



*Florida Department of Transportation*

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GOVERNOR

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KEVIN J. THIBAUT, P.E.  
SECRETARY

August 10, 2020

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

Re: State Specifications Office  
Section: **650**  
Proposed Specification: **6500202 Vehicular Traffic Signal Assemblies.**

Dear Mr. Nguyen:

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

The changes are proposed by Derek Vollmer by the Traffic Engineering and Operations Office to include new fail-safe requirements that have not been met by manufacturers and does not have requirements for flexible backplates.

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/rf

Attachment

cc: Florida Transportation Builders' Assoc.  
State Construction Engineer

**VEHICULAR TRAFFIC SIGNAL ASSEMBLIES****(REV ~~86-510-20~~)**

SUBARTICLE 650-2.2 is deleted and the following substituted:

**650-2.2 Twelve Inch Signal Head Assemblies:** Construct the assembly of materials and alloys specified in the ITE Standard for Vehicle Traffic Control Signal Heads.

Construct signal housings to allow adjustment in multiple directions for proper signal alignment. If a serrated connection is used for positioning and alignment of the signal, the top and bottom opening of each signal head section must include a circular 72-tooth serrated connection (2 inch nominal I.D.) capable of providing positive positioning and alignment in 5 degree increments. When assembled and tightened, these connections must prevent rotation or misalignment of the signal head as well as misalignment between sections. ~~The connection that mates to the disconnect hanger or other upper signal hanging component must incorporate a secondary fail-safe design that would prevent the signal from turning upon failure/slippage of the connection.~~ The serrated area must start at the outside of the 2 inch hole and be at least 1/8 inch wide. The teeth must have a minimum depth of 3/64 inch between peaks and valleys, be free from burrs or other imperfections, and provide positive locking with the grooves of mating sections, framework, and brackets. The serration on the top circular connection of a signal section must have a valley at the 0 degree position and the serration on the bottom circular connection must have a peak at the 0 degree position, both aligned perpendicular to the front of the section. Connections must permit the assembly of a multi-section signal with the front of each section aligned within 1 degree.

Provide at least two latching points with latch pads and manual Type 316 or 304 stainless steel latching devices that are tamper resistant.

If backplates are mechanically attached, each signal section must have four backplate mounting attachment points on the back of the signal, on or no more than three inches from each section corner. Attachment points must be capable of accepting No. 10-16x3/8 inch or No. 10-24x3/8 inch Type 316 or 304 stainless steel screws for attaching backplates.

Tri-stud washers, when utilized to secure signal sections, must have a minimum thickness of 0.090 inches. For five-section cluster assemblies, tri-stud washers used to attach the top signal section to the multi-signal bracket and the multi-signal bracket to the bottom four signal sections must have a minimum thickness of 3/8 inches. When fastened together, washer distortion is not allowed.

Design each signal section to prevent the accumulation of standing water within the assembly. All sections comprising a single multi-section assembly must be securely fastened together to form a rigid and weather-proof unit.

SUBARTICLE 650-2.2.7 is expanded by the following:

**650-2.2.7 Backplates:** Backplates may be constructed of either aluminum or plastic. Minimum thickness for aluminum backplates is 0.060 inch and the minimum thickness for plastic backplates is 0.120 inch. The required width of the top, bottom, and sides of backplates must measure between five to six inches. Color of backplates must be black in

accordance with 650-2.2.5. Backplate thickness measurement must not include the retroreflective sheeting thickness.

If backplates are mechanically attached, provide a minimum of four corner mounting attachment points per signal section (for example, a three-section signal assembly would have 12 mounting points). Attachment points must not interfere with the operation of traffic signal section doors. Backplate outside corners must be rounded and all edges must be deburred.

If louvers are provided, louver orientation must be vertical on sides and horizontal on top and bottom of the backplate and must be at least 1/2 inch from the inner and outer edge of the backplate panel. Universal backplates must fit all traffic signals listed on the APL.

Mount the backplate securely to the signal assembly with Type 316 or 304 passivated stainless steel installation hardware. Backplates, if mechanically attached, must be marked in accordance with 650-2.1, on the long sides of the backplate.

Backplates must include retroreflective borders using Type IV yellow retroreflective sheeting listed on the APL. Place a 2 inch border on the entire outer perimeter of the backplate panel, no closer than 1/2 inch from any louvers.

All materials must be designed for exterior use and be UV stable.

**650-2.2.7.1 Flexible Backplates:** Flexible backplates must allow the entire length of longer portions of the backplate to flex 90 degrees, or until the backplate width is reduced to 2.5 inches or less, when influenced by high wind conditions, and return to zero degrees after the wind conditions subside. Flexible backplates must maintain visibility of the retroreflective border to approaching traffic, with up to 40 mph winds.

ARTICLE 650-5 is deleted and the following substituted:

#### **650-5 Method of Measurement.**

The Contract unit price per assembly for vehicular traffic signal, furnished and installed, will consist of the traffic signal and all components necessary to make a complete unit, including mounting assemblies, backplates, visors, LED modules, labor, and materials necessary for a complete and accepted installation.

