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DIVISION 09 - FINISHES

SECTION 09900

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SECTION 09900

PAINTS, COATINGS AND STATION MARKINGS

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS (ACGIH)

ACGIH Limit Values (1999) Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.1000 Air Contaminants

FEDERAL SPECIFICATIONS (FS)

FS TT-P-115 (Rev. F) Paint, Traffic (Highway, White and Yellow)

FEDERAL STANDARDS (FED-STD)

FED-STD-313 (Rev. C) Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

FED-STD-595 (Rev B, Notice 1) Colors Used in Government Procurement

THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC PA 1 (1991) Shop, Field, and Maintenance Painting

SSPC PA 3 (1995) Safety in Paint Application

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE EM 385-1-1 (1996) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The "RE" designates that the Resident Office will review the submittal for the Government. Submit the following in accordance with Section 01330, SUBMITTAL PROCEDURES:

Samples of specified materials may be taken and tested for compliance with specification requirements.

SD-03 Product Data

Manufacturer's Technical Data Sheets.

SD-04 Samples

Color; G, RE.

Submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated.

SD-07 Certificates

Statements.

Submit statements signed by responsible officials of manufacturer of product or material attesting that product or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

SD-08 Manufacturer's Instructions

Application instructions.

Mixing.

Detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats.

Manufacturer's Material Safety Data Sheets.

Submit manufacturer's Material Safety Data Sheets for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313.

1.3 QUALITY ASSURANCE

1.3.1 Statements of Product or Material

The Contractor shall provide statements signed by responsible officials of manufacturer of product or material attesting that product or material meets specification requirements. Must be dated after award of project contract and clearly name the project.

1.4 REGULATORY REQUIREMENTS

1.4.1 Environmental Protection

In addition to requirements specified elsewhere for environmental protection, provide coating materials that conform to the restrictions of the local Air Pollution Control District and regional jurisdiction. Notify Contracting Officer of any paint specified herein which fails to conform.

1.4.2 Lead Content

Do not use coatings having a lead content over 0.06 percent by weight of nonvolatile content.

1.4.3 Chromate Content

Do not use coatings containing zinc-chromate or strontium-chromate.

1.4.4 Asbestos Content

Materials shall not contain asbestos.

1.4.5 Mercury Content

Materials shall not contain mercury or mercury compounds.

1.4.6 Human Carcinogens

Materials shall not contain ACGIH Limit Values confirmed human carcinogens (A1) or suspected human carcinogens (A2).

1.5 PACKAGING, LABELING, AND STORAGE

Paints shall be in sealed containers that legibly show the contract specification number, designation name, formula or specification number, batch number, color, quantity, date of manufacture, manufacturer's formulation number, manufacturer's directions including any warnings and special precautions, and name and address of manufacturer. Pigmented paints shall be furnished in containers not larger than 20 liters. Paints and thinners shall be stored in accordance with the manufacturer's written directions, and as a minimum, stored off the ground, under cover, with sufficient ventilation to prevent the buildup of flammable vapors, and at temperatures between 4 to 35 degrees C. Paints shall be stored on the project site or segregated at the source of supply sufficiently in advance of need to allow 30 days for testing.

1.6 SAFETY AND HEALTH

Apply coating materials using safety methods and equipment in accordance with the following:

Work shall comply with applicable Federal, State, and local laws and regulations, and with the ACCIDENT PREVENTION PLAN, including the Activity Hazard Analysis as specified in the CONTRACT CLAUSES and in COE EM 385-1-1

Appendix A. The Activity Hazard Analysis shall include analyses of the potential impact of painting operations on painting personnel and on others involved in and adjacent to the work zone.

1.6.1 Safety Methods Used During Coating Application

Comply with the requirements of SSPC PA 3.

1.6.2 Toxic Materials

To protect personnel from overexposure to toxic materials, conform to the most stringent guidance of:

- a. The applicable manufacturer's Material Safety Data Sheets (MSDS) or local regulation.
- b. 29 CFR 1910.1000.
- c. ACGIH Limit Values, threshold limit values.

1.6.3 Worker Exposures

Exposure of workers to hazardous chemical substances shall not exceed limits established by ACGIH Limit Values, or as required by a more stringent applicable regulation.

1.6.4 Toxic Compounds

Toxic products having ineffective physiological warning properties, such as no or low odor or irritation levels, shall not be used unless approved by the Contracting Officer.

