

ADDENDUM NO. 01
City of Camas
WWTP Headworks and Primary Clarifier Improvements
March 11, 2024

Addendum No. 01 Acknowledgement Page

This addendum includes:

1 – 8 ½" x 11" Acknowledgement Pages

1 – 8 ½" x 11" Revision Summary Page

17 - 8 ½" x 11" Revised Specification 09 96 00 – High Performance Industrial Coatings

19 – Total Sheets

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NOTICE is hereby given that this acknowledgement page must be signed and enclosed with the bid for the **WWTP Headworks and Primary Clarifier Improvements** project as evidence that the bidder has familiarized themselves with all information incorporated herein.

Do NOT include the entire contents of this Addendum in your bid submission.

Only this signed acknowledgement page is required.

Company Name

Name (Please Print)

Title

Signature

The following addendum is hereby issued and made a part of the Plans and Specifications for the **WWTP Headworks and Primary Clarifier Improvements** project.

Changes are marked with [1] and underlined.

This Addendum No. 01 is hereby made a part of and incorporated into that certain CONTRACT DOCUMENTS FOR THE CITY OF CAMAS **WWTP Headworks and Primary Clarifier Improvements** project. Notice is hereby given that the Contract Documents for the subject project are amended as follows:

ITEM 1 – HIGH PERFORMANCE INDUSTRIAL COATINGS

The Specification 09 96 00 contained in the Issued for Bid set dated October 2023 is removed in its entirety and replaced with the following:

SECTION 09 96 00
HIGH PERFORMANCE INDUSTRIAL COATINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. High performance industrial coatings (HPIC).
 2. Any other coating, thinner, accelerator, inhibitor, etc., specified or required as part of a complete System specified in this Specification Section.
 3. Minimum surface preparation requirements.
- B. Related Specification Sections include but are not necessarily limited to:
1. Section 01 61 03 - Equipment - Basic Requirements.
 2. Section 01 73 20 - Openings and Penetrations in Construction.
 3. Section 03 15 19 - Anchorage to Concrete.
 4. Section 05 50 00 - Metal Fabrications.
 5. Section 40 05 00 - Pipe and Pipe Fittings - Basic Requirements.
 6. Section 40 05 07 - Pipe Support Systems.
 7. Section 40 05 51 - Valves - Basic Requirements.

1.2 QUALITY ASSURANCE

- A. Referenced Standards:
1. ASTM International (ASTM):
 - a. B499, Standard Test Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals.
 - b. D3359, Standard Test Methods for Rating Adhesion by Tape Test.
 - c. D4258, Standard Practice for Surface Cleaning Concrete for Coating.
 - d. D4259, Standard Practice for Abrading Concrete.
 - e. D4262, Standard Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces.
 - f. D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
 - g. D4414, Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
 - h. D4541, Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
 - i. D6132, Standard Test Method for Nondestructive Measurement of Dry Film Thickness of Applied Organic Coatings Using an Ultrasonic Gage.
 - j. D6677, Standard Test Method for Evaluating Adhesion by Knife.
 - k. D7234, Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.
 - l. E337, Standard Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures).
 - m. F1869, Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - n. F2170, Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 2. Environmental Protection Agency (EPA).
 3. International Concrete Repair Institute (ICRI):
 - a. 310.1R, Guideline for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion.
 - b. 310.2R, Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair.

4. NACE International (NACE).
 - a. SP0188, Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates.
 5. National Association of Pipe Fabricators (NAPF):
 - a. 500-03, Surface Preparation Standard for Ductile Iron Pipe and Fittings in Exposed Locations Receiving Special External Coatings and/or Special Internal Linings:
 - 1) 500-03-04, Abrasive Blast Cleaning for Ductile Iron Pipe.
 - 2) 500-03-05, Abrasive Blast Cleaning for Cast Ductile Iron Fittings.
 6. The Society for Protective Coatings (SSPC):
 - a. PA 2, Procedure for Determining Conformance to Dry Coating Thickness Requirements.
 - b. SP 1, Solvent Cleaning.
 - c. SP 2, Hand Tool Cleaning.
 - d. SP 3, Power Tool Cleaning.
 - e. SP 16, Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals.
 7. The Society for Protective Coatings/NACE International (SSPC/NACE):
 - a. SP 5/NACE No. 1, White Metal Blast Cleaning
 - b. SP 6/NACE No. 3, Commercial Blast Cleaning.
 - c. SP 7/NACE No. 4, Brush-off Blast Cleaning.
 - d. SP 10/NACE No. 2, Near-White Blast Cleaning.
 - e. SP 13/NACE No. 6, Surface Preparation of Concrete.
- B. Qualifications:
1. Coating manufacturer's technical representative shall be a NACE Certified Coatings Inspector, Level 3 minimum.
 2. Applicators shall have minimum of 10 years of experience in application of similar products on similar project.
 - a. Provide references for minimum of three different projects completed in last five years with similar scope of work.
 - b. Include name and address of project, size of project in value (coating) and contact person.
 3. NACE inspector shall be NACE Certified Coatings Inspector Level 3 minimum and shall have minimum of five years of experience of conducting inspections and tests as indicated in this Specification Section.
- C. Miscellaneous:
1. Furnish coating through one manufacturer unless noted otherwise.
- D. Deviation from specified MIL thickness or product type is not allowed without written authorization of Engineer.
- E. Material shall not be thinned unless approved, in writing, by coating manufacturer's technical representative.

