



*Florida Department of Transportation*

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SECRETARY

January 28, 2020

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

Re: State Specifications Office  
Section: **967**  
Proposed Specification: **9670000 Components for Guardrail.**

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 eliminate confusion on the order of delivery and ability to verify material prior to installation.

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

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

Sincerely,

Signature on file

Daniel Strickland, P.E.  
State Specifications Engineer

DS/ra

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**COMPONENTS FOR GUARDRAIL**  
(REV ~~12-1423-210~~)

SECTION 967 is deleted and the following substituted:

**967-1 General Description.**

This Section covers the material and fabrication requirements for guardrail components. All timber and steel components 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.

**967-2 Timber Posts and Timber Offset BlocksMaterials.**

~~All timber and steel components 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.~~

~~967-2.1 Timber:~~ Timber products must have a minimum stress grade of 1200 psi and meet the material requirements of Section 954. Timber is to be dressed on four sides (S4S) and treated in accordance with the post requirements in Section 955. Timber posts and offset blocks shall be shaped and drilled prior to wood treatment. Posts shall not vary more than 1 inch and offset blocks shall not vary more than 0.25 inches from the specified dimensions shown in the Standard Plans.

**967-3 Steel Components**

~~967-2.2 Steel: Steel guardrail materials must meet the component fabrication requirements in 967-3.~~

~~Steel materials must meet the requirements of Table 967-1 below.~~

Production facilities must submit certified mill analyses to the Department for review and approval. Certified mill analyses must be signed by a quality control representative, describe each lot of components, and show compliance with Table 967-1.

All steel components must be melted and manufactured in the United States. The certified mill analysis must show that the included material meets the Buy America, Source of Supply-Steel requirements in Section 6.

Where specified, components must be welded in accordance with the American Welding Society Structural Welding Code ANSI/AWS D1.1 using material conforming to E60XX. Nondestructive testing of welds is not required.

<u>Table 967-1</u>				
<u>Material Requirements for Steel Guardrail Components</u>				
<u>Product</u>	<u>Standard</u>	<u>Grade / Type</u>	<u>Style</u>	<u>Reportable Properties</u>
<u>Steel Panels</u>	<u>AASHTO M-180</u>	<u>Type 2</u>	<u>W-Beam</u>	<u>Heat, Yield, Tensile, Elongation, Class, Type</u>
		<u>Class A (12 Ga.)</u>	<u>Thrie-Beam</u>	
		<u>Class B (10 Ga.)</u>	<u>Thrie-Beam Transition</u>	

<u>Table 967-1</u> <u>Material Requirements for Steel Guardrail Components</u>				
<u>End Pieces</u>	<u>AASHTO M-180</u>	<u>Type 2 Class A (12 Ga.) Class B (10 Ga.)</u>	<u>All</u>	<u>Yield, Tensile, Class, Type</u>
<u>Steel Posts &amp; Offset Blocks</u>	<u>ASTM A36</u>	<u>36</u>	<u>All</u>	<u>Killed, Yield, Tensile, Elongation</u>
	<u>ASTM A992</u>	<u>50</u>	<u>All</u>	
<u>Rub Rail</u>	<u>AASHTO M-180</u>	<u>Type 2 Class A (12 Ga.) Class B (10 Ga.)</u>	<u>All</u>	<u>Heat, Yield, Tensile, Elongation, Class, Type</u>
<u>Pipe Rail</u>	<u>ASTM A53</u>	<u>A, B</u>	<u>E, S</u>	<u>Grade, Finish</u>
<u>Steel Tube Foundations</u>	<u>ASTM A500</u>	<u>B</u>	<u>Round, Shaped</u>	<u>Composition, Yield, Tensile, Elongation</u>
<u>Brackets &amp; Fixtures</u>	<u>ASTM A36</u>	<u>36</u>	<u>All</u>	<u>Killed, Yield, Tensile, Elongation</u>
<u>Bolts</u>	<u>ASTM A307</u>	<u>A, B</u>	<u>Button-Head</u>	<u>Size, Composition, Hardness, Tensile</u>
			<u>Hex</u>	
			<u>Heavy-Hex</u>	
<u>Nuts</u>	<u>ASTM A563</u>	<u>A, B, C, C3, D, DH, DH3</u>	<u>Heavy Hex</u>	<u>Size, Composition, Proof Load, Hardness</u>
<u>Washers</u>	<u>ASTM F436</u>	<u>1, 3</u>	<u>Circular, Beveled, Clipped, Extra Thick</u>	<u>Size, Hardness</u>

