

TRAFFIC SIGNAGE

02/15

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**PART 1 GENERAL.**

1.1 REFERENCES

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.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS  
(AASHTO)

AASHTO M 133	(2012; R 2016) Standard Specification for Preservatives and Pressure Treatment Processes for Timber
AASHTO M 168	(2007; R 2012) Standard Specification for Wood Products
AASHTO M 268	(2014) Standard Specification for Retroreflective Sheeting for Flat and Vertical Traffic Control Applications
AASHTO MASH	(2016) Manual for Assessing Safety Hardware - Second Edition

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA T1	(2020) Use Category System: Processing and Treatment Standard
AWPA U1	(2020) Use Category System: User Specification for Treated Wood

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 A320/A320M	(2017b) Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service
ASTM A499	(2015, R 2020) Standard Specification for Steel Bars and Shapes, Carbon Rolled from "T" Rails
ASTM A500/A500M	(2020) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A563	(2015) Standard Specification for Carbon and Alloy Steel Nuts
ASTM A563M	(2007; R 2013) Standard Specification for Carbon and Alloy Steel Nuts (Metric)
ASTM A653/A653M	(2020) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
ASTM A709/A709M	(2018) Standard Specification for Structural Steel for Bridges
ASTM A1011/A1011M	(2018a) 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 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	(2014) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes
ASTM B221M	(2013) Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)
ASTM C94/C94M	(2020) Standard Specification for Ready-Mixed Concrete
ASTM D4956	(2013) Standard Specification for Retroreflective Sheeting for Traffic Control
ASTM F436/F436M	(2019) Standard Specification for Hardened Steel Washers Inch and Metric Dimensions
ASTM F3125/F3125M	(2019) Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

FHWA SHS	(2004; Supplement 2012) Standard Highway Signs
MUTCD	(2009; Rev 2012) Manual on Uniform Traffic

## Control Devices

NCHRP 350

(1993) Recommended Procedures for the  
Safety Performance Evaluation of Highway  
Features

### 1.2 GENERAL.

All signs must be in accordance with the MUTCD.

### 1.3 SUBMITTALS.

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the government officer that will review the submittal for the Government.

SD-03 Product Data Traffic Sign Posts, G, COR

FHWA Acceptance Letter

Traffic Sign Retroreflective Sheeting

SD-04 Samples

Flexible Posts

## **PART 2 PRODUCTS.**

### 2.1 TRAFFIC SIGN POSTS.

#### 2.1.1 Steel Flanged Channel Section (U-Shape)

Fabricate steel posts from steel conforming to ASTM A36/A36M or ASTM A499 and with a minimum yield strength of 30 ksi and a minimum tensile strength of 50 ksi. Punch or drill 5/16 to 3/8 inch diameter holes spaced at 25.4 1 or 2 inch centers along the centerline of the web prior to galvanizing for the entire length of the post. Galvanize posts after punching in accordance with ASTM A123/A123M.

#### 2.1.2 Perforated Steel Tube

Fabricate steel posts from steel conforming to either ASTM A653/A653M, structural steel, Grade 50, Class 1, coating designation G90 or ASTM A1011/A1011M, structural steel, Grade 50, hot-dip galvanized after punching in accordance with ASTM A123/A123M. Pre-punch holes approximately 7/16 inch in diameter spaced at approximately 1 inch centers along each side of the tube for the entire length of the post.

#### 2.1.3 Steel Tube

Conform to ASTM A500/A500M, Grade B or C, and hot-dip galvanized in accordance with ASTM A123/A123M. Manufactured triangular slip bases must be approved by the Federal Highway Administration (FHWA) for use under the provisions of NCHRP 350, TL-2 or AASHTO MASH, TL-2. Submit a copy of the FHWA Acceptance Letter.

#### 2.1.4 Structural Steel H Section

Conform to ASTM A709/A709M, Grade 50 or 50W. Galvanize posts, fuse

plate and splice plate after fabrication in accordance with ASTM A123/A123M.

