SECTION 09900

PAINTING

09900.01 GENERAL

A. Description

1. Painting shall include, but not necessarily be limited to, surface preparation, pretreatment where indicated, priming, shop and field coating, touch up, curing, and painted surface protection on new or existing structures, pipes, materials, or other surfaces including pipe markings, safety signs, and other identification devices in accordance with the Contract Documents.

2. The specialty items which are delivered with a prime coat shall be finished as part of this section.

3. The painting of all exposed uncovered pipe, pipe hangers, convectors, grilles, and other mechanical Work, also all exposed electric conduits, panel board, pull boxes and all other electrical Work requiring paint shall be included in this section.

B. Related Work Included Elsewhere

Painting systems for specific applications are detailed elsewhere in the Specifications. In case of conflict with this Section, the system detailed for a specific application shall govern.

C. Quality Assurance

1. Containers

   Include on label of containers: manufacturer's name, type of paint, manufacturer's stock number, color number, and instructions for reducing, where applicable. Paint in cans without this information shall not be used and shall be removed from the Project site. Paint in unopened containers with expired usage dates shall not be used and shall be removed from the Project site.

2. Samples

   Sampling of materials shall be provided when requested by the Engineer. These samples shall be obtained from material(s) stored at the Project site, if possible. New one quart metal containers shall be used for this purpose.

3. Standards

   a. Field Quality Control: Request review of first finished room or item for adequacy of workmanship. This room or item shall be held as a standard of performance and quality. For spray application Projects, paint surfaces not smaller than 100 square feet shall constitute a Project standard.

b. Sample panels, when required by the Contract Documents, shall be applied on every surface to be painted for each coating system for the Engineer's approval prior to proceeding with the remaining Work.

c. The Contractor shall provide and set aside proof panels to demonstrate that surface preparation and/or painting will meet the quality specifications. Proof panels shall be subject to acceptance by the Engineer so that they may be compared to completed Work prior to acceptance. Proof panels shall be 6" X 6" square, minimum, and shall be protected from ambient degradation.

d. The Engineer will inspect all materials and surfaces prior to and after application to ensure compliance with the Contract Documents. The Engineer will inspect painting Work at each of the following hold points:

1) After surface preparation and before priming.

2) After priming and before intermediate coat.

3) After intermediate coat and before finish coat.

4) After each coat for interior, or exterior immersion service.

e. The Contractor is required to have these various phases of his Work accepted by the Engineer prior to initiating subsequent coating Work. Failure to have a coating inspected can be cause for the Engineer to reject the final coating and direct the entire coating system to be removed by the Contractor and re-applied in conformance with these specifications.

f. The Contractor's equipment shall be subject to inspection by the County or its designated agent to insure adequate capacity and proper operation.

4. Occupational Exposure

a. The Contractor is responsible for compliance with all provisions of the Maryland Occupational Safety and Health Administration (MOSH) for Occupational Exposure to Lead in Construction Work. The Contractor shall implement control measures approved by the Engineer to control dust emissions. The Contractor shall be cognizant of the open abrasive blasting limitations imposed on this Project site by the Maryland State Air Quality Control Regulations of COMAR 10.18.06.03C(1). Compliance with <u>all</u> environmental and safety laws and regulations shall be accomplished by the Contractor without supervision from the Engineer, Inspector or other representative of the Owner.

b. In the event that lead paint is determined to exist on surfaces scheduled to be abrasively blasted and coated, then the Contractor shall not abrasively blast the surface until all engineering controls, worker protection, health

monitoring, air sampling and other required tasks as approved by the County are implemented.

5. Testing

Furnish five (5) sets of the manufacturer's label, color chart and other printed product literature including Safety Data Sheets (SDS) for each material to be used on the Project for acceptance and approval by the Engineer at least two weeks prior to purchase.

D. Submittals

1. Shop Drawings

Furnish five (5) sets of the manufacturer's label, color chart and other printed product literature including Safety Data Sheets (SDS) for each material to be used on the Project for acceptance and approval by the Engineer at least two weeks prior to purchase.

2. Finish and Color Samples

a. Submit one sample for each finish and color required. Such samples shall constitute standards for color and finish for the Project. The approved samples shall be marked and retained by the Engineer for comparison with the actual Work. Samples shall be eight inches by ten inches in size and be of the same materials as those on which the finish is to be applied.

b. Furnish samples of all opaque finishes on primed cardboard and stained wood samples on type and quality of wood specified for use on Project. Make all samples in triplicate not less than 20 square inches each.

3. Certificates of Compliance

Furnish the Manufacturer's Certification of Compliance or Conformance attesting that all of the materials proposed for use meet the requirements specified.

4. Formulator's Written Instructions

Furnish the Formulator's written instructions which include brand names, catalog numbers, and names of manufacturers. The instructions also shall include detailed mixing and application procedures, surface preparation and surface profile requirements, number and types of coats required, minimum and maximum application temperatures and relative humidity parameters, minimum and maximum recommended dry film thicknesses for each coat as well as for the completed coating system, curing procedures, induction periods, pot life, viscosity and thinning data, and shelf life.

5. Abrasive Material Information

   Furnish product literature on the aggregate(s) to be used for all abrasive blasting operations. This information must include all equipment limitations, Safety Data Sheets (SDS), chemical analysis reports and safety practices mandated for its use. All abrasive materials must be free of excessive levels of contaminants that might cause a premature failure of the coating. Such contaminants include paint, oil, moisture, chlorides, and sulfates.

