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 raw/treated water during routine operation.
- .16 Splash Zone Service: equipment or material exposed to the normal range of atmospheric conditions and conditions common to water facilities (high humidity, 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

- 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 better 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

- 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. For potable water facilities ensure that the chosen product is AWWA approved for potable water applications.

Coating	Manufacturer	Product Designation	
System		Prime Coat(s)	Finish Coat(s)
Ероху			
E-1	Amercoat Canada *	Amercoat 385 or Amercoat 370	N/A
	Carboline	Caroboline 890	None (1 coat)
	Cloverdale	Clovaguard 83150	Clovaguard 83150 (if required)
	Devoe Coatings	Devran 224 or Bar Rust 235 (application in the field)	None (1 coat)
	Hempel	Hempadur Mastic 45880	None (1 coat)
l	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

Coating System	Manufacturer	Product Designation		
		Prime Coat(s)	Finish Coat(s)	
	International	Interseal 670 HS	Interseal 670 HS	
	Rust-Oleum	9100	9102	
	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 Carbothane 133 HB (for lasting color)	
	Cloverdale	Clovazinc 2 (inorganic)	Clovaliner 83295	
	8	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 environmen recommends vinyl ester)	tN/A	
	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 Hea	t			
HH-1	Amercoat Canada *	Dimecote 9 or Dimetcote 21-5 (waterborne)	PSX 892 (if required)	
	Carboline	Carbozine 11	4900, if required	
	Cloverdale	Clovazinc 2	Clovatherm 83220	
	Devoe Coatings	Cathacoat 304 L	Cathacoat 304 L plus HT-10 aluminum topcoat, if require	

Coating	Manufacturer	Product Designation		
System		Prime Coat(s)	Finish Coat(s)	
	Hempel	Hempel's Galvosil 15700	None (1 coat)	
	International Rust-Oleum	Interzinc 22	None (1 coat)	
		N/A	N/A	
	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

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

- .1 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

- 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:

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.
- 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 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

- .1 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
 - 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.
 - .3 Non-ferrous Metal: Prepare surfaces in accordance with SSPC SP-1 (Solvent Cleaning).
 - .5 Prime Coating:
 - I 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 nonferrous 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
 - .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:
 - .1 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:
 - .1 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	uipment and Metal Appurtenances		
.1	High temperature equipment operable at: .1 93 to 400°C	HH-1	Coating Manufacturer's Standard Gray

	Surface/Location	Coating System Identification	Colour
Pipi	ng – Interior		
.1	Ferrous, non-ferrous, galvanized piping, and appurtenant supports, unless otherwise specified.	Refer to Sections 15050 and 15055 for Coating System E-1 for Identification	Refer to Section 11910
Pipi	ing - Exterior		
.1	Ferrous, non-ferrous, galvanized piping, and appurtenant supports, unless otherwise specified.	Refer to Sections 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 Sections 15050 and 15055 for Coating System	Refer to end of this Section
Val	ves (including handles)		
.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

DIVISION 11 EQUIPMENT

TABLE OF CONTENTS

DIVISION 11 - EQIPMENT

Section No.	Description
11005	General Process Revisions
11020	Process Equipment Installation
11035	Process Motors Less than 150kW
11300	Process Pumps - General Requirements
11311	Vertical In-Line Pumps
11321	Sample Pump/Holding Tank Equipment
11361	Fire Pumping Equipment
11910	Identification

1. GENERAL

1.1 Description

- .1 Unless otherwise specified, this section specifies general requirements common to all process mechanical equipment included in Division 11 to Division 15, inclusive.
- .2 Comply with all laws, ordinances, rules, regulations, codes, and order of all authorities having jurisdiction relating to this work.

1.2 Definitions and Interpretations

- .1 Where the term "Provide" is used herein, understand to include labour, materials, and services necessary to supply items or work referenced.
- .2 Where the terms "Instructions", or "As instructed", or "Where instructed" are used herein, understand to mean instruction by the Engineer, including supplementary instruction notices and all comments made regarding submittals of shop drawings and samples for review.
- .3 Where the term "Listed" is used herein, understand to mean that the material or equipment have been tested in accordance with applicable standards and methods, have been approved and listed for the intended use by a testing authority which itself has been approved by the authorities having jurisdiction.
- .4 Where the terms "Approved", or "Approval" are used herein, understand to mean approved by Authorities having jurisdiction as conforming to Codes, Standards, Bylaws, etc.
- .5 Where the terms "Acceptable", or "Acceptance" are used herein, understand to mean acceptable to the Engineer as generally conforming to the requirements of the Contract Documents.
- .6 Where the term "Submit for Review" is used herein, understand to mean submit to the Engineer.
- .7 Where the term "Subject to Review", etc. is used herein, understand to mean work shall be laid out for review by the Engineer. Do not proceed with this work until instructions have been obtained from the Engineer. Submit further information, shop drawings, samples, etc. as specified and/or as may be reasonable requested by the Engineer.
- .8 Where the term "Accessible" is used herein, understand to mean readily approachable by persons or tools as required and where obstacles may be removed and replaced without cutting or breaking out materials.
- .9 Where working pressure or pressure ratings are specified, or shown on the drawings for valves, piping, fittings, equipment, etc., design and fabricate these items to be suitable for operating at specified pressures and corresponding temperatures unless noted otherwise.

