

Section 09920

PAINTING

PART 1 - GENERAL

1-1. SCOPE. This section covers field painting of surfaces for appearance, including surface preparation, protection of surfaces, and other appurtenant work. Regardless of the number of coats previously applied, at least two field coats, in addition to any shop or field prime coats, shall be applied to all surfaces unless otherwise specified.

Dampproofing of concrete surfaces not in contact with treated or raw water, water repellent for masonry surfaces, elastomeric deck coverings, protective coatings for equipment, and surfaces with severe service conditions that have been designated to be coated with a heavy-duty maintenance coating, are covered in other sections.

1-2. GENERAL. Cleaning, surface preparation, coating application, and thickness shall be as specified herein and shall meet or exceed the coating manufacturer's recommendations. When the manufacturer's minimum recommendations exceed the specified requirements, Contractor shall comply with the manufacturer's minimum recommendations. When equivalent products are acceptable to Engineer, Contractor shall comply with this Specification and the coating manufacturer's recommendations.

1-2.01. Governing Standards. All cleaning, surface preparation, coating application, thickness, testing, and coating materials (where available) shall be in accordance with the referenced standards of the following: American Water Works Association (AWWA), American National Standard Institute (ANSI), NACE International (NACE), The Society for Protective Coating (SSPC), NSF International (NSF), and ASTM requirements.

1-3. SUBMITTALS. Contractor shall submit color cards for all coatings proposed for use, together with complete descriptive specifications and the completed Coating System Data Sheets, to Engineer for review and color selection. Requests for review submitted directly to Engineer by coating suppliers will not be considered.

For aliphatic polyurethane, and satin gloss latex emulsion finish coatings, a total of not more than five custom colors (excluding deep tone or high-level colors) may be required. The manufacturer's standard colors will be acceptable for all other coatings.

1-4. QUALITY ASSURANCE.

1-4.01. Coating System Data Sheet Certifications. When required, the coating applicator and coating manufacturer shall review and approve in writing the proposed coating manufacturer's written recommendations for the proposed coating system and the intended service. Any variations from the Specifications or the coating manufacturers published recommendations shall be submitted in writing and approved by the coating manufacturer. The coating manufacturer shall observe the surface preparation, mixing, and application of the protective coating systems and submit a written report of what has been observed and any additional recommendations.

1-5. DELIVERY AND STORAGE. All coating products shall be received and stored in accordance with the coating manufacturer's recommendations.

PART 2 - PRODUCTS

2-1. ACCEPTABLE MANUFACTURERS.

2-1.01. Alternative Manufacturers. In addition to the coatings listed herein, equivalent coatings of the following manufacturers will also be acceptable:

ICI Devoe	Rust-Oleum
PPG	Sherwin-Williams
MAB	

2-1.02. Equivalent Coatings. Whenever a coating is specified by the name of a proprietary product or of a particular manufacturer or vendor, the specified coating shall be understood as establishing the type and quality of coating desired. Other manufacturers' coatings will be accepted, provided that sufficient information is submitted to enable Engineer to determine that the proposed coatings are equivalent to those named. Information on proposed coatings shall be submitted for review in accordance with the Submittals section. Requests for review of equivalency will be accepted only from Contractor and will be considered only after the Contract has been awarded.

2-2: MATERIALS. All coatings shall be delivered to the job in original unopened containers with labels intact. Coatings shall be stored indoors and shall be protected against freezing. No adulterant, unauthorized thinner, or other material not included in the coating formulation shall be added to the coating for any purpose.

All coatings shall conform to the air quality regulations applicable at the location of use. Coating materials which cannot be guaranteed by the manufacturer to conform, whether or not specified by product designation, shall not be used.

Contractor shall be responsible for ensuring the compatibility of field coatings with each other or with the coatings on shop coated or previously coated surfaces. Coatings used in successive field coats shall be produced by the same manufacturer. Coatings used in the first field coat over shop coated or previously coated surfaces shall cause no wrinkling, lifting, or other damage to underlying coats. Costs for additional primer coats applied over shop prime coatings shall be borne by the Contractor.

2-2.01. Primers.

Universal Primer

Ameron "Amercoat 385 Epoxy", Carboline "Carboguard 888 Primer", or Tnemec "Series N27 S.T. Typoxy".

2-2.02. Intermediate and Finish Coatings.

Aliphatic Polyurethane

Ameron "Amershield Aliphatic Polyurethane", Carboline "Carbothane 134HG", or Tnemec "Series 74 Endura-Shield".

Latex Emulsion

Acrylic containing at least 50 percent by weight nonvolatile solids.

