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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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EXTERIOR SIGNAGE
08/17, CHG 1: 11/18

NOTE: This guide specification covers the requirements for common types of exterior signs, dimensional building letters, and metal plaques.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).

PART 1 GENERAL

NOTE: Reference this specification and drawings to the standards of UFC 3-120-01, Sign Standards that includes graphics, lettering style and other key components.

NOTE: Army facilities not excluded by TI 800-01 Design Criteria will be accessible in accordance with 36 CFR, Part 1191, Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.

Drawings will indicate location, dimensions,

elevations, schedules, content, details and such other information as required to indicate the extent of the work. The same terminology or titles used in the specification, for the different types of signage, will be used on the drawings and schedules.

Designer must coordinate and incorporate existing signage policy and designs, as required, for new projects on existing facilities.

This section covers some of the more common exterior sign types. When other sign types are to be used, specifications will be modified accordingly.

Product selections must be based on aesthetic values, appearance, and cost as related to project needs.

Additional Guidance on the development of signage systems is available in USACE EP 310-1-6a and 6b, Sign Standards Manual. The document is available from the USACE Publications Depot, 2803 52nd Avenue, Hyattsville, MD 20781, 301-394-0081/82/83/84.
****

1.1 REFERENCES

****
NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.
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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.

ALUMINUM ASSOCIATION (AA)

AA DAF45	(2003; Reaffirmed 2009) Designation System for Aluminum Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1	(2015) Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test

AMERICAN WELDING SOCIETY (AWS)

AWS C1.1M/C1.1	(2019) Recommended Practices for Resistance Welding
AWS D1.1/D1.1M	(2020; Errata 1 2021) Structural Welding Code - Steel
AWS D1.2/D1.2M	(2014; Errata 1 2014; Errata 2 2020) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M	(2019) Standard Specification for Carbon Structural Steel
ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A653/A653M	(2023) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A924/A924M	(2022a) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM A1011/A1011M	(2023) Standard Specification for Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength
ASTM B26/B26M	(2018; E 2018) Standard Specification for Aluminum-Alloy Sand Castings
ASTM B62	(2017) Standard Specification for Composition Bronze or Ounce Metal Castings
ASTM B108/B108M	(2019) Standard Specification for Aluminum-Alloy Permanent Mold Castings
ASTM B209	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B209M	(2014) Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B221	(2021) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B221M	(2021) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM C1036	(2021) Standard Specification for Flat Glass
ASTM D3841	(2016) Standard Specification for Glass Fiber-Reinforced Polyester Plastic Panels
ASTM E84	(2023) Standard Test Method for Surface Burning Characteristics of Building Materials

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM AMP 500	(2006) Metal Finishes Manual

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2023) National Electrical Code

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS3611	(2011; Rev E; Stabilized (S) 2011) Plastic Sheet, Polycarbonate General Purpose

1.2 GENERAL REQUIREMENTS

All exterior signage must be provided by a single manufacturer. Exterior signage must be of the design, detail, sizes, types, and message content shown on the drawings, must conform to the requirements specified, and must be provided at the locations indicated. Submit exterior signage schedule in electronic media with spread sheet format. Spread sheet must include sign location, sign type, and message. Signs must be complete with lettering, framing as detailed, and related components for a complete installation. Each sample must consist of a complete sign panel with letters and symbols. Samples may be installed in the work, provided each sample is identified and location recorded. Submit [three] [_____] color samples for each material requiring color and 305 mm 12 inch square sample of sign face color sample.

1.2.1 Wind Load Requirements

Exterior signage must be designed to withstand [_____] km/h mph windload. Submit design analysis and supporting calculations performed in support of specified signage.

1.2.2 Character Proportions and Heights

Letters and numbers on indicated signs for handicapped-accessible buildings must have a width-to-height ratio between 3:5 and 1:1 and a stroke-width-to-height ratio between 1:5 and 1:10. Characters and numbers on indicated signs must be sized according to the viewing distance from which they are to be read. The minimum height is measured using an upper case letter "X". Lower case characters are permitted.

