurfacer/Resurfacing Material: A layer of cementitious and/or resin-base material used to fill or otherwise restore surface continuity to worn or damaged concrete surfaces.

.28 Shelf Life: Maximum storage time for which a material may be stored without losing its usefulness.

.29 Shop Coat: One or more coats applied in a shop or plant prior to shipment to the site of the work, where the field or finishing coat is applied.

.30 Solvent Cleaning: Any solvent wash, solvent wipe, or cleaner used, including but not limited to those used for surface preparation in accordance with SSPC SP-1.

.31 Spreading Rate: Area covered by a unit volume of paint at a specific thickness.

.32 Stripe Coat: A separate coat of paint applied to all weld seems, pits, nuts/bolts/washers and edges by brush. Do not apply this coat until any previous coat(s) have cured and once applied, allow to cure prior to the application of the subsequent coat(s).

.33 Surface Saturated Dry (SSD): Concrete surface condition where the surface is saturated (damp) without the presence of standing water.

.34 Tie Coat: An intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.

.35 Touch-up Painting: The application of paint on areas of painted surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.

.36 VOC, Volatile Organic Content: The portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in g/L.

.37 Immersion: Refers to a service condition in which the substrate is below the waterline or submerged in water or wastewater at least intermittently if not constantly.

.38 Weld Splatter: Beads of metal scattered near seam during welding.

.39 Wet Film Thickness (WFT): The primer or coating film's thickness immediately following application. Wet film thickness is measured in micron or thousandth of an mm (0.001 mm) and is abbreviated WFT.

1.4 Submittals

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Quality assurance and quality control records.

.3 Provide Manufacturer's current printed recommendations and product data sheets for coating systems including:

.1 VOC data.

.2 Surface preparation recommendations.

.3 Primer type, where required.

.4 Maximum dry and wet-mil thickness per coat.

.5 Minimum and maximum curing time between coats, including atmospheric conditions for each.

.6 Curing time before submergence in liquid.

.7 Thinner to be used with each coating.

.8 Ventilation requirements.

.9 Minimum atmospheric conditions during which the paint is applied.

.10 Allowable application methods.

.11 Maximum allowable moisture content.

.12 Maximum shelf life.

.4 Provide certificates signed and sealed by an officer of Manufacturer's corporation, attesting to full compliance of each coating system component with current and promulgated federal, provincial, and local air pollution control regulations and requirements.

.5 Provide Manufacturer's detailed, written instructions for coating system treatment and graphic details for coating system terminations in the structures to be coated including pipe penetrations, metal embedments, gate frames, and other terminations as required for the Final Design. Include detail treatment for coating system at joints in concrete.

.6 Provide a minimum of five (5) project references each including contact name, address, and telephone number where similar coating work has been performed by their companies in the past five (5) years.

.7 Prior to application of coatings, submit letter(s) from Manufacturer's technical representative identifying the application personnel who have satisfactorily completed training as specified in this Section or a letter from Manufacturer stating that personnel who designated to perform the work are approved without need for further or additional training.

.8 Complete the Coating System Inspection Checklists. Provide checklist template.

.9 Provide MSDS for materials to be delivered to the site, including coating system materials, solvents, and abrasive blast media.

.10 Provide list of cleaning and thinner solutions allowed by the manufacturers.

1.5 Quality Assurance

.1 For standard products other than those specified, demonstrate that they are equal in composition, durability, usefulness, and convenience for the purpose intended.

.2 Identify the points of access for inspection. Provide ventilation, ingress and egress, and other means necessary to safely access the work areas.

.3 Conduct and inspect the work so that the coating system is installed as specified. Correct any coating system work that does not conform to the specifications.

.4 Develop a coating checklist and sign off at each step based on the coating system. Follow the sequential steps required for proper coating system installation as specified and as listed in the coating system inspection checklist. For each portion of the work, install the coating system and complete signoffs as specified prior to proceeding with the next step. After completing each step as indicated on the coating system inspection checklist, sign the checklist indicating that the work has been installed and inspected as specified.

.5 Provide written daily reports that present, in summary form, test data, work progress, surfaces covered, ambient conditions, quality control inspection test findings, and other information pertinent to the coating system installation.

.6 Inspection at Hold Points:

.1 Conduct inspections at Hold Points during the coating system installation and record the results from those inspections on Hold Points Inspection Form. Provide the Hold Points Inspection Form template.

.2 Coordinate such Hold Points such that inspections may be scheduled. Provide a minimum of two (2) hours of notice prior to Hold Point Inspections.

.3 Provide Hold Points as follows:

.1 Environment and Site Conditions. Prior to commencing an activity associated with coating system installation, measure, record, and confirm acceptability of ambient air temperature and humidity as well as other conditions such as proper protective

measures for surfaces not to be coated and safety requirements for personnel. Verify the acceptability of the weather and/or environmental conditions within the structure as determined by the requirements specified by the manufacturer of the coating system being used.

.2 Conditions Prior to Surface Preparation. Prior to commencing surface preparation, observe, record, and confirm that oil, grease, and/or soluble salts have been eliminated from the surface.

.3 Monitoring of Surface Preparation. Spot checking of degree of cleanliness, surface profile, and surface pH testing, where applicable. In addition, verify the compressed air used for surface preparation or blow down cleaning is free from oil and moisture.

.4 Post Surface Preparation. Upon completion of the surface preparation, measure and inspect for proper degree of cleanliness and surface profile as specified in this Section and in Manufacturer's written instructions.

.5 Monitoring of Coatings Application. Inspect, measure, and record the wet film thickness and general film quality (visual inspection) for lack of runs, sags, pinholes, and holidays as the application work proceeds.

.6 Post-application Inspection. Identify defects in application work including pinholes, holidays, excessive runs or sags, inadequate or excessive film thickness and other problems as may be observed.

.7 Post-cure Evaluation. Inspect the overall dry film thickness. Conduct a DFT survey, as well as perform adhesion testing, holiday detection, or cure testing as required based on the type of project and the specific requirements in this Section and/or in the manufacturer's written instructions.

.8 Follow-up to Corrective Actions and Final Inspection and re-inspect corrective coating work performed to repair defects identified at prior Hold Points. This activity also includes final visual inspection along with follow-up tests such as holiday detection, adhesion tests, and DFT surveys.

1.6 Delivery, Storage and Handling

.1 Refer to COATSPEC sheets at the end of this Section for storage and handling requirements specific to each coating system.

2. PRODUCTS

2.1 Performance Criteria

.1 Refer to Schedule 18 Technical Requirement for Corrosion Study in the Design Build Agreement. Modify the coating within this Specification Section according to the Corrosion Study.

.2 Select coating system for durability, corrosion resistance and longevity.

.3 Prepare surfaces as recommended by Manufacturer and follow all application requirements including humidity, temperature, material, characteristics, recoat period, thickness of application safety and all other related factors that will affect the coating.

.4 Provide quality assurance programs for coating applications.

2.2 Materials and Products

.1 Notwithstanding the listing of product names in this Section, provide certificates, signed and sealed by an officer of Manufacturer's corporation, attesting to full compliance of each coating system component with current and promulgated federal, provincial, and local air pollution control regulations and requirements. Do not apply coatings to a surface until the specified certificates have been submitted and have been accepted by the designer.

.2 The following list specifies the acceptable products for the coating systems. Coating systems are categorized by generic name followed by an identifying abbreviation. If an abbreviation has a suffix number, it is for identifying subgroups within the coating system.