Flat

Carboline "Carbocrylic 600", Sherwin-Williams "Weather Perfect Acrylic Latex Series B-36", or Tnemec "Series 6 Tneme-Cryl".

Satin Gloss

Ameron "Amerguard 220 Acrylic Enamel Satin", Carboline "Carbocrylic 3350", Sherwin-Williams "Metalatex Semi-Gloss Enamel Series B-42", or Tnemec "Series 7 Tneme-Cryl SG".

Medium Consistency Coal Tar

Carboline "Bitumastic 50" or Tnemec "46-465 H.B. Tnemecol".

High-Build Epoxy

Sika "Sikagard 62".

### PART 3 - EXECUTION

3-1. SURFACE PREPARATION. All surfaces to be coated shall be clean and dry and shall meet the recommendations of the coating manufacturer for surface preparation. Freshly coated surfaces shall be protected from dust and other contaminants. Oil and grease shall be completely removed by use of solvents or detergents before mechanical cleaning is started. The gloss of previously coated surfaces shall be dulled if necessary for proper adhesion of topcoats.

Surfaces shall be free of cracks, pits, projections, or other imperfections that would interfere with the formation of a smooth, unbroken coating film, except for concrete block construction where a rough surface is an inherent characteristic.

When applying touchup coating or repairing previously coated surfaces, the surfaces to be coated shall be cleaned as recommended by the coating manufacturer and the edges shall be sanded or wire brushed and feathered or otherwise smoothed so that they will not be noticeable after they are coated. All coatings made brittle or otherwise damaged by heat of welding shall be completely removed.

3-1.01. Galvanized Surfaces. Galvanized surfaces shall be prepared for coating in conformity with the instructions of the manufacturer. Any chemical treatment of galvanized surfaces shall be followed by thorough rinsing with clean water.

3-1.02. Ferrous Metal Surfaces – Non-immersion Service. Ferrous metal surfaces, including fabricated equipment, in non-immersion service shall be cleaned to the degree recommended by the coating manufacturer. Blast cleaning to at least SSPC-SP6 shall be used where recommended by the coating manufacturer, and may be used elsewhere at the option of Contractor,

provided that no dust is permitted to settle on adjacent wet coating. Surface profile shall be at least 15 percent of the dry film thickness specified for the coating system.

3-1.03. Ferrous Metal Surfaces – Immersion Service. Surface preparation of ferrous metal surfaces in immersion service shall consist of blast cleaning to at least SSPC-SP10 and the first application of coating shall be performed on the same day. If more surface area is prepared than can be coated in one day, the uncoated area shall be blast cleaned again to the satisfaction of Engineer. Surface profile shall be as recommended by coating manufacturer, but not less than 3.5 mils.

3-1.04. Concrete Surfaces. All concrete surfaces shall be free of objectionable substances and shall meet the coating manufacturer's recommendations for surface preparation. Any other surface preparation recommended by the coating material manufacturer shall be brought to Engineer's attention and may be incorporated into the work if acceptable to Engineer.

All concrete surfaces shall be dry when coated and free from dirt, dust, sand, mud, oil, grease, and other objectionable substances. Oil and grease shall be completely removed by use of solvents or detergents before mechanical cleaning is started.

New concrete shall have cured for at least 28 days before coating is applied as recommended by the material manufacturer. Concrete surfaces shall be tested for capillary moisture in accordance with ASTM D4263. There shall be no capillary moisture when coatings are applied on concrete.

All surfaces to be coated shall be cleaned in accordance with ASTM D4258 and abraded in accordance with ASTM D4259. Prior to application of the coating, the surfaces shall be thoroughly washed or cleaned by air blasting to remove all dust and residue. Spalled areas, voids, and cracks shall be repaired, and as acceptable to Engineer. Fins and other surface projections shall be removed to provide a flush surface before application of coating.

Except where indicated otherwise, the concrete surfaces, including those with bug holes less than 1 inch in any dimension, shall be prepared when required and as recommended by the manufacturer, using a concrete block filler.

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3-1.05. Concrete Block Surfaces. Voids and openings in concrete block surfaces shall be pointed. Interior surfaces to be coated with latex coating shall not be filled. All exposed surfaces to be coated, including the joints, shall be filled so that a continuous unbroken coating film is obtained.

3-1.06. Hardware. Hardware items such as bolts, screws, washers, springs, and grease fittings need not be cleaned prior to coating if there is no evidence of dirt, corrosion, or foreign material.

3-2. MIXING AND THINNING. Coating shall be thoroughly mixed each time any is withdrawn from the container. Coating containers shall be kept tightly closed, except while coating is being withdrawn.