6. Applicator's Qualifications

   a. Furnish documentation that the Applicator for this Project has successfully painted similar facilities for at least five years. This experience to be submitted to the Engineer for review and approval shall include at least five similar Projects; the name, address, and telephone number of the Owner's Representative, Architect, Engineer, or Construction Inspector having direct knowledge of the applicator's performance on the referenced Project. Verification of unsatisfactory performance or inadequate experience record on similar Projects will be cause for rejection of the Applicator.

   b. The Applicator's Qualifications must be provided as part of each bid submitted by a prospective Bidder on Anne Arundel County coating Projects when this technical specification is used as a stand-alone document. Otherwise, this information shall be provided as part of the submittal phase on larger multi-faceted construction Projects.

7. Noise Abatement

   Furnish details and product data of proposed noise abatement equipment as required in Section G below.

E. Acceptable Manufacturers

Except as otherwise specified, materials shall be the products of the following manufacturers:

1. Tnemec Company, Inc.
2. The Sherwin Williams Company
3. Pratt and Lambert
4. Benjamin Moore and Company
5. Glidden
6. Koppers
7. Valspar
8. Or other manufacturers approved by the Engineer.

Materials selected for a coating system for each type of surface shall be the products of a single manufacturer, except where required by the Contract Documents.

F. Substitutions

No material substitutions will be approved by the Engineer which will, in the Engineer's opinion, decrease film thickness, the number of coats, and/or the degree of surface preparation; change the generic type of coating specified; and/or reduce the physical properties of adhesion, abrasion resistance, impact resistance, hardness, weather resistance, corrosion resistance, flexibility, gloss retention and/or salt spray resistance.

G. Noise Abatement

1. The Contractor shall supply and install noise abatement measures for his equipment and abrasive cleaning operation which will result in an omni-directional sound level of 65 dBA maximum, at a distance of 100 feet from the source of the sound or the distance to the nearest property line; whichever is less.

2. Noise level measurements are to be made by a competent person using a Type 2 sound level meter, on the A-scale, slow response.

3. Noise may be controlled, or attenuated, at any of three places. One, at the source (mufflers), two, in the pathway of propagation (deflection and barriers), and at the receptor (ear plugs). Since controlling the noise at the receptor is impractical, or simply out of the realm of reasonable application for community type noise exposures, it is left to the Contractor to control environmental noise levels at the source and on the way to the receptor. Common types of engineering applications to achieve noise control are mufflers, sound absorbing surface applications, barrier deflectors, barrier sound absorbers, walls and the use of alternate and quieter equipment or methods of performing the same operation but in a quieter manner.

4. Another factor for controlling noise is to consider the arrangement and locations of equipment at the job site. Compressors should be positioned as far as practical from residences, day care facilities and other noise sensitive buildings. The broad sides of equipment storage trailers can be used to deflect sound away from sensitive areas. Lastly, the smallest size compressor to adequately support a coating Project will probably generate the least amount of noise to control.

5. Two recommended sources of information on this subject are: "The Industrial Noise Control Manual", and "Abrasive Blasting Operations: Engineering Controls and Work Practices Manual". Both of these documents are published by NIOSH and available through the National Technical Information System (NTIS) in Springfield, Virginia.

09900.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for painting.

B. Contractor's Options

The Contractor may furnish and apply the system of his choice where more than one system is specified for a given application provided that prime, intermediate and finish coats are compatible.

C. Detailed Material Requirements

1. Products are specified using Tnemec Company as basis of design; equivalent or superior products of acceptable manufacturers listed in Paragraph 09900.01E may be used in lieu of those listed, only after written approval is received from the Engineer. Approval will be based upon quantitative ASTM performance testing.

2. All paints must meet present ecological standards and lead hazard regulations. No paints will be permitted on the job site with lead contents in excess of 0.06% by weight. If the Contractor applies any paints or coatings with a lead content in excess of 0.06% by weight, then he shall be responsible for the proper removal and recoating, at no cost to the County, of the affected surface(s) to conform with this specification.

3. Colors

    a. Colors of paints shall match control samples. All colors not designated on the Drawing or in the Specifications will be selected by the Engineer.

    b. Check finish schedules for areas to be treated with accent colors (deep colors), or special materials. Where deep tones are used it is the responsibility of the Contractor to utilize the appropriate deep base primer as recommended by the paint manufacturer for use on the surface for which they are intended.

4. Exterior Painting Schedule

    a. Metals for Non-Immersion Service (Except Aluminum and Stainless Steel)

        Semi-Gloss Finish/Epoxy Polyamide - Aliphatic Polyurethane Coating

        Surface Preparation, SSPC-SP6, Commercial Blast.

        First Coat: Moisture Cured Aromatic Zinc Rich Urethane, Tnemec Series 90-97 at 2.5 to 3.5 mils DFT.

        Second Coat: High Build Polyamidoamine Epoxy, Tnemec Series V69 at 4.0 to 6.0 mils DFT.

        Third Coat: Aliphatic Acrylic Polyurethane, Tnemec Series 1095 at 2.0 to 3.0 mils DFT.

b. Metals for Wastewater Immersion Service (Except Aluminum and Stainless Steel)

High Build Coat Tar Epoxy Polyamide Coating

Surface Preparation, SSPC-SP10, Near White Metal Blast.

First Coat: High Build Coat Tar Epoxy Polyamide, Tnemec Series 46H-413 at 14.0 to 16.0 mils DFT.

Surface Profile - 1.5 to 2.5 mils.

c. Concrete Surfaces for Immersion Service (Non-Potable)

High Build Coat Tar Epoxy Polyamide Coating

Surface Preparation - Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove all coatings, laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 surface profile. (SSPC-SP-1 also may be required for oily or dirt contaminated surfaces. The Engineer shall make this determination.) Note: A given Project scope of Work may include concrete repairs. The Applicator shall insure that all concrete repairs shall have been cured for a minimum of 28 days prior to surface preparation.

Resurfacer: Epoxy Modified Cementitious Mortar, Tnemec Series 218 applied at minimum 1/16” to entire surface to fill all bugholes and create homogenous surface to receive lining.

