



Florida Department of Transportation

RON DESANTIS
GOVERNOR

605 Suwannee Street
Tallahassee, FL 32399-0450

KEVIN J. THIBAUT, P.E.
SECRETARY

January 6, 2022

Khoa Nguyen
Director, Office of Technical Services
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, Florida 32312

Re: State Specifications Office
Section: **965**
Proposed Specification: **9650000 General Provisions for Aluminum Items (Including Welding)**.

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Tim McCullough from the State Materials Office to update the language that will meet project needs and provide the ability for a quick review of project requirements.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to daniel.strickland@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at (850) 414-4130.

Sincerely,

Signature on file

Daniel Strickland, P.E.
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.
State Construction Engineer

**GENERAL PROVISIONS FOR ALUMINUM ITEMS
(INCLUDING WELDING)
(REV 11-10-21)**

SECTION 965 is deleted and the following substituted:

965-1 General.

This Section covers the material and fabrication requirements for aluminum components. All aluminum light poles, J-arms, and railings supplied under this Specification shall be from producers currently on the Department's Production Facility Listing. Producers seeking inclusion on the Department's Production Facility Listing must meet the requirements of Section 105.

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. ~~Provide certifications as specified in 965-4, upon request.~~ Protect against damage and marring during transit and delivery.

<u>Table 965-1</u>				
<u>Material Requirements for Aluminum Components</u>				
<u>Product</u>	<u>Test Method</u>	<u>Alloy/Temper</u>	<u>Reported Properties</u>	
<u>Pole, Arm, Extrusions</u>	<u>ASTM B221</u>	<u>6061-T6</u>	<u>Alloy, Temper, Thickness, Tensile Strength</u>	
		<u>6063-T6</u>		
<u>Pedestal, Posts</u>	<u>ASTM B429</u>	<u>6061-T6</u>		
<u>Bars, Plates, Stiffeners, Backing Ring, Shims, Shapes</u>	<u>ASTM B221</u>	<u>6063-T6</u>		
		<u>ASTM B209</u>		<u>6061-T6</u>
<u>Railing</u>	<u>ASTM B221</u>	<u>6351-T5</u>		
		<u>6061-T6</u>		
				<u>ASTM B241</u>
				<u>ASTM B210</u>
<u>J-Arm Tube</u>	<u>ASTM B429</u>	<u>6061-T6</u>		
		<u>ASTM B221</u>		
<u>J-Arm Connection Plate</u>	<u>ASTM B209</u>	<u>6061-T6</u>		
<u>Sheet</u>	<u>ASTM B209</u>	<u>6061-T6</u>		
		<u>5154-H38</u>		
		<u>5052-H38</u>		
<u>Structural Shapes</u>	<u>ASTM B308</u>	<u>6061-T6</u>		
<u>Single Column Ground Sign Sand Castings</u>	<u>ASTM B26</u>	<u>A356-T6</u>		
	<u>ASTM B108</u>			

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.

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.

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

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

Table 965-1 Material Requirements for Aluminum Components				
Product	ASTM	Alloy/Temper	Reportable Properties	Supplementary Requirements
Pole, Arm, Extrusions	B221	6061-T6	Alloy, Temper, Thickness	Report Tensile Strength
		6063-T6		
Bars, Plates, Stiffeners, Backing Ring, Shims, Shapes	B221	6063-T6		
	B209	6061-T6		
Castings	B26	356-T6		
	B108			
Railing	B221	6351-T5		
	B241	6061-T6		
	B210			
	B429			
J-Arm Tube	B429	6061-T6		
	B221			
J-Arm Connection Plate	B209	6061-T6		
Sheet	B209	6061-T6		
		5154-H38		
		5052-H38		
Structural Shapes	B308	6061-T6		

Table 965-3 Physical Requirements for Transformer Base		
Feature	Requirement	Documentation
<u>Height</u>	<u>Base is 12 to 18 inches in height</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Base Material</u>	<u>ASTM B26, 356 T6 or 319</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Threaded Hub</u>	<u>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.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Fastening</u>	<u>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.</u>	<u>Technical Data Sheet or Product Drawing</u>

<u>Door Size</u>	<u>Provides a door opening of not less than 8 inches by 8 inches.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Door Material</u>	<u>The door must be constructed of fiberglass or other non-combustible, non-aluminum material.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Door Attachment</u>	<u>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.</u>	<u>Technical Data Sheet or Product Drawing</u>
<u>Moment Capacity</u>	<u>Supports an ultimate moment capacity of 10,000 foot-pounds, without breaking, cracking or rupturing in any manner.</u>	<u>Certified Test Report</u>
<u>Breakaway</u>	<u>Meets the requirements in the AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.</u>	<u>FHWA Eligibility Letter.</u>

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 (ΔE^*_{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 ΔE^*_{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 ~~all aluminum castings~~ non-APL products, upon request of the Engineer. ~~Produce other certificates of compliance at the request of the Engineer.~~ Certificates of compliance shall identify the reportable properties of Table 965-1 ~~that the material has been sampled and tested in accordance with the applicable ASTM and shall include the reportable properties and supplementary requirements of the applicable Sections listed above.~~

**GENERAL PROVISIONS FOR ALUMINUM ITEMS
(INCLUDING WELDING)
(REV 11-10-21)**

SECTION 965 is deleted and the following substituted:

965-1 General.

This Section covers the material and fabrication requirements for aluminum components. All aluminum light poles, J-arms, and railings supplied under this Specification shall be from producers currently on the Department’s Production Facility Listing. Producers seeking inclusion on the Department’s Production Facility Listing must meet the requirements of Section 105.

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.

Table 965-1 Material Requirements for Aluminum Components			
Product	Test Method	Alloy/Temper	Reported Properties
Pole, Arm, Extrusions	ASTM B221	6061-T6	Alloy, Temper, Thickness, Tensile Strength
		6063-T6	
Pedestal, Posts	ASTM B429	6061-T6	
Bars, Plates, Stiffeners, Backing Ring, Shims, Shapes	ASTM B221	6063-T6	
	ASTM B209	6061-T6	
Railing	ASTM B221	6351-T5	
	ASTM B241	6061-T6	
	ASTM B210		
	ASTM B429		
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	
Single Column Ground Sign Sand Castings	ASTM B26	A356-T6	
	ASTM B108		

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.

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 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

Table 965-3 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
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.

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 (ΔE^*_{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 ΔE^*_{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.