COATING SYSTEMS

Coating System	CSM Or approved equivalent	First Coat(s) Or approved equivalent		Finish Coat(s) Or approved equivalent
Epoxy Coatings				
E-1	PPG PMC	Amerlock 2/400 Series		Amerlock 2/400 Series
	Carboline	Carboguard 890		Carboguard 890
	International Paint/ICI	Devran 224 HS		Devran 224
	Sherwin Williams	Macropoxy 646		Macropoxy 646
	Tnemec	Series V69		Series V69
E-2	PPG PMC	Amerlock 2/400 Series		Amerlock 2/400 Series
	Carboline	Carboguard 890		Carboguard 890
	International Paint/ICI	Bar-Rust 236		Bar-Rust 236
	Sherwin Williams	Sea Guard 6000 Epoxy N11-400		Sea Guard 6000 Epoxy N11-400
	Tnemec	Series V27 or V69		Series V69
E-9	PPG PMC	Amercoat 395 FD		Amercoat 395 FD
	Carboline	Carboguard 890		Carboguard 890
	International Paint/ICI	Bar-Rust 231		Bar-Rust 231
	Sherwin Williams	Sea Guard 6000 Epoxy N11-400		Sea Guard 6000 Epoxy N11-400
	Tnemec	Series 104		Series 104
Specialty Epoxy Linings				
EA-2	Carboline Carboguard	Plasite 4500S	Filler Surfacer - Carboguard 510	Plasite 4500S
	Sauereisen	Sewergard 210S	Filler Surfacer - 209 HB	Sewergard 210S
	Tnemec	Series 435	Filler Surfacer - Series 218	Series 435
Epoxy Flooring Systems				
EF-1	Stonhard	Stonhard Standard Primer	Stonshield Undercoat and Broadcoat	Stoneshield Sealer
	Tnemec	Series 238	Series 238 with Broadcoat	Series 284 Clear
Epoxy Polyurethane				
EU-1	PPG PMC	Amercoat	Amercoat 385	Amercoat 450H
	Carboline	Carbozinc 859	Carboguard 890	Carbothane 134 VOC
	International Paint/ICI	Cathacoat 313	Devran 233 or 224HS	Devthane 379
	Sherwin Williams	Zinc Clad IV	Macropoxy 646	Hi-Solids Polyurethane
	Tnemec	Series 90-97	Series V69	Series 1075
EU-1-FRP	PPG PMC	Amerlock 2/400 Series		Amershield VOC
	Carboline	Carbocrylic 120		Carbothane 134 VOC
	International Paint/ICI	Devran 223/224		Devthane 378H
	Sherwin Williams	Macropoxy 646		High Solids Polyurethane
	Tnemec	Series V27		Series 1075

COATING SYSTEMS

Coating System	CSM Or approved equivalent	First Coat(s) Or approved equivalent	Finish Coat(s) Or approved equivalent
Latex Acrylic			
L-2	PPG PMC	Amercoat 220	Amercoat 220
	Carboline	Carbocrylic 120	Carbocrylic 3359
	International Paint/ICI	Prep and Prime Gripper	Ultrahide 250-1406
	Sherwin Williams	Sher Cryl HPA	Sher Cryl HPA
	Tnemec	Series 1028 or 1029	Series 1028 or 1029
General Note: See CSM's Product Data Sheets for acceptable thinners for VOC compliance or do not thin.			

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and Section 09905 and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

3.2 Preparation

.1 Prepare each type of surface in accordance with the specific requirements of each coating specification sheet (COATSPEC) and the requirements set out in this Clause 3.2. In case of a conflict between Clause 3.2 and the COATSPEC, the COATSPEC takes precedence.

.2 Coat surfaces that are clean and dry only. Before applying coating or surface treatments, remove oil, grease, dirt, rust, loose mill scale, old, weathered coatings, and other foreign substances. Remove oil and grease before mechanical cleaning. Where using mechanical cleaning by blast cleaning, provide abrasive that is washed, graded and free from contaminants that might interfere with the adhesion of the coatings. Where air is used for blast cleaning, provide air that is sufficiently free of oil and moisture so as not to cause detrimental contamination of the surfaces to be coated.

.3 A NACE International certified coatings inspector to inspect and approve surfaces to be coated before application of a coating. Correct any surface defects identified by the inspector. Submit a report including the inspection activities and findings and corrective actions.

.4 Schedule cleaning and painting so that dust and spray from the cleaning process does not fall on wet, newly coated surfaces. Remove or mask hardware, hardware accessories, nameplates, data tags, machined surfaces, sprinkler heads, electrical fixtures, and similar uncoated items which are in contact with coated surfaces prior to surface preparation and painting operations. Following completion of coating, reinstall removed items. Move and disconnect equipment adjacent to walls to permit cleaning and painting of equipment and walls and, following painting, replace and reconnect.

.5 Blast Cleaning: When abrasive blast cleaning is required to achieve the specified surface preparation, meet the following requirements for blast cleaning materials and equipment:

.1 Do not reuse used or spent blast abrasive.

.2 Filter any compressed air used for blast cleaning and verify that air does not contain condensed water and/or oil. Clean moisture traps at every four hours or more frequently as required to prevent moisture from entering the supply air to the abrasive blasting equipment.

.3 Install oil separators just downstream of compressor discharge valves and at the discharge of the blast pot discharges. Check these in the same frequency as the moisture traps as defined in Clause 3.2.5.2.

.4 Check regulators, gauges, filters, and separators on compressor air lines to blasting nozzles at least daily during this work.

.5 Install an air dryer or desiccant filter drying unit which dries the compressed air prior to blast pot connections. Check and maintain the dryer for the duration of surface preparation work.

.6 Provide venture or other high velocity type abrasive blast nozzles with a minimum 690 kPa (100 psi) air pressure and sufficient volume to obtain the blast cleaning production rates and cleanliness specified.

.7 Provide ventilation for airborne particulate evacuation (meeting pertinent safety standards) to optimize visibility for both blast cleaning and inspection of the substrate during surface preparation work.

.8 If, between final surface preparation work and coating system application, contamination of prepared and cleaned metallic substrates occurs, or if the prepared substrate's appearance darkens or changes colour, re-clean by water blasting, reblasting and abrasive blast cleaning until the specified degree of cleanliness is restored.

.9 Provide dust control and protect mechanical, electrical, and other equipment adjacent to and surrounding the work area.

.6 Solvent Cleaning:

.1 Emulsifying type.

.2 Use clean white cloths and clean fluids in solvent cleaning.

.7 Metallic Surfaces:

.1 Prepare metallic surfaces in accordance with SSPC surface preparation specifications for each coating system. See COATSPEC for each coating system in this Section. Provide and measure the profile depth of the surface to be coated in accordance with the COATSPEC requirements in this Section and by Method C of ASTM D4417. Select blast particle size such that it produces the specified surface profile. Provide the solvent in solvent cleaning operations as recommended by the manufacturer.

.2 Prepare metallic surfaces for comparison with SSPC-VIS1-89 (ASTM D2200), and as described in the COATSPEC for each coating system. If dry abrasive blast cleaning is selected and to facilitate inspection, on the first day of cleaning operations abrasive blast metal panels to the standards specified. Provide panels with minimum measurements of 210 mm by 275 mm. Coat panels with a clear non-yellowing finish.

Prepare one panel for each type of abrasive blasting and use as the comparison standard.

.3 Blast cleaning requirements for steel and ductile iron substrates are as follows:

.1 Prepare and prime before installation steel piping in accordance with SSPC SP-6 (Commercial Blast Cleaning). Prepare ductile iron piping surfaces including fittings in accordance with NAPF 500-03, NAPF 500-03-04, and NAPF 500-03-05.

.2 Abrasive blast stainless steel surfaces to leave a clean uniform appearance with a minimum surface profile of 40 to 60 microns that is uniform.