First Coat: High Build Coat Tar Epoxy Polyamide, Tnemec Series 46H-413 at 14.0 to 16.0 mils DFT in one or two coats.

d. Concrete Surfaces for Immersion Service (Potable)

Epoxy Polyamide Coating

Surface Preparation - Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove all coatings, laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 5 surface profile. (SSPC-SP-1 also may be required for oily or dirt contaminated surfaces. The Engineer shall make this determination.) Note: A given Project scope of Work may include concrete repairs. The Applicator shall insure that all concrete repairs shall have been cured for a minimum of 28 days prior to surface preparation.

Resurfacer: Epoxy Modified Cementitious Mortar, Tnemec Series 218 applied at minimum 1/16" to entire surface to fill all bugholes and create homogenous surface to receive lining.

First and Second Coats: Phenalkamine Epoxy, Tnemec Series 21 at 7.0-9.0 mils per coat.

e. Concrete Surfaces for Non-Immersion Service (Not Exposed to Direct Sunlight)

Gloss Finish/Epoxy Polyamide

Surface Preparation - SSPC-SP-1. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove all coatings, laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 2 surface profile. Note: A given Project scope of Work may include concrete repairs. The Applicator shall insure that all concrete repairs shall have been cured for a minimum of 28 days prior to surface preparation.

First Coat: Waterborne Cementitious Acrylic Block Filler, Tnemec Series 130 over entire surface. Large imperfections and spalls will remain.

Second and Third Coats: Each coat shall be a High Build Polyamidoamine Epoxy, Tnemec Series V69 at 4.0 to 6.0 mils DFT.

f. Concrete Surfaces for Non-Immersion Service (Exposed to Direct Sunlight)

Gloss Finish/Acrylic

Surface Preparation – SSPC – SP –1 (Medium pressure (2,000 to 5,000 psi) water blasting may also be required to remove loose or chalking paint. If there is a glazed surface on the concrete, then medium pressure water blasting or acid etching with neutralization may be required to provide a broom finish to the concrete. This determination shall be made by the Engineer.) Note: A given Project scope of Work may include concrete repairs. The Applicator shall insure that all concrete repairs shall have been cured for a minimum of 28 days prior to surface preparation.

First Coat: Waterborne Modified Polyamine Epoxy, penetrating sealing primer, Tnemec Series 151-1051 at 0.7-1.5 mils DFT.

Second and Third Coats: Each coat shall be high density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT.

g. Exterior Wood for Non-Immersion Service

Semi-Gloss Finish

Surface Preparation, SSPC-SP-1, Solvent Cleaning after lightly sanding any surface gloss.

First Coat: Waterborne Modified Polyamine Epoxy, penetrating sealing primer, Tnemec Series 151-1051 at 0.7-1.5 mils DFT.

Second and Third Coats: Each coat shall be high density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT.

h. Exterior PVC Piping and Fittings for Non-Immersion Service

Semi-Gloss Finish

Surface Preparation, SSPC-SP-1, Solvent Cleaning after lightly sanding any surface gloss.

First and Second Coat: High density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT 3.0 to 4.0 mils DFT per coat.

Application is restricted to only brush or roller.

5. Interior Painting Schedule

a. Metals, (General usage except Aluminum and Stainless Steel)

Semi-Gloss Finish/Alkyd Enamel for Non-Immersion Service

Surface Preparation: SSPC-SP6, Commercial blast except for galvanized and aluminum surfaces which require SSPC-SP16 brush off blast cleaning providing a minimum 1.0 mil surface profile.

First Coat: Inorganic Hybrid Water-Based Epoxy, Tnemec Series 1224 at 4.0-6.0 mils DFT.

Second and Third Coats: High density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT 3.0 to 4.0 mils DFT per coat.

b. Mechanical Equipment for Non-Immersion Service

Semi-Gloss Finish/Epoxy Polyamide

Surface Preparation, SSPC-SP6, Commercial Blast or SSPC-SP-11T Power Tool Cleaning to Bare Metal.

First Coat: Moisture Cured Aromatic Zinc Rich Urethane, Tnemec Series 90-97 at 2.5 to 3.5 mils DFT.

Second Coat and Third Coats: High Build Polyamidoamine Epoxy, Tnemec Series V69 at 4.0 to 6.0 mils DFT.

c. Concrete Surfaces for Non-Immersion Service

Gloss Finish/Epoxy Polyamide

Surface Preparation - SSPC-SP-1. Abrasive blast, shot-blast, water jet or mechanically abrade concrete surfaces to remove all coatings, laitance, curing compounds, hardeners, sealers and other contaminants and to provide a minimum ICRI-CSP 2 surface profile. Note: A given Project scope of Work may include concrete repairs. The Applicator shall insure that all concrete repairs shall have been cured for a minimum of 28 days prior to surface preparation.

First Coat: Waterborne Cementitious Acrylic Block Filler, Tnemec Series 130 over entire surface. Large imperfections and spalls will remain.

Second and Third Coats: Each coat shall be a High Build Polyamidoamine Epoxy, Tnemec Series V69 at 4.0 to 6.0 mils DFT.

d. Interior Wood for Non-Immersion Service

Semi-Gloss Finish

Surface Preparation, SSPC-SP-1, Solvent Cleaning after lightly sanding any gloss.

First Coat: Waterborne Modified Polyamine Epoxy, penetrating sealing primer, Tnemec Series 151-1051 at 0.7-1.5 mils DFT.

Second and Third Coats: Each coat shall be high density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT.

e. Interior Wallboard (New)

Semi-Gloss Finish

Surface Preparation, sanded and dust free

First Coat: Waterborne Modified Polyamine Epoxy, penetrating sealing primer, Tnemec Series 151-1051 at 0.7-1.5 mils DFT.

