



MUNICIPAL WASTEWATER TREATMENT PLANT IMPROVEMENT PROJECT

THE CITY OF ATWATER
Merced County California

CONTRACT DOCUMENTS AND SPECIFICATIONS

Volume 2
Divisions 9 through 13

SEPTEMBER 1989



NOLTE and ASSOCIATES
ENGINEERS/PLANNERS/SURVEYORS

**Section 09800
PAINTING AND SPECIAL COATING SYSTEMS**

a single coat of Tnemec Series 90-97, Engard equivalent or equal rust inhibitive primer to a minimum dry film thickness of 2.0-3.0 mils/coat.

- 2) The following exterior storage reservoir accessories shall be hot-dip galvanized in accordance with ASTM A123 and will not require a prime coat: outside tank ladder.

b. Touch-up and Intermediate Coats:

The Contractor shall provide touch-up and intermediate coats. After erection, all exposed surfaces damaged during fabrication or erection shall be spot cleaned in accordance with SSPC-SP-6 (commercial Blast Cleaning).

1. The hot-dip galvanized exterior accessory surfaces shall be treated, as required by the paint manufacturer, prior to the application of touch-up, intermediate, and finished coatings.
2. The exterior surfaces shall receive one coat of Tnemec Series 66 Epoxy-Polyamide Engard equivalent, or equal, to a minimum dry film thickness of 4.0 mils for the intermediate coat and 5.5 mils for the field touch-up coat.

c. Finished Coat:

The Contractor shall provide the finish coat. All exposed surfaces shall be field coated with one coat of Tnemec Series 73 Polyurethane, Engard equivalent, or equal to a minimum dry film thickness of 3.0-4.0 mils per coat.

- d. The total dry film thickness for the coating system including prime, intermediate and finished coats shall be 9.0 mils minimum.

R. Concrete - Subject to Severe Chemical Attack**1. General**

- a. All interior surfaces of the anaerobic digester noted hereinafter shall be painted with Elastuff 120 Coating System, manufactured by United Coatings, or equal. Noted hereinafter covers surface preparation, prime coatings and finish coats. Manufacturer's recommendations shall be strictly adhered to.
- b. The following surfaces inside the anaerobic digester shall be coated with this system; the concrete ceiling complete, the walls, (partial) from the ceiling down to the elevation 158.00, the access manhole spool and the steel gas bonnet.
- c. The inside of the sediment traps shall also be coated with this system.

Section 09800
PAINTING AND SPECIAL COATING SYSTEMS**2. Surface Preparation**

- a. Concrete surfaces shall be dry and clean, free from any dirt, grease, oil, pollution fallout, smoke, wax, form release agents, surface chemicals, or other foreign contaminants which could interfere with proper adhesion. Surfaces shall be free of sharp projections, ridges and loose aggregate.

New concrete shall be cleaned and etched with 10% Muriatic Acid Solution or United's 2020 Clean-Etch. Surfaces shall then be rinsed with liberal amounts of fresh water to assure complete acid removal.

Concrete surfaces contaminated with oil, grease, dirt, etc. shall be cleaned prior to acid etching with a biodegradable chemical cleaner and water. High pressure power washing may be necessary to remove strongly adhering contaminants.

Sandblasting of concrete will be required if the surfaces have been previously coated or if surfaces are contaminated to the point that acid, chemical cleaning or power washing is not sufficient for removal. Sandblasting must produce an even profile with a minimum surface height of 5 to 8 mils.

Prior to sealer application, all loose material, foreign objects, dirt and dust shall be removed by use of a power vacuum. Concrete surfaces shall be completely dry.

Immediately after vacuuming is completed, concrete surfaces shall be sealed with 1 coat of United Uni-Tile Sealer. Sealer shall be applied by airless spray at the rate of 250 ft²/gal.

b. **Steel Surfaces**

Steel must be dry and clean, free of excessive rust scale, pollution fallout, dirt, grease, surface chemicals or other foreign contaminants prior to blast cleaning. A careful examination must be made to ensure that these contaminants along with any accumulated oil, smoke, wax, or any other material which could interfere with adhesion has been removed. This should be removed. This should be accomplished by use of a solvent wash as defined in SSPC-SP1 Solvent Cleaning. Excessive rust scale shall be removed by mechanical means prior to blast cleaning.

Steel surfaces must be cleaned to Near-White (SSPC-SP10) with a minimum anchor pattern of 2.0 mils.

Abrasive blast cleaning shall not be performed when surface temperature of the steel is less than 5°F above the dew point of the ambient air, or where there is a possibility that the blasted

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5. QUALIFICATIONS

5.1 The applicator of the material (Subcontractor) must be approved by the material manufacturer and the Districts. The Subcontractor shall have at least 5 years of experience in the application of the protective coating products produced by that manufacturer. Previous experience must be verified by three references having similar applications and project scope. The manufacturer's approval and references shall be submitted to the Districts.

