

TABLE OF CONTENTS

DIVISION 9 - FINISHES

Section No. Description
09900 Painting

09905 Process Painting and Coating Systems

1. GENERAL

1.1 References

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.38- M91, Interior Enamel Undercoater.
 - .2 CGSB 1-GP-48M- 78, Primer, Marine, for Steel.
 - .3 CAN/CGSB-1.57- 96, Alkyd, Interior, Semigloss, Enamel.
 - .4 CAN/CGSB-1.68- M91, Solvent Type Primer-Sealer for Interior Walls.
 - .5 CAN/CGSB-1.73- 97, Exterior and Interior Enamel for Floors.
 - .6 CAN/CGSB-1.100- 95, Interior Latex Type, Flat Paint.
 - .7 CAN/CGSB-1.153- M90, High Build, Gloss, Epoxy Coating.
 - .8 CGSB 85-GP-10M-79, Shop Painting Structural Steel.
- .2 Canadian Painting Contractors' Association (CPCA)
 - .1 Painting Specifications Manual 1993.
- .3 National Fire Code of Canada 1995.
- .4 Steel Structures Painting Council (SSPC)
 - Systems and Specifications Manual 1989.

1.2 Product Data

- .1 Submit product data in accordance with Section 01330 Submittal Procedures.
- .2 Submit full records of all products used. List each product in relation to finish formula and include the following:
 - Finish formula designation.
 - .2 Product type and use.
 - .3 CGSB number.
 - 4 Manufacturer's product number.

- .5 Colour number(s).
- .6 Manufacturer's Material Safety Data Sheets (MSDS).
- .7 Maximum VOC classification.
- .3 Submit manufacturer's application instructions for each product specified.

1.3 Quality Assurance

- 1 Retain purchase orders, invoices and other documents to prove that all materials utilized in this contract meet requirements of the specifications. Produce documents when requested by Engineer.
- .2 Standard of Acceptance:
 - .1 Walls: No defects visible from a distance of 1000 mm at 90 degrees to surface.
 - .2 Ceilings: No defects visible from floor at 45 degrees to surface when viewed using final lighting source.
 - .3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

1.4 Delivery, Storage and Handling

- .1 Deliver and store materials in original containers, sealed, with labels intact.
- .2 Indicate on containers or wrappings:
 - Manufacturer's name and address.
 - .2 Type of paint.
 - .3 Compliance with applicable standard.
 - .4 Colour number in accordance with established colour schedule.
- .3 Remove damaged, opened and rejected materials from site.
- .4 Provide and maintain dry, temperature controlled, secure storage.
- .5 Observe manufacturer's recommendations for storage and handling.
- .6 Store materials and supplies away from heat generating devices.
- .7 Store temperature sensitive products above minimum temperature as recommended by manufacturer

- .8 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Engineer. After completion of operations, return areas to clean condition to approval of Engineer.
- .9 Provide minimum one 9 kg Type ABC fire extinguisher adjacent to storage area.
- .10 Remove only in quantities required for same day use.
- .11 Fire Safety Requirements:
 - .1 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
 - .2 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

1.5 Environmental Requirements

- .1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- .2 Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
- .3 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- .4 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.

1.6 Extra Materials

- .1 Submit maintenance materials in accordance with Section 01780 Closeout Submittals.
- .2 Submit one 4-litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish formula.
- .3 Deliver to Owner and store where directed.

2. PRODUCTS

2.1 Materials

- .1 Qualified products: only paint materials listed on the CGSB Qualified Products List are acceptable for use on this project.
- .2 Paint materials for each coating formula to be products of a single manufacturer.
- .3 Low odour products: Whenever possible, select products exhibiting low odour characteristics. If two products are otherwise equivalent, select the product with the lowest odour.