1.3 DEFINITIONS

- A. Applicator:
1. Applicator is the person actually installing or applying the product in the field, at the Project site, or at an approved shop facility.
- B. Approved Factory Finish: Finish on a product in compliance with the finish specified in the Specification Section where the product is specified or in Specification Section 01 61 03.
1. Appurtenant Surface: Accessory or auxiliary surface attached to or adjacent to a surface indicated to be coated.

- C. Corrosive Environment:
 - 1. Immersion in or subject to:
 - a. Condensation, spillage or splash of a corrosive material such as water, wastewater or chemical solution.
 - b. Exposure to corrosive caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions.
 - c. For purposes of this Specification Section, corrosive environments include:
 - 1) Clarifiers and areas immediately above or adjacent to clarifiers.
 - 2) Outdoor areas not otherwise identified as highly corrosive.
 - 3) Piping galleries.
 - 4) Surfaces within 2 feet of high water level.
- D. Outdoor Atmosphere or Surface: Outdoor atmosphere or surface exposed to weather and/or direct sunlight.
- E. Finished Area: A room or area that is listed in or has finish called for on Room Finish Schedule or is indicated on Drawings to be coated.
- F. Highly Corrosive Environment:
 - 1. Immersion in and/or subject to:
 - a. Condensation, spillage or splash of a highly corrosive material such as wastewater, or chemical solution.
 - b. Exposure to highly corrosive caustic or acidic agent, chemicals, chemical fumes, chemical mixture, or solutions.
 - c. For purposes of this Specification Section, highly corrosive environments include:
 - 1) Plant headworks.
 - 2) Other areas subject to exposure to hydrogen sulfide (H₂S) gas.
- G. Holiday:
 - 1. A void, crack, thin spot, foreign inclusion, or contamination in the coating that significantly lowers the dielectric strength of the coating.
 - 2. May also be identified as a discontinuity or pinhole.
- H. HPIC: High performance industrial coatings.
 - 1. Epoxies, urethanes, vinyl ester, waterborne vinyl acrylic emulsions, acrylates, silicones, alkyds, acrylic emulsions and any other coating listed as a HPIC.
- I. Indoor Atmosphere or Surface: Indoor atmosphere or surface not exposed to weather and/or direct sunlight.
- J. Immersion Service:
 - 1. Any surface immersed in water or some other liquid.
 - 2. Surface of any pipe, valve, or any other component of the piping system subject to frequent wetting.
 - 3. Surfaces within two feet above high water level in water bearing structures.
- K. Piping System: Pipe, valves, fittings and accessories.
- L. Surface Hidden from View:
 - 1. Within pipe chases.
 - 2. Between top side of ceilings and underside of floor or roof structures above.
- M. Vapor Space: Interior space within tankage, closed structures, or similar elements that is above the low liquid line and subject to the accumulation of fumes, vapor and/or condensation.

1.4 SUBMITTALS

- A. Certifications:
 - 1. Applicator experience qualifications.
 - a. No submittal information will be reviewed until Engineer has received and approved applicator qualifications.

2. NACE inspector certification.
 3. NACE inspector experience qualifications.
 4. Certification that High Performance Coating Systems proposed for use have been reviewed and approved by a NACE Certified Coatings Inspector employed by the coating manufacturer.
 - a. Submittals not including this certification will be returned without review.
- B. Shop Drawings:
1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's surface preparation instructions.
 - c. Manufacturer's application instructions.
 - 1) Manufacturer's standard details, including but not limited to penetrations, transitions, and terminations for:
 - a) High-build coatings on concrete for wastewater service in high H₂S areas.
 - b) Metal surface coatings for wastewater immersion and vapor space service.
 - c) Pipe galleries.
 - d) Other standard wastewater treatment plant conditions as applicable.
 - d. If products being used are manufactured by Company other than listed in the MATERIALS Article of this Specification Section, provide complete individual data sheet comparison of proposed products with specified products including:
 - 1) Application procedure.
 - 2) Coverage rates.
 - 3) Certification that product is designed for intended use and is equal or superior to specified product.
 - e. Contractor's written plan of action for containing airborne particles created by blasting operation and location of disposal of spent contaminated blasting media.
 - f. Coating manufacturer's recommendation on abrasive blasting.
 - g. Coating manufacturer's technical representative's written statement attesting that applicator has been instructed on proper preparation, mixing and application procedures for coatings specified.
 - h. Manufacturer's recommendation for universal barrier coat.
 - i. Manufacturer's recommendation for providing temporary or supplemental heat or dehumidification or other environmental control measures.
 2. Manufacturer's statement regarding applicator instruction on product use.
- C. Samples:
1. Manufacturer's full line of colors for Engineer's preliminary color selection.
 2. After preliminary color selection by Engineer provide two, 3 x 5 inches samples of each final color selected.
- D. Informational Submittals:
1. Surface preparation approval by NACE inspector.
 2. Coating application certification by NACE inspector.
 3. Approval of application equipment.
 4. Applicator's daily records:
 - a. Submit daily records at end of each week in which coating work is performed unless requested otherwise by Engineer's on-site representative.
 5. Results of discontinuity testing indicating any corrective action taken.
 6. Certification that coating systems requiring holiday detection testing are free of pinholes or other material defects.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver in original containers, labeled as follows:
1. Name or type number of material.
 2. Manufacturer's name and item stock number.
 3. Contents, by volume, of major constituents.