1.3 SUBMITTALS

****

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item, if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings; G[, [_____]]

SD-03 Product Data

Modular Exterior Signage System

Installation

Exterior Signage; G[, [_____]]

Wind Load Requirements

SD-04 Samples

Exterior Signage; G[, [_____]]

SD-10 Operation and Maintenance Data

Protection and Cleaning; G[, [_____]]

1.4 QUALIFICATIONS

Signs, plaques, and dimensional letters must be the standard product of a manufacturer regularly engaged in the manufacture of the products. Items of equipment must essentially duplicate equipment that has been in satisfactory use at least 2 years prior to bid opening.

1.5 DELIVERY AND STORAGE

Materials must be wrapped for shipment and storage, delivered to the jobsite in manufacturer's original packaging, and stored in a clean, dry area in accordance with manufacturer's instructions.

1.6 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period must be provided.

1.7 EXTRA STOCK

****

NOTE: A sufficient number of message panels/bars and letters for future use for changes and message replacement must be specified.

****

Provide [_____] extra interchangeable message panels and extra stock of the following: [[_____] message bars of each color and size for sign types [_____].] [[_____] pressure-sensitive letters in each color and size for sign type [_____].] [[_____] changeable message strips for sign type [_____].]

PART 2 PRODUCTS

2.1 MODULAR EXTERIOR SIGNAGE SYSTEM

****

NOTE: Omit signage systems not required for project.

Signage for Navy projects should be designed in accordance with the Activity's Base Exterior Architectural Guide or Base Signage Guide. Check with activity concerning standards on safety regulatory signs (i.e. fire and radiation).

Enamel finish is more economical than anodized, but may not perform as well; therefore, may not be cost effective. Designer should investigate local conditions to make determination.

****

Exterior signage must consist of a system of coordinated directional, identification, and regulatory type signs located where shown. Dimensions, details, materials, message content, and design of signage must be as shown. Submit manufacturer's descriptive data and catalog cuts.

2.1.1 Free-Standing Base Mount Pylon/Monolith Type Signs

****
NOTE: Drawings should show mounting heights and mounting details.
****

2.1.1.1 Framing

Interior framing must consist of [aluminum] [or] [galvanized steel] tube columns welded to companion plates. Perimeter framing must consist of [aluminum] [or] [steel] angle framing welded to the post and plate system as designed. Framing members must be designed to permit [access to electrical equipment] [and] [panel removal]. Mounting must be provided as shown. Framing members of steel must be finished with semi-gloss baked enamel or two-component acrylic polyurethane. Openings must be sealed from moisture and made tamper-proof.

2.1.1.2 Exterior Sheeting Panels

****
NOTE: If panels are to be nonremovable, use aluminum panels to permit welding to frame. Details will be used as applicable for locations for welding.

In project locations with Environmental Severity Classifications (ESC) C3 thru C5, do not use galvanized or enameled steel products for panels, brackets, posts, fasteners, or hardware; use anodized aluminum or fiberglass for panels. Also use anodized aluminum or stainless steel for brackets and posts, and use stainless steel for fasteners and hardware. See UFC 1-200-01 for determination of ESC for project locations.
****

Modular panels must be provided in sizes shown on drawings. Panels must be fabricated a minimum of [2.3 mm 0.090 inch thick [aluminum] [steel]] [3.2 mm 0.125 inch thick fiberglass reinforced plastic (FRP)]. [Panels must be heliarc welded to framing system [_____].] Top and end panels must be removable and must be secured by 5 mm 3/16 inch socket head jack nuts. Finish for metal panels must be [semi-gloss baked enamel] [two-component acrylic polyurethane] [anodized conforming to AA DAF45].

2.1.1.3 Mounting

Mount by securing to concrete foundation as indicated.