.3 Remove traces of grit, dust, dirt, rust scale, friable material, loose corrosion products or embedded abrasive from substrate by vacuum cleaning prior to coating application.

.4 After blasting, prevent contamination of the surface from worker's fingerprints, deleterious substances on workers' clothing, or from atmospheric conditions.

.5 Ambient environmental conditions in the enclosure shall be controlled to maintain cleanliness and that no "rust back" occurs prior to coating material application.

.8 Concrete Surfaces:

.1 Inspect concrete surfaces prior to surface preparation. Perform surface preparation of concrete surfaces in accordance with SSPC-SP13 (also called NACE 6).

.2 Prepare substrate cracks, areas requiring resurfacing and perform detail treatment including but not limited to, terminating edges, in accordance with manufacturer recommendations. Provide this prior to surface preparation.

.3 Evaluate the surface profile for prepared concrete surfaces to be coated by comparing the profile of the prepared concrete with the profile of graded abrasive paper, as described in ANSI B74.18 or by comparing the profile with the ICRI 03732 (surface profile replicas). Provide surface profile requirements in accordance with the COATSPEC requirements and Manufacturer's recommendations.

.4 Inspect surface cleanliness of prepared concrete substrates after cleaning, preparation, and drying, but before making repairs or applying any coating. If concrete surfaces are repaired, re-inspect for surface cleanliness prior to application of the coating system.

.5 Provide surface preparation of concrete substrates using methods such as dry abrasive blast cleaning, high, or ultrahigh-pressure water blast cleaning in accordance with SSPC-SP-13. Follow the requirements set forth below for the selected cleaning method.

.1 Substrate shall be clean and free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Use blast cleaning and other means necessary to open up air voids or bug holes to expose their complete perimeter. Do not leave shelled over, hidden air voids beneath the exposed concrete surface. Provide dry concrete substrate prior to the application of filler/surface or coating system materials.

.2 Provide only surface preparation that produces a concrete surface with a minimum pH 8.0 to be confirmed by surface pH testing. If after surface preparation, the surface pH is less than 8.0, perform additional water blasting, cleaning, or abrasive blast cleaning until pH increases to 8.0 or higher.

.3 Following inspection of the concrete surface preparation, thoroughly vacuum clean concrete surfaces to be coated to remove loose dirt and spent abrasive (if dry blast cleaning is used) leaving a dust-free, sound concrete substrate. Remove debris produced by blast cleaning from the structures to be coated and disposed of legally off site.

.6 Should abrasive blast cleaning or high or ultrahigh pressure water blasting not remove degraded concrete, use chipping or other abrading tools to remove the deteriorated concrete until a sound, clean substrate is achieved which is free of calcium sulfate, loose coarse or fine aggregate, laitance, loose hydrated cement paste, and otherwise deleterious substances. Concrete substrates shall be dry prior to the application of fillers, surfacers or coating system materials.

.7 Inspect surface cleanliness of prepared concrete substrates after cleaning, preparation, and/or drying, but prior to application of coating materials. Re-inspect concrete surfaces that are repaired for surface cleanliness and required surface profile prior to application of the coating system.

.8 Test moisture content of concrete to be coated in accordance with ASTM D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method and ASTM F 1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride. Perform plastic sheet tests in accordance with ASTM D4263 a minimum of one per 50 m^2 of surface area to be coated. The presence of any moisture on plastic sheet following test period indicates test failure.

.9 For concrete surfaces on the back side of concrete walls or structures exposed to soils (back filled) or immersed and waterproofed as specified in Section 07100. Perform calcium chloride tests in accordance with ASTM F-1869 a minimum of one per 50 m^2 of surface area to be coated. Comply with Manufacturer's written recommendations for acceptable levels of moisture vapor emissions.

.9 Masonry Surfaces:

.1 Prepare masonry surfaces such as Concrete Masonry Units (CMU) to remove chalk, loose dirt, dried mortar splatter, dust, peeling, or loose existing coatings, or otherwise deleterious substances to leave a clean, sound substrate.

.2 Dry masonry surfaces prior to coating application. If pressure washing or low-pressure water blast cleaning is used for preparation, allow the masonry to dry for at least five days under dry weather conditions or when the minimum ambient temperature is 20°C prior to coating application work.

.10 FRP Surfaces:

.1 Prepare FRP surfaces by sanding to establish uniform surface roughness and to remove gloss from the resin in the FRP. Next, vacuum to clean and remove loose FRP

dust, dirt, and other materials. Next, solvent clean using clean white rags and allow solvent to evaporate completely before application of coating materials.

3.3 Coatings

.1 Do not use coating products until the certificate(s) specified in this Section have been submitted and the manufacturer's technical representative has trained the Coating System Applicator in the surface preparation, mixing and application of each coating system.

.2 Shop and Field Applied Coatings:

.1 Prime coats shall be shop-applied, unless otherwise specified herein. Shop-applied primer shall be compatible with the specified coating system and applied at the minimum dry film thickness recommended by the manufacturer. Provide data sheets identifying the shop primer used to the on-site coating application personnel. Perform adhesion tests on the shop primer as specified in this Section. Remove and recoat surfaces of any damaged, deteriorated and poorly applied shop coatings that do not meet the requirements of this Section. If the shop primer coat meets the requirements of this Section, the field coating may consist of touching up the shop prime coat and then applying the finish coats to achieve the specified film thickness and continuity.

.2 Provide field coats that consist of one or more prime coats and one or more finish coats to build up the coating to the specified dry film thickness. Do not apply finish coats until other work in the area is complete and until previous coats have been accepted.

.3 Adhesion Confirmation:

.1 Perform an adhesion test after proper cure in accordance with ASTM D3359 to demonstrate that:

.1 The shop applied prime coat adheres to the substrate.

.2 The specified field coatings adhere to the shop coat.

.2 Only accept test results showing an adhesion rating of 5A on immersed surfaces and 4A or better on immersed surfaces for coatings 130 microns or more in thickness (Method A).

.3 Only accept test results showing an adhesion rating of 5B on non-immersed surfaces and 4B or better on non-immersed surfaces for coating thicknesses less than 130 microns.

.3 Application Location Requirements:

.1 Equipment, non-immersed.

.1 Provide shop primed and field finished coated after installation with specified or reviewed colour. If the shop primer requires topcoating within a specified period for equipment, provide shop applied finished coat and then touch-up paint after installation. If equipment removal and reinstallation is required, provide touch-up coating work in the field following installation.

.2 Equipment, immersed:

.1 Perform surface preparation and coating work in the field for items of equipment, or parts and surfaces of equipment that are immersed when in service, with the exception of pumps and valves.

.2 Verify coating systems applied to immersed equipment are pinhole free.

.3 Erect and maintain protective enclosures as stipulated per SSPC-Guide 6 for Containing Debris Generated during Paint Removal Operations.

3.4 Application

.1 Workmanship:

.1 Provide coated surfaces free from runs, drips, ridges, waves, laps, and brush marks. Apply coats to produce an even film of uniform thickness completely coating corners and crevices.

.2 Use equipment designed for application of the materials specified. Provide compressors that have suitable traps and filters to remove water and oils from the air. Perform a paper blotter test to determine if the air is sufficiently free of oil and moisture so as not to produce deteriorating effects on the coating system. Verify the amount of oil and moisture in spray air is less than the amount recommended by the manufacturer. Equip spray equipment with mechanical agitators, pressure gages, and pressure regulators, and spray nozzles of the proper sizes.