#### 2.1.4.1 Slip Base, Fuse Plate and Splice Plate

Conform to ASTM A36/A36M, minimum yield strength 345 MPa 50,000 psi.

#### 2.1.4.2 High-Strength Bolts, Nuts and Washers

High strength bolts must conform to ASTM F3125/F3125M. Nuts must conform to ASTM A563M ASTM A563. Washers must conform to ASTM F436/F436M. High strength bolts, nuts and washers must be zinc coated.

### 2.2 FLAT ALUMINUM SIGN PANELS.

Aluminum sign panels must conform to ASTM B209M ASTM B209, alloy-temper 6061-T6 or 5052-H38. The blanks must be free from laminations, blisters, open seams, pits, holes, other defects that may affect their appearance or use. The thickness must be uniform and the blank commercially flat.

### 2.3 EXTRUDED ALUMINUM SIGN PANELS.

Conform to ASTM B221M ASTM B221, alloy 6063-T6. The maximum allowable deviation from flat on the face is 0.05 inches per foot. Aluminum edge molding must be in accordance with ASTM A320/A320M or SAE J405d austenitic steel, minimum yield strength of 30,000 psi.

### 2.4 TRAFFIC SIGN RETROREFLECTIVE SHEETING.

All background sheeting applied to flat sheet and extruded panel signs must be in accordance with ASTM D4956, Type III, IV, VII, VIII, IX or XI retroreflective sheeting and must have Class 1, 3, or 4 adhesive backing. Retroreflective sheeting must be high intensity that is an unmetallized micro prismatic reflective material.

Retroreflective sheeting must have sufficient adhesion, strength and flexibility such that the sheeting can be handled, processed and applied according to the manufacturer's recommendations without appreciable stretching, tearing, cracking or other damage.

#### 2.4.1 Legend and Border.

Apply retroreflective sheeting as legend and border in accordance with ASTM D4956, Type IX, XI, or AASHTO M 268 Type C or D, Class 1. Retroreflective sheeting must be an unmetallized cube corner microprismatic reflective material. Retroreflective sheeting applied as legend and border for specific signing applications, without a datum mark on the surface of the sheeting, must be evaluated for rotational sensitivity in accordance with AASHTO M 268, Section 3.3.1 and fabricated in accordance with AASHTO M 268, Section 3.3.2.

#### 2.4.2 Screen Printed Transparent Colored Areas

For screen printed transparent colored areas or transparent colored overlay films on white sheeting, the coefficient of retroreflection (RA) must be no less than 70 percent of the original values for the corresponding color.

#### 2.4.3 Adhesive Performance

Adhesive performance for retroreflective sheeting must be in accordance with ASTM D4956. The sheeting surface must be in condition to be readily screen processed and compatible with transparent overlay films, plus recommended transparent and opaque screen process colors. Furnish manufacturer's information as to the type of solvent or solvents that may be used to clean the surface of the sheeting without detrimental loss of performance and durability.

## 2.5 LETTERS, NUMERALS, ARROWS, SYMBOLS, AND BORDERS.

Apply letters, numerals, arrows, symbols, and borders on the retroreflective sheeting or opaque background of the sign using the direct or reverse screen process. Apply messages and borders of a color darker than the background to the paint or the retroreflective sheeting using the direct process. Messages and borders must be of a color lighter than the sign background and applied using the reverse screen process. Use opaque or transparent colors, inks, and paints of the type and quality recommended by the retroreflective sheeting manufacturer in the screen process. Perform the screening in a manner that results in a uniform color and tone, with sharply defined edges of legends and borders and without blemishes on the sign background that will affect intended use. Air dry or bake the signs after screening according to the manufacturer's recommendations to provide a smooth hard finish. Reject any signs with blister's or other blemishes.

## 2.6 DELINEATOR POSTS.

### 2.6.1 Steel Posts

Fabricate posts from steel conforming to ASTM A36/A36M or ASTM A499 and having a minimum yield strength of 30 ksi and a minimum tensile strength of 50 ksi. Galvanize posts after punching in accordance with ASTM A123/A123M.