2.1.1.4 Finishes

Base finish must be [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] [anodized conforming to AA DAF45] [_____]. Metal panel system finish must be [baked enamel or two-component acrylic polyurethane]

[anodized conforming to AA DAF45 [_____], as shown].

2.1.2 Panel And Post/Panel Type Signs

****
NOTE: Show details of sign foundations on drawings. Include provision for concealed entry of electric service to internally illuminated signs through foundation to post.
****

2.1.2.1 Posts

One-piece [aluminum] [or] [galvanized steel] posts must be provided with minimum 3.2 mm 0.125 inch wall thickness. Posts must be designed to accept panel framing system described. The post must be designed to permit attachment of panel framing system without exposed fasteners. Caps must be provided for each post.

2.1.2.2 Panel Framing System

Panel framing consisting of aluminum sections and interlocking track components must be designed to interlock with posts with concealed fasteners.

2.1.2.3 Panels

Modular message panels must be provided in sizes shown on drawings. Panels must be fabricated a minimum of [[2.0] [2.3] [3.2] mm [0.080] [0.090] [0.125] inch aluminum] [3.2 mm 0.125 inch acrylic] [3.2 mm 0.125 inch fiberglass reinforced plastic (FRP)]. [Panels must be designed to be interchangeable.] [Panels with metal return sheeting must have welded corners, ground smooth.] [Panels must be heliarc welded to framing system.] [Face panels must be removable to provide access to electrical components.]

2.1.2.4 Finishes

Post finish must be [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] [anodized conforming to AA DAF45] [_____]. Metal panel system finish must be [baked enamel or two-component acrylic polyurethane] [anodized conforming to AA DAF45 [_____], as shown].

2.1.2.5 Mounting

[Provide permanent mounting by embedding posts in concrete foundation as indicated.] [Provide removable mounting by [[a steel] [an aluminum]] [[sleeve] [flange]] embedded in concrete as indicated.]

2.1.3 Changeable Letter Directories

****
NOTE: The directories specified are standard changeable-letter type. Message strip types are also available. Cork board can be substituted for molded backing to provide bulletin boards. Lettering is available in sets of upper case, lower case, and numerals or as individual characters.

Melamine plastic (MP) header plates are a tough phenolic core material that is suitable for non-direct sun exterior usage and is recommended for raised lettering and braille.

****

2.1.3.1 Frame and Trim

Aluminum alloy finish must be [_____].

2.1.3.2 Header Plates

[Header plate must consist of background metal matching frame and having raised letters attached through the back.] [Header plate must consist of acrylic with raised acrylic letters.] [Header plate must consist of MP plastic with raised letters.]

2.1.3.3 Door Glazing

Door glazing must be [clear safety or tempered glass minimum 6 mm 1/4 inch thick.] [clear acrylic sheet 4.8 mm 3/16 inch thick.] [clear polycarbonate sheet [4.8] [6.4] mm [3/16] [1/4] inch thick.]

2.1.3.4 Door Construction

Door frame must be of same material and finish as surrounding frame. Corners must be mitered [, reinforced] [, welded], and assembled with concealed fasteners. Hinges must be standard with manufacturer, in finish to match frames and trim. Glazing must be set in frame with resilient glazing channels.

2.1.3.5 Door Locks

Door locks must be manufacturer's standard and must be keyed alike.

2.1.3.6 Fabrication

Frames and trim must be assembled with corners [reinforced] [welded] and mitered to hairline fit, with no exposed fasteners. Removable changeable directory panel must consist of [6 mm 1/4 inch thick white acrylic with clear acrylic letter tracks] [exterior grade plywood] [aluminum] [rubber] back with [vinyl] [polycarbonate] [corkboard] covering backgrooved 6 mm 1/4 inch on centers to receive letters.

2.1.3.7 Finishes

Post finish must be [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] [anodized conforming to AA DAF45] [_____]. Metal panel system finish must be [baked enamel or two-component acrylic polyurethane] [anodized conforming to AA DAF45 [_____], as shown].

