**SECTION 09900**

**PAINTING AND PROTECTIVE COATING**

* 1. **Description**. This item shall govern for the finished paints, their source and for the

application of paint to structures. The painting of structures shall include, unless

otherwise provided in the contract, the proper preparation of the surfaces, the

application, protection and drying of the paint coatings, the protection of

pedestrian, vehicular or other traffic upon or underneath the structure, the

protection of all parts of the structure (superstructure or substructure) against

disfigurement by splatters, splashers and smirches of paint materials and the

supplying of all tools, tackle, scaffolding, labor, workmanship, paint and materials

necessary for the entire work.

Surface conditions and application requirements are specified with the intent to

obtain full adhesion of coatings to clean dry metal and to previously applied coats.

This will require careful attention to the preparation of surfaces, to prevention of

contamination and moving of coatings, during and after drying and to the uniform

skillful application of each coat of paint.

Services receiving paint include:

* + 1. Metal surfaces when designated by the plans, or in these specifications.
    2. Concrete surface when noted on the plans.
    3. Interior concrete surfaces of concrete boxes, when noted on the plans.
    4. Galvanized steel surfaces when required by the plans, or in these specifications.

Do not paint the surface of stainless steel, aluminum, bronze, copper and lead.

* 1. **Quality Assurance**. All paints, sealers and coating shall be manufactured by those

firms listed in Table No. 2. Products of equal quality by other manufacturers will

be considered, subject to review of written submittal that includes product data

and a detailed coating and painting schedule.

Contractor shall provide the manufacturer's written instructions on cleaning and

coating, prior to any surface preparation or coating. Whenever possible, all

coatings shall be from a single manufacturer.

* 1. **Submittals**. Contractor shall submit a list indicating major items to be painted,

preparation, paint manufacturer, product designation and dry mil thickness.

Contractor shall also submit panels containing samples of proposed paints and coatings. Include three displays of each kind and color of paint used. Panel to be representative of material to be coated.

If requested by the Engineer, contractor shall submit 1/4 pint of each kind of paint and coating proposed for use. For all paint and coatings, contractor shall furnish Engineer with two sets of printed instructions and application sheets.

* 1. **Products**. Tables one and two of this specification include the paint, protective coatings and sealers for the project. Contractor shall furnish all such specific materials required for the manufacturer's coating systems, whether or not included in these specifications.

The Owner shall select the colors. Contractor shall submit a list of items to be painted and the color charts.

Contractor shall follow the OSHA requirements of 29 CFR Part 1910.44 for "Safety Color Codes for Marking Physical Hazards".

The following general hazards are set forth as a guide:

* + 1. Red-Fire protection equipment, danger signs and fire exit signs;
    2. Orange-Moving parts of equipment protected by guards;
    3. Yellow-Caution signs and all physical hazards;
    4. Green-To designate safety;
    5. Black & White-To indicate areas that must remain clear.
    6. Piping:

|  |  |  |
| --- | --- | --- |
| SERVICE | PIPE COLOR | LABEL COLOR |
| Fuel | Yellow | Black on Yellow |
| Air | Blue | White On Blue |
| Water | Green | White On Green |

* + 1. Pipe Label Size & Text

|  |  |  |
| --- | --- | --- |
| PIPE | MINIMUM LABEL SIZE | MINIMUM TEXT HEIGHT |
| .75”-1.25” | 1” x 8” | .5” |
| 1.5”-2” | 1” x 8” | .75” |
| 2.5”-6” | 2” x 12” | 1.25” |

1.04.8 Pipe Label Placement

Labels must always be clearly visible from the normal angle of approach. Overhead piping shall have the label below the centerline. Piping below eye level shall have the label above the centerline.

A label shall be placed:

* Near all valves.
* Both sides of floor/wall penetrations.
* At regular intervals on straight runs of pipe; at least one label every 50 feet throughout the piping run.
  + 1. Piping shall be labeled with flow direction arrows to show which direction the pipe’s contents flow.
  1. **Surface Preparation**. Prior to painting, concrete surfaces shall be free of all latent matter, burrs and fins, using one or more of the following methods:

1.05.1 Wash concrete surfaces with 10% solution of muriatic acid, then wash clean and free of scale, mortar, dust, moisture and other foreign matter.

* + 1. Sandblasting may be used if adjacent equipment is adequately protected.

1.05.3 Remove oil and grease with detergent and thoroughly rinse with fresh water.

If curing compound is used, it must be removed prior to coating.

Metal surface shall be cleaned by sandblasting in the shop as required by Table 1 and leave clean, dry and ready to receive a prime coat. Contractor shall provide moisture separators to effectively remove all oil and free moisture from air supply. All dust and sand shall be removed from surface by brushing or blowing with clean dry air and removing all sand and grit around and between joints of connecting members.

Field blasting shall be done only if required to correct unsatisfactorily cleaned and shop primed metal.