.3 Apply each coat of coating material evenly and sharply cut to line. Do not over-spray or spatter paint on surfaces not to be coated. Protect glass, hardware, floors, roofs, and other adjacent areas and installations by taping, drop cloths, or other suitable measures.

.4 Provide coating applications by conventional or airless spray, brush or roller, or trowel methods as recommended by manufacturer.

.5 Allow each coat to cure or dry thoroughly, according to manufacturer’s printed instructions, prior to recoating.

.6 Vary colour for each successive coat for coating systems.

.7 Stripe coat welds, edges of structural steel shapes, metal cut-outs, pits in steel surfaces, or rough surfaces with the primer coat when coating complex steel shapes, prior to overall coating system application, stripe. This involves applying a separate coat using brushes or rollers to ensure proper coverage. Stripe coat via spray application is not permitted.

.2 Coating Properties, Mixing and Thinning:

.1 Apply coatings that provide a satisfactory film and smooth even surface. Lightly sand glossy undercoats to provide a surface suitable for the proper application and adhesion of subsequent coats.

.2 Thoroughly stir, strain, and keep uniform consistency coating materials during application. Mix coatings consisting of two or more components in accordance with Manufacturer's instructions.

.3 Where necessary to suit the conditions of the surface, temperature, weather and method of application, thin the coatings as recommended by the manufacturer immediately prior to use. Conform the volatile organic content (VOC) of the coating applied with prevailing air pollution control regulations. Do not reduce coatings more than necessary to obtain the proper application characteristics. Provide thinner as recommended by Manufacturer.

.3 Atmospheric Conditions:

.1 Apply coatings to surfaces that are dry, and only under conditions of evaporation rather than condensation. Do not apply coatings systems during rainy, misty weather, or to surfaces upon which there is frost or moisture condensation.

.2 During damp weather, when the temperature of the surface to be coated is within 6°C of the dew point, use forced dehumidification equipment to maintain a temperature of minimum 5°C and 6°C above the dew point for the surfaces to be coated and the atmosphere in contact with the surface. Maintain these conditions for a period of at least eight hours or as recommended by Manufacturer.

.3 Where conditions causing condensation are severe, use dehumidification equipment, fans, and/or heaters inside enclosed areas to maintain the required atmospheric and surface temperature requirements for proper coating application and cure.

.4 Concrete Substrate Temperatures and Detail Treatment:

.1 When the surface temperatures of the concrete substrates to be coated are rising or when these substrates are in direct sunlight, outgassing of air from the concrete may result in bubbling, pinhole formations, and/or blistering in the coating system. Only apply filler/surface material and the coating system during periods of falling temperature. Apply the filler/surface and coating system only during the cooler evening hours.

.2 Repair bubbles, pinholes, or discontinuities that form in the applied coating system material, as recommended by Manufacturer. Repair pinholes developed in the filler/surfacer material or in the first coat of the coating material, in accordance with Manufacturer's recommendations prior to application of the next coat of material. Completely open the air void behind or beneath the pinholes and then completely fill with the specified filler/surfacer material. Next, reapply and abrade the coating over that area.

.3 Perform application detail work in accordance with Manufacturer's current written recommendations.

.5 Protection of Coated Surfaces:

.1 Do not handle, work on, or otherwise disturb items that have been coated, until the coating is completely dry and hard. After delivery at the site, and upon permanent erection or installation, recoat or retouch shop-coated metalwork with specified coating as required to maintain the integrity of the film.

.6 Coating Application Method:

.1 Where two (2) or more coats are required, provide alternate coats with sufficient compatible colour additive to act as indicator of coverage, or provide the alternate coats of contrasting colours. Do not provide colour additives that contain lead, or lead compounds, which may be destroyed or affected by hydrogen sulfide or other corrosive gas, and/or chromium.

.2 Provide mechanical equipment touch-up primed and coated with two coats of the specified coating system to match the colour scheduled.

.3 Coat electrical and instrumentation equipment specified in Division 16 as specified in this Section.

.4 Do not apply coatings to a surface until it has been prepared as specified. Apply the primer or first coat by brush to ferrous surfaces that are not blast-cleaned. Brush or spray apply coats for blast-cleaned ferrous surfaces and subsequent coats for nonblast-cleaned ferrous surfaces. Mark and repair pinholes and holidays only after the prime coat is dry in accordance with Manufacturer's recommendations and retest before succeeding coats are applied. Unless otherwise specified, brush, roll or trowel, coats for concrete and masonry.

.7 Film Thickness and Continuity:

.1 Following the application of each coat, verify the WFT of the coating system.

.2 Do not exceed the surface area covered per liter of coating for various types of surfaces by those recommended by the manufacturer. The first coat, referred to as the prime coat, on metal surfaces refers to the first full paint coat and not to solvent wash, grease emulsifiers or other pretreatment applications. Apply coatings to the thickness specified, and in accordance with these specifications. Unless otherwise specified, provide coat where the average total thickness (dry) of a completed protective coating system on exposed metal surfaces is not less than 32 micron per coat. Do not deviate the minimum thickness at any point more than 25 percent from the required average. Apply no less than two (2) coats.

.3 In testing for continuity of coating about welds, projections (such as bolts and nuts), and crevices, determine the minimum conductivity for smooth areas of like coating where the dry-mil thickness has been accepted. Provide this conductivity as a minimum for these rough or irregular areas. Recoat pinholes and holidays to the required coverage.

.4 The ability to obtain specified film thickness is generally compromised when brush or roller application methods are used and, therefore, apply more coats to achieve the specified dry film thickness if required.

.5 For concrete substrates, apply a complete skim coat of the specified filler/surfacer material over the entire substrate prior to application of the coating system. Apply such that all open-air voids and bug holes in the concrete substrate are completely filled prior to coating application.

.8 Special Requirements:

.1 Before erection, apply all but the final finish coat to interior surfaces of roof plates, roof rafters and supports, pipe hangers, piping in contact with hangers, and contact surfaces that are inaccessible after assembly. Apply the final coat after erection. Coat structural friction connections and high tensile bolts and nuts after erection. Hand clean or power tool clean and recoat areas damaged during erection with primer coat prior to the application of subsequent coats. Perform touch-up of surfaces after installation. Apply coatings only to surfaces that are clean and dry at the time of application. Except for those to be filled with grout, coat the underside of equipment bases and supports that have not been galvanized with at least two coats of primer specified for system E-2 prior to setting the equipment in place. Provide coating system terminations at leading edges and transitions to other substrates in accordance with Manufacturer's recommendations or as required for the Final Design.

.9 Electrical and Instrumentation Equipment and Materials:

.1 Coat electrical and instrumentation equipment and materials by the equipment manufacturer as specified below.

.2 Finish: Treat electrical equipment with zinc phosphate, bonderized or otherwise given a rust-preventive treatment. Prime, coat with enamel, and bake equipment. Provide minimum dry film thickness of 75 micron.

.1 Unless otherwise specified, coat instrumentation panels with system E-1 for indoor mounting and system EU-1 for outdoor mounting.

.2 Before Substantial Completion, touch up scratches on equipment with identical colour coating. Provide finish that is smooth, free of runs, and matches existing finish. Prior to touching up scratches, fill them with an appropriate filler material approved by Manufacturer.

.3 Colour:

.1 Paint exterior with FS 26463 (ANSI/NSF 61) light gray for electrical equipment. Paint interior with FS 27880 white. Provide non-metallic electrical enclosures and equipment with the equipment manufacturer's standard grey colour.

.2 Paint exterior colour of instrumentation panels and cabinets mounted indoors to FS 26463 light gray; unless otherwise specified, paint exterior colour of cabinets mounted outdoors to FS 27722, white. Paint cabinet interiors to FS 27880, white.