Second and Third Coats: Each coat shall be high density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT.

f. Interior Wallboard (Existing)

Semi-Gloss Finish

Surface Preparation, sanded, no peeling paint, and dust free (SSPC-SP-1, may be required as determined by the Engineer).

First and Second Coats: Each coat shall be high density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT.

g. Galvanized Steel for Non-Immersion Service

Semi-Gloss Finish

Surface Preparation, SSPC-SP-1 Solvent Cleaning over bare galvanized surface. If previous coating was on surface, then SSPC-SP-3 Power Tool Clean.

First Coat: Inorganic Hybrid Water-Based Epoxy, Tnemec Series 1224 at 4.0-6.0 mils DFT.

Second and Third Coats: High density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT 3.0 to 4.0 mils DFT per coat.

h. Interior PVC Piping and Fittings for Non-Immersion Service

Semi-Gloss Finish

Surface Preparation, SSPC-SP-1, solvent cleaning after lightly sanding any surface gloss.

First and Second Coat: High density pure polymer Acrylic, Tnemec Series 1029 at 2.0-3.0 mils DFT 3.0 to 4.0 mils DFT per coat.

Application is restricted to only brush or roller.

i. Interior metals in non-immersion service at locations with excessive humidity for conventional coating application and/or other conditions mandating a surface tolerant coating for a severe industrial environment.

Surface preparation, SSPC-SP-3, Power Tool Cleaning (if site conditions preclude SSPC-SP-3, then use SSPC-SP-2, Hand Tool Cleaning. If site conditions do not make SSPC-SP-2 possible, then ensure that all loose dirt and rust are scraped from the surface before coating application.)

First Coat: Phenalkamine Epoxy Mastic, Tnemec Series 132 at 4.0-6.0 mils DFT.

Finish Coat: Phenalkamide Epoxy Finish, Tnemec Series 138 at 4.0-6.0 mils DFT.

j. Interior Ductile Iron Pipe and Fittings for Immersion Sewage Wetwell Locations

Coal Tar Epoxy Polyamide Coating

Surface Preparation, SSPC-SP10, Near White Metal Blast.

Ductile iron pipe and fittings shall be coated on the inside and outside.

First and Second Coats: Red Bitumastic No. 300-M (Kp.) @ 8 mil minimum dry film thickness per coat, in conformance with SSPC-Paint 16.

Surface Profile: 2 to 3 mils.

Note: This is a special order coating system for suppliers of ductile iron pipe and fittings. All items delivered to the project shall include certification from the shop demonstrating conformance with surface preparation, coating material, average surface profile measurement, and average total coating thickness measurement.

6. Thinners

a. Only thinners specified by the coating manufacturer shall be used and only in strict conformance with the manufacturer's instructions.

b. When the use of thinner is permissible, the thinner shall be added slowly to paint during the mixing process. All thinning shall be done under the supervision of experienced personnel. The manufacturer's recommendations on viscosity limits and type of thinner to be added to the paint shall be closely followed. Further, all thinning shall be accomplished and monitored by use of Zahn or Ford cups for meeting coating viscosity limitations.

09900.03 EXECUTION

A. Products Delivery, Storage and Handling

1. Deliver in original sealed containers with seals unbroken and labels intact. Minor damage to containers is acceptable provided the container has not been punctured

or the lid seal broken. Out-of-date materials, contaminated paints and other rejected coatings, thinners, etc. shall be immediately removed from the job site by the end of the Workday in which these materials were rejected.

2. Deliver to Project site or segregate at source of supply in advance need so as to allow four (4) Working days for testing.

3. Store only acceptable Project materials on site and maintain storage area environment to comply with coating temperature limitations specified by coatings manufacturer.

4. Store abrasive materials in covered containers or atop skids. Abrasive materials shall not be stored directly in contact with the ground.

5. Store in suitable location, restricting storage to paint materials and related equipment.

6. Comply with health and fire regulations.

7. Ensure that copies of the Material Safety Data Sheets (MSDS) are available at the job site for each of the paints, thinners, solvents and other chemicals used in the course of this Project.

B. Job Conditions

1. Comply with manufacturer's recommendations as to environmental conditions under which coating system can be applied. Contractor must provide log of atmospheric conditions monitored during explicit painting periods wherein limitations are mandated by the use of various paint products.

2. Do not apply finishes in areas where dust is being generated. All materials shall be applied free of runs, sags, wrinkles, streaks, blisters, roller marks and brush marks. Further, the specific method of application (e.g. airless spray, roller, brush, etc.) shall be approved for each type of coating employed on each piece of equipment at the Project site. It is the Contractor's responsibility to obtain necessary guidance and approval from the Engineer on approved application methods.

3. Cover or otherwise protect finishes of other trades and surfaces not being painted concurrently or not to be painted. All materials shall be applied uniformly.

4. The Contractor shall be held responsible for the finished appearance and satisfactory completion of his Work and, therefore, he shall not commence any painting until surfaces to be finished are in proper condition in every respect. New masonry surfaces shall not be primed until after 28 days of curing and it has been determined that the substrates have dried sufficiently to safely accept paint material. Report to Engineer any area that does not meet the requirements.

5. A minimum interior temperature of 65°F shall be maintained during the actual application and curing of the paint, and until occupancy of the structure occurs. Adequate ventilation shall be maintained at all times to control excessive humidity which will adversely affect the curing of coatings. The Contractor is solely responsible for maintaining suitable temperatures and ventilation.

6. Enamel undercoats are to be sanded smooth prior to recoating. Tops and bottoms of doors are to be finished in the same manner as door facing, after the carpenters complete the fitting of them.

7. No exterior painting shall be undertaken if air or surface temperature is below 5O°F, nor immediately following rain or until frost, dew or condensation has evaporated, or until climatic conditions are such that they will remain acceptable for the entire period encompassing surface preparation, coating application and curing activities of a given section of the Project.