2.2 Colours

- .1 Selection of colours will be from manufacturer's full range of colours.
- .2 Where specific products are available in a restricted range of colours, selection will be based on the limited range.
- .3 Perform all colour tinting operations prior to delivery of paint to site.
- .4 Second coat in a three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats
- .5 Colours shall be as follows:
 - .1 Fire protection piping: red.
 - .2 Piping: see Mechanical (Division 15).
 - .3 Valves: see Mechanical (Division 15).
 - .4 Pipe supports: silver.
 - .5 Handrails, ladders, guardrails: safety yellow.
 - .6 Interior walls: tan.
 - .7 Structural steel: blue.
 - .8 Grating: black primer.

2.3 Paint Finishes

- .1 One primer coat: approved products are:
 - Cloverdale, Clovaprime 21.

- .2 Two top coats: approved products are:
 - Cloverdale, Clovacoat 300.

3. EXECUTION

3.1 General

- .1 Perform all painting operations in accordance with CAN/CGSB-85.100 except where specified otherwise.
- .2 Apply all paint materials in accordance with paint manufacturer's written application instructions.

3.2 Preparation

- .1 Remove electrical cover plates, light fixtures, surface hardware on doors, door stops, bath accessories and all other surface mounted fittings and fastenings prior to undertaking any painting operations. Store for re-installation after painting is completed.
- .2 As painting operations progress, place "WET PAINT" signs in occupied areas to approval of Engineer.

3.3 Protection

- .1 Protect existing building surfaces not to be painted from paint spatters, markings and other damage. If damaged, clean and restore such surfaces as directed by Engineer.
- .2 Cover or mask floors, windows and other ornamental hardware adjacent to areas being painted to prevent damage and to protect from paint drops and splatters. Use non-staining coverings.
- .3 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .4 Protect factory finished products and equipment.

3.4 Existing Conditions

.1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Engineer all damage, defects, unsatisfactory or unfavourable conditions before proceeding with work.

3.5 Cleaning

- .1 Clean all surfaces to be painted as follows:
 - .1 Remove all dust, dirt, and other surface debris by vacuuming, wiping with dry, clean cloths.
 - .2 Wash surfaces with solution of T.S.P. [bleach] and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
 - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
 - .4 Allow surfaces to drain completely and allow to dry thoroughly.
 - .5 To prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
 - .6 Use trigger operated spray nozzles for water hoses.
 - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.

3.6 Surface Preparation: Metal

- .1 Clean new metal surfaces to be painted by: removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with the following:
 - Solvent cleaning: SSPC-SP-1.
 - .2 Hand tool cleaning: SSPC-SP-2.
 - .3 Power tool cleaning: SSPC-SP-3.
 - .4 Commercial blast cleaning: SSPC-SP-6.
 - .5 Brush-off blast cleaning: SSPC-SP-7.
- .2 Remove traces of blast products from surfaces, pockets and corners to be painted by [brushing with clean brushes] [blowing with clean dry compressed air], or [vacuum cleaning].
- .3 Touch up shop primer to CGSB 85-GP-10M with primer as specified in applicable section. Touch-up to include cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas.

.4 Prepare galvanized steel and zinc coated steel surfaces to CGSB 85-GP-16M.

3.7 Mixing Paint

- .1 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
- .2 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.

3.8 Application

- .1 Conform to manufacturer's application instructions.
- .2 Brush application.
 - .1 Work paint into cracks, crevices and corners. Paint surfaces not accessible to brushes by spray, daubers or sheepskins.
 - .2 Brush out runs and sags.
 - .3 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray application.
 - .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
 - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
 - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
 - .4 Brush out immediately all runs and sags.
 - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Engineer.
- .5 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.

.6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

3.9 Mechanical / Electrical Equipment

- .1 In finished areas: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .2 In boiler room, mechanical and electrical rooms: paint exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment.
- .3 In other unfinished areas: leave exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment in original finish and touch up scratches and marks.
- .4 Do not paint over nameplates.
- .5 Paint all fire protection piping red.
- .6 Paint all natural gas piping yellow.
- .7 Paint both sides and edges of backboards for telephone and electrical equipment before installation. Leave equipment in original finish except for touch-up as required, and paint conduits, mounting accessories and other unfinished items.

3.10 Restoration

- .1 Clean and re-install all hardware items that were removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.
- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Engineer.

 Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Engineer.

END OF SECTION

1. GENERAL

1.1 Description

- .1 This Section specifies coating systems, surface preparations, and application requirements. Galvanizing does not form part of this Section.
- .2 Surface preparation, factory prime coating, factory finish coating and factory assembly and protection for all components to be provided with corrosion protection coatings.
- .3 Coordination and cooperation with Independent Testing / Inspection Agencies.

1.2 Definitions

- .1 Specific coating terminology used in this Section is in accordance with definitions contained in ASTM D16, ASTM D3960, and the following definitions:
 - .1 Painting: the process of applying a coating system.
 - .2 Coating: covering layer(s) of protecting substance(s).
 - .3 Dry Film Thickness (DFT): the thickness of one fully cured continuous application of coating.
 - .4 Coating System Thickness: the total dry film thickness of primer and finish coats.
 - .5 Prime Coat: first full coating does not include conditioners, vinyl acid wash coats, sealers or pre-treatment applications.
 - .6 Factory Applied Finish Coat: one or more coats applied in a shop or plant prior to shipment to the site, where only touch-ups are required.
 - .7 Field Coat: the application or the completion of application of the coating system after installation of the surface at the site of the work.
 - .8 Shop Coat: one or more coats applied in a shop or plant prior to shipment to the site, where the field or finishing coat is applied.
 - .9 Tie Coat: an intermediate coat used to bond different types of paint coats. Coatings used to improve the adhesion of a succeeding coat.
 - .10 Vinyl Acid Wash Coat: a coating supplied as one- or two-component systems on clean light alloy or ferrous surfaces, and on many non-ferrous surfaces, to provide adhesion with the substrates, and for the application of subsequent coats of paint.

- .11 Photochemically Reactive Organic Material: any organic material that will react with oxygen, excited oxygen, ozone or other free radicals generated by the action of sunlight on components in the atmosphere giving rise to secondary contaminants and reaction intermediates in the atmosphere which can have detrimental effects.
- .12 Volatile Organic Content (VOC): the portion of the coating that is a compound of carbon, is photochemically reactive, and evaporates during drying or curing, expressed in grams per litre.
- .13 Touch-Up: the application of a coating on areas of coated surfaces to repair marks, scratches, and areas where the coating has deteriorated to restore the coating film to an unbroken condition.
- .14 COATSPEC: Coating system specification sheets.
- .15 Submerged Service: equipment or material fully, partially or intermittently submerged in wastewater during routine plant operation.
- .16 Splash Zone Service: equipment or material exposed to the normal range of atmospheric conditions and conditions common to wastewater treatment facilities (high humidity, H₂S, etc.).
- .17 Indoor Service: equipment or material inside buildings or other ventilated spaces.
- .18 Outdoor Service: equipment or material outside buildings or other ventilated spaces, exposed to weather elements.
- 19 Independent Testing Agency: firm that may be retained by the Owner to perform and/or witness surface preparation and/or coating system applications for specific equipment.

1.3 Reference Standards

- .1 Conform to the following reference standards:
 - .1 ASTM D16, Standard Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.
 - .2 ASTM D2200, Pictorial Surface Preparation.
 - .3 ASTM D3359, Methods for Measuring Adhesion by Tape Test-Method A.
 - .4 ASTM D3960, Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings.
 - .5 ASTM D4417, Field Measurement of Surface Profile of Blast-Cleaned Steel.
 - .6 SSPC, Steel Structures Painting Council Specifications, Vol. 1, Good Painting Practice
 - .7 SSPC, Steel Structures Painting Council Specifications, Vol. 2, Systems and Specifications.

- .8 Industrial Health and Safety Regulations, Workers' Compensation Board of Alberta (WCB).
- .9 NACE: 6Q187, Current Practices in Quality Control during Application of Protective Coating Materials.
- .10 NACE: RP0178, Standard Recommended Practice Fabrication Details, Surface Finish Requirements and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service.