1.6.5 Training

Workers having access to an affected work area shall be informed of the contents of the applicable material safety data sheets (MSDS) and shall be informed of potential health and safety hazard and protective controls associated with materials used on the project. An affected work area is one which may receive mists and odors from the painting operations. Workers involved in preparation, painting and clean-up shall be trained in the safe handling and application, and the exposure limit, for each material which the worker will use in the project. Personnel having a need to use respirators and masks shall be instructed in the use and maintenance of such equipment.

1.6.6 Coordination

Work shall be coordinated to minimize exposure of building occupants, other Contractor personnel, and visitors to mists and odors from preparation, painting and clean-up operations.

1.7 ENVIRONMENTAL CONDITIONS

1.7.1 Coatings

Do not apply coating when air or substrate conditions are:

- a. Less than 3 degrees C above dew point;
- b. Below 10 degrees C or over 35 degrees C, unless specifically pre-approved by the Contracting Officer and the product manufacturer. Under no circumstances shall application conditions exceed manufacturer recommendations.
- c. Unless otherwise recommended by the paint manufacturer, the ambient temperature shall be between 7 and 35 degrees C when applying coatings other than water-thinned, epoxy, and moisture-curing polyurethane coatings. Water-thinned coatings shall be applied only when ambient temperature is between 10 and 32 degrees C. Epoxy, and moisture-curing polyurethane coatings shall be applied only within the minimum and maximum temperatures recommended by the coating manufacturer. Moisture-curing polyurethane shall not be applied when the relative humidity is below 30 percent.

1.8 COLOR SELECTION

Colors of finish coats shall be as indicated or specified. Where not indicated or specified, colors shall be selected by the Contracting Officer. Manufacturers' names and color identification are used for the purpose of color identification only. Named products are acceptable for use only if they conform to specified requirements. Products of other manufacturers are acceptable if the colors approximate colors indicated and the product conforms to specified requirements.

Tint each coat progressively darker to enable confirmation of the number of coats.

PART 2 PRODUCTS

2.1 MATERIALS

Conform to the coating specifications and standards referenced in PART 3. Submit manufacturer's technical data sheets for specified coatings and solvents. Submit application instructions and mixing information for the material being utilized.

2.1.1 Paint

The term "paint" as used herein includes emulsions, enamels, paints, stains, varnishes, sealers, cement-emulsion filler, and other coatings, whether used as prime, intermediate, or finish coat. Additional requirements are as follows:

2.1.1.1 Colors and Tints

Color samples for concrete channel wall stain and for pipe safety railing paint shall be submitted to the Contracting Officer and approved colors

shall be determined by Contracting Officer.

2.1.1.2 Exterior Paint on Concrete

Exterior paint on concrete shall conform to FS TT-P-115, except the color shall be non-fading black, non-fading yellow, and reflective white.

PART 3 EXECUTION

3.1 PROTECTION OF AREAS AND SPACES NOT TO BE PAINTED

Prior to surface preparation and coating applications, remove, mask, or otherwise protect, hardware, hardware accessories, machined surfaces, radiator covers, plates, lighting fixtures, public and private property, and other such items not to be coated that are in contact with surfaces to be coated. Following completion of painting, workmen skilled in the trades involved shall reinstall removed items. Restore surfaces contaminated by coating materials, to original condition and repair damaged items.

3.2 SURFACE PREPARATION

Remove dirt, splinters, loose particles, grease, oil, and other foreign matter and substances deleterious to coating performance as specified for each substrate before application of paint or surface treatments. Oil and grease shall be removed prior to mechanical cleaning. Cleaning shall be programmed so that dust and other contaminants will not fall on wet, newly painted surfaces. Exposed ferrous metals such as nail heads on or in contact with surfaces to be painted with water-thinned paints, shall be spot-primed with a suitable corrosion-inhibitive primer capable of preventing flash rusting and compatible with the coating specified for the adjacent areas.

3.3 PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.3.1 Concrete and Masonry

a. Curing: Concrete and masonry surfaces shall be allowed to cure at least 30 days before painting, except concrete slab on grade, which shall be allowed to cure 90 days before painting.

b. Surface Cleaning: Remove the following deleterious substances.

(1) Dirt, Chalking, Grease, and Oil: Wash new and existing uncoated surfaces with a solution composed of 0.2 liter trisodium phosphate, 0.1 liter household detergent, and 6.4 liters of warm water. Then rinse thoroughly with fresh water. For large areas, water blasting or light sand blasting may be used.