8. Surface preparation and coating activities shall be limited to an 8 a.m. to 5 p.m. Monday through Friday schedule. Work activities shall also be modified to accommodate local, Maryland State and Federal regulations and laws and to minimize complaints from nearby residents. Exemptions from these operating hour restrictions may be needed from the Engineer due to weather and/or facility access limitations. Approval by the Engineer shall be contingent upon the site-specific conditions and the Contractor's plan to minimize nuisance complaints.

9. Paint shall not be applied in the rain, wind, snow, mist, and fog, or when steel or metal surface temperatures are less than 5°F above the dew point.

10. Paint shall not be applied when temperature of metal to be painted is above 120°F or as recommended by the coating manufacturer.

11. Paint shall not be applied when the relative humidity is above 85% or the temperature is above 90°F.

12. During performance of all Work under this Contract, the Contractor shall strictly adhere to Environmental Protection Agency (EPA) regulations, Occupational Safety and Health Administration (OSHA) regulations, and Maryland Occupational Safety and Health (MOSH) regulations as well as other applicable Federal, state and local requirements. In addition, the safety procedures in "A Manual for Painter Safety, a Report of Technical Unit Committee T-6D" published by the National Association of Corrosion Engineers (NACE) and the "Paint Application Guide No. 3, A Guide to Safety in Paint Application" by the Steel Structures Painting Council (SSPC) shall be strictly observed in their entirety. Waste products, including contaminated blasting grit and construction debris, shall be disposed of by the Contractor at an off-site landfill in accordance with all applicable codes and ordinances. The coatings specified may have potential health hazards if ingested or improperly handled. The coating manufacturer's written safety precautions shall be followed throughout the mixing, application, and cure for the coatings. The

Contractor shall be responsible for coordination of his Work with any other Contractors Working at the job site, with the Inspector, and with the facility personnel. (NOTE: Projects involving removal of lead containing paints shall have all debris stored at the job site until such time as laboratory analyses establishes a leachable lead content below 5 mg per liter of lead. If the level of leachable lead is equal to or greater than 5 mg per liter, then the blasting debris shall be disposed of by Anne Arundel County as hazardous waste.)

13. All flammable paint products, wiping cloths, drop cloths, and sanding residue shall be removed at the close of each Workday. Approved explosion-proof fans shall be used for ventilation where required while Work is in process. Storage of materials inside the building will not be permitted except with written approval by the County. It is the responsibility of the Contractor to ensure that all materials are stored in strict conformance with manufacturer recommendations. Special attention will be provided to the minimum and maximum temperature and humidity limitations of paints during surface preparation, coating application and full curing.

14. The Contractor is responsible for monitoring ambient and surface temperatures, dew point temperature, relative humidity, and wind velocity and restricting his blasting and painting operations to comply with specified environmental conditions as well as those mandated by the coatings manufacturer. Supplemental ventilation, dehumidification, or heating will be provided by the Contractor when required for safety or for maintaining proper surface preparation, coating application or paint curing conditions. Painting is prohibited when the surface or ambient temperatures are below 50°F or when freshly painted surfaces may be damaged by rain, fog, dust, snow or condensation, or when it can be anticipated that these conditions will exist during the requisite curing/drying period. Blasting residue will not be permitted to settle on County buildings or expose County and off-site personnel and residents to potential respiratory risks.

C. Inspection

1. Examine surfaces scheduled to receive paint and coatings finished and notify Engineer in writing of conditions that will adversely affect execution, permanence or quality of Work and which cannot be put into acceptable condition through preparatory Work as included in Paragraph B, above.

2. Do not proceed with surface preparation or coating application until conditions are suitable.

3. All unfinished surfaces and material except those excluded by the Contract Documents, shall be painted. See painting schedule herein for types and locations of the various surfaces requiring painting or finishing and the number of coats. An additional coat will be required on any surface when in the sole judgment of the Engineer, the finish surface is not satisfactory; this will be done at no increase in Contract price. Further, all coats must meet the specified minimum and maximum

dry film thickness requirements detailed in this specification and the recommended limits of the paint manufacturer.

D. Preparation of Surface

1. Remove, by grinding, all weld splatter and other similar surface imperfections. The surface shall be cleaned as specified in the procurement documents. In the event that a cleaning method has not been specified, the surface preparation shall not be less than the paint manufacturer's recommendations for the intended service environment.

2. The surface to be painted shall have the specified surface preparation at the time of application of the paint. If the surface is degraded or contaminated subsequent to surface preparation and prior to painting, the surface shall be restored before paint application.

3. In order to prevent the degradation or contamination of cleaned surfaces, the pretreatments, or, in the absence of a pretreatment, the prime coat of paint shall be applied within six hours after the surface has been cleaned. Succeeding coats shall be applied before contamination of the under surface occurs. When this procedure is impossible or impractical, the Contractor and the County shall agree on the procedure to be followed.

4. Previously applied coatings shall be roughened prior to painting intercoat by a method approved by the Engineer.

5. Cleaning and painting shall be so programmed that dust or other contaminants do not fall on wet, newly-painted surfaces. Surfaces not intended to be painted shall be suitably protected from the effects of cleaning and painting operations.

E. Mixing and Tinting

1. All ingredients in any container of paint shall be thoroughly mixed before use and shall be agitated often enough during application to keep the paint uniform. The paint shall be mixed in a manner which will insure the break-up of all lumps, complete dispersion of pigment, and uniform composition. Paint shall be carefully examined after mixing for uniformity and to verify that no unmixed pigment remains on the bottom of the container. Contractor is responsible to provide continuous agitation in a paint pot when this is recommended by the coating manufacturer.