6. MATERIALS

The corrosion control products shall be:

6.1 A Single Source Responsibility: Provide primers, coating and accessory materials produced or approved for use by the same manufacturer as the protective coating system.

6.2 Elastuff 120 Polyurethane Coating as manufactured by United Coatings, Inc.:

Primer - Uni-Tile Sealer, penetrating epoxy sealer.

Resurfacing and Pore-filling Mortar - Uni-Crete, concrete renovation and repair material.

Protective Coating - Elastuff 120, hydrophobic polyurethane elastomer.

6.3 Polibrid 705 Polyurethane Coating as manufactured by Polibrid Coatings, Inc. (Carboline Company):

Primer - Polibrid 670 S epoxy primer.

Resurfacing and Pore-filling Mortar - Five Star Cement V/O by Five Star Products, Inc. or Semcrete 610, and Semcrete 826 by Sentry Polymers (Carboline Co.).

Protective Coating - Polibrid 705, Solventless Elastomeric Polyurethane.

6.4 The color of each of the finish coats shall be different with the final color being grey or as approved by the Engineer.

6.5 Concrete repair products shall be compatible with the protective coating products and shall be approved by the manufacturer of the protective coating.

6.6 Or Equal. Contractor(s) seeking approval of substitute materials shall submit their request in writing to the District at most 20 working days after award. Include product data sheets, samples, complete performance (including but not limited to crack bridging and chemical resistance) data, installation guidelines, certification from independent testing laboratory regarding conformity with equal specifications and list of completed successful installations, with phone number of responsible person to contact, to enable accurate appraisal of the system. The list of installations shall include only projects that have the protective coating product in service for at least two years. The products shall have been available for at least 5 years prior to award.

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6.7 Material Substitution. Substitution of the protective coating materials to be used in the Biological Reactors shall conform to the requirements of Section 4-1.6 of the Standard Specifications and to the requirements specified herein. Substitute protective coating materials which are proposed for application within the oxygen enriched environment of the Biological Reactors shall be tested for safety and oxygen compatibility in this environment in accordance with Section 11B, Part 17 of these Special Provisions. The Contractor shall complete the substitute materials testing and evaluation, and obtain the District's approval at least 90 days prior to the time of proposed application of the product.

7. PRE-INSTALLATION INSPECTION

7.1 General. All concrete surfaces to be coated shall have cured for a minimum of 28 days prior to beginning surface preparation or applying primers and coatings.

The final finish in the Biological Reactors interior (gas zone) is class "Ordinary Surface Finish".

7.2 Concrete Surfaces. The Subcontractor shall perform an inspection of the work areas to note areas that require repair, beyond those required for Substrate Preparation in Part 8 below, prior to installation of the protective coating. Any areas where the surface finish can not be repaired per Part 8 below or has other defects which will affect the performance of the protective coating shall be corrected. The Subcontractor shall notify the Engineer in writing of all requests made to the Contractor for repair of the substrate. The Subcontractor shall have deemed to have accepted the substrate when he begins work on it. Any subsequent defects detected after the Subcontractor begins work in the area is the Subcontractor's responsibility.

8. CONCRETE SUBSTRATE PREPARATION

8.1 The Contractor shall remove water and any accumulated solid particles; wash down all walls and roofs and other areas that will receive the coating, using cleansers and chemicals if necessary to remove all dirt, oils, grease and other chemical contamination. The Contractor shall dry the area by air circulation and heat, if required, to reduce the moisture content to below 12% on the concrete surface.

8.2 The Contractor shall sandblast all concrete surfaces on the walls and roofs that will receive the protective coating to expose bugholes, pin holes; to remove all laitance, soft concrete and to remove any chemically contaminated concrete (surface pH below 7.0). The sand blasting operation shall conform to the South Coast Air Quality Management District (SCAQMD) rules and regulations. Abrasive media for blasting operations shall be certified non-hazardous copper slag conforming to ASTM D4940 and shall be approved by the Air Resources Board.

8.3 All surfaces where deteriorated concrete has been removed or where the pH was measured below 7.0 will require inspection by the Engineer to determine sound concrete prior to commencement of the repair operation. The surfaces will

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be tested for acidity and moisture. If the pH of the surface is less than seven(7), additional concrete shall be removed to a depth where the surface reading for the pH is equal to or greater than seven(7). Moisture readings for the surface of the concrete will be performed to verify the specification requirements of the manufacturer of the repair and coating materials. Any areas with remaining contaminated concrete shall be removed by sand blasting or other mechanical methods to a depth where only hard gray concrete with a surface pH of 7.0 or greater remains. Where the deteriorated concrete is removed, the Contractor shall thoroughly clean the surface to remove all fines and other materials that will adversely affect the bond of the repair material.