2.1.3.8 Mounting

Directories must be mounted to supporting structures with concealed fasteners in accordance with manufacturer's instructions.

2.1.3.9 Changeable Letters

****

NOTE: Allow for changes and message replacement by specifying a sufficient number of letters for future use. For other lettering types, special equipment may be required to apply messages. If so, be sure to include the equipment and operating instructions. In areas where vandalism is a problem, acrylic solvent may be used to glue letters to the background. This limits changing of the message.

****

Changeable letters must be upper-case or upper and lower-case [helvetica medium] [_____]. Tabbed vinyl letters and numbers must be furnished in accordance with the [drawings] [and] [schedule].

2.2 ILLUMINATION

****

NOTE: Coordinate illumination with Division 26 and available electric service.

Exterior signs with the message "EMERGENCY" should be connected to an emergency power source.

****

Concealed lighting must be provided within panel framing members. Lighting must be controlled by a photocell device. [Top] [Back] lighting must be provided by [T-12 slimline lamps, [120] [277] [_____] volt, 60-hertz, single-phase, Type 1, or Type 2 ballast] [_____]. Ballast must be integrally mounted, high power factor and rated for use down to minus 29 degrees C minus 20 degrees F ambient starting temperature. Ballast and wiring within the sign must be in metal raceways. Electrical equipment must be UL or FM listed and comply with NFPA 70. Illumination must be evenly distributed. A switch on the interior of the sign must be provided to turn off power in the sign. Switch must be readily accessible when sign is open.

2.3 GRAPHICS FOR EXTERIOR SIGNAGE SYSTEMS

2.3.1 Graphics

****

NOTE: Choose the appropriate paragraph for the graphics application. The process of silk-screening for large areas, type, etc. does not weather properly without proper protective overspray protection with UV inhibitors.

****

Signage graphics must conform to the following:

[a. [Cast] [Custom fabricated] [Plate] aluminum letters, [6] [13] [_____] mm [1/4] [1/2] [_____] inch thick must be provided and fastened to the message panel with concealed fasteners. Letters must project [_____] mm inches from face of panel.]

[b. Pressure sensitive precision cut vinyl letters [with reflecting surface] [_____] must be provided.]

[c. Message must be applied to panel using the silkscreen process. Silkscreened images must be executed with photo screens prepared from original art. Handcut screens will not be accepted. Original art must be defined as artwork that is a first generation pattern of the original specified art. Edges and corners must be clean. Rounded corners, cut or ragged edges, edge buildup, bleeding or surfaces pinholes will not be accepted.]

[d. Message letters must be cut out from panel. Panel cutouts must be backed with [2.0 mm 0.080 inch FRP] [3.2 mm 0.125 inch acrylic] where cutouts occur.]

[e. Message must be cut out from panel. Acrylic letters [3] [6] [13] mm [1/8] [1/4] [1/2] inch thick must be projected through the cutout area and chemically welded to 3.2 mm 0.125 inch thick acrylic backup sheet.]

[f. Message must be embedded in FRP sheet and completely covered with thermosetting polyester resin. Message must be embedded minimum 0.8 mm 1/32 inch. Sheets must be processed in one piece, in one process, to prevent delamination.]

[g. Message must be applied using the frisket method. Photomechanically reproduced graphic masks must be applied to the sign face which has been coated with the graphics color. A background must then be applied to the exposed surfaces. Handcut masks will not be accepted. Edges that are nicked, cut, or ragged will not be acceptable. A protective overcoat containing UV-resistant additives must be applied.]

[h. Message must be engraved in non-corrosive, three-ply fiberglass laminate. Message must be core color or paint filled multiple colors.]

2.3.2 Messages

****
NOTE: Choose typeface consistent with total signage system and Activity Standards. Show message content, sizes, and colors on drawings or in a message schedule.
****

See [drawings] [and] [schedule] for message content. Typeface: [Helvetica medium] [_____]. Type size [_____] [as indicated].

2.4 METAL PLAQUES

Design and location of plaques must be as indicated.

