
USACE / NAVFAC / AFCEA / NASA UFGS-10430 (November 2003)

Preparing Activity: USACE MasterFormat™ 2004 - 10 14 01
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UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UML dated 23 June 2005

Latest change indicated by CHG tags

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SECTION 10430

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11/03

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SECTION 10430

EXTERIOR SIGNAGE

11/03

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

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).

Use of electronic communication is encouraged.

Brackets are used in the text to indicate designer choices or locations where text must be supplied by the designer.

PART 1 GENERAL

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 shall 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.

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 DAF-45 (2003) Designation System for Aluminum Finishes

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Glazing Materials Used in Buildings

AMERICAN WELDING SOCIETY (AWS)

AWS C1.1M/C1.1 (2000) Resistance Welding

AWS D1.1/D1.1M	(2004) Structural Welding Code - Steel
AWS D1.2	(2003) Structural Welding Code - Aluminum

ASTM INTERNATIONAL (ASTM)

ASTM A 1011/A 1011M	(2004a) Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High Strength Low-Alloy and High-Strength Low-Alloy With Improved Formability
ASTM A 123/A 123M	(2002) Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A 36/A 36M	(2004) Carbon Structural Steel
ASTM A 653/A 653M	(2004a) Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A 924/A 924M	(2004) General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
ASTM B 108	(2003a) Aluminum-Alloy Permanent Mold Castings
ASTM B 209	(2004) Aluminum and Aluminum-Alloy Sheet and Plate
ASTM B 209M	(2004) Aluminum and Aluminum-Alloy Sheet and Plate (Metric)
ASTM B 221	(2004a) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B 221M	(2004) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM B 26/B 26M	(2003) Aluminum-Alloy Sand Castings
ASTM B 62	(2002) Composition Bronze or Ounce Metal Castings
ASTM C 1036	(2001) Flat Glass
ASTM D 3841	(1997; R 2001) Glass-Fiber-Reinforced Polyester Plastic Panels
ASTM E 84	(2004) Surface Burning Characteristics of Building Materials

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)

NAAMM MFM	(1988) Metal Finishes Manual
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NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70

(2005) National Electrical Code

SOCIETY OF AUTOMOTIVE ENGINEERS INTERNATIONAL (SAE)

SAE AMS3611

(1994; Rev D; R 2003) Plastic Sheet,
Polycarbonate General Purpose

1.2 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation 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.

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" designation; submittals not having a "G" designation are [for Contractor Quality Control approval.] [for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Approved Detail Drawings[; G][; G, [_____]]

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 shall be included.

SD-03 Product Data

Modular Exterior Signage System

Manufacturer's descriptive data and catalog cuts.

Installation

Manufacturer's installation instructions and cleaning instructions.

Exterior Signage[; G][; G, [____]]

Exterior signage schedule in electronic media with spread sheet format. Spread sheet shall include sign location, sign type, and message.

Wind Load Requirements

Design analysis and supporting calculations performed in support of specified signage.

SD-04 Samples

Exterior Signage[; G][; G, [____]]

One 300 mm 12 inch length of framing for illuminated signs. One sample of [each type of sign] [____]. Each sample shall 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. [Three][____] color samples for each material requiring color and 305 mm 12 inch square sample of sign face color sample.

SD-10 Operation and Maintenance Data

Protection and Cleaning

[Six] [____] copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions shall include simplified diagrams for the equipment as installed.

1.3 GENERAL

All exterior signage shall be provided by a single manufacturer. Exterior signage shall be of the design, detail, sizes, types, and message content shown on the drawings, shall conform to the requirements specified, and shall be provided at the locations indicated. Signs shall be complete with lettering, framing as detailed, and related components for a complete installation. Recyclable materials shall conform to EPA requirements in accordance with Section 01670 RECYCLED / RECOVERED MATERIALS.

1.4 WIND LOAD REQUIREMENTS

Exterior signage shall be designed to withstand [____] km/h mph windload.