8.4 Concrete surfaces with exposed bug holes, soft concrete areas with depressions greater than 1/4-inch and areas where deteriorated concrete has been removed shall be repaired with resurfacing and pore-filling mortar as specified in Part 6 above. The Contractor shall fill all holes and rebuild surfaces to original lines and shapes where the deteriorated concrete was removed. All repaired concrete surfaces shall receive a controlled pattern sweep of sand blast to remove laitance and a thorough clean up including vacuuming to provide a clean dry surface for the protective coating.

9. INSTALLATION

The Contractor shall comply fully with the inspection, minor concrete repair, substrate preparation, installation, quality control, and curing specifications of the manufacturer of the product used to coat the above facilities. Installation of the protective product shall not begin until concrete repair products cure time and all other concrete work in the area has been completed. The total and individual target thickness of coatings shall be submitted to the Districts for review.

9.1 Work shall not proceed if the relative humidity in the work area is greater than 90%.

9.2 The surface temperature shall be 5 degrees or more above the dew point of the air in the work area. Additional surface temperature requirements as stated by the material manufacturer must be adhered to.

9.3 The Subcontractor shall check the concrete surfaces for residual laitance by visual inspection with magnification, if necessary, and by primer application on suspect areas. If the primer does not penetrate the concrete surface by turning the surface dark and the laitance area can be visually detected; the Subcontractor shall not accept the surface and shall have the area removed.

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9.5 The application of the epoxy primers shall be when the temperature of the concrete is falling. Usually this is from late afternoon to early morning. The application shall be terminated prior to dawn to give the required time for the primer to cure preventing out-gassing from the concrete.

9.6 The sequence and minimum thicknesses for the products shall be:

9.6.1 United Coatings, Elastuff 120 Polyurethane:

9.6.1.1 After resurfacing and repairing concrete surfaces to achieve a sound, consistent surface, free of bug holes, voids and depressions; after curing and blasting repaired areas; the Uni-Tile Sealer (primer) shall be applied by airless spray or roller at the rate of 250 square feet per gallon in one coat. Allow 30 minutes of drying time at 75 degrees F before applying the protective coating.

9.6.1.2 The resurfacing and pore-filling coat shall be applied after the concrete surfaces to be coated are cleaned and sand blasted exposing bug holes, soft areas, spalls, voids and other inconsistencies. Uni-Crete material shall be mixed and applied in accordance with the manufacturer's instructions. Surfaces to be repaired shall be pre dampened with clean water. Deep repairs shall be hand packed and all repair areas shall be finished to a smooth consistency with a damp brush or trowel. After the repaired areas have cured for the manufacturer's recommended time, they shall receive a light blasting to remove soft areas and laitance.

9.6.1.3 Elastuff 120 Polyurethane Coating shall be applied by plural component airless spray equipment or long-nap roller or power roller in accordance with the manufacturer's written instructions at a rate that will result in a 60 mil dry film thickness. The application rate per pass shall be no less than 20 dry mils and no greater than 40 dry mils. The coating shall be applied such that the result is a cohesive monolithic membrane, free of pinholes, blisters and delaminations. The coating shall terminate at the lower edge into a key 1/4-inch by 1/8-inch wide saw cut. There shall be no over-spray below the saw cut.

9.6.2 Carboline Company, Polibrid 705 Polyurethane:

9.6.2.1 Polibrid 670 S Primer shall be applied to prepared concrete surfaces by roller or airless spray at a rate to yield 5 mils dry film thickness. The concrete surface shall have been prepared to a smooth consistent surface, free of bug holes and other voids and depressions, using the resurfacing material specified by the manufacturer. The resurfaced areas shall have been re-blasted and cleaned before coating.

9.6.2.2 After sandblasting and cleaning the concrete surfaces to be coated, the Resurfacing and Pore-filling coat shall be applied in accordance the manufacturer's instructions to fill the exposed bug holes, soft areas, spalls, and other voids and inconsistencies with Five Star Cement V/O, Semente 610 or 826 mortar. The resurfaced areas shall be re-blasted as required and cleaned (vacuumed) after the proper cure time, prior to applying the primer.

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9.6.2.3 Polibrid 705 Elastomeric Polyurethane coating shall be applied by plural component airless spray equipment, approved by Polibrid Coatings, Inc. at a rate that will result in an 75 mil dry film thickness. The coatings shall be applied such that the results is a single monolithic membrane, free of pin holes, blisters, and delaminations, and shall terminate at the lower edge in a saw cut key as shown of the drawings.