4. Warning labels.
 5. VOC content.
- B. Store materials in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.

1.6 PROJECT CONDITIONS

- A. Pre-application Conference:
1. Prior to commencement of surface preparation or coating application, the Contractor shall convene a pre-application conference with all affected parties, including but not limited to: the applicator, coating manufacturer's technical representative, Owner's representative, and Engineer's representative(s).
 2. The meeting shall discuss all aspects of the Project including but not limited to:
 - a. Schedule.
 - b. Material storage and handling.
 - c. Examination of surfaces to be coated.
 - d. Protection of surfaces not to be coated.
 - e. Surface preparation.
 - f. Coating application:
 - 1) Environmental conditions for application of coatings.
 - 2) Temporary environmental controls.
 - g. Field quality control requirements:
 - 1) Manufacturer's technical representative responsibilities.
 - 2) Contractor performed testing.
 - a) Instrumentation requirements.
 - b) Frequency of testing.
 - c) Record keeping.
 - 3) NACE inspector performed testing.
- B. Verify that atmosphere in area where coating is to take place is within coating manufacturer's acceptable temperature, humidity and sun exposure limits.
1. Provide temporary heating, shade and/or dehumidification as required to bring area within acceptable limits.
 - a. Provide temporary dehumidification equipment properly sized to maintain humidity levels required by coating manufacturer.
 - b. Provide clean heat with heat exchanger type equipment sufficient in size to maintain temperature on a 24 hour basis.
 - 1) Vent exhaust gases to outdoor environment.
 - 2) No exhaust gases shall be allowed to vent into the space being coated or any adjacent space.
 2. Do not apply coatings in snow, rain, fog or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. High Performance Industrial Coatings:
 - a. The Sherwin-Williams Company (Sherwin Williams).
 - b. Tnemec Company, Inc. (Tnemec).
 - c. [1] Raven by PPG.
- B. "Or-Equal" Submittals:
1. Materials by other manufacturers are acceptable provided that they are established as being compatible with and of equal quality to the coatings of the manufacturers listed.

2. Provide satisfactory documentation from the proposed "or-equal" manufacturer that proposed materials meets or exceeds the following:
 - a. Is of the same generic resin.
 - b. Requires comparable surface preparation.
 - c. Has comparable application requirements.
 - d. Meets the same VOC levels or better.
 - e. Provides the same finish and color options.
 - f. Is suitable for the intended service.
 - g. Resistance to abrasion and physical damage.
 - h. Resistance to chemical attack.
 - i. Resistance to UV exposure.
 - j. Ability to recoat in future.
 - k. Dry film thickness per coat.
 - 1) Where manufacturer's product data sheet indicates a minimum MIL thickness per coat that is greater than specified herein, MIL thickness for entire coating system shall be increased proportionately.
 - l. Minimum and Maximum time between coats.
 - m. Compatibility with other coatings.
 - n. Temperature limitations in service and during application.
 - o. Type and quality of recommended undercoats and topcoats.
 - p. Ease of application.
 - q. Ease of repairing damaged areas.
 - r. Stability of colors.
3. The cost of all testing and analyzing of the proposed substitute materials shall be borne by the CONTRACTOR.

2.2 MATERIALS

- A. Coatings used for indoor finishes shall meet the requirements of the building code.
- B. Coatings shall comply with the VOC limits of EPA.
- C. For unspecified materials such as thinner, provide manufacturer's recommended products.
- D. High Performance Industrial Coatings:

COATING CODE	GENERIC DESCRIPTION	MANUFACTURER	
		TNEMEC	SHERWIN WILLIAMS
AREC	Abrasion-Resistant Epoxy Coating	Series 435 Perma-Glaze	Duraplate 5900 or Duraplate 6100
AAP	Aliphatic Acrylic Polyurethane	Series 1095 Endurashield	Acrolon Ultra
CRM	Cementitious Repair Mortar	Series 217 MortarCrete	A.W. Cook Cemtec Silatec MSM
CRU	Corrosion Resistant Urethane	Series 290 CRU	Polylon HP
EMM	Epoxy Modified Cementitious Mortar	Series 218 MortarClad	Duraplate 2300
GFRE	Glass Flake Reinforced Epoxy	Series 142	Sher-Glass FF
HRE	H ₂ S-Resistant Epoxy	Series 132 Protuff Mastic	Duraplate 235
HREM	H ₂ S-Resistant Epoxy Mortar	Series 434 Perma-Shield H ₂ S	Duraplate 5900 Mortar

COATING CODE	GENERIC DESCRIPTION	MANUFACTURER	
		TNEMEC	SHERWIN WILLIAMS
MPE	Multi-Purpose Epoxy	Series N69 Hi-Build Epoxoline II	Macropoxy 646
STEP	Surface-Tolerant Epoxy Primer	Series 135 Chembuild	Macropoxy 646
ZRU	Zinc-Rich Urethane	Series 94-H ₂ O Hydro-Zinc	Corothane 1 Galvapak