2.4.1 Cast Metal Plaques

2.4.1.1 Fabrication

Cast metal plaques must have the logo, emblem and artwork cast in the [bas relief] [flat relief] [_____] technique. Plaques must be fabricated from [prime aluminum] [bronze] [yellow brass].

2.4.1.2 Size

Plaque size must be [_____] [as indicated].

2.4.1.3 Border

Border must be [flat band] [plain edge] [bevel] [custom ornamental as indicated] [_____].

2.4.1.4 Background

Background texture must be [leather] [fine pebble] [_____].

2.4.1.5 Mounting

Mounting must be [concealed] [rosettes and anchors] [rosettes and toggle bolts] [invisible] [_____].

2.4.1.6 Finish

Finishes must consist of [aluminum light colored sandblasted background. Letters must be satin polished and entire plaque must be sprayed with two coats of clear lacquer.] [aluminum with background sprayed dark gunmetal colored lacquer. Letters must be satin polished and entire plaque sprayed with two coats clear lacquer.] [bronze with dark finish oxidized background. Letters must be satin polished and entire plaque sprayed with two coats of clear lacquer.] [[aluminum] [bronze] with sprayed background. Letters must be satin polished.]

2.4.2 Chemically Etched Metal Plaques

2.4.2.1 Fabrication

Plaque must be chemically [single-] [double-] etched one-piece [brass] [bronze] [_____] [0.8128] [1.6256] [3.175] [6.35] mm [0.032] [0.064] [0.125] [0.250] inch thick.

2.4.2.2 Size

Plaque size must be [_____] [as shown].

2.4.2.3 Finish

[Single-etched raised areas must be in [gold-tone] [silver-tone] [bronze-tone] finish and recessed areas must be colorfilled.] [Double-etched raised areas must be [gold-tone] [silver-tone] and recessed textured areas must be [gold-tone] [silver-tone] colorfilled.]

2.4.3 Frost and Surface Oxidized Plaques

2.4.3.1 Fabrication

Plaque must be frosted and surface oxidized one - piece [anodized aluminum] [brass] [bronze] [stainless steel] [1.02] [3.175] mm [0.040] [0.125] inch thick.

2.4.3.2 Size

Plaque size must be [_____] [as shown].

2.4.3.3 Finish

[Material finish must be [satin] [polished].] [Frosted areas must be

oxidized [black for aluminum or stainless steel] [or] [black or brown, for brass or bronze].]

2.5 DIMENSIONAL BUILDING LETTERS

****
NOTE: These letters are for direct application to exterior building surfaces. Drawings must show mounting type details.
****

2.5.1 Fabrication

Letters must be fabricated from [cast aluminum] [cast bronze] [2.29 mm 0.090 inch aluminum sheet] [3.17 mm 0.125 inch aluminum sheet] [extruded aluminum] [_____]. Letters must be cleaned by chemical etching or cleaned ultrasonically in a special degreasing bath. Letters must be packaged for protection until installation.

2.5.2 Typeface

Typeface must be [helvetica medium] [_____] [as indicated].

2.5.3 Size

Letter size must be [_____] [as indicated].

2.5.4 Finish

[Anodized aluminum] [Baked enamel or two-component acrylic polyurethane] [[Polished] [Oxidized] bronze with clear coat] finish must be provided.

2.5.5 Mounting

[Threaded studs] [Steel U-bracket, cap screws, and expansion bolts] of number and size as recommended by manufacturer, must be used for concealed anchorage. Letters which project from the building line must have stud spacer sleeves. Letters, studs, and sleeves must be of the same material. Supply templates for mounting.

2.6 ALUMINUM ALLOY PRODUCTS

Aluminum alloy products must conform to ASTM B209M ASTM B209 for sheet or plate, ASTM B221M ASTM B221 for extrusions and ASTM B26/B26M or ASTM B108/B108M for castings. Aluminum extrusions must be provided at least 3 mm 1/8 inch thick and aluminum plate or sheet at least 16 gauge thick. Welding for aluminum products must conform to AWS C1.1M/C1.1.