(2) Fungus and Mold: Wash new and existing uncoated surfaces with a solution composed of 0.2 liter trisodium phosphate, 0.1 liter household detergent, 1.6 liters 5 percent sodium hypochlorite solution and 4.8 liters of warm water. Rinse thoroughly with fresh water.

(3) Paint and Loose Particles: Remove by wire brushing.

(4) Efflorescence: Remove by scraping or wire brushing followed by washing with a 5 to 10 percent by weight aqueous solution of hydrochloric (muriatic) acid. Do not allow acid to remain on the surface for more than five minutes before rinsing with fresh water. Do not acid clean more than 0.4 square meter of surface, per workman, at one time.

- c. Cosmetic Repair of Minor Defects: Repair or fill mortar joints and minor defects, including but not limited to spalls, in accordance with manufacturer's recommendations and prior to coating application.

3.4 APPLICATION

3.4.1 Coating Application

Painting practices shall comply with applicable federal, state and local laws enacted to insure compliance with Federal Clean Air Standards. Apply coating materials in accordance with SSPC PA 1. SSPC PA 1 methods are applicable to all substrates, except as modified herein.

At the time of application, paint shall show no signs of deterioration. Uniform suspension of pigments shall be maintained during application.

Unless otherwise specified or recommended by the paint manufacturer, paint may be applied by brush, roller, or spray. Rollers for applying paints and enamels shall be of a type designed for the coating to be applied and the surface to be coated.

Paints, except water-thinned types, shall be applied only to surfaces that are completely free of moisture as determined by sight or touch.

Thoroughly work coating materials into joints, crevices, and open spaces. Special attention shall be given to insure that all edges, corners, crevices, welds, and rivets receive a film thickness equal to that of adjacent painted surfaces.

Each coat of paint shall be applied so dry film shall be of uniform thickness and free from runs, drops, ridges, waves, pinholes or other voids, laps, brush marks, and variations in color, texture, and finish. Hiding shall be complete.

Touch up damaged coatings before applying subsequent coats.

- a. Drying Time: Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.
- b. Primers, and Intermediate Coats: Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats.

Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.

- c. Finished Surfaces: Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

3.5 COATING SYSTEMS FOR CONCRETE SUBSTRATES OTHER THAN STATION MARKING

Safety Striping at access ladders shall follow the same surface preparation and paint application requirements as Station Marking.

3.6 STATION MARKING

3.6.1 General, Station Marking

All markings shall be painted on concrete walls (channel walls, headwalls, abutments, etc. See included Table or Contract Drawings for required locations.

3.6.2 Preparation of Surfaces, Station Marking

See Paragraph PREPARATION OF CONCRETE AND CEMENTITIOUS SURFACE

3.6.3 Application, Station Marking

Painting shall be done in a neat and workmanlike manner and may be applied by brush, spray, roller or any combination of these methods. Painting of numbers and letters shall be accomplished with stencils and brush or spray application. Color for letters and numbers shall be black. All markings on concrete shall be in uniform capital block letters and numbers, 150 mm high, 75 mm wide, and 9 mm width of line. Markings on concrete walls shall be horizontal with the bottom of the marking not lower than 610 mm below the top of the wall or below the soffit of the Reinforced Concrete Box (RCB).

3.6.4 TABULATION OF LOCATION AND TEXT OF STATION MARKINGS

3.6.4.1 Tabulation F-1 Channel, New Channel, Hualapai Way to Beltway

Location of Marking Wall	Station*	Text of Marking	Location of Marking Wall	Station*	Text of Marking
B	37+65.605	F1 12300	B	50+15.288	F1 16400
B	37+96.085	F1 12400	B	50+45.768	F1 16500
B	38+26.565	F1 12500	B	50+76.248	F1 16600
B	38+57.045	F1 12600	B	51+06.728	F1 16700
B	38+87.525	F1 12700	B	51+37.208	F1 16800
B	39+18.005	F1 12800	B	51+67.688	F1 16900
B	39+48.485	F1 12900	B	51+98.168	F1 17000