2.3 COATING SYSTEMS

- A. The following tables indicate coating systems by material and environment unless a specific application is indicated.
- B. Ferrous Metals (Structural and Miscellaneous Metals):

Environment/ Application	Surface Preparation	Prime Coat	Intermediate Coat	Finish Coat
Indoor atmospheric	SSPC-SP 6/NACE No. 3	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE
Indoor atmospheric (corrosive environment)	SSPC-SP 10/NACE No. 2, min. 2 MIL anchor profile	2.5 to 3.5 MIL ZRU	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE
Indoor atmospheric (highly corrosive environment)	SSPC-SP 10/NACE No. 2, min. 2 MIL anchor profile	2.5 to 3.5 MIL ZRU	3.0 to 4.0 MIL MPE	2.0 to 3.0 MIL CRU
Immersion - Wastewater	SSPC-SP 10/NACE No. 2 min. 3 MIL anchor profile	4.0 to 6.0 MIL MPE	4.0 to 6.0 MIL MPE	12 to 16 MIL GFRE
Immersion - Wastewater (abrasion resistant)	SSPC-SP 10/NACE No. 2 min. 3 MIL anchor profile	15 to 20 MIL AREC		15 to 20 MIL AREC
Outdoor atmospheric	SSPC-SP 6/NACE No. 3	2.5 to 3.5 MIL ZRU	3.0 to 5.0 MIL MPE	2.5 to 3.5 MIL AAP
Vapor space at covered clarifiers, digesters and similar structures	SSPC-SP 10/NACE No. 2 min. 3 MIL anchor profile	5 to 7 MIL HRE		30 to 40 MIL AREC

- C. Galvanized Steel:

Environment/ Application	Surface Preparation	Prime Coat	Intermediate Coat	Finish Coat
Indoor atmospheric	SSPC-SP 16	4.0 to 6.0 MIL STEP		2.0 to 3.0 MIL MPE
Immersion - non NSF	SSPC-SP 16	4.0 to 6.0 MIL STEP	2.0 to 3.0 MIL MPE	2.0 to 3.0 MIL MPE

Environment/ Application	Surface Preparation	Prime Coat	Intermediate Coat	Finish Coat
Outdoor atmospheric	SSPC-SP 16	4.0 to 6.0 MIL STEP		2.5 to 3.5 MIL AAP
Field cut pipe threads	SSPC-SP 3	4.0 to 6.0 MIL STEP	Coat per exposure above	Coat per exposure above

D. Non Ferrous Metals, including piping:

Environment/ Application	Surface Preparation	Prime Coat	Intermediate Coat	Finish Coat
Dissimilar Materials Protection	SSPC-SP 2	4.5 to 5.5 MIL MPE		
Indoor atmospheric	SSPC-SP 2	3.0 to 4.0 MIL MPE		3.0 to 4.0 MIL MPE
Vapor space at covered clarifiers, digesters and similar structures	SSPC-SP 10/NACE No. 2 min. 3 MIL anchor profile	5 to 7 MIL HRE		30 to 40 MIL AREC
Immersion - Wastewater (abrasion resistant)	SSPC-SP 16			40 to 45 MIL AREC
Outdoor atmospheric	SSPC-SP 2	4.0 to 6.0 MIL MPE		2.5 to 3.5 MIL AAP

E. Ferrous Piping:

Environment/ Application	Surface Preparation	Prime Coat	Intermediate Coat	Finish Coat
Indoor atmospheric	SSPC-SP 6/ NACE No. 3	2.5 to 3.5 MIL ZRU	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE
Vapor space at covered clarifiers, digesters and similar structures	SSPC-SP 10/NACE No. 2 min. 3 MIL anchor profile	5 to 7 MIL HRE		30 to 40 MIL AREC
Immersion - Wastewater	SSPC-SP 10/NACE No. 2	3.0 to 4.0 MIL HRE		12 to 16 MIL GFRE
Immersion - Wastewater (abrasion resistant)	SSPC-SP 10/NACE No. 2, min 3 MIL anchor profile	15 to 20 MIL AREC		15 to 20 MIL AREC
Outdoor atmospheric	SSPC-SP 10/NACE No. 2	2.5 to 3.5 MIL ZRU	3.0 to 4.0 MIL MPE	2.5 to 3.5 MIL AAP

F. Ductile Iron Piping:

Environment/ Application	Surface Preparation	Prime Coat	Intermediate Coat	Finish Coat
Indoor atmospheric	Pipe: NAPF 500-03-04 Fittings: NAPF 500-03-05	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE
Vapor space at covered clarifiers, digesters and similar structures	SSPC-SP 10/NACE No. 2 min. 3 MIL anchor profile	5 to 7 MIL HRE		30 to 40 MIL AREC
Immersion - Wastewater	Pipe: NAPF 500-03-04 Fittings: NAPF 500-03-05	3.0 to 4.0 MIL HRE		12 to 16 MIL GFRE
Immersion - Wastewater (abrasion resistant)	Pipe: NAPF 500-03-04 Fittings: NAPF 500-03-05	15 to 20 MIL AREC		15 to 20 MIL AREC
Outdoor atmospheric	Pipe: NAPF 500-03-04 Fittings: NAPF 500-03-05	3.0 to 4.0 MIL MPE	3.0 to 4.0 MIL MPE	2.5 to 3.5 MIL AAP

G. Concrete:

1. For repair of deteriorated existing concrete, provide additional surface preparation as specified in PREPARATION article in this Specification Section.

