

SECTION 10 14 00 SIGNAGE

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section specifies interior signage for room numbers, directional signs exterior signage, code required signs and temporary signs.
- B. Interior signs to match details as indicated in the drawings
- C. This section specifies porcelain enamel exterior signage.
- D. Concrete Post Footings: Section 03 30 53, Miscellaneous Cast-in-Place Concrete.

1.2 RELATED WORK:

- A. Sustainable design requirements: Section 01 81 13, SUSTAINABLE DESIGN REQUIREMENTS.
- B. Structural Steel Supports: Section 05 12 00, STRUCTURAL STEEL FRAMING.
- C. Concrete Post Footings: Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.3 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Provide signage that is the product of one manufacturer, who has provided signage as specified for a minimum of three (3) years. Submit manufacturer's qualifications.
- B. Installer's Qualifications: Minimum three (3) years' experience in the installation of signage of the type as specified in this section. Submit installer's qualifications.

1.4 SUBMITTALS:

- A. Submit in accordance with section 01 33 00, shop drawings, product data and samples.
- B. Manufacturer's Literature:
 - 1. Showing the methods and procedures proposed for the anchorage of the signage system to each surface type.
 - 2. Manufacturer's printed specifications and maintenance instructions.
- C. Sign location plan, showing location, type and total number of signs required.
- D. Shop drawings: scaled for manufacture and fabrication of sign types. Identify materials, show joints, welds, anchorage, accessory items, mounting and finishes.
- E. Manufacturer's qualifications.
- F. Installer's qualifications.

1.5 DELIVERY AND STORAGE:

- A. Deliver materials to job in manufacturer's original sealed containers with brand name marked thereon. Protect materials from damage.
- B. Package to prevent damage or deterioration during shipment, handling, storage and installation. Maintain protective covering in place and in good repair until removal is necessary.
- C. Deliver signs only when the site and mounting services are ready for installation work to proceed.
- D. Store products in dry condition inside enclosed facilities.

1.6 WARRANTY:

- A. Construction Warranty: comply with FAR clause 52.246-21, "Warranty of Construction".

1.7 APPLICABLE PUBLICATIONS:

- B. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. American Architectural Manufacturers Association (AAMA):
 - B. 611-14 Anodized Architectural Aluminum
 - 2603-13 Voluntary specification, performance requirements and test procedures for pigmented organic coatings on aluminum extrusions and panel
- C. American National Standards Institute (ANSI):
 - A117.1-09 Accessible and Usable Buildings and Facilities
- D. ASTM International (ASTM):
 - A36/A36M-14 Carbon Structural Steel
 - A240/A240M-15 Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - A666-10 Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar
 - A1011/A1011M-14 Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
 - B36/B36M-13 Brass Plate, Sheet, Strip, and Rolled Bar
 - B152/B152M-13 Copper Sheet, Strip, Plate, and Rolled Bar
 - B209-14 Aluminum and Aluminum-Alloy Sheet and Plate

- B209M-14..... Aluminum and Aluminum-Alloy Sheet and Plate
(Metric)
- B221-14 Aluminum and Aluminum-Alloy Extruded Bars,
Rods, Wire, Shapes, and Tubes
- B221M-13..... Aluminum and Aluminum-Alloy Extruded Bars,
Rods, Wire, Shapes, and Tubes (Metric)
- C1036-11(R2012) Flat Glass
- C1048-12 Heat-Treated Flat Glass-Kind HS, Kind FT Coated
and Uncoated Glass
- C1349-10 Architectural Flat Glass Clad Polycarbonate
- D1003-13 Test Method for Haze and Luminous Transmittance
of Transparent Plastics
- D4802-10 Poly(Methyl Methacrylate) Acrylic Plastic Sheet
- E. Code of Federal Regulation (CFR):
- 40 CFR 59..... Determination of Volatile Matter Content, Water
Content, Density Volume Solids, and Weight Solids
of Surface Coating
- F. Federal Specifications (Fed Spec):
- MIL-PRF-8184F Plastic Sheet, Acrylic, Modified.
- MIL-P-46144C..... Plastic Sheet, Polycarbonate
- F. National Fire Protection Association (NFPA):
- 70-14 National Electrical Code
- G. Vitreous Enamel Development Council: Vitranamel Quality Standards for Signs
- H. Porcelain Enamel Institute, Arlington, VA
- PEI S-100..... Specification for Architectural Porcelain Enamel on
Steel

PART 2 – PRODUCTS

2.1 WARRANTY:

- A. Construction Warranty: Comply with FAR clause 52.246-21, “Warranty of construction.”

2.2 SIGNAGE GENERAL:

- A. Provide signs of type, size and design shown on the construction documents.
1. Graphics for Historical Signs to be provided by the VA
- B. Provide signs complete with lettering, framing and related components for a complete installation.
- C. Provide graphics items as completed units produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.

