

## Evaluation Table

<b>PEP ID:</b>	XXXXX
<b>Manufacturer:</b>	Name of Manufacturer
<b>Product Name:</b>	Name of Product

606, 607, 608 Signing

608 Sign Panels (Extruded Aluminum)(with Demountable Characters)

ADOT Standard Specification: 608

ADOT Stored Specification: 608PANEL

ADOT Standard Drawing: S series drawings, as applicable

Responsible Section: Traffic Group

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Sheeting Warranty	608-2.01	Signs shall be fabricated in accordance with the recommendations established by the manufacturer of the sign sheeting. All processes and materials used to make a sign shall in no way impact the performance, uniform appearance (day and night), or durability of the sheeting, or invalidate the sign sheeting manufacturers' warranty.		
Background / Legend	608-2.01	All sheeting used for background and legend shall be from the same manufacturer.		
Letter Orientation	608-2.01	All text and numerals shall all be installed at the same orientation: either zero degrees or 90 degrees.		
Fabrication	608-2.02	Panels shall be fabricated from 12-inch wide aluminum extrusions formed from Aluminum Alloy 6063-T6 conforming to the requirements of ASTM B221.		
Panel Surfaces, preparation	608-2.02	Panel surfaces to be covered with retroreflective sheeting shall be prepared in accordance with the recommendations of the sheeting manufacturer.		
Panel Surfaces, etching	608-2.02	Panel surfaces not covered with sheeting shall be etched in accordance with the recommendations of the extrusion manufacturer to reduce glare from reflected sunlight.		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Panel, preparation	608-2.02	After all fabrication has been completed, including the cutting and punching of holes, except holes for demountable letters, numerals, symbols, and borders, the aluminum extrusions shall be degreased and the retroreflective sheeting shall be applied.		
Length Tolerance	608-2.02	Aluminum extrusions shall be flat with 1/4 inch of tolerance allowed in an 8-foot length, with proportionally greater tolerances permitted on lengths greater than 8 feet.		
Flatness Tolerance	608-2.02	Flatness tolerance across the face of each extrusion shall be 0.5 percent of the width.		
Assembly	608-2.02	Aluminum extrusions shall be bolted together on 12-inch centers with a maximum allowable gap of 1/32 inch between extrusions.		
Side Trim Molding	608-2.02	Each completed sign panel shall be provided with a side trim molding fabricated from extruded Aluminum Alloy 6063-T6 conforming to the requirements of ASTM B221.		
Side Trim Molding	608-2.02	The trim molding shall be fastened to each individual 12-inch aluminum extrusion with two 5/32-inch diameter self-plugging aluminum blind rivets, 2-1/2 inches from either edge.		
Side Trim Molding	608-2.02	The exposed surface of the side trim molding shall be treated by etching as recommended by the manufacturer to reduce glare from reflected sunlight.		
Hardware	608-2.02	Each completed sign panel shall be shipped with sufficient bolt clamps placed to install the panel on the sign posts as shown in the plans.		
Retroreflective sheeting, sign-making inks, and opaque films	608-2.07	Retroreflective sheeting, sign-making inks, and opaque films shall conform to the requirements of Section 1007 of the specifications. (attach corresponding 1007 evaluation table)		
Letters, Numerals, Symbols & Borders	608PANEL, Section 608-2.02	The letters, numerals, symbols, borders, and other features of the sign message shall be direct-applied, or demountable, and shall conform to the requirements of Subsection 608-2.08 or Subsection 608-2.09 of the specifications. (see below for Section 608-2.08 requirements, Demountable Characters)		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Demountable Characters	608-2.08(A)	Letters, numerals, symbols, route shields, borders, and other features of the sign message shall consist of cut-out, flat sheet aluminum legends, with direct-applied sign sheeting or other finishes, that are mounted to the sign panel with rivets as described herein.		
Demountable Characters	608-2.08(A)	Flat sheet aluminum substrates used for characters and borders shall be either aluminum alloy 3105-H14, 3003-H14, 5052-H36, or 5052-H38 as specified in ASTM B209.		
Demountable Characters	608-2.08(A)	Characters produced from the flat sheet aluminum alloy shall sit flat on the face of the sign panel without visible gap or deformation.		
Demountable Characters	608-2.08(A)	The thickness for letters and numbers shall be 0.032 inches.		
Demountable Characters	608-2.08(A)	The thickness for symbols, route shields, and borders shall be 0.063 inches.		
Demountable Characters	608-2.08(A)	All aluminum shall be chemically treated with a chromate acid conversion type coating, or equivalent, to form an oxidation resistant barrier film that is suitable for long term outdoor application.		
Demountable Characters	608-2.08(A)	The coating shall prevent the occurrence of oxidation that may cause streaking or discoloration on the sign. The coating shall be applied in accordance with the manufacturer's specifications, and shall have a minimum thickness of 0.002 inches.		
Demountable Characters	608-2.08(A)	All corners and edges of the characters shall be clean and well-defined with no apparent waviness, tears, delamination, deformation, or flaws. Burrs and waste material generated from the cutting process shall be removed so characters have a clean, flat, and correct appearance.		
Demountable Characters	608-2.08(A)	Splicing of aluminum panels will be acceptable for diagrammatic arrows or other large symbols and shields exceeding 48 inches in more than one direction.		
Demountable Characters	608-2.08(A)	Splices, when required, shall include a continuous 4 to 6-inch wide aluminum back plate that overlaps the joint. The back plate shall ensure no gap at the splice joint when the symbol is assembled and attached to the sign.		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Demountable Characters	608-2.08(A)	Borders on signs with demountable characters shall also be made of aluminum substrate panels, unless otherwise specified. However, in all cases borders on signs with demountable characters shall be made of the same material as the legend.		
Demountable Characters	608-2.08(B)	Sheeting or film applied to demountable characters shall be a continuous monolithic piece, without splice or patch, that covers the entire front face of the character. Splicing of the sheeting for demountable borders or characters which have a dimension larger than 48 inches in more than one direction will be allowed. Only one splice shall be allowed every 4 feet. When a splice is necessary, the adjoining edges shall be placed so there is no visible gap between the two pieces.		
Demountable Characters	608-2.08(B)	The color for demountable letters, numbers, symbols, and route shields on green, blue, and brown background signs shall be white, and shall conform to the requirements of Section 1007 of the specifications. Demountable legends on white and yellow background signs shall be black, and shall be opaque and non-reflective. Black characters shall be finished with laminated black opaque acrylic film.		
Demountable Characters	608-2.08(B)	When borders are used with demountable characters, white legend and border shall be used on green, blue, or brown sign backgrounds, and black legend and border shall be used on white or yellow sign backgrounds. Sign sheeting conforming to Section 1007 of the specifications shall be used for white borders. Black borders shall be laminated black opaque acrylic film.		
Demountable Characters	608-2.08(B)	On combination signs, such as a green background sign with white characters that also includes a smaller panel with yellow background and black characters, the color scheme used for the characters and border for each portion of the sign shall be as specified above, i.e. white legend and border shall be used on the green background portion of the sign and black legend and border shall be used on the yellow background portion.		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Demountable Characters	608-2.08(C)	Self plugging aluminum, protruding, regular head blind rivets shall be used to secure all demountable characters. The rivets shall conform to the applicable requirements of International Fasteners Institute (IFI) 114 standard for break mandrel blind rivets. All rivets shall be 5/32 inch in diameter with the appropriate grip range.		
Demountable Characters	608-2.08(C)	Rivets shall be either IFI 114 Grade 10 or 11 aluminum alloy rivets. The rivets shall have an ultimate shear and tensile strength that has been determined by IFI 135 Specification 2.1 and 2.2. The ultimate shear and tensile strength shall meet or exceed those values specified for a 5/32 inch (0.1562) nominal rivet diameter per IFI 114 Table 6 for Grades 10 or 11. A higher strength and grade aluminum rivet can be used at the option of the sign fabricator.		
Demountable Characters	608-2.08(C)	Rivets securing the characters to the back panel shall be of sufficient length to ensure a secure attachment and conform to the grip length specifications of the rivet manufacturer. The determination of rivet grip length shall include the total thickness of the joint. This thickness shall include the character (sheeting and aluminum sheet), spacer (if applicable) and the sign back panel (sheeting and aluminum extrusion).		
Demountable Characters	608-2.08(C)	The hole size used to install the rivets shall conform to the recommendation of the rivet manufacturer and Table 2 of IFI 114. Rivets shall be placed a minimum of four times the diameter of the rivet from the edge of the character being attached, e.g., 5/8 inch clearance for a 5/32 inch diameter rivet. Clearance shall be measured to the outside of the rivet head.		
Demountable Characters	608-2.08(C)	Straight numerals and letters such as "1" shall have three rivets, one at the top, middle and bottom. The more complex numerals and letters shall have from four to seven rivets. Letters such as "W" and "M" typically require seven rivets. Letters and numerals such as "P", "H" and "9" typically require six rivets. Letters and numerals such as "G", "S", "2", "3" and "7" typically require five rivets.		