**967-3 Fabrication.**

~~967-3.1 Posts: Posts shall not vary more than 1 inch from the specified length shown in the Standard Plans.~~

~~967-3.1.1 Timber Posts: Posts shall be shaped and drilled prior to wood treatment.~~

~~967-3.1.2 Steel Posts, Special Steel Posts, Steel Offset Blocks, and Rub Rail: Posts must conform to the requirements of ASTM A6, ASTM A36 or ASTM A992. Posts must be fabricated from rolled sections with cross-sections defined in the American Institute of Steel Construction (AISC) Manual of Steel Construction. Complete all fabrication prior to galvanizing. Galvanizing shall have the composition that meets or exceeds "Prime Western Grade" in accordance with ASTM B6. Posts must be drilled or punched prior to galvanizing in accordance with ASTM A123. Posts shall not vary more than 1 inch and offset blocks shall not vary more than 0.25 inches from the specified dimensions shown in the Standard Plans.~~

~~967-3.2 Special Steel Posts:~~ Posts and plate materials must meet the requirements of ASTM A6 and ASTM A36. Posts and plates must be drilled, punched, and welded prior to galvanizing in accordance with ASTM A123.

~~967-3.3 Offset Blocks:~~ Offset blocks must not vary more than 0.25 inch from the specified dimensions in the Standard Plans.

~~967-3.3.1 Steel Offset Blocks:~~ Blocks must meet the requirements for steel posts.

~~967-3.3.2 Timber Offset Blocks:~~ Blocks must meet the requirements for timber posts.

~~967-3.3.3 Composite Offset Blocks:~~ Composite offset blocks must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit an application in accordance with Section 6 and include the following:

~~1. Test reports from an independent laboratory showing the product meets all crash test requirements of MASH.~~

~~2. Test reports from an independent laboratory showing the composite material meets the following physical requirements:~~

Table 967-1		
Composite Block	Test Method	Requirement
Durometer Hardness	ASTM D2240 Shore D	Minimum 50
Durometer Hardness after UV exposure	ASTM D5870	<15 points change from initial after exposure per ASTM D4329, 1000 hours, cycle C, type UVB-313 lamps

~~967-3.24 Steel Panels and End Pieces:~~ W-beam, thrie-beam, and thrie-beam transitions, must meet the requirements of Table 967-1 for steel panels. Terminal connectors, end shoes, end units, and all other compatible components ~~panels~~ must meet the requirements of Table 967-1 for end pieces. AASHTO M180 (for beams and rails), for either Class shown.

~~Galvanize shall have a composition that meets or exceeds "Prime Western Grade" in accordance with ASTM B6. Type II zinc coating is~~ will be required on all panels.

All w-beam, thrie-beam, and thrie-beam transition panels must be marked by a pressed stamp showing production lot information (e.g. AASHTO-approved brand registration, lot number, production date, operator, etc.). Upon approval of the certified mill analysis by the Department, each lot will be stored in the Department's database with a reference to the stamped information.

~~967-3.35 Bolts, Nuts, Washers, and Steel Plates:~~ Hex and button head bolts, including nuts, washers, and other accessories, must meet the material requirements of AASHTO M180, except bolts must be galvanized Galvanize hardware in accordance with ASTM A153. Galvanize steel plates in accordance with ASTM A153.

~~967-3.6 Barrier Delineators:~~ Barrier delineators must meet the requirements of Sections 705 and 993 and be listed on the APL.

~~967-3.7 End Delineators:~~ Retroreflective sheeting is to be yellow, Type IV or greater in accordance with Section 994 and listed on the APL.

~~967-3.8 Steel Plates:~~ Steel plates must meet the requirements of ASTM A36. Drill holes prior to galvanizing in accordance with ASTM A123.

**967-3.49 Pipe Rail:** Pipe is to be Schedule 40, ~~in accordance with ASTM A53 and, if~~ applicable, welded prior to galvanizing.

