CITY OF LIVERMORE

TECHNICAL SPECIFICATIONS

DIVISION 9 – FINISHES

SECTION 099000 - PROTECTIVE COATING

PART 1 -- GENERAL

1.1 THE REQUIREMENT

A. The CONTRACTOR shall provide all materials, equipment and labor necessary to furnish and install the protective coating of all specified surfaces including, but not necessary limited to, all surface preparation, pretreatment, coating application, touch-up of factory-coated surfaces, protection of surfaces not to be coated, cleanup, and all appurtenant work, complete in place, as specified herein.

B. The following surfaces shall not be protective coated unless specifically shown or specified.

1. Concrete.

2. Stainless steel.

3. Machined surfaces.

4. Grease fittings.

5. Glass.

6. Equipment nameplates.

C. The Coating System Schedules summarize the surfaces to be coated, the required surface preparation, and the coating systems to be applied. Coating notes on the drawings are used to show exceptions to the schedules, to show or extend the limits of coating systems, or to clarify or show details for application of the coating systems.

D. The CONTRACTOR shall be responsible for compliance with EPA and DHS regulations for all products and materials, and use of all products and materials.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. **Commercial Standards:**

ANSI/AWWA C105	Standard for Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids.
ASTM C 309	Specification for Liquid Membrane - Forming Compounds for Curing Concrete.
AWWA C550	Standard for Protective Epoxy Interior Coatings for Valves and Hydrants.
AWWA C 205	Standard for Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 inch and larger - Shop applied.
NACE	National Association of Corrosion Engineers.
NSF	National Sanitation Foundation.
SSPC	Steel Structures Painting Council.

1.3 CONTRACTOR SUBMITTALS

A. **Certificates of Compliance:** Certificates of Compliance shall be provided for all products and materials proposed to be used under this Section.

B. **Paint Manufacturer's Information:** For each paint system to be used the CONTRACTOR shall submit the following listed data.

1. Paint manufacturer's data sheet for each product used, including statements on the suitability of the material for the intended use.

2. Paint manufacturer's printed instructions and recommendations on surface preparation and application.

3. Colors available for each product (where applicable).

4. Compatibility of shop and field applied coatings (where applicable).

5. Current material safety data sheet for each product used.

6. Two sets of color samples to match each color selected by the ENGINEER from the manufacturer's standard color sheets. If custom mixed colors are required by this Section, the color samples shall be made using color formulations prepared to match the color samples furnished by the ENGINEER. The color formula shall be shown on the back of each color sample.

1.4 QUALITY ASSURANCE

A. **Surface Preparation:** Evaluation of blast cleaned surface preparation work will be based upon comparison of the blasted surfaces with the definitions and standard visual samples available from the SSPC, using SSPC-VIS1 Standards. The ENGINEER shall be sole judge as to whether the quality of blast cleaning conforms to visual comparison standards, and its decision as to allowability shall be final.

B. **Film Thickness Testing:** On ferrous metals, the dry film coating thickness will be measured in accordance with SSPC "Paint Application Specification No. 2." Each coat will be tested for the correct thickness. No measurements will be made until at least 8 hours after application of the coating. On non-ferrous metals and other substrates, the coating thicknesses will be measured at the time of application using a wet film gage.

PART 2 -- PRODUCTS

2.1 GENERAL

A. **Definitions:** The term "paint," "coatings," "linings," or "finishes" as used herein, shall include surface treatments, emulsions, enamels, paints, epoxy resins, and all other protective coatings, excepting galvanizing or anodizing, whether used as a pretreatment, primer, intermediate coat, or finish coat. The term "DFT" means minimum dry film thickness.

B. **General:** Coating materials shall be sealed in containers that plainly show the designated name, formula or specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer, all of which shall be plainly legible at the time of use.

C. The CONTRACTOR shall use coating materials suitable for the intended use and recommended by their manufacturer for the intended service.

D. **Compatibility:** In any coating system only compatible materials from a single manufacturer shall be used in the WORK. Particular attention shall be directed to compatibility of primers and finish coats. If necessary, subject to the requirements of the ENGINEER, a barrier coat shall be applied between existing prime coat and subsequent field coats to ensure compatibility.