2. The following are acceptable methods for mixing most paints:

    a. Mixing by hand: Most of the vehicle (solvent or binder) shall be poured off into a clean container. The pigment in the paint shall be lifted from the bottom of the container with a broad, flat paddle, lumps shall be broken up, and the pigment thoroughly mixed with the remaining vehicle. The poured off vehicle shall be returned to the paint with simultaneous stirring, or boxed

until the composition is uniform. Boxing is the process of mixing paint by pouring from one container to another. The maximum container size shall be five gallons.

b. Mixing with mechanical paint shakers or mixers: This will usually give a better mixing in a much shorter time than mixing by hand.

c. All pigmented paint shall be strained after mixing except where application equipment is provided with strainers. Strainers shall be of a type to remove only skins and undesirable matter but not to remove the pigment. Strainer size shall be as recommended by the coating manufacturer.

d. Where a skin has formed in the container, the skin shall be cut loose from the sides of the container, removed and discarded. If the volume of such skins are more than 2% of the remaining paint, the paint shall not be used.

e. Mixing in open containers shall be done in a well ventilated area away from sparks or flames.

f. Paint shall not be mixed or kept in suspension by means of an air stream bubbling under the paint surface.

g. Dry pigments which are separately packaged shall be mixed into paints in such a manner that they are uniformly blended and all particles of the dry powder are wetted by the vehicle.

h. Pastes shall be made into paints in such a manner that the paste shall be uniformly blended and all lumps and particles broken up to form a homogenous paint.

i. Tinting pastes or colors shall be wetted with a small amount of thinner, vehicle, or paint and thoroughly mixed. Next, the thinned mixture shall be strained. Finally, it shall be added to the large container of paint and mixed until the color is uniform. When successive coats of paint of the same color have been specified, alternate coats of paint shall be tinted, when practical, sufficiently to produce enough contrast to indicate complete coverage of the surface. Tinting shall be performed in such a manner that it will not be necessary to tint the final coat. When the paint is the color of the steel, the first coat to be applied shall be tinted. The tinted material shall be compatible with the paint and not detrimental to its service life. It is suggested that the paint be tinted by the manufacturer and appropriately labeled.

j. Paint which does not have a limited pot life (time interval) or does not deteriorate on standing may be mixed at any time before using, but if settling has occurred it must be remixed immediately before using.

k. Paint shall not remain in spray pots, painters' buckets, etc., overnight, but shall be stored in a covered container and remixed before use.

l. Catalysts, curing agents, or hardeners which are separately packaged shall be added to the base paint only after the latter has been thoroughly mixed. The proper volume of the catalyst shall then be slowly poured into the required volume of base with constant agitation. Do not pour off the liquid which has separated from the pigment and then add the catalyst to the settled pigment to aid mixing. The mixture shall be used within the pot life specified by the manufacturer. (For example, more than 20 minutes and less than eight hours after mixing are the pot life limits for some chemically cured paints.) Therefore, only enough paint should be catalyzed for prompt use. Most mixed or catalyzed paints cannot be stored and unused portions of these shall be discarded at the end of each Working Day. When specified, special continuous mixing equipment shall be used according to the manufacturer's directions.

m. No thinner shall be added to the paint unless necessary for proper application. Paints to be applied by brush will usually not require thinning. Paints to be sprayed, if not specifically formulated for spraying, may require thinning when proper adjustment of the spray equipment and air pressure does not result in satisfactory paint application. In no case shall thinner be added than that recommended by the manufacturer's instructions.

F. Application

1. Do not apply coating until moisture content of surface is within limitations recommended by the paint manufacturer and the prepared surface has been approved by the Engineer.

2. Apply paint coatings with suitable brushes, denapped rollers or spray equipment which has been kept clean, free from contamination and suitable for finish required.

3. Rate of application of coating shall be as recommended by the paint manufacturer for the purpose and surface involved.

4. Comply with required drying time between coats as directed by manufacturer. Note that curing times for recoating, immersion service, etc. are significantly affected by temperature.

5. Sand and remove dust between each coat to remove defects visible from 5 feet. Finish coats shall be smooth, free from brush marks, streaks, laps, sags, skips, holidays, blisters, etc. All metal surfaces shall be holiday tested at the election of the Engineer to insure a "RELATIVELY PINHOLE FREE" surface as defined by NACE Condition B.

6. Do not apply additional coats until completed coat has been inspected and accepted by the Engineer. Only inspected coats of paint will be considered in determining number of coats applied.

7. Damaged areas of paint which are detrimental to the service life shall be removed; the surface again prepared and repainted with the same number of coats of paint of the same kind as the undamaged areas.

8. All edges, corners, crevices, rivets, bolts, welds, and sharp edges shall be stripe painted with the priming paint before a steel surface receives its first full prime coat of paint. Such striping shall extend a minimum of one inch (2 cm) from the edge. The stripe coat shall cure to touch before the full prime coat is applied. However, the stripe coat shall not be permitted to dry for a period long enough to allow rusting of the unprimed steel. Alternatively, the stripe coat may be applied after a complete prime coat.

9. To the maximum extent practical, each coat of paint shall be applied as a continuous film of uniform thickness free of pores. All thin spots or areas missed in the application shall be repainted and permitted to dry before the next coat of paint is applied.

10. Unless otherwise specified in these specifications, all dry film thickness determinations on ferrous structures shall be performed as specified in SSPC-PA 2, "Measurement of Dry Paint Thickness with Magnetic Gages". Paint thickness is usually specified (or implied) as a minimum. Greater thickness that does not detrimentally affect the appearance or service life of the coating is permitted unless otherwise specified. However, in no case will thicknesses per coat be permitted to exceed manufacturer's recommended maximum DFT per coat.

11. Unless otherwise specified, the prime coat(s) of paint and the first field coat of primer (when specified) shall be within a thickness range of 1.5 mils (38 microns) to 2.5 mils (63 microns) when dry. Each intermediate and finish coat of paint shall be within a thickness range of 1.0 mils (25 microns) to 2.0 mils (50 microns). Vinyls, lacquers, emulsions, high-build coatings, and bituminous coatings usually deviate from these thicknesses. When the specification for a paint or painting system requires a thickness other than that stipulated herein, that specification shall govern.