2.7 ANODIC COATING

****
NOTE: Edit the following requirements as necessary for the project.
****

Anodized finish must conform to AA DAF45 as follows:

[Clear (natural) designation AA-M10-C22-A31, Architectural Class II 0.010 mm 0.4 mil or thicker.]

[Integrated color anodized designation AA-M10-C22-A32, Architectural Class 0.010 to 0.018 mm 0.4 to 0.7 mil.]

[Electrolytically deposited color - anodized designation AA-M10-C22-A34, Architectural Class II 0.010 to 0.018 mm 0.4 to 0.7 mil.
]

2.8 ORGANIC COATING

****
NOTE: Edit this paragraph to include only types and finishes being used.
****

Clean, prime and give surfaces a [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] finish in accordance with NAAMM AMP 500, AMP 505, with total dry film thickness not less than 0.030 mm 1.2 mils.

2.9 STEEL PRODUCTS

Structural steel products must conform to ASTM A36/A36M. Sheet and strip steel products must conform to ASTM A1011/A1011M. Welding for steel products must conform to AWS D1.2/D1.2M.

2.10 CAST BRONZE

Fabricate components with sharp corners, flat faces, and accurate profiles. Remove and polish burrs and rough spots. Finish faces to a uniform high luster. Cast bronze must be in accordance with ASTM B62.

2.11 VINYL SHEETING FOR GRAPHICS

Vinyl sheeting must be 5 to 7 year premium type and must be in accordance with the flammability requirements of ASTM E84 and must be a minimum 0.08 mm 0.003 inch film thickness. Film must include a precoated pressure sensitive adhesive backing, Class 1, or positionable pressure sensitive adhesive backing, Class 3.

2.12 GLASS

Glass must be in accordance with ASTM C1036, Type I, Class 1, Quality q3 and ANSI Z97.1.

2.13 FIBER-REINFORCED POLYESTER (FRP) PANELS

Fiber-reinforced polyester (FRP) must be in accordance with ASTM D3841, Type II, Grade 1, Class 124, [_____] [as indicated].

2.14 ACRYLIC SHEET

Acrylic sheet must be in accordance with the flammability requirements of ASTM E84 and must conform to ANSI Z97.1.

2.15 POLYCARBONATE SHEET

Polycarbonate sheet must conform to SAE AMS3611.

2.16 ANCHORS AND FASTENERS

Exposed anchor and fastener materials must be compatible with metal to which applied and must match in color and finish and must be non-rusting, non-corroding, and non-staining. Exposed fasteners must be tamper-proof.

2.17 SHOP FABRICATION AND MANUFACTURE

2.17.1 Factory Workmanship

Work must be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled must be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws must be drilled or punched. Drilling and punching must produce clean, true lines and surfaces. Welding to or on structural steel must be in accordance with AWS D1.1/D1.1M. Welding must be continuous along the entire area of contact. Exposed welds must be ground smooth. Exposed surfaces of work must have a smooth finish and exposed riveting must be flush. Fastenings must be concealed where practical. Items specified to be galvanized must be by hot-dip process after fabrication if practical. Galvanization must be in accordance with ASTM A123/A123M and ASTM A653/A653M, as applicable. Other metallic coatings of steel sheet must be in accordance with ASTM A924/A924M. Joints exposed to the weather must be formed to exclude water. Drainage and weep holes must be included as required to prevent condensation buildup.

2.17.2 Dissimilar Materials

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NOTE: If signs are to have extensive metal parts or are to be anchored to structural steel, include this paragraph. Otherwise edit as appropriate.

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Where dissimilar metals are in contact, or where aluminum is in contact with concrete, mortar, masonry, wet or pressure-treated wood, or absorptive materials subject to wetting, the surfaces must be protected with a coat of asphalt varnish or a coat of zinc-molybdate primer to prevent galvanic or corrosive action.