- D. Do not scale construction documents for dimensions. Verify dimensions and coordinate with field conditions. Notify Contracting Officer Representative (COR) of discrepancies or changes needed to satisfy the requirements of the construction documents.

2.3 INTERIOR SIGN MATERIALS:

- A. Aluminum:
 - 1. Sheet and Plate: ASTM B209M (B209).
 - 2. Extrusions and Tubing: ASTM B221M (B221).
- B. Cast Acrylic Sheet: MIL-PRF-8184F; Type II, class 1, Water white non-glare optically clear. Matt finish water white clear acrylic shall not be acceptable.
- C. Polycarbonate: MIL-P-46144C; Type I, class 1.
- D. Vinyl: Premium grade 0.1 mm (0.004 inch) thick machine cut, having a pressure sensitive adhesive and integral colors.
- E. Adhesives:
 - 1. Adhesives for Field Application: Mildew-resistant, nonstaining adhesive for use with specific type of panels, sheets, or assemblies; and for substrate application; as recommended in writing by signage manufacturer.
 - 2. Adhesives to have VOC content of 50 g/L or less when calculated according to 40 CFR 59, (EPA Method 24).
- F. Typography: Comply with VA Signage Design Guide.
 - 1. Type Style: Helvetica Medium and Helvetica Medium Condensed. Initial caps or all caps.
 - 2. Arrow: Comply with graphic standards in construction documents.
 - 3. Letter spacing: Comply with graphic standards in construction documents.
 - 4. Letter spacing: Comply with graphic standards in construction documents.
 - 5. Provide text, arrows, and symbols in size, colors, typefaces and letter spacing shown in construction documents. Text shall be a true, clean, accurate reproduction of typeface(s). Text shown in construction documents is for layout purposes only.

2.3 EXTERIOR SIGN MATERIALS:

- A. Aluminum Sheet and Plate: ASTM B209M (B209).
- B. Aluminum Extrusions: ASTM B221M (B221).
- C. Brass Sheet (Yellow Brass): ASTM B36/B36M.
- D. Bronze Plate: ASTM B36/B36M.
- E. Copper Sheet: ASTM B152/B152M.
- F. Steel Products: Structural steel products that conform to ASTM A36/A36M. Sheet and strip steel products that conform to ASTM A1011/A1011M.
- G. Stainless Steel Sheet: ASTM A240/A240M, stretcher leveled standard of flatness.
- H. Acrylic Sheet: ASTM D4802; category as standard with manufacturer for each sign. Provide type UVF.

- I. Fiberglass Sheet: Multiple laminations of glass fiber-reinforced polyester resin with UV light-stabilized, colorfast, nonfading, weather- and stain-resistant, colored polyester gel coat with manufacturer's standard finish.
- J. Polycarbonate Sheet: ASTM C1349, Appendix X1, Type II (coated, mar-resistant, UV-stabilized polycarbonate) with coating on both sides.
- K. Finish:
 - 1. Aluminum Finishes:
 - a. Clear Anodic Finish: AAMA 611.
 - b. Color Anodic Finish: AAMA 611.
 - c. Baked Enamel or Powder Coat Finish: AAMA 2603 with a minimum dry film thickness of 0.04 mm (1.5 mils).
- L. Metallic Coated Steel Finish:
 - 1. Baked Enamel or Powder Coat Finish: After cleaning and pretreating, apply manufacturer's standard two (2) coat baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 0.05 mm (2 mils).

2.2 PORCELAIN ENAMEL SIGNAGE

- A. Porcelain Enamel:
 - 1. Porcelain enamel on steel is a substantially vitreous (glassy) inorganic coating bonded to metal by fusion at temperatures above 1400 Fahrenheit. Porcelain enamel is not to be confused with baked paints or organic enamels
- B. Steel:
 - 1. For purposes of this specification, "steel" is special purpose enameling iron or steel as defined by ASTM A424 Type 1. The standard thickness for most applications is 16 gauge (.060"). If required, the steel can be as thick as 14 gauge (.075"), and as thin as 18 gauge (.048"). Please note that porcelain enamel edge "burn-off" can occur on steel lighter than 16 gauge.
- C. Frits/Glazes/Oxides:
 - 1. Specially-formulated porcelain enamel frits, glazes and oxides as supplied by Ferro, Chivit, APEC, Pemco, and Degussa. These materials when combined and processed in final form, shall have no less than a Class A acid-resistance rating as defined by ASTM C282 Citric Acid Spot Test.
- D. Art:
 - 1. The graphic material and images as supplied by or directed under the supervision of the customer on this project. This includes electronic files, mechanicals, text, photographs, transparencies, film, and other graphic source materials.
- E. Approvals:
 - 1. Approvals shall be obtained at each stage of production and are the responsibility of the customer as submitted by the supplier. Work shall not proceed without the proper written authorizations.