12. In the event the required minimum thickness is not achieved, as specified, additional coats shall be applied until the required thickness is obtained. The inorganic zinc-rich coatings shall not be corrected in this manner unless the manufacturer's instructions specifically permit this practice.

13. Each coat of paint shall be in a proper state of cure or dryness before the application of the succeeding coat. Paint shall be considered dry for recoating when an additional coat can be applied without the development of any detrimental film irregularities, such as lifting, wrinkling, blistering or loss of adhesion of the

undercoat. The time interval between coating applications shall be in compliance with manufacturer's instructions at the specified curing temperature. If the ambient conditions were below the specified curing temperature, then the minimum curing time shall be increased until the resulting coating finish withstands the appropriate pencil hardness test or MEK rub test approved by the coating manufacturer to establish proper curing conditions.

14. Undercoats having a glossy surface which detrimentally affects the adhesion of the subsequent coat shall be treated by mild surface abrasion, solvent treatment, or other suitable processes which will not cut through or detract from the performance of the underlying paint.

15. Unless otherwise specified, the following practice shall be followed regarding painting of contact surfaces:

    a. The areas of steel surfaces to be encased or embedded in concrete shall not be painted.

    b. Steel to be completely enclosed in brick or other masonry shall be given at least one coat of shop paint.

    c. The areas of steel surfaces to be in contact with wood shall be painted as indicated in e. below.

    d. Surfaces to be in contact with wood only after field erection shall be painted as provided in e. below except where the paint interferes with assembly or where indicated in g. below.

    e. Steel surfaces not in direct bonded contact, but inaccessible after assembly shall receive the full specified paint system before assembly.

    f. Bearing-type joints may be painted as required in e. above.

    g. Contact surfaces of members to be joined by high strength bolts in friction-type joints are a special case. Unless specifically authorized to the contrary, they shall be left unpainted and free of oil, grease, and coatings. However, they may be painted with approved coatings which do not reduce the coefficient of friction between contact surface and joined member in accordance with regulations of the American Institute of Steel Construction (AISC), the American Welding Society (AWS), and the Research Council on Structural Connections (RCSC).

16. Brush application of paint shall be in accordance with the following:

    a. Brushes shall be of a style and quality that will enable proper application of paint. Round or oval brushes are generally considered most suitable for rivets, bolts, irregular surfaces, and rough or pitted steel. Wide, flat brushes

are suitable for large flat areas, but they should not have a width over five inches.

b. The brushing shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained.

c. Paint shall be worked into all crevices and corners.

d. All runs or sags shall be brushed out.

e. There shall be a minimum of brush marks left in the applied paint.

f. Surfaces not accessible to brushes shall be painted by spray, daubers, or sheepskins.

17. Roller application of paint shall be in accordance with the following:

a. Roller application may be used on flat or slightly curved surfaces and shall be in accordance with the recommendations of the paint manufacturer and roller manufacturer. Denapped paint rollers shall be of a style and quality that will enable proper application of paint having the continuity and thickness required by this specification.

b. Roller application shall not be used on irregular surfaces such as rivets, bolts, crevices, welds, corners, or edges, unless otherwise specified. When permitted, however, the paint applied by roller on these irregular surfaces shall be subsequently brushed out to form a continuous and unbroken film.

18. All spray application of paint, whether air spray, airless spray, hot air spray or hot airless spray, shall be in accordance with the following:

a. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the paint to be applied, and shall be equipped with suitable pressure regulators and gages. The equipment shall be maintained in proper working condition.

b. Paint ingredients shall be kept uniformly mixed in the spray pots or containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary.

c. Spray equipment shall be kept sufficiently clean so that dirt, dried paint, and other foreign materials are not deposited in the paint film. Any solvents left in the equipment shall be completely removed before using.

d. Paint shall be applied in a uniform layer with overlapping at the edges of the spray pattern. During application, the gun shall be held perpendicular to the surface and at a distance which will ensure that a wet layer of paint is

deposited on the surface. The trigger of the gun should be released at the end of each stroke.

e. All runs and sags shall be brushed out immediately or the coating shall be removed and the surface repainted.

f. Cracks, crevices, blind areas of all rivets and bolts, and all other inaccessible areas shall be painted by brush, daubers, or sheepskins.

g. Paint shall be suitable for the particular spray application method used.

G. Mechanical Work

1. Factory finish coats are specified elsewhere for certain items of mechanical equipment. Field painting will not be required for such items which have factory finish, except where finish is damaged by handling, weather or because the equipment is included in the Project scope of Work. Damaged portions shall be field primed and finished with sufficient finish coats to give a smooth, unmarred finish, with primer and finish being of the same type and color paint as originally used in the factory applications.

   Damaged portions shall be refinished to the satisfaction of the Engineer. Finish coat shall be uniform for factory painted equipment.

2. Prime coat paint used on mechanical equipment shall be compatible, so as not to be lifted by subsequent coats or cause other undesirable effect, with the field finish coats hereinafter specified. The equipment manufacturer's standard shop prime coat may be used only if compatibility is proven to the Engineer's satisfaction. For any equipment delivered to the site with a shop prime coat not compatible with the finish coats, the Contractor may be ordered to sandblast or otherwise restore the equipment to the bare metal condition. A field prime coat, conforming to these specifications, shall then be applied to the equipment.

3. Color and marking of various exposed piping systems shall be as specified hereinafter or as subsequently furnished to the Contractor prior to the beginning of Work. Valves, fittings, and accessories located in a particular pipeline shall be painted the same color as the line piping, unless otherwise specified.