E. **Colors:** All colors of paint shall be as selected or specified by the ENGINEER. Finish colors shall be as specified from the manufacturer's standard color samples.

F. **Protective Coating Materials:** Products shall be standard products produced by recognized manufacturers who are regularly engaged in production of such materials for essentially identical service conditions.

G. **Substitute or "Or-Equal" Submittals:** Unless otherwise specified, materials are from the catalogs of the companies listed herein. Materials by other manufacturers are acceptable provided that they are established as being compatible with and of equal quality to the coatings and colors of the companies listed. The CONTRACTOR shall provide satisfactory documentation from the firm manufacturing the proposed substitute or "or-equal" material that said material meets the specified requirements and is equivalent or better than the specified materials.

2.2 COATING SYSTEMS

A. **Materials:** Each of the following manufacturers listed in this section is capable of supplying many of the coating materials specified herein. Where manufacturers and paint numbers are listed, it is to show the type and quality of coatings that are required. Proposed substitute materials must be shown to satisfy the material descriptions and to equal or exceed the properties of the listed materials as required in the paragraph entitled "Substitute or `Or-Equal' Submittals" herein. The decisions of the ENGINEER as to acceptable color substitutions will be final.

B. **System 1 - Alkyd Enamel:** High quality, gloss or semi-gloss, medium long oil alkyd finish shall have a minimum solids content of 49 percent by volume. Primer shall be as recommended by manufacturer. Hydrant colors shall be as follows:

1. Potable Water System:

a. City Water Systems

(1) New Hydrants:

i. Manufacturers standard color compatible with Rustoleum Enamel No. 7448, Caterpillar Yellow.

(2) Repair and Maintenance:

i. Fuller O'Brien, Heavy Duty Gloss Enamel No. 312-74 or 612-35, Hi-Way Yellow.

ii. Kelly Moore, Kel-Guard Rust Inhibiting Enamel No. 1700-63, Safety Yellow.

b. California Water Service System:

(1) New hydrants:

i. Manufacturers standard color compatible with Rustoleum Enamel No. 1210, Red.

(2) Repair and Maintenance:

i. Fuller O'Brien, Heavy Duty Gloss Enamel No. 312-74 or 612-74, Bright Red.

ii. Kelly Moore, Kel-Guard Rust Inhibiting Enamel No. 1700-63, Siren Red.

2. Recycled Water Systems:

a. All fire hydrants, valve covers, water meters, backflow preventors, angle meter stops and other Appurtenances on Recycled Systems shall be:

i. Kelly Moore No. 3-03*942LM, Livermore Grape.

3. Fire Hydrant Valve Lids and Potable Water Main Valves:

a. Potable System: Valve cover lids on fire hydrant laterals in potable systems shall be painted white with **Bauer Zone-lac Traffic Paint or Pervo Traffic Paint.**

b. Potable water main valve cover lids shall be painted blue with **Handicap Blue Traffic Paint manufactured by Pervo Paint or equal.**

4. **Guard Posts:** Guard posts shall be installed as shown on the Drawings. All Guard posts for potable and recycleded water systems shall be painted white with gloss enamel paint as approved by the ENGINEER.

5. Paint manufacturers for all other uses shall be as follows:

a. Prime Coat: **Sherwin Williams, Kem-Kremik Universal Primer, DuPont 681 FD, or equal.**

b. Finish Coat: **Sherwin Williams, Industrial Gloss Enamel, DuPont 31 PSG, or equal.**

6. Coating requirements shall be as follows:

a. Prime Coat DFT=3 mils each

b. Finish Coats (2 or more) DFT=3 mils each

c. Total System DFT=6 mils, minimum

C. **System 2 - Fusion Bonded Epoxy:** The coating material shall be a 100-percent powder epoxy applied in conformance with AWWA C550, except that the surface preparation shall be as specified in the Coating System Schedule of this Section.

1. Liquid Epoxy: For field repairs the use of a liquid epoxy will be permitted, applied in not less than 3 coats to provide a total DFT of 12 mils. The liquid epoxy shall be a 100-percent solids epoxy recommended by the powder epoxy manufacturer.