F. Fasteners:

1. Stainless steel or cadmium-plated steel.

G. Laminates:

1. Laminate material shall be bonded to the back surface of the porcelain enamel sign panel to meet structural and flatness criteria.

H. Adhesives:

1. Adhesives used to bond laminates shall be neoprene-based cement. Adhesive shall be water-resistant and heat-resistant up to 100 degrees C.

2.6 EXTERIOR SIGN TYPES:

A. Post and Panel Signs:

1. Construct sign of extruded aluminum system including the following integral features: Water relief channel, integral flanges for attachment of additional structural supports and mounting to posts with minimum 3 mm (0.125 inch) wall thickness. Weld post caps or mechanically attach with concealed fasteners.
2. Reveal Between the Post and Sign Cabinet: Extruded aluminum.
 - a. Provide adjustable extruded connector to allow for // flush // // 12 mm (0.5 inch) // // //
// 25 mm (1 inch) // reveal between the sign post and cabinet or tube. //

2.7 FABRICATION:

- A. Design interior signage components to allow for expansion and contraction for a minimum material temperature range of 38 degrees C (100 degrees F), without causing buckling, excessive opening of joints or over stressing of adhesives, welds and fasteners.
- B. Form work to required shapes and sizes, with true curve lines and angles. Provide necessary rebates, lugs and brackets for assembly of units. Provide concealed fasteners wherever possible.
- C. Shop-fabricate so far as practicable. Fasten joints flush to conceal reinforcement, or weld joints, where thickness or section permits.
- D. Level and assemble contract surfaces of connected members so joints will be tight and practically unnoticeable, without applying filling compound.
- E. Signs: Fabricate with fine, even texture to be flat and sound.
 1. Maintain lines and miters sharp, arises unbroken, profiles accurate and ornament true to pattern.
 2. Plane surfaces to be smooth, flat and without oil-canning, free of rack and twist.
 3. Maximum variation from plane of surface plus or minus 0.3 mm (0.015 inches). Restore texture to filed or cut areas.
- F. Finish extruded members to be free from extrusion marks. Fabricate square turns, sharp corners, and true curves.
- G. Finish hollow signs with matching material on all faces, tops, bottoms and ends. Mitere edge joints to give appearance of solid material.

- H. Do not manufacture signs until final sign message schedule and location review has been completed by the COR and forwarded to contractor.
- I. Drill holes for bolts and screws. Mill smooth exposed ends and edges with corners slightly rounded.
- J. Form joints exposed to weather to exclude water.
- K. Movable Parts, Including Hardware: Cleaned and adjusted to operate as designed without binding or deformation of members. Center doors and covers in opening or frame.
 - 1. Align contact surfaces fit tight and even without forcing or warping components.
- L. Pre-assemble items in shop to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- M. Prime painted surfaces as required. Apply finish coating of paint for complete coverage with no light or thin applications allowing substrate or primer to show.
 - 1. Finish surface smooth, free of scratches, gouges, drips, bubbles, thickness variations, foreign matter and other imperfections.

2.8 FABRICATION OF PORCELAIN ENAMEL SIGNS:

A. Metal Approvals:

- 1. The supplier shall generate individual shop drawings from construction drawings provided by the customer. Fabrication shall not commence until said shop drawings have been approved.

B. Metal Fabrication:

- 1. Steel substrates shall be machine fabricated in accordance with approved shop drawings and shall exhibit straight lines, square corners and/or smooth bends, and shall be free of twists, kinks, warps, dents, and other imperfections which may affect appearance or serviceability. Curved sections shall be formed to smooth and even radii.

C. Flatness:

- 1. Finished panels shall have a maximum variation of .188" in a convex direction when measured perpendicular to the nominal plane of the panel face. Variation in the concave direction shall be limited to .094" from the actual plane of the panel face. These tolerances are for panels with a face area of 8 sq. ft. or less. Proportionately greater allowance will be permitted for panels of greater areas.

D. Squareness:

- 1. Panels of less than 8 square feet shall be square within .063" as measured across the diagonal and within .094" on panels over 8 square feet.

E. Welding:

- 1. Fusion welds must be free of porosity, inclusions, foreign matter, cracks and pinholes. Any wire or rod fillers used must match the chemical composition of the base metal. All welds shall be

ground and sanded smooth to match the radius of the mechanical break. Refer to Porcelain Enamel Institute Technical Manual "PEI-201" section 7.

F. Holes and Cutouts:

1. The cutting of any holes shall be made by mechanical equipment and shall be completed prior to applying the enamel coating. All machined edges shall be sufficiently ground to hold a porcelain coating.