1.3 Shop Drawings

- .1 Refer to Division 1 for the general requirements for shop drawings.
- .2 In addition to the requirements of Division 01, submit the following specific information with shop drawings for each item of equipment specified in Division 11.
 - .1 Assemble drawings showing details of connections and terminations of equipment for connection by others.
 - .2 List of materials of construction, detailing the component parts and reference specifications (ASTM, CSA, ANSI, etc.).
 - .3 Motor operating data, including motor and insulation ratings, start-up and operating current ratings, operating voltage and amperage tolerances, and description of construction, complete with illustrative drawings.
 - .4 Gearbox and drive data, including AGMA/AFBMA ratings for components, materials of construction, tolerances, and description of construction.
 - .5 Control schematics, text, and wiring diagrams as required to describe control operations.
 - .6 Required ancillary services including, but not limited to electrical, non-potable water and drains.
 - .7 Installation instructions indicating assembly and mounting requirements, alignment and assembly tolerances, and point of connection for ancillary services.
 - .8 Start-up instructions including lubricant requirements, electrical requirements, etc.
 - .9 Details of coating systems to be applied.
 - .10 Details of insulation provided to prevent galvanic corrosion between mating surfaces constructed of dissimilar metals.
 - A copy of the Contract Document mechanical layout drawings, control diagrams, and process and instrumentation diagrams, with addenda updates, that apply to the equipment marked to indicate special changes necessary for the supplied equipment. If no changes are required, mark the drawing(s) "no changes required".
 - .12 A copy of the related specification section with addenda updates, and all referenced sections with addenda updates, with each paragraph check-marked to show specification compliance or marked to show deviations.

1.4 Temporary Usage

.1 Temporary usage by the Owner of any process device, apparatus, machinery, or equipment prior to interim or final inspections is not to be construed as acceptance.

1.5 Owner Supplied Equipment

- .1 Where indicated in the drawings or noted in the specifications, install, test, and commission equipment provided by the Owner.
- .2 Review all information available for the Owner supplied equipment and ensure familiarity as to all requirements for storage, installation, testing, and commissioning.
- .3 Hand over of Owner supplied equipment to the Contractor will be made according to a schedule agreed upon by the Contractor, the Engineer, and the Owner.
- .4 Upon hand over, fully inspect the item of equipment in the presence of the Engineer. Where the equipment requires modification or repair to properly function, these items will be identified to and confirmed by the Engineer.

1.6 Design Standards, Acceptable Products, and Acceptable Manufacturers

- Equipment lists included in the specifications may be in two parts. The first part is the "Design Standard" equipment items. The second part of the list is comprised of "Acceptable Manufacturers" if the equipment of a specific vendor is specified.
- .2 The design has been based on the Design Standard. Quality of workmanship, dimensions, operating protocol, basic materials, and ancillary services have been defined on this basis and incorporated in the design.
- .3 Where Acceptable Products or Acceptable Manufacturers have been listed after a Design Standard, these products or ranges of products have been accepted by the Engineer as being capable of meeting the basic functional requirements of the equipment, but may not be the same as the Design Standard in detail. Provide all ancillary services, material upgrades, etc. as necessary to satisfy the functional and quality requirements defined by the Design Standard. Make all changes in fabrication, arrangement, piping, and/or electrical connections, etc. as necessary to suit the requirements of the Acceptable Products or Acceptable Manufacturers.
- Where Acceptable Products or Acceptable Manufacturers have been listed, but no Design Standard is listed, these products or ranges of products have been accepted by the Engineer as being capable of meeting the basic functional requirements of the equipment. Provide all ancillary services and modifications to arrangement, piping, and/or electrical connections, etc. as necessary to suit the functional requirements of the equipment.
- .5 Modify standard products as necessary to provide the specified features and to meet the specified operating conditions.

.6 No additional payment will be made for revisions or alterations made to accommodate the equipment supplied.

1.7 Abbreviations

.1 The following abbreviations are found in the Division 11 specifications:

AFBMA - Anti-Friction Bearing Manufacturers Association
AGMA - American Gear Manufacturers Association
AISI - American Iron and Steel Institute
ANSI - American National Standards Institute
AMCA - Air Movement and Control Association

ASCE - American Society of Civil Engineers

ASTM - American Society for Testing and Materials

AWS - American Welding Society

BS - British Standard

CEMA - Conveyor Equipment Manufacturers Association

CGA - Canadian Standards Association

CGSB - Canadian Government Standards Board

CSA - Canadian Standards Association

DIN - Deutsche Instustrie Norm

EEMAC - Electrical Equipment Manufactures Association of Canada

ISA - Instrumentation Society of America
ISO - International Standards Organization

MSS - Manufacturers Standardization Society of the Valve and Fittings

Industry.

NACE - National Association of Corrosion Engineers

NBC - National Building Code NEC - National Electrical Code

NEMA National Electrical Manufacturers Association

NFC - National Fire Code

NPC - National Plumbing Code

NSF - National Sanitation Foundation

SSPC - Structural Steel Painting Council

1.8 Coordination

.1 Coordinate the requirements of the equipment supplied with piping, structural supports, drainage, ventilation/cooling, electrical service, instrumentation and control interface, and other ancillaries specified in other Divisions.