4. Galvanized pipe and equipment shall be solvent cleaned and primed as specified. Chemical cleaners and passivators shall be submitted for approval by the Engineer prior to use.

5. All physical hazards and safety equipment shall be color coded in accordance with paragraph 1910.144(a)(1)(ii) of the OSHA regulations. The colors utilized shall meet the tests specified in ANSI Z53.1-1979, "Safety Color Code for Marking Physical Hazards". The following listing includes general categories of physical hazards to be identified but does not necessarily include every item. The Contractor shall, however, color code all physical hazards as specified above.

a. Safety Red - Fire Protection equipment and apparatus; barricaded and temporary obstructions; containers for flammable liquids; emergency electrical stop switches for machinery. (WARNING: Many coating formulations for this color as well as Safety Orange and Safety Yellow contain lead pigments above the 0.06% by weight lead standard. Contractor shall insure that only lead-free paints are used on this Project and shall be responsible for the complete expense of removing lead paints in the event they are used.)

b. Safety Orange - Dangerous parts of machines or energized equipment; hazards exposed when enclosure doors or guards are opened or removed. (WARNING: See Paragraph 5.a above.)

c. Safety Yellow - Exposed edges of platforms, pits, etc.; Caution and warning signs. (WARNING: See Paragraph 5.a above.)

H. Electrical Work

1. Major items of electrical equipment shall be furnished with factory finish. Field painting will not be required for such items except when finish is damaged. Damaged portions shall be field primed and finished with one finish coat, with prime and finish being of the same type and color paint as originally used in the factory application. Repainting shall be performed using the same methods as used by the manufacturers of the equipment. Damaged portions shall be refinished to give uniform color and texture. Finish coat shall be uniform color and texture. Finish coat shall be uniform for factory painted equipment.

2. Exposed electrical items of Work which do not have a factory painted finish such as pull boxes, junction boxes, terminal boxes, conduits, racks, supports and ferrous accessories, shall be painted in an identical manner to that specified for mechanical Work items. Exposed electrical items and conduit finish color shall match the background color upon which the item or conduit is mounted. (Note: Dissimilar surfaces may require different surface preparation and prime coats on the walls and electrical equipment.)

3. Bright metal parts such as stainless steel or chrome plate device plates, knobs, and items provided with a plastic finish and trim shall not be painted.

I. Piping Identification Schedule

1. The exposed piping systems shall be identified by lettered legends clearly indicating the contents of the system in accordance with the Contract Document.

2. Lettered legends shall be stenciled on the piping at the horizontal or vertical centerline thereof, except where pipelines are too close together or above the operator's normal line of vision. In these situations, the lettering shall be placed above or below the horizontal centerline as directed by the Engineer. Pre-printed vinyl labels by Seton or other suppliers can also be used for this purpose. The

legends shall indicate the contents of the pipe and, when required for clarity, the associated process. All legends shall be submitted to the Engineer for acceptance. As a guideline some examples are listed at piping system paint schedule, in this Section.

3. Lettered legends shall be located at points where pipes enter and leave the rooms, buildings, or spaces; at junction points of distribution; close to valves and equipment; at changes in direction; and at intervals along the piping at least every twenty feet.

4. Arrows indicating direction of flow shall be stenciled on the piping adjacent to the legends. The arrows shall be the same size as the letters and shall be located so that the arrow points away from the legend. Letter sizes are given in the schedule below.

Outside Diameter of Pipe	Covering Heights of Letters
3/4 to 1-1/4 inches	1/2 inches
1-1/4 to 2-1/2 inches	3/4 inches
3 to 6 inches	1-1/4 inches
7 to 10 inches	2-1/2 inches
Over 10 inches	3-1/2 inches

5. In lieu of stenciled legends and flow arrows, snap-on type labels will be allowable substitutes. Labels shall be Set Mark System, manufactured by Seton Name Plate Corp., or equal.

J. Equipment Identification Schedule

1. Mark each unit of newly installed process equipment including all non-submersible pumps, air compressors, local panel controls, chemical feed tanks, flow meters, thermostats, switches, etc., with its functional name (e.g. "Non-Potable Water Pump No. 1", "PAL U.V., No. 1") by means of an etched aluminum name plate with permanent adhesive backing.

2. Name plates unless otherwise specified, shall be 1-1/2" by 4" with a black enamel background and etched or engraved lettering. Name plates, if specified, shall be attached to the exterior wall of buildings with brass screws and to tanks or other equipment with adhesive. Provide sign support for locations obscured by walls, stairways, etc.

3. Major pieces of processing equipment (e.g., Pressure Filter No. 1, Tank No. 3, etc.) shall be marked in stenciled letters of a contrasting color 2" high. Reprinted labels may be substituted with approval from the Engineer for this requirement.

4. Ensure that equipment designations and their corresponding electrical control equipment designations coincide.

K. Utilization of Painted Surfaces

Do not use or place into service items which are painted until paints and coatings are fully cured (dry-hard).

L. Cleanup

1. Provide "Wet Paint" signs as required to protect newly painted finishes.

2. Remove temporary protective wrappings provided by others for protection of their Work after completion of paint Work operations.

3. The Contractor shall remove all paint smears, splatters, or smudges from all glass, floors, walls, hardware, and other unpainted or previously painted surfaces. Spills must be cleaned up immediately.

4. The Contractor shall touch-up minor surface damage which can be job-repaired to the satisfaction of the Engineer.

5. Areas of finish surface damage which can not, in the opinion of the Engineer, be satisfactorily "touched-up" shall be refinished at no cost to the County.

09900.04 METHOD OF MEASUREMENT

Painting will not be measured for payment.

09900.05 BASIS OF PAYMENT

Painting shall not be paid as a separate item but is considered incidental to other items of Work. Payment will be included in other related items of Work and will constitute full compensation for all labor, equipment, tools, and incidentals necessary to complete the required Work.

END OF SECTION