1.4 Restrictions

- .1 Regardless of whatever else is specified in this Section, no paint containing a chromate based additive can be used. Substitute products of equal or greater quality.
- .2 Prior to using of any grout or filler to smooth the metal surface, in the event that the surface is not accessible to grind smooth, obtain permission from the Engineer.

1.5 Submittals

- .1 With the equipment shop drawings, the Contractor shall submit details of the factory applied prime and finish coat systems to be applied.
- .2 Submit colour chart in accordance with Section 01300.
- .3 Submit a complete list of all coatings used in this Contract in accordance with Section 01300. The list is to include the following information: location of application, system identification, manufacturer, product, (prime and finish coats) colour identification code, supplier and date of completion.

1.6 Quality Control

- .1 Particular attention shall be paid to ensure the compatibility of each surface treatment with the preceding and subsequent surface treatments and coatings. The Contractor shall be responsible for the compatibility of all surface treatments and coatings.
- .2 Provide materials and supplies that are the standard products of manufacturers. Provide materials in each coating system that are the products of a single manufacturer.
- .3 Do not use coating products until the Engineer has inspected and reviewed the materials.
- .4 Strictly adhere to all manufacturer's printed recommendations with respect to ambient conditions at time of application, drying times, application method, mixing instruction, application equipment, pot life, thinning and any other manufacturer's recommendations deemed applicable by the Engineer.

1.7 Shipment, Protection And Storage

.1 Coatings

- .1 Deliver materials to the job site in their original, unopened containers. Provide on each container the manufacturer's name, coating type, batch number, date of manufacture, storage life, colour special directions and Manufacturer's material safety data sheets. Identify all toxic substances.
- .2 When storage life is not specified, obtain manufacturers certification of paint integrity 1 year after date of manufacture, prior to use.
- .3 Store materials in enclosed structures and protect from weather. Maintain temperature within manufacturer's recommended storage range. Store flammable materials in accordance with provincial and local codes.
- .4 Use materials with oldest date of manufacture first.
- .5 Remove from the site materials exceeding storage life recommended by the manufacturer.

.2 Coated Surfaces

- .1 Items which are to be bolted together before shipment shall have their surfaces prepared and coated before the parts are assembled.
- .2 All coated equipment shall be protected adequately against damage, dust, moisture and scratching during shipment, off-loading and storage on site.
- .3 Damage to coatings occurring at any time shall be made good prior to the application of any further coatings.
- .4 After delivery to the site and after permanent erection or installation, factory-coated metalwork shall be re-coated or retouched by the Contractor.
- .5 Tag, lift and ship in such a manner as to minimize damage to equipment coatings.
- .6 If, in the opinion of the Engineer, the coating is damaged during shipment to the extent that touch-up would not be satisfactory, the equipment shall be returned and re-coated at no change in the Contract Price.

1.8 Safety And Ventilation Requirements

.1 Meet requirements for safety and ventilation in accordance with SSPC and all applicable regulations and codes.

1.9 Warranty

- .1 The Engineer will notify in advance of an inspection of applied coatings prior to expiry of the warranty period. A list of all coating defects and failures will be prepared and transmitted.
- .2 All defective coatings to be repaired using coating materials, equipment and methods similar to those used in the original work. Materials to be of fresh manufacture and within the manufacturers stated shelf life at the time of application.
- .3 Within 90 calendar days of this inspection, the Contractor shall arrange to have all required coating repairs completed.

2. PRODUCTS

2.1 Acceptable Products

.1 The following list specifies the material requirements for coating systems. Coating systems are categorized by generic name followed by an identifying abbreviation. If an abbreviation has a suffix number, it is for the purpose of identifying subgroups within the coating system.