Environment/ Application	Surface Preparation	Filler/Surfacer [1]	Prime Coat [1]	Intermediate Coat	Finish Coat [1]
Immersion - Wastewater (Abrasion Resistant)	SSPC-SP 13/NACE No. 6 ICRI CSP 5	1/16 to 1/2 inches: <u>PPG Raven 760 EMC multiple lifts as needed</u> 1/4 to 4 inches: <u>PPG Raven 755 High Early Strength Underlayment</u>	<u>1/8 inch: 2 coats PPG Raven 175 Epoxy @ 8.0 mils</u>		<u>PPG Raven 405 @150.0 mils DFT min to 200.0 mils DFT max</u>

PART 3 - EXECUTION

3.1 ITEMS TO BE COATED

- A. Items to be coated include, but are not limited to:
 1. Headworks Facility.
 - a. Channel Walls.

- b. Channel Floors.
- c. Top decking.
 - 1) Coating in the headworks facility is to be full height, both above and below the waterline.
- 2. Primary Clarifier Facility (No. 1 and No. 2)
 - a. All metal materials, above and below the waterline, including but not limited to:
 - 1) Clarifier center column.
 - 2) Clarifier arms.
- 3. Other Piping, Items, and Locations Specifically Noted on Drawings.

3.2 ITEMS NOT TO BE COATED

- A. General: Do not coat items listed in this Article, unless noted otherwise.
- B. Items with Approved Factory Finish: These items may require repair of damaged coated areas or coating of welded connections.
- C. Electrical Equipment.
- D. Moving parts of mechanical and electrical units where coating would interfere with the operation of the unit.
- E. Code labels, equipment identification or rating plates and similar labels, tagging and identification.
- F. Contact surfaces of friction-type structural connections.
- G. Interior of Pipe, Ductwork, and Conduits.
- H. Galvanized Steel Items, unless specifically noted to be coated.

3.3 EXAMINATION

- A. Concrete:
 - 1. Test pH of surface to be coated in accordance with ASTM D4262.
 - a. If surface pH is not within coating manufacturer's required acceptable range, use methods acceptable to coating manufacturer as required to bring pH within acceptable range.
 - b. Retest pH until acceptable results are obtained.
 - 2. Verify that moisture content of surface to be coated is within coating manufacturer's recommended acceptable limits.
 - a. Test surface to be coated in accordance with ASTM D4263 to determine the presence of moisture.
 - 1) If moisture is detected, test moisture content of surface to be coated in accordance with ASTM F1869 or ASTM F2170.
 - 2) Provide remedial measures as necessary to bring moisture content within coating manufacturer's recommended acceptable limits.
 - 3) Retest surface until acceptable results are obtained.

3.4 PREPARATION

- A. General:
 - 1. Prepare surfaces to be coated in accordance with coating manufacturer's instructions and this Specification Section unless noted otherwise in this Specification Section.
 - a. Where discrepancy between coating manufacturer's instructions and this Specification Section exists, the more stringent surface preparation shall be provided unless approved otherwise, in writing, by the Engineer.
 - 2. Remove all dust, grease, oil, compounds, dirt and other foreign matter which would prevent bonding of coating to surface.
 - 3. Adhere to manufacturer's recoat time surface preparation requirements.

- a. Surfaces that have exceeded coating manufacturer's published recoat time and/or have exhibited surface chalking shall be prepared prior to additional coating in accordance with manufacturer's published recommendations.
 - 1) Minimum SSPC-SP 7/NACE No. 4 unless otherwise approved by Engineer.
- B. Obtain samples of existing coating and have samples tested by a recognized testing laboratory to determine if existing coating contains lead, asbestos or any other health hazard as defined by the EPA.
 - 1. If existing coating is found to contain lead, asbestos, or any other health hazard, notify the Engineer immediately.
 - 2. Prepare plan of action for safe, legal removal and disposal of contaminated coating.
 - 3. Engineer, Contractor and Owner shall negotiate agreement for cost associated with removal.
- C. Protection:
 - 1. Protect surrounding surfaces not to be coated.
 - 2. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.
 - 3. Protect code labels, equipment identification or rating plates and similar labels, tagging and identification.
 - 4. For Clarifiers: Remove, mask, or otherwise protect all surfaces not intended to be coated. Provide drop cloths to prevent surface preparation or coating materials from falling on, marring, or overspraying adjacent surfaces, with special care given to the gearboxes and motors. All covering panels on top of clarifiers shall be protected from overspray. All damaged external areas shall be repaired to the original condition at the sole expense of the Contractor.
 - 5. For the Headworks facilities: Remove, mask, or otherwise protect all surfaces not intended to be coated. Provide drop cloths to prevent surface preparation or coating materials from falling on, marring, or overspraying adjacent surfaces, with special care given to the screens, gate actuators, and other motorized equipment. All damaged external areas shall be repaired to the original condition at the sole expense of the Contractor.
- D. Prepare and coat before assembly all surfaces which are inaccessible after assembly.
- E. Ferrous Metal:
 - 1. Prepare ductile iron pipe in accordance with pipe manufacturer's recommendations and NAPP.
 - a. All piping, pumps, valves, fittings and any other component used in the water piping system that requires preparation for coating shall be prepared in accordance with requirements for immersion service.
 - b. Prepare all areas requiring patch coating in accordance with recommendations of manufacturer and NAPP.
 - c. Remove bituminous coating per piping manufacturer, coating manufacturer and NAPP recommendations.
 - 1) The most stringent recommendations shall apply.
 - 2. Complete fabrication, welding or burning before beginning surface preparation.
 - a. Chip or grind off flux, spatter, slag or other laminations left from welding.
 - b. Remove mill scale.
 - c. Grind smooth rough welds and other sharp projections.
 - 3. Solvent clean in accordance with SSPC-SP 1.
 - 4. Restore surface of field welds and adjacent areas to original surface preparation.
- F. Galvanized Steel and Non-ferrous Metals:
 - 1. Solvent clean in accordance with SSPC-SP 1 followed by brush-off blast clean in accordance with SSPC-SP 16 to remove zinc oxide and other foreign contaminants.
 - a. Provide uniform 1 MIL profile surface.
- G. Concrete:
 - 1. Cure for minimum of 28 days.