2. Field repair coating (DFT = 12 mils), **Scotchkote 306 or 312, DURA-POX 646, or equal.**

D. **System 3 - Polyethylene Encasement:** Application of polyethylene encasement shall be in conformance with ANSI/AWWA C105 using Method A.

E. **System 4 - Cement Mortar Coating:** Unless otherwise specified on the Drawings, mortar coating and reinforcement shall be in conformance with AWWA C205.

F. **System 5 - Factory Applied Epoxy:** The coating material shall be a liquid epoxy applied in conformance with AWWA C550.

G. **System 6 - Coal Tar Paint:** High solids content coal tar paint for use on buried pipeline and fittings.

1. Prime coat and finish coats (2 or more, total DFT=24 mils), **Protecto Wrap CA-1200, Polyguard No. CA-14, Kop-Coat Bitumastic Super Service Black, or equal.**

PART 3 -- EXECUTION

3.1 STORAGE, MIXING AND THINNING OF MATERIALS

A. **Manufacturer's Recommendations:** Unless otherwise specified herein, the coating manufacturer's printed recommendations and instructions for thinning, mixing, handling, applying, and protecting its coating materials, for preparation of surfaces for coating, and for all other procedures relative to coating shall be strictly adhered to. The CONTRACTOR shall supply the ENGINEER with copies of each manufacturer's printed recommendations and instructions for review prior to use of any coating product.

B. All protective coating materials shall be used within the manufacturer's recommended shelf life.

C. **Storage and Mixing:** Coating materials shall be protected from exposure to cold weather, and shall be thoroughly stirred, strained, and kept at a uniform consistency during application. Coatings of different manufacturers shall not be mixed together.

3.2 PREPARATION FOR COATING

A. **General:** All surfaces to receive protective coatings shall be cleaned as specified herein prior to application of said coatings. The CONTRACTOR shall examine all surfaces to be coated, and shall correct all surface defects before application of any coating material. All marred or abraded spots on shop-primed and on factory-finished surfaces shall receive touch-up restoration prior to any coating application.

B. **Protection of Surfaces Not to be Coated:** Surfaces which are not to receive protective coatings shall be protected during surface preparation, cleaning, and coating operations.

C. All hardware, machined surfaces, couplings, shafts, bearings, nameplates on machinery, and other surfaces not to be coated shall be removed, masked or otherwise protected. The working parts of all mechanical and electrical equipment shall be protected from damage during surface preparation and coating operations. Openings in motors shall be masked to prevent entry of coating or other materials.

D. Care shall be exercised not to damage adjacent work during blast cleaning operations. Spray painting shall be conducted under carefully controlled conditions. The CONTRACTOR shall be fully responsible for and shall promptly repair any and all damage to adjacent work or adjoining property occurring from blast cleaning or coating operations.

E. **Protection of Painted Surfaces:** Cleaning and coating shall be so programmed that dust and other contaminants from the cleaning process will not fall on wet, newly-coated surfaces.

3.3 SURFACE PREPARATION STANDARDS

A. The following referenced surface preparation specifications of the Steel Structures Painting Council's "Steel Structure Painting Manual, Volume 2, Systems and Specification" shall form a part of this specification:

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, dirt, soil, salts, and contaminants by cleaning with solvent, vapor, alkali, emulsion, or steam.

2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mill scale, and loose paint to degree specified, by hand chipping, scraping, sanding, and wire brushing.

3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mill scale, and loose paint to degree specified by power tool chipping, descaling, sanding, wire brushing, and grinding.

4. White Metal Blast Cleaning (SSPC-SP5): Removal of all visible rust, mill scale, paint, and foreign matter by blast cleaning by wheel or nozzle (dry or wet) using sand, grit, or shot.

5. Commercial Blast Cleaning (SSPC-SP6): Blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.

6. Brush-Off Blast Cleaning (SSPC-SP7): Blast cleaning of all except tightly adhering residues of mill scale, rust, and coatings, exposing numerous evenly distributed flecks of underlying metal.