Separate payment for backplates will only be made for retrofitting existing signal heads, when called for in the Contract Documents.

ARTICLE 650-5 is deleted and the following substituted:

#### **650-~~6~~5 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

- |                         |   |
|-------------------------|---|
| Item No. 650- 1-        | Vehicular Traffic Signal - per assembly.        |
| <u>Item No. 650- 2-</u> | <u>Vehicular Signal Auxiliaries - per each.</u> |

## VEHICULAR TRAFFIC SIGNAL ASSEMBLIES (REV 8-5-20)

SUBARTICLE 650-2.2 is deleted and the following substituted:

**650-2.2 Twelve Inch Signal Head Assemblies:** Construct the assembly of materials and alloys specified in the ITE Standard for Vehicle Traffic Control Signal Heads.

Construct signal housings to allow adjustment in multiple directions for proper signal alignment. If a serrated connection is used for positioning and alignment of the signal, the top and bottom opening of each signal head section must include a circular 72-tooth serrated connection (2 inch nominal I.D.) capable of providing positive positioning and alignment in 5 degree increments. When assembled and tightened, these connections must prevent rotation or misalignment of the signal head as well as misalignment between sections. The serrated area must start at the outside of the 2 inch hole and be at least 1/8 inch wide. The teeth must have a minimum depth of 3/64 inch between peaks and valleys, be free from burrs or other imperfections, and provide positive locking with the grooves of mating sections, framework, and brackets. The serration on the top circular connection of a signal section must have a valley at the 0 degree position and the serration on the bottom circular connection must have a peak at the 0 degree position, both aligned perpendicular to the front of the section. Connections must permit the assembly of a multi-section signal with the front of each section aligned within 1 degree.

Provide at least two latching points with latch pads and manual Type 316 or 304 stainless steel latching devices that are tamper resistant.

If backplates are mechanically attached, each signal section must have four backplate mounting attachment points on the back of the signal, on or no more than three inches from each section corner. Attachment points must be capable of accepting No. 10-16x3/8 inch or No. 10-24x3/8 inch Type 316 or 304 stainless steel screws for attaching backplates.

Tri-stud washers, when utilized to secure signal sections, must have a minimum thickness of 0.090 inches. For five-section cluster assemblies, tri-stud washers used to attach the top signal section to the multi-signal bracket and the multi-signal bracket to the bottom four signal sections must have a minimum thickness of 3/8 inches. When fastened together, washer distortion is not allowed.

Design each signal section to prevent the accumulation of standing water within the assembly. All sections comprising a single multi-section assembly must be securely fastened together to form a rigid and weather-proof unit.

SUBARTICLE 650-2.2.7 is expanded by the following:

**650-2.2.7 Backplates:** Backplates may be constructed of either aluminum or plastic. Minimum thickness for aluminum backplates is 0.060 inch and the minimum thickness for plastic backplates is 0.120 inch. The required width of the top, bottom, and sides of backplates must measure between five to six inches. Color of backplates must be black in accordance with 650-2.2.5. Backplate thickness measurement must not include the retroreflective sheeting thickness.

If backplates are mechanically attached, provide a minimum of four corner mounting attachment points per signal section (for example, a three-section signal assembly

would have 12 mounting points). Attachment points must not interfere with the operation of traffic signal section doors. Backplate outside corners must be rounded and all edges must be deburred.

If louvers are provided, louver orientation must be vertical on sides and horizontal on top and bottom of the backplate and must be at least 1/2 inch from the inner and outer edge of the backplate panel. Universal backplates must fit all traffic signals listed on the APL.

Mount the backplate securely to the signal assembly with Type 316 or 304 passivated stainless steel installation hardware. Backplates, if mechanically attached, must be marked in accordance with 650-2.1, on the long sides of the backplate.

Backplates must include retroreflective borders using Type IV yellow retroreflective sheeting listed on the APL. Place a 2 inch border on the entire outer perimeter of the backplate panel, no closer than 1/2 inch from any louvers. All materials must be designed for exterior use and be UV stable.

**650-2.2.7.1 Flexible Backplates:** Flexible backplates must allow the entire length of longer portions of the backplate to flex 90 degrees, or until the backplate width is reduced to 2.5 inches or less, when influenced by high wind conditions, and return to zero degrees after the wind conditions subside. Flexible backplates must maintain visibility of the retroreflective border to approaching traffic, with up to 40 mph winds.

ARTICLE 650-5 is deleted and the following substituted:

**650-5 Method of Measurement.**

The Contract unit price per assembly for vehicular traffic signal, furnished and installed, will consist of the traffic signal and all components necessary to make a complete unit, including mounting assemblies, backplates, visors, LED modules, labor, and materials necessary for a complete and accepted installation.

Separate payment for backplates will only be made for retrofitting existing signal heads, when called for in the Contract Documents.

ARTICLE 650-5 is deleted and the following substituted:

**650-6 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

- Item No. 650- 1- Vehicular Traffic Signal - per assembly.
- Item No. 650- 2- Vehicular Signal Auxiliaries - per each.