.10 Soluble Salt Contamination of Metallic Substrates:

.1 Test in accordance with SSPC-TU-4 metallic substrates to be coated that have been exposed to seawater or coastal air or to industrial fallout of particulate or other sources of soluble chlorides (such as wastewater exposure). If testing indicates detrimental levels of soluble salts, those in excess of 25 ppm, clean and prepare these surfaces to remove the soluble salts.

3.5 Field Quality Control

.1 City may perform, or contract with an inspection agency to perform, quality control inspection and testing of the coating work covered by this Section. These inspections may include the following:

.1 Inspect materials upon receipt to ensure that they are supplied by the manufacturer.

.2 Inspect to verify that specified storage conditions for the coating system materials, solvents and abrasives are provided.

.3 Inspect and record the degree of cleanliness of substrates.

.4 Measure and record pH of concrete and metal substrates.

.5 Inspect and record substrate profile (anchor pattern).

.6 Measure and record ambient air and substrate temperature.

.7 Measure and record relative humidity.

.8 Check for the presence of substrate moisture in the concrete.

.9 Inspect to verify that correct mixing of coating system materials is performed in accordance with Manufacturer’s instructions.

.10 Inspect, confirm, and record that the "pot life" of coating system materials is not exceeded during installation. Inspect to verify that recoat limitations for coating materials are not exceeded.

.11 Perform adhesion testing.

.12 Measure and record the thickness of the coating system.

.13 Inspect to verify proper curing of the coating system in accordance with Manufacturer's instructions.

.14 Perform holiday or continuity testing for coatings that are to be immersed or coatings that are to be exposed to aggressively corrosive conditions.

.2 Manufacturer Services:

.1 Retain or obtain the services of Manufacturer's technical representative to be on site to perform application training and to routinely inspect and verify in writing that the application personnel have successfully performed surface preparation, filler/surface application, coating system application, and quality control inspection in accordance with this Section and to warrantable level of quality. This must include checking the required degree of cleanliness, surface pH for concrete substrates, surface profile of substrates, proper mixing of coating materials, application (including checking the wet and dry film thickness of the coating systems), proper cure of the coating systems, and proper treatment of coating systems at terminations, transitions, and joints and cracks in substrates. This inspection is in addition to the other inspections performed in accordance with this Section.

.3 Coating System Installation Training:

.1 Provide a minimum of eight (8) hours of classroom and off-site training for application and supervisory personnel (including Coating System Applicator's personnel). Provide training to a minimum of one (1) supervisor and two (2) supervisory personnel from the Coating System Applicator. Training to include at a minimum:

.1 Detailed explanation of mixing, application, curing, and termination details.

.2 Hands-on demonstration of how to mix and apply the coating systems.

.3 Detailed explanation of the ambient condition requirements (temperature and humidity) and surface preparation requirements for application of the coating system as well as a detailed explanation of re-coat times, cure times, and related ambient condition requirements.

.2 Manufacturer's technical representative shall verify in writing that training was satisfactorily completed by the personnel listed by name in the letter.

.4 Coating System Inspection:

.1 Manufacturer's technical representative shall do the following to confirm acceptability and conformance with the specifications:

.1 Inspect ambient conditions during various coating system installation at hold points for conformance with the specified requirements.

.2 Inspect the surface preparation of the substrates where the coating system terminates or is to be applied for conformance to the specifications.

.3 Inspect preparation and application of coating detail treatment (for example, terminations at joints or metal embedment in concrete).

.4 Inspect application of filler and surface materials for concrete and masonry substrates.

.5 Inspect application of the primers and finish coats including wet and dry film thickness of the coatings.

.6 Inspect coating systems for cure.

.7 Review adhesion testing of the cured coating systems for conformance to specifications.

.8 Review coating system continuity testing for conformance to specifications.

.9 Inspect and record representative local repairs made to discontinuities identified in continuity testing.

.10 Final review of completed coating system installation for conformance to the specifications.

.11 Prepare and submit a report following each site visit documenting the acceptability of the coating work in accordance with Manufacturer's recommendations.

.5 Final Report:

.1 Upon completion of coating work, obtain a final report from Manufacturer's technical representative. Report must include summary of daily test data, observations, drawings, and photographs in accordance with this Section. Include substrate conditions, ambient conditions, and application procedures, observed during Manufacturer's technical representatives' site visits. Include written verification that the work was completely in accordance with the requirements of this Section and Manufacturer's recommendations.

.6 Final Inspection:

.1 Conduct a final inspection to determine whether coating system work meets the requirements of this Section and Section 09905.

.2 Mark any rework required. Re-clean and repair such areas as shown in the Final Design.

3.6 Cleaning

.1 Upon completion of coating, remove surplus materials, protective coverings, and accumulated rubbish, and thoroughly clean surfaces and repair overspray or other coating related damage.

3.7 Coating System Specification Sheets (COATSPEC)

.1 Coating systems for different types of surfaces and general service conditions for which these systems are normally applied are specified on the COATSPEC sheets. COATSPEC sheets follow this Section.

.2 Coat surfaces as specified in the COATSPEC to the system thicknesses specified. Section 09905 specifies coatings and finishes for surfaces throughout this Agreement. In case of conflict between Section 09905 and the COATSPEC, Section 09905 prevails.

