

# EXPECTED IMPLEMENTATION JULY 2024 (FY 2024-25)

## 965 GENERAL PROVISIONS FOR ALUMINUM ITEMS (INCLUDING WELDING)

(REV 4-28-23) (FA 11-30-23) (FY 2024-25)

SECTION 965 is deleted and the following substituted:

### 965-1 General.

This Section covers the material and fabrication requirements for aluminum components. Provide aluminum light poles and Gantry J-arms from Producers who are approved in one of the following fabrication categories:

1. American Institute of Steel Construction, Highway Component

Manufacturer

2. American Welding Society, Certified Welding Fabricator
3. Canadian Welding Bureau, Fusion Welding of Aluminum (W47.2).

### 965-2 Fabrication.

Provide fabricated components in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, the Design Plans, and this section. Verify the strength of each Lot by tensile test. Alternate testing will not be accepted. Protect against damage and marring during transit and delivery. Provide an anodic coating (minimum 0.0002 inch) and chromate seal all hardware.

An American Welding Society certified welding inspector must visually inspect all welds for final approval. A certifying statement from the welding inspector must be provided with the component. The document must identify the project information, date of inspection, welding inspector name, and inspector certification number.

| Table 965-1<br>Material Requirements for Aluminum Components |             |              |   |
|--|-------------|--------------|---|
| Product  | Test Method | Alloy/Temper | Reported Properties                           |
| Pole, Arm, Extrusions  | ASTM B221   | 6061-T6      | Alloy, Temper,<br>Thickness, Tensile Strength |
|  |             | 6063-T6      |   |
| Pedestal, Posts  | ASTM B429   | 6061-T6      |   |
| Bars, Plates, Stiffeners,<br>Backing Ring, Shims,<br>Shapes  | ASTM B221   | 6063-T6      |   |
|  |             | 6061-T6      |   |
|  |             | 6061-T6      |   |
| Railing  | ASTM B221   | 6351-T5      |   |
|  |             | 6061-T6      |   |
|  |             | 6061-T6      |   |
|  |             | 6061-T6      |   |

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| Table 965-1<br>Material Requirements for Aluminum Components |             |                               |                               |
|--|-------------|-------------------------------|-------------------------------|
| Product  | Test Method | Alloy/Temper                  | Reported Properties           |
| J-Arm Tube   | ASTM B429   | 6061-T6                       |                               |
|  | ASTM B221   |                               |                               |
| J-Arm Connection Plate                                       | ASTM B209   | 6061-T6                       |                               |
| Sheet  | ASTM B209   | 6061-T6                       |                               |
|  |             | 5154-H38                      |                               |
|  |             | 5052-H38                      |                               |
| Structural Shapes  | ASTM B308   | 6061-T6                       |                               |
|  | ASTM B221   |                               |                               |
| Single Column Ground<br>Sign<br>Sand Castings                | ASTM B26    | A356-T6                       |                               |
|  | ASTM B108   | A356-T61                      |                               |
| Washers  | ASTM B221   | 7075-T6<br>2024-T4            |                               |
| Button Head or Flat<br>Head Bolts                            | ASTM F468   | 2024-T4<br>6061-T6            | S2 Lot Testing, Alloy, Temper |
| Hex Nuts   | ASTM F467   | 6061-T6<br>6262-T9<br>2024-T4 | S2 Lot Testing, Alloy, Temper |

**965-2.1 Light Poles:** Provide aluminum lighting poles in accordance with this section and Table 965-1. Weld arms and poles in the T4 condition, using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code. Weld to castings in accordance with 965-2.3. Heat treat the arm and pole, until aged to the T6 condition. Transverse welds are only allowed at the base. Equip poles with a vibration damper, when specified in the contract documents.

Provide exterior surface with a clean, uniform silvery appearance, free of dark streaks and discoloration. Finish the pole and arm with a satin rubbed finish.

**965-2.2 Overhead Sign Components:** Provide aluminum toll gantry J-arms in accordance with this section and Table 965-1. Weld tube to plate connections in the T4 or T6 condition, using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code. Heat treat tube and plate in the T4 condition until aged to the T6 condition.

Provide exterior surface with a clean, uniform silvery appearance, free of dark streaks and discoloration.

**965-2.3 Castings:** Provide aluminum castings in accordance with this section and Table 965-1. Weld aluminum castings to itself or aluminum tube to castings using the filler metal ER4043, in accordance with AWS D1.2 Aluminum Structural welding Code. Heat treat the castings, until aged to the T6 condition.