3.4 METAL SURFACE PREPARATION (UNGALVANIZED)

A. The minimum abrasive blasting surface preparation shall be as specified in the "Coating System Schedules" specified in Section 3.11 herein . Where there is a conflict between these specifications and the coating manufacturer's printed recommendations for the intended service, the higher degree of cleaning shall apply.

B. Workmanship for metal surface preparation shall be in conformance with the current SSPC Standards and this Section. Blast cleaned surfaces shall match the standard samples available from the National Association of Corrosion Engineers, NACE Standard TM-01-70.

C. All oil, grease, welding fluxes and other surface contaminants shall be removed by solvent cleaning per SSPC-SP1 prior to blast cleaning.

D. All sharp edges shall be rounded or chamfered and all burrs, and surface defects and weld splatter shall be ground smooth prior to blast cleaning.

E. The CONTRACTOR shall comply with the applicable federal, state, and local air pollution control regulations for blast cleaning.

F. Compressed air for air blast cleaning shall be supplied at adequate pressure from well maintained and properly operating compressors equipped with oil/moisture separators which remove at least 95 percent of the contaminants.

G. Surfaces shall be cleaned of all dust and residual particles of the cleaning operation by dry air blast cleaning, vacuuming or another approved method prior to coating.

H. Enclosed areas and other areas where dust settling is a problem shall be vacuum cleaned and wiped with a tack cloth.

I. Damaged or defective coating shall be removed by the specified blast cleaning to meet the clean surface requirements before recoating.

J. If the specified abrasive blast cleaning performed in the field will damage adjacent work, the area to be cleaned is less than 100 square feet, and the coated surface will not be submerged in service, then SSPC-SP2, hand tool cleaning or SSPC-SP3, power tool cleaning, may be used.

K. For unburied surfaces, shop applied coatings of unknown composition shall be completely removed before the specified coatings are applied. Valves, castings, ductile or cast iron pipe, and fabricated pipe or equipment shall be examined for the presence of shop-applied temporary coatings. Temporary coatings shall be completely removed by solvent cleaning per SSPC-SP1 before the abrasive blast cleaning work has been started.

L. Shop primed surfaces shall be solvent cleaned per SP1 in the field before finish coats are applied.

3.5 SURFACE PREPARATION FOR GALVANIZED FERROUS METAL

A. Galvanized ferrous metal shall be alkaline cleaned per SSPC-SP1 to remove oil, grease, and other contaminants detrimental to adhesion of the protective coating system to be used.

B. Pretreatment coatings of surfaces shall be in accordance with the printed recommendations of the coating manufacturer.

3.6 SURFACE PREPARATION OF FERROUS SURFACES WITH EXISTING COATINGS

A. **General:** All grease, oil, heavy chalk, dirt, or other contaminants shall be removed by solvent or detergent cleaning per SP1 prior to abrasive blast cleaning. The generic type of the existing coatings shall be determined as necessary to assure compatibility with field applied coatings.

B. **Abrasive Blast Cleaning:** The CONTRACTOR shall provide the degree of cleaning specified in the Coating System Schedule for the entire surface to be coated. If the degree of cleaning is not specified in the schedule, deteriorated coatings shall be removed by abrasive blast cleaning to SSPC-SP6. Areas of tightly adhering coatings shall be cleaned to SSPC-SP7, with the remaining thickness of existing coating not to exceed 3 mils.

C. **Incompatible Coatings:** If coatings to be applied are not compatible with existing coatings the CONTRACTOR shall apply intermediate coatings per the coating manufacturer's printed recommendation for the specified coating system or shall completely remove the existing coating prior to abrasive blast cleaning. A small trial application shall be conducted for compatibility prior to coating large areas.

D. **Unknown Coatings:** Coatings of unknown composition shall be completely removed prior to application of new coatings.

E. **Regulatory Compliance:** Surface preparation shall be performed in strict compliance with applicable regulations governing worker safety, disposal and removal of used solvents and abrasives, and disposal of materials removed.

3.7 WORKMANSHIP

A. Skilled craftsmen and experienced supervision shall be used on all work.

B. All damage to surfaces resulting from the work hereunder shall be cleaned, repaired, and refinished to their original condition.