COATING SYSTEMS

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	E-1
Coating Material:	Epoxy
Surface:	Metal
Service Condition:	interior; exterior, covered, not exposed to direct sunlight.
Surface Preparation:	
Shop Primed Surfaces:	Prepare in the field by cleaning all surfaces in accordance with SSPC-SP 1, Solvent Cleaning. Clean damaged shop coating in accordance with SSPC-SP 3, Power Tool Cleaning and repaint with the primer specified.
Ferrous Metal:	Prepare bare ferrous metal surfaces in accordance with SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning. Clean bleeding surfaces in accordance with SSPC-SP 1, Solvent Cleaning and seal with two coats of sealer recommended by coating Manufacturer, applied to a thickness of 25 microns (1 mil) per coat prior to application of the prime coat.
Nonferrous and Galvanized Metal:	Prepare in accordance with SSPC-SP 1, Solvent Cleaning.
Application:	Field
General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
Ferrous Metal:	Provide epoxy primer compatible prime coats with the specified finish coats and applied in accordance with the written instructions of the CSM.
Nonferrous:	Clean nonferrous metal prior to the application of the prime coat in accordance with SSPC SP-1 (Solvent Cleaning).
System Thickness:	250-micron dry film thickness.
Coatings:	
Primer:	One coat at CSM's recommended dry film thickness.
Finish:	One or more coats at CSM's recommended dry film thickness per coat to achieve the specified system thickness.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	E-2
Coating Material:	Epoxy
Surface:	Metal
Service Condition:	Immersed, non-potable; non-immersed, moderately corrosive environment, colour required.
Surface Preparation:	
Ferrous Metal:	Prepare ferrous metal surfaces in accordance with SSPC SP-5 (White Metal Blast Cleaning) to achieve a uniform surface profile of 50 to 65 microns. Clean damaged shop coating in accordance with SSPC SP-5 (White Metal Blast Cleaning) and vacuum cleaning and spot primed with the primer specified. Lightly abrasive blast and vacuum clean shop epoxy primed surfaces prior to receiving finish coats if the maximum recoat time for the primer has been exceeded. This cleaning must produce a uniform 25 to 40-micron profile in the intact shop primer. For ductile iron surfaces, refer to the requirements in Clause 3.2.
Nonferrous and Galvanized Metal:	Prepare nonferrous and galvanized metal in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to achieve a uniform surface profile of 25 to 40 microns. Do not use galvanized steel with this coating system in immersion service in wastewater.
Application:	Field
General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
Ferrous Metal:	Provide epoxy primer compatible prime coat with the specified finish coats.
Nonferrous and Galvanized Metal:	Coat nonferrous and galvanized metal, non-immersed, prior to the application of the prime coat with a grease emulsifying agent in accordance with the CSM's written instructions. Do not paint nonferrous metal to be immersed. Do not immerse galvanized metal if it is painted.
System Thickness:	400-micron dry film thickness.
Coatings:	
Primer:	One (1) coat at CSM's recommended dry film thickness.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	E-2 (continued)
Finish:	Two (2) or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	E-9
Coating Material:	Epoxy
Surface:	Metal
Service Condition:	Immersed, non-potable; non-immersed, corrosive environment, colour required.
Surface Preparation:	
Ferrous Metal:	Prepare ferrous metal surfaces in accordance with SSPC SP-5 (White Metal Blast Cleaning) to achieve a uniform surface profile of 60 to 75 microns. Prepare shop primed surfaces which are to be incorporated in the work in the field by cleaning surfaces in accordance with SSPC SP-2 (Hand Tool Cleaning) or SSPC-SP-3 (Power Tool Cleaning). Clean damaged shop coating in accordance with SSPC SP-5 (White Metal Blast Cleaning) to achieve a uniform surface profile of 65 to 75 microns and spot prime with the primer specified. Lightly blast or abrade shop epoxy primed surfaces to achieve a uniform surface profile of 25 to 40 microns in the intact shop primer prior to receiving finish coats if the maximum recoat time for the primer has been exceeded. For ductile iron surfaces, refer to the requirements in Clause 3.2.5.
Nonferrous and Galvanized Metal:	Prepare nonferrous and galvanized metals in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to achieve a 40- to 50-micron profile that is uniform. Do not use galvanized steel with this coating system in immersion service in wastewater.
Application:	Field
General:	Prime coat may be thinned and applied as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
Ferrous Metal:	Provide epoxy primer prime coat with the specified finish coats.
Nonferrous and Galvanized Metal:	Coat nonferrous and galvanized metal, non-immersed, prior to the application of the prime coat with a grease emulsifying agent in accordance with the CSM's written instructions. Do not paint non-ferrous metal to be immersed. Do not immerse galvanized metal even if it is painted with this coating system.
System Thickness:	380 to 500-micron dry film thickness.
Coatings:	

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	E-9 (continued)
Primer:	One (1) coat at CSM's recommended dry film thickness.
Finish:	Two (2) or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EA-2
Coating Material:	Blended Amine Cured Epoxy
Surface:	Concrete or masonry
Service Condition:	Immersed, non-potable; non-immersed, corrosive environment, colour not required, new construction especially for headspace environments that are corrosive due to biogenic sulfide corrosion.
Surface Preparation:	Prepare all coating termination and transition details in accordance with the CSM's standard detail drawings. This includes coating termination details, coating transitions at vertical and vertical to horizontal corners, coating terminations at joints, concrete crack treatment, pipe penetration treatment, coating terminations at metal embedments in the concrete substrate, and other details. Submit the CSM's standard detail drawings for all such coating applications. If standard details are not available for a given detail treatment, require the CSM to produce one. If wet abrasive or water blasting surface preparation methods were used, allow the concrete substrate to dry under warm conditions (minimum of 25°C) for at least five (5) days prior to coating application. Following surface preparation work and dry out, vacuum clean all surfaces to be coated for removal of all loose dirt, dust, or other loose materials.
Concrete:	Allow concrete surfaces to cure for at least twenty-eight (28) days and dry to the moisture content recommended by the CSM. Moisture content may be tested with a Delmhorst Instrument Company moisture detector, or equal. Except as otherwise specified, remove loose concrete, form oils, surface hardeners, curing compounds, and laitance from surfaces by abrasive blasting and chipping, and repair voids and cracks as specified in Section 03300. Provide Surface Preparation that opens up all shelled over air voids or bug holes to expose fully the void's depth, width, and length. Abrade concrete to achieve a uniform concrete surface profile of CSP-5 in accordance with ICRI 03732. After surface preparation has been accepted, apply a complete skim coat of the specified filler surfacer over all concrete surfaces and fill all bug holes (air voids) using this same material. Apply the filler/surfacer material as a complete parge coat of the substrate. If the parge coat (filler/surfacer material) is non-polymer modified, brush blast clean following adequate cure per CSM's instructions to produce a uniform anchor pattern of CSP-4 in accordance with ICRI 03732 prior to coating application.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EA-2 (continued)
Masonry:	Allow masonry surfaces to cure for at least twenty-eight (28) days. Fill holes or other joint defects with mortar and repoint and allow to cure for twenty-eight (28) days or fill with a repair material compatible with the coating system that does not require hydration cure time. Remove loose or splattered mortar by scrapping and chipping. Clean masonry surfaces with clear water by washing and scrubbing to remove foreign and deleterious substances. Do not use Muriatic acid. After cleaning, skim coat masonry surfaces with a surfacer or block filler compatible with the specified coating system.
Application:	Field Apply surfacer or filler per CSM's recommendations prior to application of coating to fill all bug holes and voids and create a complete parge coat of the prepared substrate. Fill all bug holes and voids in the substrate with this parge coat and completely cover the substrate unless specified otherwise above such filled voids by 3.2 mm of thickness. Follow drying time between coats as specified by the CSM for the site conditions. If the maximum recoat time is exceeded, prepare surface by solvent washing, light abrasive blasting, or other procedures per CSM's instructions.
System Thickness:	1500-micron dry film thickness in addition to the parge coat.
Coatings:	
Finish:	One (1) or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.
Testing:	Perform Holiday detection over 100 percent of the coated surface area to identify any holidays or pinholes, which could compromise coating system performance. Perform Holiday testing after application and adequate cure of the spray applied epoxy coating material. Perform Holiday detection in accordance with NACE RP0188.

Coating System Specification Sheets (COATSPEC)

Coating System Identification: EA-2 (continued)

Pinhole and Holiday Repair Procedure:

Repair pinholes and holidays identified by Holiday Detection as follows:

- Using a grinder or other suitable power tool, remove the coating system at all pinholes or holidays in an area at least 50 mm in diameter or in both dimensions around the defect back to the concrete substrate.
- Chip out and remove the concrete to expose the full dimensions in all three directions of the air void responsible for the defect.
- Aggressively abrade or sand the intact coating system surface at least 75 mm beyond the removal area in all directions to produce a uniform 150- to 200-micron profile in the intact coating system.
- Vacuum clean the prepared area to remove all dust and dirt leaving clean sound surfaces.
- Tape to mask the periphery of the prepared intact coating area to prevent coating repair application onto the prepared area.
- Using a putty knife or other suitable tool, fill the opened void with the reviewed filler/surfacer material completely and strike-off. Allow to cure per CSM's recommendations.
- Apply the coating system in the number of coats necessary to achieve the specified 1500-micron DFT over the defect and coating removal area and feather the coating onto the abraded coated surfaces around the removal area to avoid a lip and to achieve a neat repair outline. Allow to cure properly.