Coating	Manufacturer	Product Designation		
System		Prime Coat(s)	Finish Coat(s)	
Ероху				
E-1	Amercoat Canada *	Amercoat 385 or Amercoat N/A 370		
	Carboline	Caroboline 890	None (1 coat)	
	Cloverdale	Clovaguard 83150 Clovaguard 83150 (if requ		
	Devoe Coatings	Devran 224 or Bar Rust 235 None (1 coat) (application in the field)		
	Hempel	Hempadur Mastic 45880	None (1 coat)	
	International	Intergard 345 FD or Interseal 670 HS	Intergard 345 or 670 HS	
	Rust-Oleum	9100	None (1 coat)	
	Sherwin Williams	N/A	N/A	
	Tnemec	Series 1 Purple Prime	Series 161 Tneme-Fascure	
E-2a	Amercoat Canada	Amerlock	Amerlock	
	Carboline	Carboline 890	Carboline 890	
	Cloverdale	Clovaliner 83295	Clovaliner 83295	
	Devoe Coatings	Bar-Rust 236	Bar-Rust 236	
	Hempel	Hempadur 15500	Hempadur 15500	
	International	Interseal 670 HS	Interseal 670 HS	
	Rust-Oleum	9100	9102	

Coating System		Product Designation		
	Manufacturer	Prime Coat(s)	Finish Coat(s)	
	Sherwin Williams	N/A	N/A	
	Tnemec	Series 1 PurplePrime	Series 164 Epoxoline 80	
E-2b	Amercoat Canada	Dimetcote 9 or Dimetcote 21-5 (inorganic zinc)	Amercoat 385 or Amercoat 370	
		Amercoat 68A (organic zinc)		
	Carboline	Carboline 859 (organic zinc)	Carboline 890 or Carbothano 133 HB (for lasting color)	
	Cloverdale	Clovazinc 2 (inorganic)	Clovaliner 83295	
		Clovazinc 3 (organic)		
	Devoe Coatings	CathaCoat 302H (organic zinc)	Devran 224 HS or Bar Rust 235, optional Devran 359	
	Hempel	Hempel's Galvosil 15700	Hempadur Mastic 45880	
	International	Interzinc 52	Intergard 345 or 670 HS	
	Rust-Oleum	9100	9102	
	Sherwin Williams	N/A	N/A	
	Tnemec			
E-2c	Amercoat Canada	Amerlock	Amerlock	
	Cloverdale	Clovaliner 83295	Clovaliner 83295	
	Devoe Coatings	Bar Rust 236	Bar Rust 236	
	Hempel	N/A (for acidic environment recommends vinyl ester)		
	International	Interseal 670HS	Interseal 670HS	
	Rust-Oleum	N/A	N/A	
	Sherwin Williams	N/A	N/A	
	Tnemec	Series 1 PurplePrime	Series 164 Epoxoline 80	
High Heat	t			
HH-1	Amercoat Canada *	Dimecote 9 or Dimetcote 21-5 (waterborne)	PSX 892 (if required)	
	Carboline	Carbozinc 11	4900, if required	
	Cloverdale	Clovazinc 2	Clovatherm 83220	
	Devoe Coatings	Cathacoat 304 [Cathacoat 304 L plus HT-10 aluminum topcoat, if required	
	Hempel	Hempel's Galvosil 15700	None (1 coat)	
	International	Interzinc 22	None (1 coat)	
	Rust-Oleum	N/A	N/A	

Coating System	Manufacturer	Product Designation	
		Prime Coat(s)	Finish Coat(s)
	Sherwin Williams	Zinc Clad II ES	Kem Hi Temp 850
	Tnemec	Series 90-96 Tneme-Zinc	None (1 coat)

.2 Colour additives are not to contain lead, or any lead compound which may be destroyed or affected by hydrogen sulphide or any other corrosive gas.

3. EXECUTION

3.1 General

- .1 Perform all painting operations in accordance with CAN/CGSB-85.100 except where specified otherwise.
- .2 Apply all paint materials in accordance with paint manufacturer's written application instructions.