C. All coatings shall be applied under dry and dust-free conditions. Coating shall be done in a workmanlike manner so as to produce an even film of uniform thickness. Edges, corners, crevices, and joints shall receive special attention to insure that they have been thoroughly cleaned and that they receive an adequate thickness of coating material. The finished surfaces shall be free from runs, drops, ridges, waves, laps, brush marks, and variations in color, texture, and finish. Special attention shall be given to insure that edges, corners, crevices, welds, and similar areas receive a film thickness equivalent to adjacent areas, and installations shall be protected by the use of drop cloths or other approved precautionary measures.

3.8 SHOP COATING REQUIREMENTS

A. Unless otherwise indicated, all items of equipment, or parts of equipment which are not submerged in service, shall be shop primed and then finish coated in the field after installation with the indicated or selected color. The methods, materials, application equipment and all other details of shop painting shall comply with this section. If the shop primer requires topcoating within a specified period of time, the equipment shall be finish coated in the shop and then touch-up painted after installation.

B. All items of equipment, or parts and surfaces of equipment which are submerged or inside an enclosed hydraulic structure when in service, with the exception of pumps and valves, shall have all surface preparation and coating work performed in the field.

C. For certain pieces of equipment it may be undesirable or impractical to apply finish coatings in the field. Such equipment may include engine generator sets, equipment such as electrical control panels, switchgear or main control boards, submerged parts of pumps, ferrous metal passages in valves, or other items where it is not possible to obtain the indicated quality in the field. Such equipment shall be primed and finish coated in the shop and touched up in the field with the identical material after installation. The CONTRACTOR shall require the manufacturer of each such piece of equipment to certify as part of its shop drawings that the surface preparation is in accordance with these specifications. The coating material data sheet shall be submitted with the shop drawings for the equipment.

D. For certain small pieces of equipment the manufacturer may have a standard coating system which is suitable for the intended service conditions. In such cases, the final determination of suitability will be made during review of the shop drawing submittals. Equipment of this type generally includes only indoor equipment such as instruments, small compressors, and chemical metering pumps.

E. Shop painted surfaces shall be protected during shipment and handling by suitable provisions including padding, blocking, and the use of canvas or nylon slings. Primed surfaces shall not be exposed to the weather for more than 2 months before being topcoated, or less time if recommended by the coating manufacturer.

F. Damage to shop-applied coatings shall be repaired in accordance with this Section and the coating manufacturer’s printed instructions.

G. The CONTRACTOR shall make certain that the shop primers and field topcoats are compatible and meet the requirements of this Section. Copies of applicable coating manufacturer's data sheets shall be submitted to the ENGINEER.

3.9 APPLICATION OF COATINGS

A. The application of protective coatings to steel substrates shall be in accordance with "Paint Application Specification No. 1, (SSPC-PA1)," Steel Structures Painting Council.

B. Cleaned surfaces and all coats shall be inspected by the CONTRACTOR prior to each succeeding coat.

C. Blast-cleaned ferrous metal surfaces shall be coated before any rusting or other deterioration of the surface occurs. Blast cleaning shall be limited to only those surfaces that can be coated in the same working day.

D. Coatings shall be applied in accordance with the manufacturer's printed instructions and recommendations and this Section, whichever has the most stringent requirements.

E. Special attention shall be given to materials which will be joined so closely that proper surface preparations and application are not possible. Such contact surfaces shall be coated prior to assembly or installation.

F. Coatings shall not be applied under the following conditions:

1. Temperature above or below the manufacturer's recommended maximum and minimum allowable.

2. Dust or smoke laden atmosphere.

3. Damp or humid weather.

G. All field coating shall be in conformance with the Manufacturer's printed recommendations.

3.10 CURING OF COATINGS

A. The CONTRACTOR shall provide curing conditions in accordance with the conditions recommended by the coating material manufacturer or by this Section, whichever is the most stringent requirement, prior to placing the completed coating system into service.