1.5 CHARACTER PROPORTIONS AND HEIGHTS

Letters and numbers on indicated signs for handicapped-accessible buildings shall 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 shall 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.

1.6 QUALIFICATIONS

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

1.7 DELIVERY AND STORAGE

Materials shall 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.

1.8 WARRANTY

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

1.9 EXTRA STOCK

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

The Contractor shall 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 shall consist of a system of coordinated directional, identification, and regulatory type signs located where shown. Dimensions, details, materials, message content, and design of signage shall be as shown.

2.1.1.1 Free-Standing Base Mount Pylon/Monolith Type Signs

NOTE: Drawings should show mounting heights and mounting details.

2.1.1.1.1 Framing

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

2.1.1.1.2 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.

Modular panels shall be provided in sizes shown on drawings. Panels shall 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 shall be heliarc welded to framing system [____].] Top and end panels shall be removable and shall be secured by 5 mm 3/16 inch socket head jack nuts. Finish for metal panels shall be [semi-gloss baked enamel] [two-component acrylic polyurethane] [anodized conforming to AA DAF-45].

2.1.1.1.3 Mounting

Mounting shall be provided by securing to concrete foundation as shown.

2.1.1.1.4 Finishes

Base finish shall be [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] [anodized conforming to AA DAF-45] [____]. Metal panel system finish shall be [baked enamel or two-component acrylic polyurethane] [anodized conforming to AA DAF-45 [____], 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 shall be provided with minimum 3.2 mm 0.125 inch wall thickness. Posts shall be designed to accept panel framing system described. The post shall be designed to permit attachment of panel framing system without exposed fasteners. Caps shall be provided for each post.

2.1.2.2 Panel Framing System

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

2.1.2.3 Panels

Modular message panels shall be provided in sizes shown on drawings. Panels shall 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 shall be designed to be interchangeable.] [Panels with metal return sheeting shall have welded corners, ground smooth.] [Panels shall be heliarc welded to framing system.] [Face panels shall be removable to provide access to electrical components.]

2.1.2.4 Finishes

Post finish shall be [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] [anodized conforming to AA DAF-45] [_____]. Metal panel system finish shall be [baked enamel or two-component acrylic polyurethane] [anodized conforming to AA DAF-45 [_____], as shown].

2.1.2.5 Mounting

[Permanent mounting shall be provided by embedding posts in concrete foundation as shown.] [Removable mounting shall be provided by [[a steel] [an aluminum]] [[sleeve] [flange]] embedded in concrete as shown.]

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 shall be [_____].

2.1.3.2 Header Plates

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

2.1.3.3 Door Glazing

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

2.1.3.5 Door Locks

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

2.1.3.6 Fabrication

Frames and trim shall be assembled with corners [reinforced] [welded] and mitered to hairline fit, with no exposed fasteners. Removable changeable directory panel shall 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 shall be [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] [anodized conforming to AA DAF-45] [_____]. Metal panel system finish shall be [baked enamel or two-component acrylic polyurethane] [anodized conforming to AA DAF-45 [_____], as shown].

2.1.3.8 Mounting

Directories shall 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 shall be upper-case or upper and lower-case [helvetica medium] [____]. Tabbed vinyl letters and numbers shall be furnished in accordance with the [drawings] [and] [schedule].

2.2 ILLUMINATION

NOTE: Coordinate illumination with Division 16 and available electric service.

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

Concealed lighting shall be provided within panel framing members. Lighting shall be controlled by a photocell device. [Top] [Back] lighting shall be provided by [T-12 slimline lamps, [120] [277] [____] volt, 60-hertz, single-phase, Type 1, or Type 2 ballast] [____]. Ballast shall 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 shall be in metal raceways. Electrical equipment shall be UL or FM listed and comply with NFPA 70. Illumination shall be evenly distributed. A switch on the interior of the sign shall be provided to turn off power in the sign. Switch shall 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 shall conform to the following:

- a. [[Cast] [Custom fabricated] [Plate] aluminum letters, [6] [13] [____] mm [1/4] [1/2] [____] inch thick shall be provided and fastened to the message panel with concealed fasteners. Letters shall project [____] mm inches from face of panel.]
- b. [Pressure sensitive precision cut vinyl letters [with reflecting surface] [____] shall be provided.]
- c. [Message shall be applied to panel using the silkscreen process. Silkscreened images shall be executed with photo screens prepared from original art. Handcut screens will not be accepted. Original art shall be defined as artwork that is a first generation pattern of the original specified art. Edges and corners shall be clean. Rounded corners, cut or ragged edges, edge buildup, bleeding or surfaces pinholes will not be accepted.]
- d. [Message letters shall be cut out from panel. Panel cutouts shall be backed with [2.0 mm 0.080 inch FRP] [3.2 mm 0.125 inch acrylic] where cutouts occur.]

- e. [Message shall be cut out from panel. Acrylic letters [3] [6] [13] mm [1/8] [1/4] [1/2] inch thick shall be projected through the cutout area and chemically welded to 3.2 mm 0.125 inch thick acrylic backup sheet.]
- f. [Message shall be embedded in FRP sheet and completely covered with thermosetting polyester resin. Message shall be embedded minimum 0.8 mm 1/32 inch. Sheets shall be processed in one piece, in one process, to prevent delamination.]
- g. [Message shall be applied using the frisket method. Photomechanically reproduced graphic masks shall be applied to the sign face which has been coated with the graphics color. A background shall 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 shall be applied.]
- h. [Message shall be engraved in non-corrosive, three-ply fiberglass laminate. Message shall 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 shall be as shown.

2.4.1 Cast Metal Plaques

2.4.1.1 Fabrication

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

2.4.1.2 Size

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

2.4.1.3 Border

Border shall be [flat band] [plain edge] [bevel] [custom ornamental as shown] [_____].

2.4.1.4 Background

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

2.4.1.5 Mounting

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

2.4.1.6 Finish

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

2.4.2 Chemically Etched Metal Plaques

2.4.2.1 Fabrication

Plaque shall 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 shall be [_____] [as shown].

2.4.2.3 Finish

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

2.4.3 Frost and Surface Oxidized Plaques

2.4.3.1 Fabrication

Plaque shall 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 shall be [_____] [as shown].

2.4.3.3 Finish

[Material finish shall be [satin] [polished].] [Frosted areas shall 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 shall 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 shall be cleaned by chemical etching or cleaned ultrasonically in a special degreasing bath. Letters shall be packaged for protection until installation.

2.5.2 Typeface

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

2.5.3 Size

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

2.5.4 Finish

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

2.5.5 Mounting

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

2.6 ALUMINUM ALLOY PRODUCTS

Aluminum alloy products shall conform to ASTM B 209M ASTM B 209 for sheet or plate, ASTM B 221M ASTM B 221 for extrusions and ASTM B 26/B 26M or ASTM B 108 for castings. Aluminum extrusions shall be provided at least 3 mm 1/8 inch thick and aluminum plate or sheet at least 16 gauge thick. Welding for aluminum products shall conform to AWS C1.1M/C1.1.

2.7 ANODIC COATING

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

Anodized finish shall conform to AA DAF-45 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.

Surfaces shall be cleaned, primed, and given a [semi-gloss baked enamel] [or] [two-component acrylic polyurethane] finish in accordance with NAAMM MFM, AMP 505, with total dry film thickness not less than 0.030 mm 1.2 mils.

2.9 STEEL PRODUCTS

Structural steel products shall conform to ASTM A 36/A 36M. Sheet and strip steel products shall conform to ASTM A 1011/A 1011M. Welding for steel products shall conform to AWS D1.2.

2.10 CAST BRONZE

Components shall be fabricated with sharp corners, flat faces, and accurate profiles. Burrs and rough spots shall be removed and polished. Faces shall be finished to a uniform high luster. Cast bronze shall be in accordance with ASTM B 62.