~~967-3.10 Rub Rail: Rail materials must meet the requirements of 967-3.4.~~

**967-3.511 Steel Tube Foundations:** ~~Steel tube foundations must meet the requirements of ASTM A500, Grade B. Galvanize steel tube foundations, brackets, and fixtures a~~After all punching, drilling, stamping, and welding is complete, ~~steel tube foundations are to be galvanized in accordance with ASTM A123 Galvanize in accordance with ASTM A123.~~

~~Brackets and fixtures must meet the requirements of ASTM A36. Foundations must be drilled or punched prior to galvanizing in accordance with ASTM A123.~~

### **967-4 Barrier Delineators.**

Barrier delineators must meet the requirements of Sections 705 and 993 and be listed on the APL.

### **967-5 End Delineators.**

Retroreflective sheeting is to be yellow, Type IV or greater in accordance with Section 994 and listed on the APL.

~~967-3.12 Approach Terminal Assemblies: Approach terminals must be listed on the APL.~~

~~Manufacturers seeking evaluation of their product for approval must submit:~~

~~1. A completed application in accordance with Section 6, including product drawings meeting the dimensions of Standard Plans, Index 536-001 and that is signed and sealed by a registered Florida P.E.~~

~~2. Independent test reports indicating that the product meets all crash test requirements of MASH.~~

### **967-6 Approved Products List.**

**967-6.1 Approach Terminal Assemblies:** Approach terminals must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit:

1. A completed application in accordance with Section 6, including product drawings meeting the dimensions of Standard Plans, Index 536-001 and that is signed and sealed by a registered Florida P.E.

2. Independent test reports indicating that the product meets all crash test requirements of MASH.

**967-6.2 Composite Offset Blocks:** Composite offset blocks must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit an application in accordance with Section 6 and include the following:

1. Test reports from an independent laboratory showing the product meets all crash test requirements of MASH.

2. Test reports from an independent laboratory showing the composite material meets the following physical requirements:

<u>Table 967-2</u>		
<u>Composite Block</u>	<u>Test Method</u>	<u>Requirement</u>
<u>Durometer Hardness</u>	<u>ASTM D2240 Shore D</u>	<u>Minimum 50</u>
<u>Durometer Hardness after UV</u>	<u>ASTM D5870</u>	<u>≤ 15 points change from</u>

<u>Table 967-2</u>		
<u>Composite Block</u>	<u>Test Method</u>	<u>Requirement</u>
<u>exposure</u>		<u>initial after exposure per ASTM D4329, 1000 hours, cycle C, type UVB-313 lamps</u>

**COMPONENTS FOR GUARDRAIL****(REV 1-14-21)**

SECTION 967 is deleted and the following substituted:

**967-1 General.**

This Section covers the material and fabrication requirements for guardrail components. All timber and steel components 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.

**967-2 Timber Posts and Timber Offset Blocks.**

Timber products must have a minimum stress grade of 1200 psi and meet the material requirements of Section 954. Timber is to be dressed on four sides (S4S) and treated in accordance with the post requirements in Section 955. Timber posts and offset blocks shall be shaped and drilled prior to wood treatment. Posts shall not vary more than 1 inch and offset blocks shall not vary more than 0.25 inches from the specified dimensions shown in the Standard Plans.

**967-3 Steel Components**

Steel materials must meet the requirements of Table 967-1 below.

Production facilities must submit certified mill analyses to the Department for review and approval. Certified mill analyses must be signed by a quality control representative, describe each lot of components, and show compliance with Table 967-1.

All steel components must be melted and manufactured in the United States. The certified mill analysis must show that the included material meets the Buy America, Source of Supply-Steel requirements in Section 6.

Where specified, components must be welded in accordance with the American Welding Society Structural Welding Code ANSI/AWS D1.1 using material conforming to E60XX. Nondestructive testing of welds is not required.