3.2 Preparation

- .1 Surfaces to be painted are to be clean and dry. Before applying coating or surface treatments, remove oil, grease, dirt, rust, loose mill scale, old weathered coatings, and other foreign substances except as specified.
- .2 Where mechanical cleaning is accomplished by blast cleaning, the abrasive used is to be washed, graded and free of contaminants that might interfere with the adhesion of the coatings.
- .3 No more surface is to be blasted than can be prime coated before visible or detrimental rerusting occurs.
- 4 Examine all surfaces to be painted and correct all surface defects before application. Remove weld splatter, high ridges and slag prior to painting.
- .5 Use clean cloths and clean fluids in solvent cleaning.
- .6 Schedule cleaning and painting so that dust and spray from the cleaning process will not fall on wet, newly painted surfaces.
- .7 When field coating, 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 painting, reinstall removed items complete with all tags, labels and/or attached instruction or data sheets. Replace damaged items caused by removal at no expense to the Owner.

- .8 In the field, disconnect and move equipment adjacent to walls such as cables or cover plates, to permit cleaning and painting of equipment and walls and replace and reconnect on completion. Mask and paint around large panels or equipment.
- .9 Lightly sand glossy undercoats to provide a surface suitable for the proper application and adhesion of subsequent coats.

3.3 Workmanship

- .1 Coated surfaces to be free from runs, drops, ridges, waves, laps, and brush marks. Paint so as to produce an even film of uniform thickness completely coating corners and crevices. Paint in accordance with the requirements of SSPC.
- .2 Coated surfaces to be free from gaps or holidays. Any gaps or holidays found during inspection to be touched-up by roughening surface around the fault and repainting at no expense to the Owner.
- .3 Apply each coat of paint evenly and to a sharply cut line. Exercise care to avoid over-spraying or spattering paint on surfaces not to be coated.
- .4 In the field, protect glass, hardware, floors, roofs, and other adjacent areas and installations with taping, drop cloths, or other suitable measures.

3.4 Mixing And Thinning

- .1 Mix ingredients in container before and during use and ensure breaking up of lumps, complete dispersion of settled pigment, and uniform composition.
- .2 Thin paint for spraying according to manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Engineer.

3.5 Environmental Requirements

- .1 Apply paint finishes only when temperature at location of installation can be satisfactorily maintained within manufacturer's recommendations.
- .2 Provide temporary heating where permanent facilities are not available to maintain minimum recommended temperatures.
- .3 Apply paint finish only in areas where dust is no longer being generated by related construction operations such that airborne particles will not affect the quality of the finished surface.
- .4 Apply paint only when surface to be painted is dry, properly cured and adequately prepared.

3.6 Application

.1 Conform to manufacturer's application instructions.

.2 Brush application.

- .1 Work paint into cracks, crevices and corners. Paint surfaces not accessible to brushes by spray, daubers or sheepskins.
- .2 Brush out runs and sags.
- .3 Remove runs, sags and brush marks from finished work and repaint.

.3 Spray application.

- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges
- .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.
- .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
- .4 Brush out immediately all runs and sags.
- .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Engineer.
- .5 Apply each coat of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.

3.7 Drying and Curing

- .1 All drying and re-coat times shall be that specified by the manufacturer's specifications.
- .2 Cure time shall be as specified by the manufacturer's published literature.

3.8 Field Touch-ups

.1 Field touch-ups and field applied protective and maintenance coatings will be undertaken by the Contractor.

3.9 Cleanup

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

.2 Do not dispose of solvents, cleaning solutions, thinners or extra paint on site. Store in sealed containers and remove from site to proper disposal, storage or recycling facilities.

3.10 Coating System Specification Sheets (COATSPEC)

Coating systems for different types of surfaces and general service conditions for which these systems are normally applied are specified on the following COATSPEC sheets. In case of conflict between the finishing schedule and the COATSPECS, the requirements of the finishing schedule will prevail.

- .1 Coating System Identification: E-1
 - .1 Coating Material: epoxy finish system
 - .2 Surface: Metals (excluding Stainless Steel)
 - .3 Service Condition: non-immersion, interior exposure, covered and not exposed to direct sunlight including exterior surface of interior installed pipes
 - .4 Surface Preparation:
 - .1 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.
 - .2 Ferrous Metal (excluding Stainless Steel): Prepare bare ferrous metal surfaces in accordance with SSPC SP-6 (Commercial Blast Cleaning). Prepare bleeding surfaces in accordance with coating manufacturer's written recommendations.
 - .3 Non-ferrous Metal: Prepare in accordance with SSPC SP-1 (Solvent Cleaning).