G. Forming:

1. All forming shall be via mechanical equipment and shall be completed prior to the porcelain enamel coating.

H. Metal Preparation/Cleaning:

1. Degreasing: Prior to the enameling process, all parts shall be degreased by immersion in an approved degreasing fluid. Oil residues must be completely removed to ensure proper porcelain adhesion to the steel substrate.
2. Rinsing: All parts must be adequately rinsed prior to the phosphate coating process.
3. Coating: Immediately after rinsing, all parts shall be immersed in a phosphate coating solution to avoid rusting of steel prior to and during the enameling process.

I. Porcelain Enameling:

1. A porcelain enamel ground coat shall be applied to all areas of each unit, including backside and flanges, by spraying methods recognized by PEI and VEDC. At least one additional separately fired cover coating shall be applied to the face, sides, and flanges of each unit. For corrosion protection and flatness, one additional cover coating shall be applied to the backside of each panel.

J. Finish:

1. The cover coat shall not exhibit any breaks, gas bubbles, scumming, hairlines, stress lines or other surface defects when visually inspected.

K. Finish and Background Color Control:

1. The color and finish shall match samples previously submitted by the supplier and approved by the customer within (2) NBS units (Note: a 1-2 NBS unit variation is barely perceptible to the human eye.)

L. Ground Coat and Cover Coat Thickness:

1. Ground coat and cover coat applications shall be applied in accordance with PEI recommendations to a thickness range between 0.004" to 0.020", as required by the supplier to suit the intended use.

M. Firing:

1. Panels shall be fired at temperatures above 1400 Fahrenheit in a furnace specifically designed for porcelain enamel manufacturing. After firing, each panel shall be submitted to a visual inspection compared to the customer-approved control sample for color consistency.

N. Art and Imaging:

1. The supplier shall produce film positives and /or negatives from mechanical artwork or electronic art files as supplied by the VA.
2. Art Approvals: All artwork, including laser separations, digital color composites, color keys, bluelines, and/or full size film shall be submitted to the customer for approval before it is reproduced in porcelain enamel.
3. Art Work: Original artwork shall not be harmed in any way (writing, cutting, folding, rough handling, etc.) and shall be returned to the client upon successful completion and acceptance of the project.
4. Imaging: The application of graphics shall be done using various imaging techniques as required to satisfy the design intent.
 - a. Line Art/Spot Color Application: Line art and /or spot color shall be printed over background colors in perfect registration, with uniform edges, at a minimum output resolution of 1200 DPI. Line weight thickness shall be printed at a minimum of 1/2 point and type shall be printed at a minimum size of 6 points. The supplier is responsible for the appropriate trapping where colors touch.
 - b. Four-color Process: For panels up to nine square feet, four-color process imaging shall be in perfect registration in a resolution of not less than 150 lines per inch (LPI). Please note: 150 LPI requires a minimum input resolution of 300 dots per inch (DPI) at full size, and a minimum output resolution of 2400 DPI. For panels greater than nine square feet, four color process imaging shall be in perfect registration in a resolution of not less than 100 LPI (200 DPI minimum input resolution and 1200 DPI minimum output resolution). If requested, supplier must be able to print at a maximum resolution of 300 LPI (600 DPI input resolution, and 3600 DPI output resolution) for panels which have a maximum dimension of 36" in either direction.
 - c. Technical Proficiency: Supplier shall be proficient in the following imaging techniques and able to demonstrate capabilities to the customer: reproduction of photographs or original art by halftone, duo-tone, and four-color process, as well as special imaging techniques including hand painting, stencil brushing, spraying textures, and air brushing.
5. Screen printing Pastes: Screen printing pastes shall be milled to a 400-mesh particle size or smaller and shall have sufficient glass content to be acid-resistant, corrosion-proof, opaque, UV-proof, and vandal-resistant.
6. Color Matching: The supplier shall demonstrate proficiency in matching a wide range of colors as represented by color systems such as the Pantone Matching System (PMS), Matthews Paints, Toyo Inks, etc.

PART 3 - EXECUTION**3.1 INSTALLATION:**

- A. Locate signs as shown on the construction documents. at each sign location there are no utility lines behind each sign location that will be affected by installation of signs.
 - 1. Correct and repair damage done to utilities during installation of signs at no additional cost to government.
- B. Provide inserts and anchoring devices which must be set in concrete or other material for installation of signs. Submit setting drawings, templates, instructions and directions for installation of anchorage devices, which may involve other trades.
- C. Touch up exposed fasteners and connecting hardware to match color and finish of surrounding surface.
- D. At completion of sign installation, clean exposed sign surfaces. Clean and repair adjoining or adjacent surfaces that became soiled or damaged as a result of installation of signs.

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