2. Concrete surfaces shall be cleaned in accordance with ASTM D4258.
 3. Repair deteriorated concrete surfaces in accordance with ICRI 310.1R.
 - a. Remove unsound concrete, loose materials, existing coatings, or other bond-inhibiting materials in accordance with SSPC-SP 13/NACE No. 6 to minimum ICRI 310.2 CSP 6.
 - b. Where steel reinforcing or embeds are exposed:
 - 1) Remove concrete minimum 3/4 inches around entire circumference of bar or perimeter of embed.
 - 2) Abrasive blast steel to SSPC-SP 10/NACE No. 2 or Power Tool Clean to SSPCSP 11.
 - 3) Coat steel with minimum 5.0 MIL dry film thickness (DFT) MPE scheduled in MATERIALS article of this Specification Section.
 - c. Restore surface using EMM or CRM scheduled in MATERIALS article of this Specification Section.
 - 1) Dry-pack flush to original concrete plane.
 4. Abrasive blast concrete surfaces in accordance with ASTM D4259 and SSPC-SP 13/NACE No. 6.
 - a. Provide profile per ICRI 301.2 as listed in MATERIALS article of this Specification Section.
 5. Test pH and moisture content in accordance with EXAMINATION article in this Specification Section.
- H. Preparation by Abrasive Blasting:
1. Schedule the abrasive blasting operation so blasted surfaces will not be wet after blasting and before coating.
 2. Provide compressed air for blasting that is free of water and oil.
 - a. Provide accessible separators and traps.
 3. Protect nameplates, valve stems, rotating equipment, motors and other items that may be damaged from blasting.
 4. All abrasive-blasted ferrous metal surfaces shall be inspected immediately prior to application of coatings.
 - a. Inspection shall be performed to determine cleanliness and profile depth of blasted surfaces and to certify that surface has been prepared in accordance with these Specifications.
 - b. Surface preparation shall be approved in writing by NACE coatings inspector.
 5. Perform additional blasting and cleaning as required to achieve surface preparation required.
 - a. Re-blast surfaces not meeting requirements of these Specifications.
 - b. Prior to coating, re-blast surfaces allowed to set overnight and surfaces that show rust bloom.
 - c. Surfaces allowed to set overnight or surfaces which show rust bloom prior to coating shall be re-inspected prior to coating application.
 6. Profile depth of blasted surface: Not less than 1 MIL or greater than 2 mils unless required otherwise by coating manufacturer.
 7. Ensure abrasive blasting operation does not result in embedment of abrasive particles in coating.
 8. Confine blast abrasives to area being blasted.
 - a. Provide shields of polyethylene sheeting or other such barriers to confine blast material.
 - b. Plug pipes, holes, or openings before blasting and keep plugged until blast operation is complete and residue is removed.
 9. Abrasive blasting media may be recovered, cleaned and reused providing Contractor submits, for Engineer's review, a comprehensive recovery plan outlining all procedures and equipment proposed in reclamation process.
 10. Properly dispose of blasting material contaminated with debris from blasting operation.