.5 Prime Coating

- .1 General: apply one coat of primer at manufacturer's recommended dry film thickness.
- .2 Ferrous Metal (excluding Stainless Steel): The primer coat is to be an epoxy primer compatible with specified epoxy finish coats and applied in accordance with coating manufacturer's written recommendations.
- .3 Non-ferrous Metal: Prepare in accordance with SP-7 (light uniform brush blast) or if recommended by coating manufacturer paint with a vinyl acid wash coat prior to the application of the prime coat.

.6 Finish Coating

.1 Apply one or more coats at manufacturer's recommended dry film thickness per coat to the specified system thickness – Not required if only one coat is needed.

- .7 System Thickness: 125 200 microns (5 8 mils) total dry film thickness.
- .2 Coating System Identification: E-2a
 - .1 Coating Material: epoxy finish system.
 - .2 Surface: Metals (excluding Stainless Steel).
 - .3 Service Condition: submerged.
 - .4 Surface Preparation:
 - 1 Remove oil and grease before mechanical cleaning is started in accordance with SSPC-SP1 (Solvent Cleaning).
 - .2 Ferrous Metal (excluding Stainless Steel): Prepare surfaces in accordance with SSPC SP-5 (White Metal Blast Cleaning). Blast profile to a minimum surface roughness of 1.5 2.5 mils or as specified by the coating manufacturer.
 - .3 Non-ferrous Metal: Prepare surfaces in accordance with SSPC SP-1 (Solvent Cleaning).
 - .5 Prime Coating
 - General: apply one coat at manufacturer's recommended dry film thickness.
 - Ferrous Metal (excluding Stainless Steel): The primer coat is to be compatible with specified finish coat.
 - .3 Non-ferrous Metal: Prepare in accordance with SP-7 (light uniform brush blast) or if recommended by coating manufacturer paint with a vinyl acid wash coat prior to the application of the prime coat. Do not paint submerged nonferrous metal.
 - .6 Finish Coating
 - The finish coating shall be a polyamide cured epoxy or modified phenolic epoxy. The minimum solids volume shall be 70%. Apply two or more coats at manufacturer's recommended dry film thickness per coat to the specified system thickness.
 - .7 System Thickness: 275 375 microns (11 15 mils) total dry film thickness.
- .3 Coating System Identification: E-2b
 - .1 Coating Material: epoxy finish coating.
 - .2 Surface: Metals (excluding Stainless Steel).
 - .3 Service Condition: splash zone.

.4 Surface Preparation:

- .1 Remove oil and grease before mechanical cleaning is started in accordance with SSPC SP-1 (Solvent Cleaning).
- .2 Ferrous Metal (excluding Stainless Steel): Prepare surfaces in accordance with SSPC SP-5 (White Metal Blast Cleaning). Blast profile to a minimum surface roughness of 1.5 – 2.5 mils or as specified by the coating manufacturer.
- .3 Non-ferrous Metal: Prepare surfaces in accordance with SSPC SP-1 (Solvent Cleaning).

.5 Prime Coating

- .1 General: apply one coat at manufacturer's recommended dry film thickness.
- .2 Ferrous Metal (excluding Stainless Steel): The primer coat shall be an inorganic zinc-rich coating containing 80% metallic zinc by weight in the applied dry film unless a written request for using organic zinc-rich coat is made. Touch up is always made using an organic zinc-rich coat. The primer coat is to be compatible with the specified finish coat.
- .3 Non-ferrous Metal: Prepare in accordance with SP-7 (light uniform brush blast) or if recommended by coating manufacturer paint with a vinyl acid wash coat prior to the application of the prime coat.

.6 Finish Coating

- .1 The paint shall be an epoxy. Apply two or more coats at manufacturer's recommended dry film thickness per coat to the specified system thickness.
- .7 System Thickness: 250 325 microns (10 13 mils) total dry film thickness.
- .4 Coating System Identification: E-2c
 - .1 Coating Material: epoxy finish coating
 - .2 Surface: Metals (excluding Stainless Steel) used where H₂S is present in the air.
 - .3 Service Condition: splash zone.