Oil and grease shall be removed with a solvent approved by the coating manufacturer, or by steam combined with detergent. The use of gasoline, kerosene, naptha, or carbon tetrachloride shall not be permitted.

In field work, where sandblasting is not possible, scrapers, wire brushes and other suitable grinding or chipping tools may be used for the removal of existing paint coatings prior to repainting or for cleaning before applying second coat.

Surfaces which have been cleaned, but which have started to show signs of rust or dirt, are to be cleaned again prior to coating at no additional expense to the Owner. Surfaces shall be coated the same day they are cleaned.

* 1. **Application of Paint & Protective Coating**. Contractor shall protect floors and all other areas where work is done with suitable drop cloths and remove oil rags and waste from work area at the close of each day's work. On completion of operations, contractor shall remove all spots, oil and stain from all surfaces and leave the entire project in a clean condition. Remove from premises, all containers and debris resulting from this work.

Contractor shall use only those thinners and solvents specified in paint formulas of the paint being used and shall use in the proportions recommended by the paint manufacturer.

Coverage shall be as recommended by the paint manufacturer and sufficient to obtain the minimum mil thickness specified. If applicable, contractor shall not exceed the maximum mil thickness specified by the manufacturer. After the final coat is applied, the thickness shall be checked with an elecometer or mikotest dry film thickness gauge. The drying time specified by the manufacturer, shall be allowed between coats.

For brush application, use first quality hog hair or suitable synthetic bristle brushes. The use of horsehair bristle brushes is not permitted. Brushes shall be kept clean and free from the accumulation of dried paint or dirt. When brushes for oil or varnish base paints are not in use, they shall be kept suspended in a linseed oil bath. Brushes shall be cleaned with turpentine or mineral spirits, before reuse. Brush application shall be by uniform thickness, consistent with specified coverage and with sufficient cross-brushing to ensure filling of surface irregularities. Care shall be exercised in painting around bolt heads and nuts and in corners and other restricted space.

Spray application shall be done with an adjustable air gun, equipped with suitable water trap to remove moisture from compressed air and with a paint pot having a hand agitator. Application shall be made with a width of spray not less than 12 inches, nor more than 18- inches and with a suitable pressure for the particular type of paint being used. Contractor shall make frequent checks to ensure a correct spreading rate and coating and shall apply without sags or runs.

Metal surfaces shall be shop primed prior to delivery to the job site. After delivery and prior to installation, all coated metal surfaces shall be kept clean and free from corrosion. Contractor shall clean up or repair damaged areas with additional primer.

After erection or installation of metal work, clean and touch up all rust spots and all places where primer has been rubber or scraped off and all bolts and nuts. After previously applied paint has hardened and when surfaces to receive succeeding coats of paint have been cleaned and dried, apply finish paint in accordance with Tables 1 and 2. Allow 5 days or more, as recommended by coating manufacturer for hardening of final coat for submerged surfaces.

* 1. **Special Requirements**. Contractor shall provide electrical flow detection equipment, such as a Tinker Rasor Holiday Detector to test areas of coatings that are to be submerged. Tests are to be performed before structure is put into the water.
  2. **Measurement & Payment**. Payment shall be made for work performed under this item on a square foot basis.

# TABLE NO. 1

SYSTEM SCHEDULE

# TABLE NO. 2 - MATERIAL REFERENCE

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Type of Surface** | **Exposure** | **Cleaning** | **Primer** | **1ST**  **Coat** | **2nd**  **Coat** | **3rd**  **Coat** | **Minimum**  **Total Mill Thickness** |
| **Structural and Misc.**  **Steel** | Exterior | NACE\*-#3 | 16 | 18 | 9 | - | 7.0 |
| **Structural and Misc.**  **Steel** | Interior | NACE\*-#2 | 16 | 17 | - | - | 5.5 |
| **Galvanized**  **Steel** | Interior | Solvent Cleaning | 15 | 17 | - | - | 2.9 |
| **Galvanized Steel and Galvanized**  **Pipe Conduit**  **Threads** | Exterior | Solvent Cleaning | 15 | 18 | 9 | - | 4.4 |
| **Wet-Well** | Interior Surfaces | Para. 3.01A | 6 | 13 | 13 | - | 22 |

\*Note: NACE - Reference to National Association of Corrosion Engineers.