2.11 VINYL SHEETING FOR GRAPHICS

Vinyl sheeting shall be 5 to 7 year premium type and shall be in accordance with the flammability requirements of ASTM E 84 and shall be a minimum 0.08 mm 0.003 inch film thickness. Film shall include a precoated pressure sensitive adhesive backing, Class 1, or positionable pressure sensitive adhesive backing, Class 3.

2.12 GLASS

Glass shall be in accordance with ASTM C 1036, Type I, Class 1, Quality q3 and ANSI Z97.1.

2.13 FIBER-REINFORCED POLYESTER (FRP) PANELS

Fiber-reinforced polyester (FRP) shall be in accordance with ASTM D 3841, Type II, Grade 1, Class 124, [_____] [as indicated].

2.14 ACRYLIC SHEET

Acrylic sheet shall be in accordance with the flammability requirements of ASTM E 84 and shall conform to ANSI Z97.1.

2.15 POLYCARBONATE SHEET

Polycarbonate sheet shall conform to SAE AMS3611.

2.16 ANCHORS AND FASTENERS

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

2.17 SHOP FABRICATION AND MANUFACTURE

2.17.1 Factory Workmanship

Work shall be assembled in the shop, as far as practical, ready for installation at the site. Work that cannot be shop assembled shall be given a trial fit in the shop to ensure proper field assembly. Holes for bolts and screws shall be drilled or punched. Drilling and punching shall produce clean, true lines and surfaces. Welding to or on structural steel shall be in accordance with AWS D1.1/D1.1M. Welding shall be continuous along the entire area of contact. Exposed welds shall be ground smooth. Exposed surfaces of work shall have a smooth finish and exposed riveting shall be flush. Fastenings shall be concealed where practical. Items specified to be galvanized shall be by hot-dip process after fabrication if practical. Galvanization shall be in accordance with ASTM A 123/A 123M and ASTM A 653/A 653M, as applicable. Other metallic coatings of steel sheet shall be in accordance with ASTM A 924/A 924M. Joints exposed to the weather shall be formed to exclude water. Drainage and weep holes shall be included as required to prevent condensation buildup.

2.17.2 Dissimilar Materials

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

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 shall 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, shall 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 shall not be painted. Upon completion of work, damaged surfaces shall be recoated.

2.18 COLOR, FINISH, AND CONTRAST

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

Editing of color reference sentence(s) shall be coordinated with the Government. Generally the 09915 COLOR SCHEDULE or drawing is used when the project is designed by an Architect or Interior designer. Color shall 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.

When the Government directs that color be located in the drawings a note shall 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.

Color shall be [in accordance with Section 09915 COLOR SCHEDULE.] [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 shall be eggshell, matte, or other non-glare finish. Characters and symbols shall 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 shall be installed in accordance with approved manufacturer's instructions at locations shown on the approved detail drawings. Circuits installed underground shall conform to the requirements of Section 16375A ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUND. Steel conduits installed underground and illuminated signage mounted directly on buildings shall be in conformance with the requirements of Section 16402 INTERIOR DISTRIBUTION SYSTEM. Signs shall be installed plumb and true at mounting heights indicated, and by method shown or specified. Signs mounted on other surfaces shall not be installed until finishes on such surfaces have been completed.

3.1.1 Anchorage

Anchorage and fastener materials shall be in accordance with approved manufacturer's instructions for the indicated substrate. Anchorage not otherwise specified or indicated shall 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 shall be protected against damage during construction. Hardware and electrical equipment shall be adjusted for proper operation. Glass, frames, and other sign surfaces shall be cleaned in accordance with

manufacturer's instructions. After signs are completed and inspected, the Contractor shall cover all project identification, directional, and other signs which may mislead the public. Covering shall be maintained until instructed to be removed by the Contracting Officer or until the facility is to be opened for business. Signs shall be cleaned, as required, at time of cover removal.

3.2 FIELD PAINTED FINISH

Miscellaneous metals and frames shall be field painted in accordance with Section 09900 PAINTS AND COATINGS. Anodized metals, masonry, and glass shall be protected from paint. Finish shall be free of scratches or other blemishes.

-- End of Section --