Material Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
Demountable Characters	608-2.08(C)	A rivet shall secure each corner of the letter or numeral. For shields and symbols, rivets shall be spaced evenly around the entire perimeter. Additional rivets shall be added in the middle of the shield or symbol as necessary to eliminate bowing. Rivets for borders shall be spaced evenly around the border.		
Demountable Characters	608-2.08(C)	The actual number of rivets used will depend on the thickness, configuration, weight, position (with or without spacers), size of the character being attached, and the recommendations of the rivet manufacturer. The number and location of rivets shall be sufficient to secure the character to the panel so it shall not miss-align, bend or move when subjected to wind loading. Additionally, the number of rivets used shall ensure that the character does not bow or pull away from the back panel for the life of the sign. Rivets shall be placed in a defined, evenly spaced pattern which is consistent from character to character. The placement and pattern of rivets shall not interfere with the appearance of the sign from normal drive-by viewing distances.		
Demountable Characters	608-2.08(C)	The protruding head and shaft of the rivets shall closely match the color of the character on which they are being applied, e.g., black characters shall be applied with black rivets. Aluminum colored rivets are acceptable for mounting white characters.		
Demountable Characters	608-2.08(C)	The coating used to color the rivets shall be a factory-applied anodized type finish, or equivalent, that is suitable for long term outdoor application. The coating shall have durable colorfastness and shall be capable of preventing the occurrence of oxidation that may cause streaking or discoloration on the sign. Non-factory painting of the protruding heads of the rivets is not acceptable.		