Coating shall be factory mixed to proper consistency and viscosity for hot weather application without thinning. Thinning will be permitted only as necessary to obtain recommended coverage at lower application temperatures. In no case shall the wet film thickness of applied coating be reduced, by addition of coating thinner or otherwise, below the thickness recommended by the coating manufacturer. Thinning shall be done in compliance with all applicable air quality regulations.

3-3. APPLICATION. Coating shall be applied in a neat manner that will produce an even film of uniform and proper thickness, with finished surfaces free of runs, sags, ridges, laps, and brush marks. Each coat shall be thoroughly dry and hard before the next coat is applied. In no case shall coating be applied at a rate of coverage greater than the maximum rate recommended by the coating manufacturer.

Coating failures will not be accepted and shall be entirely removed and the surface recoated. Failures include but are not limited to sags, checking, cracking, teardrops, fat edges, or delaminations.

3-3.01. Priming. Edges, corners, crevices, welds, and bolts shall be given a brush coat of primer before application of the primer coat. Special attention shall be given to filling all crevices with coating.

Abraded and otherwise damaged portions of shop-applied coating shall be cleaned and recoated as recommended by the manufacturer of the finish coating. Welded seams and other uncoated surfaces, heads and nuts of field-installed bolts, and surfaces where coating has been damaged by heat shall be given a brush coat of the specified primer. Before the specified spot or touchup coating of metal surfaces, edges, corners, crevices, welds, and bolts in the area

of the spot or touchup coating, shall be given a brush coat of primer. This patch, spot, or touchup coating shall be completed, and the paint film shall be dry and hard, before additional coating is applied.

3-3.02. Latex Coating. Latex coating shall be applied by brushing or rolling; spraying will not be permitted. Latex coating shall not be thinned excessively.

Coatings shall not be applied to concrete surfaces in direct sunlight or when the temperature of the concrete is rising. Preferably the coating shall be applied when the temperature of the concrete is dropping.

When applying coatings with a roller or brush and where a dry film thickness of at least 4 to 6 mils per coat is required, two or more coats shall be applied to achieve the recommended dry film thickness equal to a spray applied coating.

3-3.04. Film Thickness. The total coating film thickness, including prime coat (if any), intermediate coats, and finish coat, shall be not less than the following:

Type of Coating	Minimum Dry Film Thickness
Latex	3 mils
Coal tar epoxy	20 mils
High-build epoxy	10 mils
All other finishes	5 mils

3-3.05. Weather Conditions. Coatings shall not be applied, except under shelter, during wet, damp, or foggy weather, or when windblown dust, dirt, debris, or insects will collect on freshly applied coating. Coatings shall not be applied at temperatures lower than the minimum temperature recommended by the coating manufacturer or to metal surfaces such as tanks or pipe containing cold water, regardless of the air temperature, when metal conditions are likely to cause condensation. When necessary for proper application, a temporary enclosure shall be erected and kept heated until the coating has fully cured.

3-4. REPAIRING FACTORY-FINISHED SURFACES. Factory-finished surfaces damaged prior to acceptance by Owner shall be spot primed and recoated with materials equivalent to the original coatings. If, in the opinion of Engineer, spot repair of the damaged area is not satisfactory, the entire surface or item shall be recoated.

3-5. PROTECTION OF SURFACES. Throughout the Work, Contractor shall use drop cloths, masking tape, and other suitable measures to protect adjacent surfaces. Contractor shall be responsible for correcting and repairing any damage resulting from its subcontractors' operations. Coatings spilled or spattered on adjacent surfaces which are not being coated at the time shall be immediately removed. Exposed concrete or masonry not specified to be coated which is damaged by coatings shall be either removed and rebuilt or, where authorized by Owner, coated with two coats of masonry coating.

3-6. FIELD PRIMING SCHEDULE. In general, surfaces of steel, cast iron, and equipment are specified to be shop primed. Any such surfaces which have not been shop primed shall be field primed. Damaged or failed shop coatings which have been determined unsuitable by Engineer shall be removed and the surfaces shall be field primed. Galvanized, aluminum, stainless steel, wood, and insulated surfaces shall be field primed. Primers used for field priming, unless otherwise required for repair of shop primers, shall be as follows:

<u>Surface To Be Primed</u>	<u>Material</u>
Steel and cast iron	As recommended by manufacturer of finish coats
Galvanized	As recommended by manufacturer of finish coats
Aluminum	As recommended by manufacturer of finish coats
Plastic surfaces, including PVC and FRP	Same as finish coats
Insulated piping	As recommended by manufacturer of finish coats
Concrete block	Concrete block filler

Unless otherwise recommended by the coating manufacturer or specified herein, priming will not be required on concrete or concrete block surfaces specified to be coated with latex coating. Priming will not be required on surfaces to be marked with traffic marking paint.