3.11 COATING SYSTEM SCHEDULES - FERROUS METALS

A. **Coating System Schedule, Ferrous Metal - Not Galvanized:**

	Item	**Surface Preparation**	**System No.**
FM-1	All surfaces, indoors and outdoors, exposed or covered, except those surfaces included below.	Commercial Blast Cleaning SSPC-SP6	(1) Alkyd Enamel
FM-2	Exposed FHs, valve lids, marker posts, Backflow Preventors lettering, exposed pipe and fittings, and vent pipe.	Solvent Cleaning SSPC-SP1	(1) Alkyd Enamel
FM-3	Buried pipe with a nominal diameter of less than 6 inches and greater than 2 inches, excluding ductile iron pipe.	Solvent Cleaning SSPC-SP1	(6) Coal Tar Paint

FM-4	Fittings and flanged joints, where the piping is plastic. Buried fittings on ductile iron pipe used for FH laterals, fire service laterals, and Backflow Prevention Assemblies. Joints, and fittings on ductile iron pipe with coal tar coating.	Commercial Blast Cleaning SSPC-SP6	(6) Coal Tar Paint
	Item	**Surface Preparation**	**System No.**
FM-5	Buried pipe couplings; fittings; and flanged joints, including epoxy coated surfaces, except valves; where the piping is polyethylene encased ductile iron.	As specified by reference specification for appropriate fittings.	(3) Polyethylene Encasement
FM-6	Buried pipe couplings, fittings, and flanged joints, where piping is cement mortar coated and lined steel pipe, excluding epoxy coated surfaces.	Solvent Cleaning SSPC-SP1	(4) Cement Mortar Coating
FM-7	Buried cast couplings, buried sleeve-type tapping sleeves, welded tapping outlets. Ferrous surfaces of gate valves.	White Metal Blast Cleaning SSPC-SP5	(2) Fusion Bonded Epoxy
FM-8	External ferrous surfaces of check valves.	White Metal Blast cleaning SSPC-SP5	(2) Fusion Bonded Epoxy
FM-9	Ferrous internal surfaces of fire hydrants.	White Metal Blast cleaning SSPC-SP5	(2) Fusion Bonded Epoxy
FM-10	Internal/External Ferrous Surfaces of butterfly valves	White Metal Blast Cleaning SSPC-SP5	(5) Factory Applied Epoxy

B. **Coating System Schedule, Ferrous Metal - Galvanized:** Pretreatment coatings, barrier coatings, or washes shall be applied as recommended by the coating manufacturer. All galvanized surfaces except for floor gratings and frames, shall be coated unless coating is required by other Sections:

	Item	**Surface Preparation**	**System No.**
FMG-1	All exposed surfaces, indoors or outdoors, including exposed galvanized pipe, except those surfaces included	Alkaline Cleaning per SSPC-SP1	(1) Alkyd Enamel

below.

FMG-2	Buried pipe with a nominal diameter of 2 inches and less, including valves, fittings	Alkaline Cleaning per SSPC-SP1	(6) Coal Tar Paint

- END OF SECTION -

SECTION 099100

PROTECTIVE COATINGS FOR CONCRETE SANITARY SEWER MANHOLES

PART 1- GENERAL

1.1 SECTION INCLUDES

A. This section includes specifications for installing protective coatings for the concrete in existing sanitary sewer manholes at the locations shown on the plans.

B. The Contractor shall furnish all materials, equipment, and labor necessary to acceptably rehabilitate the interior concrete surfaces of existing sanitary sewer manholes at locations depicted on the project plans. All concrete surfaces shall be coated, including the manhole flow channel above the normal flow line.

1.2 RELATED SECTIONS

A. Section 330200 – Cured-In-Place Pipe

B. Division 1 - General Requirements.

1.3 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

ASTM D 4259	Standard Practice for Abrading Concrete
ASTM D 4787	Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates

1.4 GUARANTEE

A. All coating work shall be fully guaranteed by the Contractor for a period of (5) years from the date of the Notice of Completion. During this period all serious defects discovered by the City shall be removed and replaced in a satisfactory manner at no cost to the City. The City may conduct an independent inspection, at their own expense, of the lining work prior to the completion of the (5) year guarantee period.

B. Said guarantee shall be in written form acceptable to the City, and shall be furnished to the Engineer prior to the City filing a notice of completion for the project.

1.5 QUALIFICATIONS

A. Installer: The application of coating system shall be performed by a licensed professional applicator, which shall be manufacturer certified on a non-exclusive basis. Provide written documentation of applicator certification by manufacturer.