3.5 APPLICATION

A. General:

1. Thin, mix and apply coatings by brush, roller, or spray in accordance with manufacturer's installation instructions.
 - a. Application equipment must be inspected and approved in writing by coating manufacturer.
 2. Temperature and weather conditions:
 - a. Do not coat surfaces when surface temperature is below 50 degrees F unless product has been formulated specifically for low temperature application and application is approved in writing by Engineer and coating manufacturer's technical representative.
 - b. Avoid coating surfaces exposed to hot sun.
 - c. Do not coat damp surfaces.
 - d. Apply coating to concrete or masonry surfaces in descending temperatures, in accordance with coating manufacturer's application instructions.
 3. Apply materials under adequate illumination.
 4. Provide complete coverage to MIL thickness specified.
 - a. Thickness specified is dry MIL thickness.
 5. Evenly spread to provide full, smooth coverage.
 - a. All coating systems are "to cover."
 - 1) In situations of discrepancy between manufacturer's square footage coverage rates and MIL thickness, MIL thickness requirements govern.
 - b. When color or undercoats show through, apply additional coats until coating is of uniform finish and color.
 - c. Finished coating system shall be uniform and without voids, bugholes, holidays, laps, brush marks, roller marks, runs, sags or other imperfections.
 6. If so directed by Engineer, do not apply consecutive coats until Engineer has had an opportunity to observe and approve previous coats.
 7. Work each application of material into corners, crevices, joints, and other difficult to work areas.
 8. Provide coating manufacturer's recommended details at all terminations, penetrations, embedments, cracks, joints and changes in substrate direction.
 9. Avoid degradation and contamination of blasted surfaces and avoid inter-coat contamination.
 - a. Clean contaminated surfaces before applying next coat.
 - b. Intercoat surface cleanliness shall be inspected and approved by the Engineer prior to application of each coat.
 - c. NACE coatings inspector shall inspect and approve surface of each preceding coat prior to application of each succeeding coating.
 10. Smooth out runs or sags immediately, or remove and recoat entire surface.
 11. Allow preceding coats to dry before recoating.
 - a. Recoat within time limits specified by coating manufacturer.
 - b. If recoat time limits have expired re-prepare surface in accordance with coating manufacturer's printed recommendations.
 12. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
 13. Coat all aluminum in contact with dissimilar materials.
 14. When coating rough surfaces which cannot be backrolled sufficiently, hand brush coating to work into all recesses provided that the maximum DFT is not exceeded.
 15. Backroll surfaces if coatings are spray applied.
- B. Employ services of coating manufacturer's technical representative to ensure that field-applied coatings are compatible with factory-applied or existing coatings.
1. Certify through material data sheets.
 2. Perform test patch.
 - a. Prepare existing coating surface to receive specified coating system.
 - b. Apply coating to a minimum 1 square feet area and allow to cure in accordance with manufacturer's recommendations.
 - c. Evaluate adhesion to existing coating:
 - 1) Concrete or Masonry substrates: ASTM D4541.

- 2) All other substrates: ASTM D6677 and ASTM D3359 (X-cut method).
 - 3. If field-applied coating is found to be not compatible, require the coating manufacturer's technical representative to recommend, in writing, product to be used as barrier coat, thickness to be applied, surface preparation and method of application.
 - a. Perform test patch as described above.
 - 4. At Contractor's option, coatings may be removed, surface re-prepared, and new coating applied using appropriate coating system listed in the MATERIALS Article, Coating Systems paragraph of this Specification Section.
 - a. All damage to surface as result of coating removal shall be repaired to original condition or better by Contractor at no additional cost to Owner.
- C. Prime Coat Application:
- 1. Prime all surfaces indicated to be coated.
 - a. Apply prime coat in accordance with coating manufacturer's written instructions and as written in this Specification Section.
 - 1) If coatings are removed and surface is re-prepared by Contractor, NACE coatings inspector shall inspect and approve surface in writing prior to recoating and shall provide continuous observation and certification of new coating.
 - 2. Prime ferrous metals embedded in concrete to minimum of 1 inch below exposed surfaces.
 - 3. Apply zinc-rich primers while under continuous agitation.
 - 4. Brush or spray bolts, welds, edges and difficult access areas with primer prior to primer application over entire surface.
 - 5. Touch up damaged primer coats prior to applying finish coats.
 - a. Restore primed surface equal to surface before damage.
 - 6. All surfaces of steel lintels and steel components of concrete lintels used in wall construction shall be completely coated with both prime and finish coats prior to placing in wall.
- D. Finish Coat Application:
- 1. Apply finish coats in accordance with coating manufacturer's written instructions and in accordance with this Specification Section; manufacturer instructions take precedent over these Specifications.
 - 2. Touch up damaged finish coats using same application method and same material specified for finish coat.
 - a. Prepare damaged area in accordance with the PREPARATION Article of this Specification Section.

3.6 FIELD QUALITY CONTROL

- A. Application Deficiencies:
- 1. Surfaces showing runs, laps, brush marks, telegraphing of surface imperfections or other defects will not be accepted.
 - 2. Surfaces showing evidence of fading, chalking, blistering, delamination or other defects due to improper surface preparation, environmental controls or application will not be accepted.
 - a. Epoxy surfaces showing evidence of chalking or amine blush shall be prepared and recoated as follows:
 - 1) Solvent clean surfaces in accordance with SSPC-SP 1 and abrasive blast in accordance with SSPC-SP 7/NACE No. 4.
 - 2) Recoat with intermediate and finish coats in accordance with coating system specified herein.
- B. Provide protection for coated surfaces.
- 1. Surfaces showing soiling, staining, streaking, chipping, scratches, or other defects will not be accepted.
- C. Contractor Performed Testing:
- 1. Provide ongoing testing and inspection, including but not limited to the following:
 - a. Measurement and recording of environmental conditions as specified herein.