3-7. COATING SCHEDULE. The following schedule lists coatings for intermediate and finish coats. All exposed surfaces, including sides and edges, shall be coated.

3-7.01. Metal Surfaces.

Surface To Be Coated	Material
Steel Doors and Frames	
Intermediate coat.	Universal primer
Finish coat.	Aliphatic polyurethane
Structural and miscellaneous steel exposed to view <u>inside buildings</u> . (Galvanized surfaces are not to be coated unless otherwise specified.)	As recommended by manufacturer of finish coats
Pumps, piping, valves, pipe supports in exposed, non-submerged areas.	Aliphatic polyurethane
Pipes in wetwell.	Coal tar epoxy
Heating and air conditioning units, convector covers, electrical equipment cabinets, and similar items and equipment (unless factory finished) exposed to view.	
Intermediate coat.	Universal primer
Finish coat.	Aliphatic polyurethane
Ductwork exposed to view inside buildings, after proper priming.	
Adjacent to ceilings.	Aliphatic polyurethane
Adjacent to walls.	Aliphatic polyurethane

Surface To Be Coated

Material

Electrical conduit exposed to view inside buildings (except banks of conduits in multiple layers hung from ceilings), including fittings, boxes, supports, and accessories, after proper priming.

Adjacent to ceilings.

Aliphatic polyurethane

Adjacent to walls.

Aliphatic polyurethane

3-7.02. Concrete and Masonry Surfaces.

Surface To Be Coated

Material

Surfaces scheduled to receive coatings which are exposed to view in interior locations where indicated in the Room Finish Schedule (two coats).

Walls.

Satin gloss latex emulsion

Ceilings and overhead construction.

Flat latex emulsion

Interior concrete surfaces in Wetwell (two coats).

High-build epoxy

3-7.03. Surfaces Not to Be Coated. Unless otherwise specified, the following surfaces shall be left uncoated:

Exposed aluminum, except ductwork.

Polished or finished stainless steel. Unfinished stainless steel, except flashings and counterflashings, shall be coated.

Nickel or chromium.

Galvanized surfaces, except piping, conduit, ductwork, metal deck and other items specifically noted.

Piping concealed in inaccessible plumbing chases and above suspended ceilings.

Rubber and plastics, except as specified.

Brick.

Surfaces specified to be factory finished.

End of Section

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<b>SURFACE DESCRIPTION</b>	<b>SYSTEM NO. -</b>

<b>SURFACE PREPARATION DESCRIPTION</b>
<input type="checkbox"/> Solvent SSPC-SP1 <input type="checkbox"/> Ferrous Metal Nonimmersion SSPC-SP6 <input type="checkbox"/> Ferrous Metal Immersion <input type="checkbox"/> SSPC-SP10 <input type="checkbox"/> SSPC-SP-5 <input type="checkbox"/> Other

<b>COATING</b>	<b>DFT mils [μm]</b>	<b>MANUFACTURER AND PRODUCT</b>
<b>First Coat (Primer)</b>		
<b>Second Coat</b>		
<b>Third Coat</b>		
<b>Total System</b>		Not less than minimum thickness specified.

Notes: (Attached if needed.)
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Project:		
Coatings Manufacturer:		Initials _____
Painting Applicator:		Initials _____
<b>BLACK &amp; VEATCH</b>	<b>COATING SYSTEM DATA SHEET</b>	Fig 1-09920



<b>SURFACE DESCRIPTION</b>	<b>SYSTEM NO. -</b>	<b>-F</b>

<b>SURFACE PREPARATION DESCRIPTION</b>
<input type="checkbox"/> Solvent SSPC-SP1 <input type="checkbox"/> Other:

<b>COATING</b>	<b>DFT mils [µm]</b>	<b>MANUFACTURER AND PRODUCT</b>
<b>Shop (Primer)</b>		(Identify Product/Type)
<b>Touchup</b>		
<b>Intermediate Coat</b>		
<b>Finish Coat</b>		
<b>Total System</b>		Not less than minimum thickness specified.

Notes: (Attached if needed.)

Project:		
Coatings Manufacturer:		Initials _____
Painting Applicator:		Initials _____
<b>BLACK &amp; VEATCH</b>	<b>COATING SYSTEM DATA SHEET</b>	<b>Fig 2-09920</b>

