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|  | FDOT Traffic Engineering Research Laboratory (TERL)  Vehicular Traffic Signal Assembly Compliance Matrix | By signing this form, the applicant declares that he/she has read and understands the provisions of Sections 650 and 995 of the *FDOT Standard Specifications for Road and Bridge Construction* and all implemented modifications. The requirements listed on this matrix are derived from Sections 650 and 995 and are the basis for determining a product’s compliance and its acceptability for use on Florida roads. |

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| --- | --- | --- | --- |
| Date: | Click here to enter a date. | Applicant’s  Name (print): |  |
| Manufacturer: |  |  |  |
| Item, Model No.: |  | Signature: |  |

|  |  | **\*\* Greyed out rows in table below are for TERL use only \*\*** |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **ID No** | **Section** | **Requirement** | **Item Comply? (Yes/No/NA)** | **Comments (Applicant must provide information as indicated)** | **TERL Evaluation Method** |
| The following compliance matrix criteria are for all signal heads. | | | | | |
| 1 | 995-1.1 | Vehicular traffic signal assemblies are marked with the manufacturer’s name or trademark, part or model number and date of manufacture or serial number. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 1) |  |  | Init.: |
| 2 | 995-4.1 | Vehicular traffic signal assembly meets the requirements of Section 603 and the Institute of Transportation Engineers (ITE) Standard for Vehicle Traffic Control Signal Heads. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 1) |  |  | Init.: |
| 3 |  | Fastening hardware such bolts, screws, nuts, washers, latches, and studs are SAE Type 316 or 304 stainless steel. |  | *Provide statement of conformance from hardware supplier that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 2) |  |  | Init.: |
| 4 |  | Horizontal signal assemblies are constructed so the door hinges, when installed, are located on the bottom of the signal assembly. Vertical mounted five-section cluster assemblies are constructed so that the door hinges, when installed, are located along the outside edges of the complete assembly and each section opens away from the horizontally adjacent section. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA002 (Steps 2 and 3) |  |  | Init.: |
| 5 | 995-4.2 | The assembly is constructed for 12-inch signal modules and is constructed of the materials and alloys specified in the ITE *Standard for Vehicle Traffic Control Signal Heads*. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and  Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 3), VTSA002 (Step 4) |  |  | Init.: |
| 6 |  | If a serrated connection is used for positioning and alignment of the signal, the top and bottom opening of each signal head section includes a circular 72-tooth serrated connection (2-inch nominal I.D.) capable of providing positive positioning and alignment of the signal head sections and the complete assembly in 5-degree increments. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 5) |  |  | Init.: |
| 7 |  | Serrated connections, when completely assembled and tightened in accordance with manufacturer recommendations, prevent rotation or misalignment of the signal head as well as misalignment between sections. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 6) |  |  | Init.: |
| 8 |  | The serrated area starts outside of the 2-inch hole and is at least 1/8- inch wide. The teeth have a minimum depth of 3/64-inch between peaks and valleys; are free from burrs, or other imperfections; and provide positive locking with the grooves of mating sections, framework, and brackets. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and  Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 4), VTSA002 (Step 7) |  |  | Init.: |
| 9 |  | The serration on the top circular connection of a signal section has a valley at the 0-degree position, aligned perpendicular to the front of the section; the serration on the bottom circular connection has a peak at the 0-degree position, aligned perpendicular to the front of the section. |  | *Provide a statement of conformance in this field.* | Compliance Matrix Review and Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 5), VTSA002 (Step 8) |  |  | Init.: |
| 10 |  | Serrated connections permit the assembly of a multi-section signal with the front of each section aligned within 1 degree. |  | *Provide a statement of conformance in this field.* | Compliance Matrix Review |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 6) |  |  | Init.: |
| 11 |  | Signal sections include at least two latch pads and manual Type 316 or 304 stainless steel latching devices that are tamper resistant. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 7), VTSA002 (Step 9) |  |  | Init.: |
| 12 |  | For mechanically attached backplates, each signal section has four back plate mounting attachment points. Each mounting point is no more than three inches from the corner of each section. Back plate attachment points are designed to accept 10-16 x 3/8 inch or 10-24 x 3/8-inch Type 316 or 304 stainless steel screws. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 8), VTSA002 (Step 10) |  |  | Init.: |
| 13 |  | Tri-stud washers, when utilized to secure signal sections, must have a minimum thickness of 0.090 inches. Tri-stud washers used to attach the top section of a 5-section cluster assembly to the multi-signal bracket and the multi-signal bracket to the bottom four sections are a minimum of 3/8-inch thick. Washers do not distort when fastened. |  | *Provide statement of conformance from hardware supplier that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 9) |  |  | Init.: |