- b. Measurement and recording of substrate conditions as specified herein.
- c. Thickness Testing:
 - 1) Wet film thickness during application in accordance with ASTM D4414.
 - 2) Coating DFT testing in accordance with SSPC-PA 2.
 - 3) Engineer may measure coating thickness at any time during project to assure conformance with these Specifications.
- d. Bond Strength:
 - 1) Bond strength testing will be required by the Engineer or Owner where there is reason to suspect the integrity of the coating system.
 - 2) Measure bond strength of the coating in accordance with:
 - a) Steel substrate: ASTM D4541.
 - b) Concrete substrate: ASTM D7234.
 - 3) The number of test sites and locations to be tested shall be determined by the Engineer or Owner after application of coating. The Contractor will apply the dollies, perform the tests and repair the coating in the presence of the Engineer or Owner.
 - a) For each test that fails, two additional tests shall be performed in the adjacent area.
 - b) Further bond tests may be performed to determine the extent of potentially deficient bonded areas at no additional cost to the Owner.
 - 4) Repairs shall be made by applicator in strict accordance with manufacturer's recommendations. Any coated areas that do not pass the bond strength tests shall be removed and replaced at the expense of the Contractor.
- 2. Holiday Testing (Spark Testing):
 - a. Provide holiday testing for the following:
 - 1) Ferrous metal components coated in Clarifier Facility No.1 and No. 2.
 - a) Includes all ferrous metal components including but not limited to clarifier tower and clarifier arms.
 - b. Test the completed coating system in accordance with NACE SP0188.
 - c. All detected holidays shall be marked and repaired.
 - 1) Abrade the coating surface as recommended by the coating manufacturer.
 - 2) After proper abrading and cleaning, apply additional protective coating material to the repair area.
 - 3) All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.
 - d. Following manufacturer's recommended cure time for repaired areas, measure dry film thickness:
 - 1) Ensure the specified thickness has been achieved.
 - e. Retest and recoat as required until area passes test criterion.
 - f. Provide certification that completed lining system is free of pinholes or other material defects.

D. NACE inspection:

- 1. A NACE Level 3 coating inspector will be assigned by the Owner to perform observation, inspection and testing as deemed necessary to document the quality of the Work.
 - a. All work shall be done to the satisfaction of the Owner's inspector.
 - b. Any portion of the coating that does not satisfactorily pass the inspection and testing requirements shall be repaired or replaced by the Contractor at no additional cost to the Owner.
 - c. Additional testing and/or inspection may be done at the discretion of the Owner.
 - 1) The Contractor will provide all equipment, materials, and labor to perform the testing.
- 2. Inspection, testing or observation by the Owner's inspector shall not relieve the Contractor of responsibility for surface preparation, inspection or quality control specified herein.

E. Instrumentation:

1. Provide instrumentation as necessary to measure and record atmospheric and substrate conditions, including but not limited to:
 - a. Dry Film Thickness Gauge:
 - 1) Ultrasonic: ASTM D6132.
 - 2) Magnetic: ASTM B499.
 - b. Wet Film Thickness Gauge: ASTM D4414.
 - c. Sling Psychrometer: ASTM E337.
 - d. Surface Temperature Gauge.
 - e. Anemometer.
 - f. Moisture Meter.
 - g. Adhesion test apparatus:
 - 1) Steel: ASTM D4541.
 - 2) Concrete: ASTM D7234.
- F. Maintain Daily Records:
 1. Record the following information during application:
 - a. Date, starting time, end time, and all breaks taken by applicators.
 - b. Air temperature.
 - c. Relative humidity.
 - d. Dew point.
 - e. Moisture content and pH level of concrete or masonry substrates prior to coating.
 - f. Surface temperature of substrate.
 - g. Provisions utilized to maintain work area within manufacturer's recommended application parameters including temporary heating, ventilation, cooling, dehumidification and provisions utilized to mitigate wind-blown dust and debris from contaminating the wet coating.
 - h. For outdoor coating, also record:
 - 1) Sky condition.
 - 2) Wind speed and direction.
 - i. Record environmental conditions, substrate moisture content and surface temperature information not less than once every 4 hours during application.
 - 1) Record hourly when temperatures are below 50 degrees F or above 100 degrees F.
 2. Record the following information daily for the coating manufacturer's recommended curing period:
 - a. Date and start time of cure period for each item or area.
 - b. For outdoor coating, also record:
 - 1) Sky conditions.
 - 2) Wind speed and direction.
 - 3) Air temperature.
 - a) Dry Bulb.
 - b) Wet Bulb.
 - 4) Relative humidity.
 - 5) Dew point.
 - 6) Surface temperatures.
 - c. Record environmental conditions not less than once every 4 hours.
 - 1) Record hourly when temperatures are below 50 degrees F or above 100 degrees F.
 - d. Provisions utilized to protect each item or area and to maintain areas within manufacturer's recommended curing parameters.
 3. Format for daily record to be computer generated.
- G. Provide wet paint signs.

3.7 CLEANING

- A. Clean coating spattered surfaces.
 1. Use care not to damage finished surfaces.
- B. Upon completion of coating, replace hardware, accessories, plates, fixtures, and similar items.

- C. Remove surplus materials, scaffolding, and debris.
- D. Remove all wetting agent and residue remaining after completion of discontinuity testing.

END OF SECTION