COATING SYSTEMS

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EF-1
Coating Material:	Epoxy Resin Based Floor Coating
Surface:	Concrete Floors
Service Condition:	For interior light duty applications light wheel traffic, mostly foot traffic, and mildly corrosive. Mainly for wear resistance, aesthetics, and cleanability. Non-slip texture can be varied depending on wetness of exposure. Test patches to be installed for deciding on level of non-slip texture required.
Surface Preparation:	Concrete floor slabs are to be allowed to age for at least twenty-eight (28) days and must meet a moisture vapor transmission rate of less than 3.0 lbs. of moisture per twenty-four (24) hours per 1,000 SF in accordance with ASTM F1869. It is also essential that a well-sealed and intact vapor barrier has been installed beneath all slabs on grade to receive this floor coating system. Except as otherwise specified, loose concrete, curing compounds, and laitance are to be removed by abrasive blast cleaning or preferably by shot blasting. Surface preparation is to produce a clean sound concrete substrate with a concrete surface profile of CSP-6 minimum in accordance with ICRI 03732. Surface preparation is to be in accordance with SSPC-SP-13. Additionally, all coating termination and transition details are to be prepared in accordance with the CSM's standard detail drawings. This includes coating termination details, coating transitions at vertical and vertical to horizontal corners, coating terminations at joints, concrete crack treatment, pipe penetration treatment, coating terminations at metal embedments in the concrete substrate, and other details. The CSM's standard detail drawings are to be submitted for all such coating applications. If standard details are not available for a given detail treatment, the CSM is required to produce one. If wet abrasive or water blasting surface preparation methods were used, the concrete substrate is to be allowed to dry under warm conditions (minimum of 75°F) for at least five (5) days prior to coating application. Following surface preparation work and dry-out, all surfaces to be coated are to be vacuum cleaned to remove all loose dirt, dust, or other loose materials.
Application:	Carefully follow CSM's written instructions regarding mixing, thinning, application, recoat limitations (windows) and curing of coating materials.
System Thickness:	125 mils dry film.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EF-1 (continued)
Coatings:	Primer Coat – Brush or roller apply at 6.0 – 10.0 mils DFT. Broadcast Applied Coat – Brush or roller catalyzed resin and broadcast aggregate to rejection (should achieve 100 to 105 mils DFT). Topcoat – brush or roller apply at 8.0 – 10.0 mils. Total System DFT = 125 mils Install all termination and transition details in accordance with the CSM's detail drawings.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EU-1
Coating Material:	Zinc-Epoxy-Polyurethane System
Surface:	Ferrous Metal
Service Condition:	Exterior, exposed to direct sunlight, moderately corrosive, non-immersed.

Surface Preparation:

General:	Prepare shop primed surfaces in the field by cleaning surfaces in accordance with SSPC SP-2 (Hand Tool Cleaning). Clean damaged shop coated areas in accordance with SSPC SP-3 (Power Tool Cleaning) and recoat with the primer specified.
Ferrous Metal:	Prepare bare ferrous metal surfaces in accordance with SSPC SP-6 (Commercial Blast Cleaning) to achieve a uniform, surface profile of 65 to 75 microns. Abrasive blast clean ductile iron surfaces to be coated in accordance with Clause 3.2.5. Clean ferrous metal with rust bleeding in accordance with SSPC-SP-11 (Power Tool Cleaning to Bare Metal). Spot blast areas of rust penetration to SSPC SP-10 (Near White Blast) and spot prime with the specified primer.
Galvanized Metal:	Clean damaged galvanized steel areas with exposed ferrous metal and/or rusted in accordance with SSPC SP-5 (White Metal Blast Cleaning) or Power Tool Cleaned to Bare Metal in accordance with SSPC-SP-11 to achieve a uniform 25- to 40-micron profile and spot primed with the primer specified. Prepare nonferrous and galvanized metal in accordance with SSPC SP-7 (Brush-off Blast Cleaning) to impart a 25- to 50-micron profile to the galvanized steel surfaces. Where this cannot be performed, prepare by abrading in accordance with SSPC-SP-3, Power Tool Cleaning to impart a 25- to 40-micron profile uniformly to the galvanized steel surfaces. For EU-1 over galvanized steel, delete the zinc rich primer.

Application:	Field
General:	Thin and apply prime coat as recommended by the CSM, provided the coating as applied complies with prevailing air pollution control regulations.
Ferrous Metal:	Provide prime coats that are zinc rich epoxy or polyurethane primer compatible for use with urethane finish coats and application in accordance with written instructions of the CSM or in accordance with local jurisdiction.

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EU-1 (continued)
System Thickness:	75 to 100 microns of zinc rich primer, one (1) intermediate or primer epoxy coat at 125 to 150 microns and one finish coat of polyurethane at 50 to 75-micron DFT.
Coatings:	
Primer:	One (1) coat at CSM's recommended dry film thickness.
Intermediate:	One (1) coat at CSM’s recommended dry film thickness.
Finish:	One (1) coat at CSM's recommended dry film thickness per coat to meet the specified system thickness.

COATING SYSTEMS

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	EU-1-FRP
Coating Material:	Specialty Primer plus Polyurethane Finish Coat.
Surface:	Exterior of FRP Pipe and Tanks.
Service Condition:	Exterior, exposed to direct sunlight, non-immersed.
Surface Preparation:	
General:	Clean to remove loose dirt, dust, or other contaminants. Prepare surfaces by sanding to produce roughness to achieve a uniform, minimum surface profile of 40 to 50 microns. Solvent clean thoroughly using solvent as recommended by the CSM. Thoroughly clean to remove loose debris by vacuum cleaning.
Application:	Field
General:	Apply primer coat and thin as recommended by the CSM provided the coating applied complies with prevailing air pollution control regulations. Apply finish coat as recommended by the CSM.
System Thickness:	Primer to 50 to 100 microns and finish coat is 50 to 75-micron DFT.
Coatings:	
Primer:	One (1) coat at CSM's recommended dry film thickness.
Finish:	One (1) coat at CSM's recommended dry film thickness per coat to meet the specified system thickness.

COATING SYSTEMS

Coating System Specification Sheets (COATSPEC)

Coating System Identification:	L-2
Coating Material:	Latex
Surface:	PVC and CPVC pipe.
Service Condition:	Exterior, direct sunlight exposure.
Surface Preparation:	Clean plastic pipe with solvent compatible with the specified primer and sanded to roughen surfaces to achieve a uniform surface profile of 25 to 40 microns. Vacuum clean after sanding to remove all loose dust, plastic particles, and dirt.
Application:	Field
System Thickness:	75-micron dry film thickness.
Coatings:	
Primer:	One (1) coat at CSM's recommended dry film thickness.
Finish:	One (1) or more coats at CSM's recommended dry film thickness per coat to the specified system thickness.

END OF SECTION

FINISHES AND COATING SCHEDULES

1. GENERAL

1.1 Summary

.1 This Section specifies schedules for protective coatings to be applied or installed on new surfaces.

1.2 Submittals

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

2. PRODUCT

2.1 Performance Criteria

.1 See Section 01450 for definitions and delineation of area exposure designations listed in the Coating Systems Schedules in this Section.

.2 All deviations from colours specified in the coating system schedules must be either selected or reviewed by the City. Submit proposed colour selection deviations for review.

.3 Repair any coatings damaged as a result of the Work. Match existing material, finish, and colour. Repair coatings in accordance with the coating Manufacturer’s recommendations.

.4 Coatings installed for protection against corrosion, moisture, or exposures to weather are considered protective coatings. Protective coatings are scheduled based on the substrate or material that a coating is applied to and the corrosion environment (Refer to Section 01450) for the location that the coating is installed.

.5 Interior finishes for room, doors and frames, window frames, cabinets, case work, furnishings and other surfaces shall conform to Final Design.

.6 Exterior Finishes for building exteriors, structures, and similar surfaces shall conform to Final Design.

2.2 Finishes

.1 Apply interior and exterior finishes as required by the Final Design.

2.3 Protective Coatings

.1 Refer to Schedule 18 Technical Requirement for the corrosion study in the Design Build Agreement. Modify the coating within this Specification Section according to the corrosion study.