9.7 Sealing of Penetrations Through Coating. Penetrations through coatings at fasteners or other items installed after the coating system is complete shall be thoroughly sealed with Sikaflex-1A polyurethane sealant, as specified in Section 3A-9.4 of these Special Provisions.

10. QUALITY CONTROL

Inspection and testing shall be performed by an independent test laboratory at the Contractor's expense. The test laboratory shall be approved by the protective coating system manufacturer and the Districts.

10.1 Visual inspection of concrete substrate and concrete surface preparation.

10.2 Visual inspection of primer and coatings shall be made to ensure specified coverages.

10.3 During application random wet film thickness readings shall be taken.

10.4 Random dry film thickness and total thickness readings shall be taken.

10.5 Adhesion tests of coating system to the concrete shall be performed in accordance with ASTM D4541 and the coating system manufacturer's specifications or procedures.

10.6 Spark testing for pinholes and holidays shall be performed in accordance with the material manufacturer's specifications using a non-destructive holiday detector, such as Tinker and Raser, Model M-1 or KD Bird Dog set at minimum of 200 volts per wet mil thickness.

10.7 A record of the manufacturer's product batch numbers and quantities used shall be maintained on a daily basis.

10.8 Film thickness readings shall be recorded.

10.9 Documentation of all quality control measures shall be in a written report, reviewed by the coating manufacturer and submitted to the Districts within ten(10) working days after completion of the coating in each Biological Reactor work area.

10.10 Failed, destructive test patches, defective, stained, and damaged protective coatings shall be removed and repaired in accordance with the manufacturer's procedure as approved by the Engineer.

10.11 It is required that the completed corrosion protective shall be free from the following defects: pinholes in the coating, uncured material, debris and

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foreign materials in the cured coating; inadequate thickness; use of material not authorized in the specification or by the protective coating products manufacturer; unauthorized variance from specifications. These defects shall be corrected prior to placement of the work areas into service.

11. SAFETY REQUIREMENTS

11.1 A written Safety Procedure shall be provided to the District.

11.2 The material safety data sheets (MSDS) of protective coating products and materials used in its application shall be provided to the District.

11.3 A minimum of one safety meeting shall be held with all personnel (which may include but is not limited to District, Contractor, other Subcontractors) who will come in contact of the work area.

11.4 Documentation of worker safety training for respirators, confined space, and fume monitoring shall be available to the Engineer upon his request and maintained at the jobsite.

12. CURING

The time between coats and time before use shall be in accordance with the manufacturer of the protective coating coating system. In no instance shall more area be coated than can be satisfactorily cured in accordance with the time requirements contained in the manufacturer's procedures or instructions.

13. PROTECTION

The Contractor shall make provisions which include but is not limited to barriers, signs, coordination, written notification to subcontractors and field forces (other than the applicator's work crews), and as directed by the Engineer to prevent access to the protective coating products applicator's work area during installation and curing until the applicator provides written notification to the District that traffic is permitted on the coated surface. Any damage to the coated surfaces as a result of construction activities in those areas shall be repaired at the Contractor's expense.

14. LIGHTING

The subcontractor shall provide sufficient lighting when work is required to be performed after 3:30 p.m. and before 7:30 a.m. or in the interior of closed structures and as directed by the Engineer.

15. CLEAN-UP

At the end of each day the work area shall be left in a clean condition and as directed by the Engineer. Extraneous material which include but is not limited

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to sand and blast debris, spills, uncured material, and masking material shall be removed in a timely manner and not left to accumulate. After coating has completely cured and immediately before final inspection, wash coated areas with soap and water, and let dry. The work areas shall be left in a clean condition prior to placement of the work areas into service.

16. WARRANTY

Material manufacturer shall have unit responsibility and warrant both material performance and the applicators workmanship for one(1) year from date when the facilities are placed into service.

17. PAYMENT

Payment for minor repair, substrate preparation, furnishing, installing, coatings repair and inspection shall be included in Bid Item No. 1 in the Proposal Form.

18. DRAWINGS AND DATA

The following items shall be submitted to the Districts in accordance with Section 1A - GENERAL CONDITIONS, unless noted otherwise:

- 18.1 Qualifications and references;
- 18.2 Concrete Repair Material with protective coating product manufacturer's approval;
- 18.3 Protective Coating Materials;
- 18.4 Total and individual target thickness of coatings;
- 18.5 Drawings and joint details;
- 18.6 Procedures, which include but is not limited to: 1) Substrate Repair and Preparation; 2) Installation which include but is not limited to curing requirements; 3) Coating Repair; Inspection and testing procedures;
- 18.7 Material Safety Data Sheets;
- 18.8 Quality Control Records.

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