### 2.6.2 Flexible Posts

Provide one-piece driveable or two-piece with driveable steel anchor flexible posts. Posts must be impact-resistant, integrally colored UV stabilized polymer or polycarbonate extrusion or fiberglass reinforced composite material. Other materials are subject to approval by the Contracting Officer's Representative. Include a retroreflective sheeting plate with each post as indicated.

## 2.7 DELINEATOR RETROREFLECTORS.

### 2.7.1 Circular Prismatic Reflectors

Retroreflectors attached to steel posts must be a 3-inch minimum diameter acrylic plastic lens with prismatic optical elements and a smooth, clear, transparent face. Fabricate the back from similar material and fuse to the lens around the entire perimeter to form a homogeneous unit. Permanently seal the units against the intrusion of dust, water, or air. Mount the retroreflector unit in a housing fabricated from 1.6 mm

0.063-inch aluminum alloy or similar, or from cold-rolled, hot dip, galvanized steel, having a thickness of 0.064 inches. Provide the indicated color.

#### 2.7.2 Retroreflective Sheeting

A retroreflective sheeting plate must be applied to each flexible post by the post manufacturer and must be in accordance with ASTM D4956, Type III, IV, V, VII, VIII, IX or XI retroreflective sheeting. Retroreflective sheeting must be high intensity that is an unmetallized cube corner micro prismatic reflective material. Provide the size and color of the retroreflective sheeting plate as indicated.

#### 2.8 HARDWARE.

Bolts, nuts, post clips, lock and flat washers must be either aluminum alloy or commercial quality stainless steel, hot-dip galvanized or cadmium plated after fabrication. Bolts/nuts must be an approved tamper resistant design. Provide fiber washers of commercial quality.

#### 2.9 CONCRETE.

ASTM C94/C94M, using 3/4 inch maximum aggregate, and having minimum compressive strength of 3000 psi at 28 days.

### **PART 3 EXECUTION.**

#### 3.1 SIGN POSTS.

##### 3.1.1 Round Steel Tube

Sign posts consist of a base post and sign post. Embed steel sign base posts in concrete as indicated. Install manufactured triangular slip bases in accordance with the manufacturer's instructions.

#### 3.2 SIGN PANELS.

Clean, degrease and etch the face of metal panels using methods recommended by the retroreflective sheeting manufacturer. After cleaning and degreasing, apply retroreflective sheeting material to the sign panels as recommended by the manufacturer. Perform shearing, cutting and punching prior to preparing the blanks for application of reflective material. Do not field drill holes in any part of the panel. Use nylon washers recommended by the sign sheeting manufacturer between the bolt heads and sign faces on flat sheet aluminum signs. Replace any damaged sign panels at no additional cost to the Government.

#### 3.3 DELINEATORS.

Drive steel delineator posts into the ground in a manner that will not damage the post. Attach flexible delineator posts to steel anchors or drive into the soil in accordance with the manufacturer's instructions. Demonstrate the method of installation for the Contracting Officer's Representative to verify that posts will be installed without being damaged.

#### 3.4 LOCATION AND POSITION OF SIGNS.

Locate and erect all signs in accordance with the drawings and MUTCD. Vertically mount signs at right angles to the direction of, and facing, the traffic that they are intended to serve. Where mirror reflection from the sign face is encountered to such a degree as to reduce legibility, turn the sign slightly away from the road. Turn signs that are placed 30 feet or more from the pavement edge toward the road. On curved alignments, determine the angle of placement by the direction of approaching traffic rather than by the roadway edge at the point where the sign is located. Mounted signs must present a smooth flat surface varying no more than 3/8 inch from a 4-foot straightedge placed in any position on the face of the sign after erection. Mount signs on traffic signal posts with strap or clamp type sign supports. Each installed sign will be inspected by the Contracting Officer's representative prior to acceptance by the Government.

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