# TABLE NO. 2

PAINT, SEALER, AND COATING SCHEDULE

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Symbol** | **Minimum Dry Mills Per Coat\*** | **Service** | **Generic Type** | **Brand and Manufacturer** |
| 1. | N/A | Primary Sealer | Chemical Penetrant | 46-V-6 Silikote Water Repellent-  Mobil |
| 2. | N/A | Weatherproof Primary Sealer | Acrylic Emulsion | 600 Emulsion- Koppers  Concrete and Masonry Filler |
| 79-W-8 Block Filler Valspar |
| Cook 304 Block  Filler |
| Amercoat 5625- Ameron |
| 3. | N/A | Primary Sealer | Vinyl-Acrylic Emulsion with epoxy esters | 600 Emulsion- Koppers Concrete and  Masonry Filler |
| 79-W-8 Block Filler Valspar |
| Cook 304 Block  Filler |
| Amercoat 5625- Ameron |
| 4. | 1.5 | Finish Coat | Acrylic Emulsion | Koppers-600- Koppers 79 Series Exterior  Latex Valspar |
| Amercoat 5801- Ameron |
| Cook Corocryl 827 Series |
| 5. | 1.5 | Metal Primer | Alkyd, Zinc Chromate | Penetrating Primer No. 622-  Koppers |
| 13-R-50  Chromox Primer- Valspar Amercoat 5105-  Ameron |
| Cook 814-Y-436 |
| 6. | 2.0 | Metal Primer | Polymide-Cured Epoxy Resin | 654-Epoxy Primer-Koppers 13-R-56 Epoxy  Primer-Valspar |
| Amercoat 71- Ameron |
| Cook Co Poly  Primer 920-Y- 134 |
| Inorganic  Coatings, Inc. P21 Epoxy |
| 7.\*\* | 2.0-4.0  (as  recommended) | Metal Primer | Polyamide-Cured Epoxy Resin | Epoxy Coating Hi-Gard-Koppers 78 Series High Build Epoxy with 50% Valspar 7-  T-35 Valspar |
| Amercoat 395 (off-white)-  Ameron |
| Cook Epicon MW 920-W-365 |
| Inorganic  Coatings, Inc. P21 Epoxy |
| 8. | 1.5 | Finish Coats | Alkyd, Straight  Long-oil | Rustarmor 500 Enamel-Koppers 12 Series Panorama  Coatings-Valspar |
| Amercoat 5401- Ameron |
| Cook 801 Enamel |
| 9. | 2.0 | Finish Coat | Aliphatic Urethane | Inorganic Coatings, Inc.  P35 Urethane |
| Dupont Imron 326 |
| Devoe-Napko  369 Pruthane |
| 10. | 1.5 | Wood Primer | Oil Base | Thin Rustarmor  500 Koppers 400-Koppers |
| 17-W-4 Exterior First Coater Valspar |
| Cook 307 |
| 11. | 1.5 | Finish Coat | Alkyd, Straight Long-oil | Rustarmor 500 Enamel-Koppers 20 Series M.F.  Enamel-Valspar |
| Cook 801 Enamel |
| Amercoat 5401-  Ameron |
| 12.\*\* | 4.0-6.0  (as  recommended) | Submerged Steel, Iron and Concrete | Polymide-Cured Epoxy Resin | Epoxy Coating  Hi-Guard- Koppers |
| 78 Series High  Build Epoxy- Valspar |
| 13. | 10 | Submerged Steel or Iron | Coal Tar Epoxy Two Component | 300-M-Koppers |
| 578-J-1 High  Build Coal Tar Epoxy-Valspar |
| Amercoat 330- Ameron |
| Cook Coal Tar Epoxy 920-B-950 |
| Inorganic Coatings, Inc.  P29 Coal Tar Epoxy |
| 14. | 16 | Buried Steel or Iron | Tar Base Pitch | Bitumastic No.  50-Koppers |
| 35-J-10 High  Build Bituminous Coating Valspar |
| 15. | 0.4 | Galvanized Metal Primer | Vinyl Wash Primer | 40 Passivator- Koppers |
| 13-Y-8 Val-Chem  Vinyl Wash Primer-Valspar |
| Amercoat 178 |
| Inorganic Coatings, Inc. B11 Wash  Primer |
| Cook 900-Y-002  Vinyl Wash Primer |
| 16. | 3.0 | Steel Above Ground and Above Waterline | High Ratio Silicate Inorganic Zinc | Inorganic Coatings, Inc. IC 531 |
| Dupont 347 WB Inorganic Zinc |
| Devoe-Napko  Zinc Prime 9Z |
| 17. | 2.5 | Steel Interior | Polyamide Cured Epoxy Resin | Inorganic  Coatings, Inc. P24 Epoxy |
| Dupont Corlar 823 |
| Devoe-Napko 545 Epoxy |
| 18. | 2.0 | Intermediate Finish | Epoxy Primer | Inorganic  Coatings, Inc. P24 Epoxy |
| Dupont Corlar 823 |
| Devoe-Napko  Chemfast 545 Epoxy |
| 19. | 6.0-8.0 | Exhaust and Air Intake Piping Elevated Temperature  Finish Coat | Inert Multipolymeric Matrix | TNEMEC Series 1528 Endura-Heat DTM  Color: 1525-08HT Aluminum |
| PPG HI-TEMP 1027  Color: Light Gray |
| \*Or manufacturer's standard, whichever is greater.  \*\*For potable water use.  **END OF SECTION** | | | | |