2.17.3 Shop Painting

Surfaces of miscellaneous metal work, except nonferrous metal, corrosion resisting steel, and zinc-coated work, must be given one coat of zinc-molybdate primer or an approved rust-resisting treatment and metallic primer in accordance with manufacturer's standard practice. Surfaces of items to be embedded in concrete must not be painted. Upon completion of work, damaged surfaces must be recoated.

2.18 COLOR, FINISH, AND CONTRAST

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NOTE: Color must be specified in this paragraph unless identified elsewhere in finish paragraphs. Delete color portion if covered elsewhere.

Editing of color reference sentence(s) must be coordinated with the Government. Generally the 09 06 00 SCHEDULES FOR FINISHES or drawing is used

when the project is designed by an Architect or Interior designer. Color must be selected from manufacturers standard colors or identified as a manufacturers color in this specification only when the project is very simple and has minimal finishes. Coordinate choice of colors with manufacturer's information as regards to color fastness. Coordinate color selections with installation standards, if one exists.

When the Government directs that color be located in the drawings a note must be added that states: "Where color is shown as being specific to one manufacturer, an equivalent color by another manufacturer may be submitted for approval. Manufacturers and materials specified are not intended to limit the selection of equal colors from other manufacturers. The word "color" as used herein includes surface color and pattern."

Prior to specifying a custom color finish, research to determine if additional cost and lead time is feasible. Note there is often a minimum order requirement; this requirement will also affect future orders.

When a manufacturer's name, stock number, pattern, and color is used, be certain that the product conforms to this specification, as edited.

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Color must be [in accordance with Section 09 06 00 SCHEDULES FOR FINISHES.] [as indicated on the drawings.] [selected from manufacturers standard colors.] [[_____.] Color listed is not intended to limit the selection of equal colors from other manufacturers.] For buildings required to be handicapped-accessible, the characters and background of signs must be eggshell, matte, or other non-glare finish. Characters and symbols must contrast with their background - either light characters on a dark background or dark characters on a light background.

PART 3 EXECUTION

3.1 INSTALLATION

Signs, plaques, or dimensional letters must be installed in accordance with approved manufacturer's instructions at locations shown on the approved detail drawings; submit drawings showing elevations of each type of sign; dimensions, details, and methods of mounting or anchoring; shape and thickness of materials; and details of construction. A schedule showing the location, each sign type, and message must be included. Circuits installed underground must conform to the requirements of Section 33 71 02 UNDERGROUND ELECTRICAL DISTRIBUTION. Steel conduits installed underground and illuminated signage mounted directly on buildings must be in conformance with the requirements of Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM. Signs must be installed plumb and true at mounting heights indicated, and by method shown or specified. Signs mounted on other surfaces must not be installed until finishes on such surfaces have been completed. Submit manufacturer's installation instructions and cleaning instructions.

3.1.1 Anchorage

Anchorage and fastener materials must be in accordance with approved manufacturer's instructions for the indicated substrate. Anchorage not otherwise specified or indicated must include slotted inserts, expansion shields, and powder-driven fasteners when approved for concrete; toggle bolts and through bolts for masonry; machine carriage bolts for steel; lag bolts and screws for wood.

3.1.2 Protection and Cleaning

The work must be protected against damage during construction. Hardware and electrical equipment must be adjusted for proper operation. Glass, frames, and other sign surfaces must be cleaned in accordance with manufacturer's instructions. After signs are completed and inspected, cover all project identification, directional, and other signs which may mislead the public. Covering must be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Submit [six] [_____] copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions must include simplified diagrams for the equipment as installed. Signs must be cleaned, as required, at time of cover removal.

3.2 FIELD PAINTED FINISH

Miscellaneous metals and frames must be field painted in accordance with Section 09 90 00 PAINTS AND COATINGS. Anodized metals, masonry, and glass must be protected from paint. Finish must be free of scratches or other blemishes.

-- End of Section --