B	39+78.965	F1 13000	B	52+28.648	F1 17100
B	40+09.446	F1 13100	B	52+59.128	F1 17200
B	40+39.926	F1 13200	B	52+89.608	F1 17300
B	40+70.406	F1 13300	B	53+20.088	F1 17400
B	41+00.886	F1 13400	B	53+50.568	F1 17500
B	41+31.366	F1 13500	B	53+81.048	F1 17600
B	41+61.846	F1 13600	B	54+11.528	F1 17700
B	41+92.326	F1 13700	B	54+42.008	F1 17800
B	42+22.806	F1 13800	B	54+72.488	F1 17900
B	42+53.286	F1 13900	B	55+02.969	F1 18000
B	42+83.766	F1 14000	B	55+33.449	F1 18100
B	43+14.246	F1 14100	B	55+63.929	F1 18200
B	43+44.726	F1 14200	B	55+94.409	F1 18300
B	43+75.206	F1 14300	B	56+24.889	F1 18400
B	44+05.686	F1 14400	B	56+55.369	F1 18500
B	44+36.166	F1 14500	B	56+85.849	F1 18600
B	44+66.646	F1 14600	B	57+16.329	F1 18700
B	44+97.127	F1 14700	B	57+46.809	F1 18800
B	45+27.607	F1 14800	B	57+77.289	F1 18900
B	45+58.087	F1 14900	B	58+07.769	F1 19000
B	45+88.567	F1 15000	B	58+38.249	F1 19100
B	46+19.047	F1 15100	B	58+68.729	F1 19200
B	46+49.527	F1 15200	B	58+99.209	F1 19300
B	46+80.007	F1 15300	B	59+29.689	F1 19400
B	47+10.487	F1 15400	B	59+60.169	F1 19500
B	47+40.967	F1 15500	B	59+90.650	F1 19600
B	47+71.447	F1 15600	B	60+21.130	F1 19700
B	48+01.927	F1 15700	B	60+51.610	F1 19800
B	48+32.407	F1 15800	B	60+82.090	F1 19900
B	48+62.887	F1 15900	B	61+12.570	F1 20000
B	48+93.367	F1 16000	B	61+43.050	F1 20100
B	49+23.847	F1 16100	B	61+73.530	F1 20200
B	49+54.327	F1 16200	B	62+04.010	F1 20300
B	49+84.807	F1 16300			

R = Right Channel Wall (looking downstream)

L = Left Channel Wall (looking downstream)

B = Both Channel Walls

* = The actual location of the channel station shall be accurate to the nearest half meter.

3.6.4.2 Tabulation F-2 Channel, New Channel, Hualapai Way to Beltway

Location of Marking Wall	Station*	Text of Marking	Location of Marking Wall	Station*	Text of Marking
B	10+00.000	F2 000			
B	12+74.320	F2 900	B	19+75.361	F2 3200
B	13+04.800	F2 1000	B	20+05.842	F2 3300
B	13+35.280	F2 1100	B	20+36.322	F2 3400
B	13+65.760	F2 1200	B	20+66.802	F2 3500
B	13+96.240	F2 1300	B	20+97.282	F2 3600
B	14+26.720	F2 1400	B	21+27.762	F2 3700
B	14+57.200	F2 1500	B	21+58.242	F2 3800

B	14+87.680	F2 1600	B	21+88.722	F2 3900
B	15+18.161	F2 1700	B	22+19.202	F2 4000
B	15+48.641	F2 1800	B	22+49.682	F2 4100
B	15+79.121	F2 1900	B	22+80.162	F2 4200
B	16+09.601	F2 2000	B	23+10.642	F2 4300
B	16+40.081	F2 2100	B	23+41.122	F2 4400
B	16+70.561	F2 2200	B	23+71.602	F2 4500
B	17+01.041	F2 2300	B	24+02.082	F2 4600
B	17+31.521	F2 2400	B	24+32.562	F2 4700
B	17+62.001	F2 2500	B	24+63.042	F2 4800
B	17+92.481	F2 2600	B	24+93.522	F2 4900
B	18+22.961	F2 2700	B	25+24.003	F2 5000
B	18+53.441	F2 2800	B	25+54.483	F2 5100
B	18+83.921	F2 2900	B	25+84.963	F2 5200
B	19+14.401	F2 3000	B	26+15.443	F2 5300
B	19+44.881	F2 3100	B	26+35.775	F2 5366.71

R = Right Channel Wall (looking downstream)

L = Left Channel Wall (looking downstream)

B = Both Channel Walls

* = The actual location of the channel station shall be accurate to the nearest half meter.

Text

3.7 INSPECTION AND ACCEPTANCE

In addition to meeting previously specified requirements, demonstrate mobility of moving components, including swinging and sliding doors, cabinets, and windows with operable sash, for inspection by the Contracting Officer. Perform this demonstration after appropriate curing and drying times of coatings have elapsed and prior to invoicing for final payment.

-- End of Section --