.4 Surface Preparation:

- .1 Remove oil and grease before mechanical cleaning is started in accordance with SSPC SP-1 (Solvent Cleaning).
- .2 Ferrous Metal (excluding Stainless Steel): Prepare surfaces in accordance with SSPC SP-5 (White Metal Blast Cleaning). Blast profile to a minimum surface roughness of 1.5 – 2.5 mils or as specified by the coating manufacturer

- Non-ferrous Metal: Prepare surfaces in accordance with SSPC SP-1 (Solvent Cleaning).
- .5 Prime Coating:
 - General: Apply one coat at manufacturer's recommended dry film thickness.
 - .2 Ferrous Metal (excluding Stainless Steel): The primer coat is to be compatible with specified finish coat.
 - Non-ferrous Metal: Prepare in accordance with SP-7 (light uniform brush blast) or if recommended by coating manufacturer paint with a vinyl acid wash coat prior to the application of the prime coat. Do not paint submerged non-ferrous metal.
- .6 Finish Coating:
 - The paint shall be an epoxy. Apply two or more coats at manufacturer's recommended dry film thickness per coat to the specified system thickness.
- .7 System Thickness: minimum 325 microns (minimum 10 mils) total dry film thickness
- .5 Coating System Identification: HH-1
 - Coating Material: inorganic zinc
 - .2 Surface: ferrous metal (not insulated)
 - .3 Service Condition: temperature up to 400 °C. Confirm actual service conditions with coating manufacturer.
 - .4 Application: field
 - .5 Surface Preparation:
 - Prepare metal surfaces in accordance with SSPC SP-10 (Near White Metal Blast Cleaning). Blast profile to a minimum surface roughness of 1.5 mils or as specified by the coating manufacturer.
 - .6 Prime Coating:
 - 1 Coating: one or more coats at manufacturer's recommended dry film thickness per coat to the specified thickness.
 - .7 Finish Coating:
 - Coating: one or more coats at manufacturer's recommended dry film thickness per coat to the specified system thickness.
 - .8 System Thickness: 63-100 microns (2.5 4.0 mils) total dry film thickness.

3.11 Finishing Schedule

.1 Specific coating systems, colours, and finishes for rooms, tunnels, piping, equipment, and other items which are coated or have other architectural finishes are shown on the drawings, individual specification sections or specified in the following coating system schedule. Unless otherwise specified in the coating system schedule, the word "interior" means the inside of a building or structure, and the word "exterior" means outside exposure to weather elements. Final colours will be selected during construction based on the sample colour chart submittal.

	Surface/Location	Coating System Identification	Colour
Equ	ipment and Metal Appurtenances		<u> </u>
.1	High temperature equipment operable at:		
	.1 93 to 400°C	HH-1	Coating Manufacturer's Standard Gray
Pip	ing – Interior	-	
.1	Ferrous, non-ferrous, galvanized piping, and appurtenant supports, unless otherwise specified.	Refer to Section 15050 and 15055 for Coating System	Refer to Section 11910
		E-1 for Identification	
Pip	ing - Exterior		
.1	Ferrous, non-ferrous, galvanized piping, and appurtenant supports, unless otherwise specified.	Refer to Section 15050 and 15055 for Coating System	Refer to Section 11910
Pipi	ing – Below Grade		
.1	Ferrous, non-ferrous, galvanized piping, and appurtenant supports, unless otherwise specified.	Refer to Section 15050 and 15055 for Coating System	Refer to end of this Section
Val	ves (including handles)	1	
.1	Control and specialty valves, including actuators	Shop applied manufacturer's coating system	To manufacturer's requirements

3.12 Colour Coding

.1 Refer to Section 11910 for Process identification colours.

3.13 Spare Paint

.1 Provide one gallon of all types of finish coatings and colour schedules for touch up purposes.

END OF SECTION