

extent, sizes, and complete details of the membrane waterproofing, including detailed installation instructions.

- (g) **Certification.** Furnish a type D certification for the materials specified above in accordance with Subsection 106.04.

SECTION 718

PREMOLDED ASPHALT PLANK

718.01. ASPHALT PLANK.

- (a) **Description.** This Subsection covers asphalt plank for use on railroad bridges.
- (b) **General Requirements.** Premolded asphalt plank shall conform to the requirements of the current AREA Specifications, Chapter 29, Part 2, Section B, Article 4g.

SECTION 719

SIGNS

Description. This Section establishes the requirements for materials for signs in Section 850.

719.01. PANELS.

- (a) **Aluminum.**
 1. **Sheet Aluminum.** Sheet aluminum signs shall be ASTM B 209 alloy 6061-T6 or 5052-H38 with mill finish. Thickness, dimensions, hole sizes, and hole locations shall be shown on the Plans. All panels shall be flat and straight within commercial tolerances established by the aluminum industry.

Sheet aluminum signs shall be treated with a chromate type chemical conversion coating in accordance with ASTM B 449, Class II.
 2. **Extruded Aluminum.** Extruded aluminum panel signs shall be ASTM B 221 alloy 6063-T6. Thickness, dimensions, hole sizes and hole locations shall be as shown on the Plans. All panels shall be flat and straight within commercial tolerances established by the aluminum industry. The extruded aluminum shall be free of corrosion, white rust, and dirt.

Type A edge strip shall be aluminum ASTM B 221 alloy 6063-T6. Aluminum type B sheet metal screws with slotted pan heads shall be placed on 24 inch (609.6 mm) centers maximum to secure the edge strips to the sign panels. On signs with width of 36 inches (914.4 mm) or less, a minimum of three screws shall be used.
- (b) **Sign Faces.** All sign faces are to be made in accordance with the detailed drawings as shown in the latest revision of the Manual on Uniform Traffic Control Devices for Streets and Highways, and/or as shown on the Plans.
- (c) **Basis of Acceptance.** A type A or B certification is required for acceptance of sign panels, extrusions, and shapes covered in this Section.

719.02. SUPPORT ARMS AND FITTINGS.

- (a) **Materials.** Sign supports for sheet signs shall be structural steel conforming to AASHTO M 183 or aluminum alloy conforming to ASTM B 221 alloy 6063-T6.
- (b) **Fabrication.** Fabrication of all signs, bracket arms and fittings shall be accomplished in a uniform and workmanlike manner. All fabrication, including cuttings, shearing and punching, shall be completed prior to metal degreasing, etching, and application of reflective sheeting. All parts shall be cut to size and shape and shall be free of buckles, warp, dents, cockles, burrs, and all defects resulting from fabrication.
- (c) **Basis of Acceptance.** A type A or B certification is required for acceptance of material in this Section.

719.03. SHEET AND EXTRUDED ALUMINUM SIGN FASTENERS.

Bolts for fastening sheet aluminum signs to sign bracket arms shall be aluminum fasteners and collars of the size shown on the Plans.

Panel bolts, hex nuts, post clip bolts, stop nuts, and flat washers shall be aluminum ASTM B 209 alloy 2024-T4. Extruded aluminum signs shall be attached to posts on each side as shown on the Plans with post clip, post clip bolt, and nut and flat washer. Flat washers shall be used under each nut to prevent gouging.

719.04. RETROREFLECTIVE AND NONRETROREFLECTIVE SHEETING.

- (a) **Description.** Retroreflective sheeting used in the fabrication of reflectorized sign faces shall be of types as follows:

Type II - A medium-high intensity retroreflective sheeting, typically enclosed lens glass-bead sheeting.

Type III - A high-intensity retroreflective sheeting, typically encapsulated glass-bead reflective material.

Type IV - A high-intensity retroreflective sheeting, typically an unmetallized microprismatic retroreflective element material.

All retroreflective sheeting shall be of the Type II classification unless otherwise required by Plan details or the proposal.

All sheeting shall be weather resistant and have a precoated adhesive backing protected by a removable liner.

- (b) **Requirements.**

1. **Photometric.** Material requirements for all retroreflective sheeting shall be in accordance with the provisions of AASHTO M 268.
2. **Tests and Samples.** Furnish a certified test report confirming compliance with the requirements noted in these Specifications. In addition, furnish at least one set of four 12 x 12 inch (300 x 300 mm) samples of each color and each lot of material involved in the Contract for evaluation and verification tests by the Department.

Verify colors by comparing samples with color tolerance charts published by the FHWA. Noticeable variation of color in a production run shall be cause for ordering inspection of all sign faces and the rejection of any sign face outside of the tolerances provided by the color tolerance charts.

All testing shall be in accordance with AASHTO M 268.

All completed signs shall be inspected on the project by the Resident Engineer. Faulty application, blemishes or other faults that might impair the serviceability of the sign or any noticeable color mismatching, when viewed from a distance of 25 feet (7.6 m) under both daylight and night time conditions, shall be cause for rejection of any sign face.

719.05. SIGN COPY.

(a) **Screen Copy.**

1. **Direct Screening Process.** The direct screening process may be used for applying nonreflectorized copy on reflectorized or nonreflectorized backgrounds. This method is normally applicable to black copy.
2. **Reverse Screening Process.** The reverse screening process shall be used to provide reflectorized messages on colored backgrounds by the use of transparent color stencil paste applied to a sheeting background of silver white color. This method is normally applicable to a requirement for white copy, for example, the "STOP" sign.
3. **Material and Application.** Material for application by the silk screen method shall be a top quality exterior baking screen enamel or stencil paste manufactured especially for use on roadway signs and compatible with the type sign background material being used. Application of screened copy and curing thereof shall be in strict accordance with the manufacturer's recommendations of the background material.
Colors shall be durable and consistent with the requirements of the FHWA Standards Colors Charts for Signs. The color shall be uniform in acceptable hue when viewed in daylight or under normal headlights at night.
4. **Final Finish.** All of the above mentioned signs shall be treated after completion as prescribed in Subsection 850.04(d).
5. **Tests.** All screening enamel, stencil pastes, and process inks when applied in accordance with recommended procedure and exposed to accelerated weathering for 1000 hours in accordance with Federal Test Method 141/6151 shall show no appreciable discoloration, cracking, crazing, blistering, or lifting.

719.06. RETROREFLECTIVE AND NON-RETROREFLECTIVE CUTOUT LETTERS, NUMERALS, ARROWS, SYMBOLS AND BORDERS.

- (a) **General.** Letter design shall be in accordance with the 1966 FHWA standard alphabets (as revised). Retroreflective cutout letters shall be Type III or Type IV retroreflective sheeting as specified in the Plans and shall meet the requirements of Subsection 719.04.