1.6 SUBMITTALS

A. Submittals shall be in accordance with Section 013300.

B. Submit certificates showing:

1. Evidence of acceptance of applicator by manufacturer.

2. Materials and components furnished conform to requirements of these specifications.

C. Submit samples and manufacturer's literature:

1. Product data and samples.

2. Manufacturer's requirements for product use.

3. List of materials proposed for use.

PART 2- PRODUCTS

2.1 MANHOLE REHABILITATION COATINGS

Protective coatings for the concrete in existing sanitary sewer manholes shall be as follows:

A. Plugging active leaks (waterstop): "**Seal Tite" by Parson Environmental, "EC Flex Grout" by Environmental Coatings, LLC,** or approved equal.

B. Underlayment/leveling course/primer: **"CA Liner 100" by Parson Environmental, "Hydro-Pox 251", thickened with "Hydro-Thix" by Con-Tech of California, Inc.,** or approved equal.

C. Corrosion Barrier: **"Parsonpoxy SEL-80", by Parson Environmental, "Hydro-Pox 212 GL" by Con-Tech of California, Inc.,** or approved equal.

The underlayment and the corrosion barrier shall be from the same manufacturer to ensure compatibility.

PART 3- EXECUTION

3.1 GENERAL

Prior to entering access areas such as manholes, and performing lining or cleaning operations, an evaluation of the atmosphere to determine the presence of toxic, explosive, or flammable vapors or lack of oxygen must be undertaken by the CONTRACTOR in accordance with local, state, or federal safety regulations.

3.2 SURFACE PREPARATION

A. All active infiltration must be stopped prior to application of coating system.

B. Surfaces shall be cleaned to achieve an ASTM 4259 standard for concrete. Cleaning shall occur by mechanical means such as abrasive air blasting or jet water blasting at a minimum of 3500 psi, maximum of 4500 psi. If necessary, manual scrubbing with a wire brush may be required. All of the surfaces shall be cleaned to remove all dirt, dust, corrosion products, loose concrete, debris, grease, oils, growth, and foreign matter. Existing coatings shall be removed to the extent of any loose, scaling material, which would prevent the coating system from proper adhesion to the substrate. The coating system will adhere to coal tar epoxies previously applied, but the substrate must be totally free of any loose, scaling or oxidizing material, and must be applied to a sound clean porous surface. Cracks shall be routed out and cleaned to provide an adequate bonding surface for the application of underlayment material or waterstop.

C. Cleaning operations shall not occur on the **first Wednesday of each month** to avoid interference with the operations of the wastewater treatment plant. The Contractor shall schedule construction activities accordingly.

3.3 APPLICATION

All products under this section shall be mixed, applied, and cured per the manufacturer's recommendations. All interior concrete surfaces shall be coated except approximately the bottom third of the flow channel (the portion below the normal flowline).

Construction shall occur in the following order:

A. Cleaning/surface preparation of manhole per Section 3.2.

B. Stopping active leaks using waterstop material.

C. Application of underlayment material. All voids, cracks, joints and surface irregularities shall be prepared, filled and smoothed with this step. Material shall be applied to a minimum finish thickness of 150 mil (not including void depth) using one coat. If the "**Hydro-Pox**" system is used, "**Hydro-Pox 251**" shall be thickened by adding 0.75-1.0lb "**Hydro-Thix**" per gallon of "**Hydro-Pox 251**".

D. Application of corrosion barrier. Material shall be applied at a minimum total thickness of 150 mil using two coats.

Application of all manhole coatings shall be performed by confined space entry. The use of drop-in, rotary sprayers shall not be permitted.

3.4 TESTING

A. The coating shall not have blisters, cracks, under film voids, mechanical damage, holidays, pinholes or discontinuities. The contractor shall conduct a high voltage spark test for holiday or pinhole detection in accordance with ASTM D4787 in the presence of the Engineer.

3.5 REPAIR OF HOLIDAYS OR PINHOLES

Surface preparation for repair of holidays and pinholes shall be in strict conformance with the manufacturer's written directions. The finished coat shall be free of all voids and imperfections.

END OF SECTION