Product	Standard	Grade / Type	Style	Reportable Properties
Steel Panels	AASHTO M-180	Type 2 Class A (12 Ga.) Class B (10 Ga.)	W-Beam	Heat, Yield, Tensile, Elongation, Class, Type
			Thrie-Beam	
			Thrie-Beam Transition	
End Pieces	AASHTO M-180	Type 2 Class A (12 Ga.) Class B (10 Ga.)	All	Yield, Tensile, Class, Type

Table 967-1 Material Requirements for Steel Guardrail Components				
Steel Posts & Offset Blocks	ASTM A36	36	All	Killed, Yield, Tensile, Elongation
	ASTM A992	50	All	
Rub Rail	AASHTO M-180	Type 2 Class A (12 Ga.) Class B (10 Ga.)	All	Heat, Yield, Tensile, Elongation, Class, Type
Pipe Rail	ASTM A53	A, B	E, S	Grade, Finish
Steel Tube Foundations	ASTM A500	B	Round, Shaped	Composition, Yield, Tensile, Elongation
Brackets & Fixtures	ASTM A36	36	All	Killed, Yield, Tensile, Elongation
Bolts	ASTM A307	A, B	Button-Head	Size, Composition, Hardness, Tensile
			Hex	
			Heavy-Hex	
Nuts	ASTM A563	A, B, C, C3, D, DH, DH3	Heavy Hex	Size, Composition, Proof Load, Hardness
Washers	ASTM F436	1, 3	Circular, Beveled, Clipped, Extra Thick	Size, Hardness

**967-3.1 Steel Posts, Special Steel Posts, Steel Offset Blocks, and Rub Rail:** Posts must be fabricated from rolled sections with cross-sections defined in the American Institute of Steel Construction (AISC) Manual of Steel Construction. Complete all fabrication prior to galvanizing. Galvanizing shall have the composition that meets or exceeds “Prime Western Grade” in accordance with ASTM B6. Posts shall not vary more than 1 inch and offset blocks shall not vary more than 0.25 inches from the specified dimensions shown in the Standard Plans.

**967-3.2 Steel Panels and End Pieces:** W-beam, thrie-beam, and thrie-beam transitions must meet the requirements of Table 967-1 for steel panels. Terminal connectors, end shoes, end units, and all other compatible components must meet the requirements of Table 967-1 for end pieces.

Galvanize shall have a composition that meets or exceeds “Prime Western Grade” in accordance with ASTM B6. Type II zinc coating is required on all panels.

All w-beam, thrie-beam, and thrie-beam transition panels must be marked by a pressed stamp showing production lot information (e.g. AASHTO-approved brand registration, lot number, production date, operator, etc.). Upon approval of the certified mill analysis by the Department, each lot will be stored in the Department’s database with a reference to the stamped information.



**967-3.3 Bolts, Nuts, Washers, and Steel Plates:** Galvanize hardware in accordance with ASTM A153. Galvanize steel plates in accordance with ASTM A153.

**967-3.4 Pipe Rail:** Pipe is to be Schedule 40. If applicable, weld prior to galvanizing.

**967-3.5 Steel Tube Foundations:** Galvanize steel tube foundations, brackets, and fixtures after all punching, drilling, stamping, and welding is complete. Galvanize in accordance with ASTM A123.

**967-4 Barrier Delineators.**

Barrier delineators must meet the requirements of Sections 705 and 993 and be listed on the APL.

**967-5 End Delineators.**

Retroreflective sheeting is to be yellow, Type IV or greater in accordance with Section 994 and listed on the APL.

**967-6 Approved Products List.**

**967-6.1 Approach Terminal Assemblies:** Approach terminals must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit:

1. A completed application in accordance with Section 6, including product drawings meeting the dimensions of Standard Plans, Index 536-001 and that is signed and sealed by a registered Florida P.E.
2. Independent test reports indicating that the product meets all crash test requirements of MASH.

**967-6.2 Composite Offset Blocks:** Composite offset blocks must be listed on the APL. Manufacturers seeking evaluation of their product for approval must submit an application in accordance with Section 6 and include the following:

1. Test reports from an independent laboratory showing the product meets all crash test requirements of MASH.
2. Test reports from an independent laboratory showing the composite material meets the following physical requirements:

Table 967-2		
Composite Block	Test Method	Requirement
Durometer Hardness	ASTM D2240 Shore D	Minimum 50
Durometer Hardness after UV exposure	ASTM D5870	< 15 points change from initial after exposure per ASTM D4329, 1000 hours, cycle C, type UVB-313 lamps