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**965-2.4 Railing:** Provide aluminum railing in accordance with this section and Table 965-1. Weld aluminum railing using the filler metal ER4043, ER4047, ER5183, ER5356, or ER5556 in accordance with AWS D1.2 Aluminum Structural welding Code.

**965-2.5 Static Sign Assemblies:** Provide aluminum sheet, plate, and structural shapes in accordance with this section and Table 965-1. Weld structural profiles to itself or aluminum components using ER4043, ER4047, ER5183, ER5356 or ER5556 in accordance with AWS D1.2 Aluminum Structural Welding Code. Heat treat the structural profiles, until aged to the T6 condition.

**965-2.6 Transformer Bases (Excluding Lighting):**

**965-2.6.1 Product Acceptance:** Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation, showing that the product meets the applicable requirements.

| Table 965-2<br>Submittal Compliance Requirements |   |
|--|---|
| Documentation                                    | Requirements  |
| Certified Test Report                            | Shows that product meets Moment Capacity  |
| Installation Instructions                        | Include installation instructions   |
| Product Identification Photo                     | Display's the manufacturer's name or logo and the model number.   |
| Product Photo                                    | Displays the significant features of the product as required in this section.   |
| Technical Data Sheet or Product Drawing          | Uniquely identifies the product and includes product details, notes, material specifications, dimensions, and sizes meeting the specification |

**965-2.6.2 Physical Requirements:** Meet the requirements of Table 965-3.

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| Table 965-3<br>Physical Requirements for Transformer Base |  |   |
|---|--|---|
| Feature   | Requirement  | Documentation                           |
| Height  | Base is 12 to 18 inches in height  | Technical Data Sheet or Product Drawing |
| Base Material   | ASTM B26, 356 T6 or 319  | Technical Data Sheet or Product Drawing |
| Threaded Hub  | Hub located at the top for mounting a nominal 4-inch Schedule 40 (4-1/2-inch outside diameter) aluminum pole. The threaded hub must be tapped to allow full pole engagement. | Technical Data Sheet or Product Drawing |
| Fastening   | Provides for fastening to a foundation with four 3/4-inch anchor bolts located 90 degrees apart. The base design must allow for bolts that are placed off-center.            | Technical Data Sheet or Product Drawing |
| Door Size   | Provides a door opening of not less than 8 inches by 8 inches.   | Technical Data Sheet or Product Drawing |
| Door Material   | The door must be constructed of fiberglass or other non-combustible, non-aluminum material.  | Technical Data Sheet or Product Drawing |

| Table 965-3<br>Physical Requirements for Transformer Base |   |   |
|---|---|---|
| Door Attachment   | Attach the door to the base with cleats and one stainless steel socket button head screw or by other means suitable for NEMA 3 electrical enclosures. | Technical Data Sheet or Product Drawing |
| Moment Capacity   | Supports an ultimate moment capacity of 10,000 foot-pounds, without breaking, cracking or rupturing in any manner.                                    | Certified Test Report                   |
| Breakaway   | Meets the requirements in the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.                  | FHWA Eligibility Letter.                |

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## **965-3 Paint for Poles, Pedestals, and Posts.**

Paint systems used on aluminum poles, pedestals, and posts shall meet the color requirements as specified in the Contract Documents. All paint systems shall possess physical properties and handling characteristics that are compatible with the application requirements of Section 646. Materials shall be specifically intended for use over aluminum. Paint systems shall exhibit no loss of adhesion or total color difference ( $\Delta E^*_{ab}$ ) greater than 8.0 units for five years after final acceptance as specified in 5-11. An aluminum pole, pedestal, post, or sign panel that exhibits a cumulative surface area of delamination in excess of 50 square inches will constitute an adhesion failure. Delamination shall be defined as any area of exposed metal surface subsequent to hand tool cleaning. A  $\Delta E^*_{ab}$  value exceeding 8.0 units per the International Commission on Illumination L\*a\*b\* 1976 (CIELAB) space and color difference formula, measured in accordance with ASTM D2244, will constitute a color retention failure.

The Department will measure and enter in the Department's database the CIELAB color chromaticity coordinates for the color of the top coat of sample coupons provided as required by 646-2.7 using a BYK-Gardner Handicolor colorimeter using D65 illuminant and 2-degree geometry settings. The Department-measured CIELAB chromaticity coordinates shall define the initial color and will be used for resolution of color retention failures and the resolution of color retention disputes.

## **965-4 Certification.**

Produce a certificate of compliance for non-APL products, upon request of the Engineer. Certificates of compliance shall identify the reportable properties of Table 965-1.