.2 Apply the coating system specified for each substrate and material listed in the following schedule. Acceptable Manufacturers for coatings are listed in Section 09900 with surface preparation and installation requirements for each coating system. Provide coating materials as specified in this schedule unless specified otherwise.

.3 For materials and Area Exposures not listed in the following tables, leave surface uncoated unless required by Final Design.

.4 Protective coatings for structural components:

Material	Area Exposure	Coating System	Colour	Notes
Concrete	Any wastewater Head Space, including tank, channel, wet well and any other chamber head space and Chemical Corrosive, including chemical containment areas, odour treatment units, and any other areas that would regularly be exposed to chemicals or a chemically corrosive atmosphere	EA-2 or permanent liner system	As per Final Design	Except where thermoplastic lining is required for the Final Design
	Submerged with walls and/or floors common with Indoor Dry or Indoor Wet areas	Waterproofing Membrane per Section 07100	As per Final Design	Extend coating 1.5 m both vertically and horizontally from portion that is directly opposite the interior space.
	Buried side of ceiling slab and walls in common with Indoor Dry, Indoor Wet, and Submerged areas	Waterproofing Membrane per Section 07100	--	
	Buried side of ceilings, walls, and floors in common with Head Space, Process Corrosive, and Chemical Corrosive areas	Waterproofing Coating at ceiling and Damp-proofing Coating at walls per Section 07100	--	
Ferrous Metal (Iron and Steel)	Indoor Dry	E-1	As per Final Design	
	Indoor Wet	E-2	As per Final Design	
	Outdoor	EU-1	As per Final Design	
	Submerged	E-9	--	
PVC and CPVC	Outdoor	L-2	As per Final Design	
Stainless Steel and Aluminium (all grades / alloys)	All Exposures	Bitumastic coating on aluminium surfaces in contact with concrete	--	.

.5 Protective coatings for process and building mechanical components:

Material	Area Exposure	Coating System	Colour	Notes
Ferrous Metal (Iron and Steel)	Indoor Dry	E-1	As per Final Design	See Division 15 for factory applied coatings
	Indoor Wet	E-1	As per Final Design	See Division 15 for factory applied coatings
	Outdoor	EU-1	As per Final Design	See Division 15 for factory applied coatings
	Submerged	E-2	--	
Aluminium (all grades / alloys)	All Exposures	Bitumastic coating on aluminium surfaces in contact with concrete	--	
PVC and CPVC	Outdoor	L-2	As per Final Design	
FRP	All Exposures	EU-1-FRP	As per Final Design	
Concrete	All Exposures (Process area floor only)	EF-1 with silica grit	Safety Yellow	Delineate Exit Route

.6 Protective coatings for electrical components:

Material	Area Exposure	Coating System	Colour	Notes
Ferrous Metal (Iron and Steel)	Indoor Dry	E-1	As per Final Design	Coated by the equipment Manufacturer as specified in Section 09900
	Indoor Wet	E-2	As per Final Design	Coated by the equipment Manufacturer as specified in Section 09900
	Outdoor	EU-1	As per Final Design	Coated by the equipment Manufacturer as specified in Section 09900
Copper, Brass and Bronze	Indoor Dry and Indoor Wet	E-2	As per Final Design	Coated by the equipment Manufacturer as specified in Section 09900
	Outdoor	EU-1	As per Final Design	Coated by the equipment Manufacturer as specified in Section 09900

Material	Area Exposure	Coating System	Colour	Notes
PVC and CPVC	Outdoor	L-2	As per Final Design	Coated by the equipment Manufacturer as specified in Section 09900

.7 Protective coatings for miscellaneous components:

Substrate / Material	Area Exposure	Coating System	Colour	Notes
Bollards	Indoor Dry	E-1	Safety Yellow	
	Indoor Wet	E-2	Safety Yellow	
	Outdoor	EU-1	Safety Yellow	

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION

PAINTING

1. GENERAL

1.1 Summary

.1 This Section specifies painting.

1.2 Standards

.1 MPI Architectural Painting Specification Manual.

1.3 Submittals

.1 Provide submittals in accordance with Sections 01300, 09000 and the following:

.1 Manufacturer's descriptive literature for materials.

.2 Paint and finishes schedule and concepts elevations.

.3 216 mm by 279 mm draw down card indicating paint type, finish and sheen for each level of paint used.

2. PRODUCTS

2.1 Manufacturer and Products

.1 Walls, Shelving:

.1 Use Gloss level 4 (satin) for walls in Process Areas.

.2 Use Gloss level 5 (semi-gloss) for shelving.

.3 Application to be brush or roller spray.

.4 Clean up: warm water.

.5 Thinner if needed: water.

.2 Door frames and metal doors:

.1 Use Gloss level 5 (semi-gloss) for all door frames and metal doors.

.2 Application to be brush or roller spray.

.3 Clean up: warm water.

.4 Thinner if needed: water.

.3 Wood Finish Doors:

.1 Use clear coat interior polyurethane for all wood finish doors.

.2 Application to be brush or roller spray.

.3 Clean up: warm water.

.4 Thinner if needed: water.

.4 Paint Grade Doors:

.1 Use Gloss level 4 (satin) for all paint grade doors.

.2 Application to be brush or roller spray.

.3 Clean up: warm water.

.4 Thinner if needed: water.

.5 Ceilings, Exposed Structure and Mechanical (ductwork and piping in occupied areas):

.1 Use Gloss Level 3 (eggshell) paint for all ceilings, exposed structure, and mechanical ductwork in occupied areas.

.2 Application to be brush or roller spray.

.3 Clean up: warm water.

.4 Thinner if needed: water.

.6 Exterior Walls:

.1 Use exterior Gloss Level 5 (semi-gloss) latex for all exterior walls.

.2 Application to be brush or roller spray.

.3 Clean up: warm water.

.4 Thinner if needed: water.

.7 Floors, Concrete:

.1 Use a 2-component mixture (base component A, curing agent B).

.2 Use a primer if part of coating system.

.3 Application to be brush or roller spray.

.4 Thinner: C70 or C25.

.8 Glue-laminated Beams and Columns:

.1 Use 2-component polyurethane, clear or low-VOC wood finish.

.1 Acceptable Manufacturer:

.1 Broda Clarity.

.2 Approved equivalent.

.2 Application to be brush or roller spray.

.3 Cleanup and thinner in accordance with manufacturer's instructions.

.9 Use exterior paints of a quality designed to protect substrate materials from weather and climate conditions.

.10 Provide graffiti resistant coating/ anti-graffiti system for the exterior extending from grade to 1800 mm. and all exterior and interior finishes in areas exposed to the public.

.11 Use exterior and interior finish materials with surface finishes either integral to the finish material or field-applied separately to the surface of the finish material.

.12 Treat exterior masonry materials such as brick and stone veneer with water-repellent coatings to prevent water ingress into or through the material.

.13 Provide a special protective coating on exterior and interior materials subject to corrosion from exposure to moisture or other corrosive agents and where painting is insufficient protection. Materials requiring a special protective coating include exterior and interior structural, galvanized, and miscellaneous steel.

.14 Materials containing lead or mercury shall not be used.

.15 If seamless epoxy wall coatings are used, provide a two-component, high solids, solvent-free, epoxy glaze wall coating that is seamless and abrasion-, chemical-, and UV-resistant.

3. EXECUTION

3.1 General

.1 Install in accordance with Manufacturer's recommendations and as required by the Final Design.

.2 Undertake commissioning phases as specified in the Schedule 18 Technical Requirements.

END OF SECTION