| 14 |  | Each signal section is designed to prevent the accumulation of standing water within the assembly. |  | *Provide a statement of conformance in this field.* | Compliance Matrix Review |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 10) |  |  | Init.: |
| 15 |  | All sections comprising a single multi-section vehicular signal assembly are securely fastened together to form a rigid and weather-proof unit. |  | *Provide a statement of conformance in this field.* | Compliance Matrix Review and Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 11), VTSA002 (Step 11) |  |  | Init.: |
| 16 | 995-4.2.1 | Each signal section includes at least two hinges for mounting a door. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 12) |  |  | Init.: |
| 17 |  | Hinge pins are captive. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 13) |  |  | Init.: |
| 18 |  | Doors are captive and secure at all times and are capable of either left or right swing. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 14) |  |  | Init.: |
| 19 |  | Door latch holds the door tightly closed. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 15) |  |  | Init.: |
| 20 |  | Door includes slotted pads that allow the door to be opened and closed by engaging or disengaging the latching device. The outside face of the door includes four holes equally spaced around the circumference of the lens opening to accommodate the attachment of a visor. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 16) |  |  | Init.: |
| 21 |  | The lens opening in the door has a diameter of 11 to 11.5 inches. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 17) |  |  | Init.: |
| 22 | 995-4.2.2 | The rear of the visor has four tabs, notches, or holes for securing the visor to a signal housing door. The visor mounting method permits the visor to be rotated and secured at 90 degrees for horizontal signal head installations. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 18) |  |  | Init.: |
| 23 |  | Visors have a minimum downward tilt of 3.5 degrees measured from the center of the lens and are a minimum length of 9.5 inches. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 12), VTSA002 (Step 19) |  |  | Init.: |
| 24 |  | For tunnel visors, the visor encircles and shields the lens 300 degrees, plus or minus 10 degrees. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 13) |  |  | Init.: |
| 25 |  | If used, louvers are only used in combination with full circle visors |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 20) |  |  | Init.: |
| 26 |  | Light does not escape between the visor and the door. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 21) |  |  | Init.: |
| 27 | 995-4.2.3 | Gaskets are constructed of weather-resistant material and are glued or sealed where they meet to provide one continuous length of gasket capable of providing a weatherproof seal for the signal assembly. |  | *Provide a statement of conformance in this field.* | Compliance Matrix Review |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 14) |  |  | Init.: |
| 28 |  | Seals are provided between the housing and door, between the lens and the door, and between any other mating surfaces where dust and moisture could enter. |  | *Applicant may provide comments in this field.* | Physical Inspection |
|  |  | TERL Test Cases (Steps): VTSA002 (Step 22) |  |  | Init.: |
| 29 |  | Gaskets meet NEMA 250 and are constructed of temperature stabilized material that prevents any residue from collecting on the internal surfaces of the signal head. |  | *Provide statement of conformance from gasket supplier that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 15) |  |  | Init.: |
| 30 | 995-4.2.4 | Three section signal head assemblies have at least one five-connection terminal block; five section signal head assemblies have at least three five-connection terminal blocks. Terminal block connections do not require any tool other than a screwdriver. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review and  Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 16), VTSA002 (Steps 23, 24, and 25) |  |  | Init.: |
| 31 |  | Terminal blocks are mounted to the signal housing with Type 316 or 304 passivated stainless-steel hardware. Corrosion resistant screws are used on terminal blocks. |  | *Provide statement of conformance from hardware supplier that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 17) |  |  | Init.: |
| The following compliance matrix criteria are for aluminum signal head assemblies only. | | | | | |
| 32 | 995-4.2.5 | Housing, door, visor, and backplate are powder coated dull black (Federal Standard 595-37038) with a reflectance value not exceeding 25 percent as measured by American Society for Testing and Materials (ASTM) E1347. |  | *Provide product literature, specifications, user manual,or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 18) |  |  | Init.: |
| The following compliance matrix criteria are for plastic signal head assemblies only. | | | | | |
| 33 |  | Black color is incorporated into the plastic material before molding. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 19) |  |  | Init.: |
| The following compliance matrix criteria are for aluminum signal head assemblies only. | | | | | |
| 34 |  | The finish on interior and exterior surfaces of aluminum signal head assemblies, visors, doors, and housing, are painted in accordance with Military Standard MIL-PRF-24712A or American Architectural Manufacturers Association-2603-02 and must meet the requirements of ASTM D3359, ASTM D3363, and ASTM D522. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 20) |  |  | Init.: |
| 35 |  | Surface erosion, flaking, or oxidation will not occur within the normal life expectancy under typical installation conditions. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 21) |  |  | Init.: |
| The following compliance matrix criteria are for plastic signal head assemblies only. | | | | | |
| 36 | 995-4.2.6 | The housing, door, and visors are molded from ultraviolet stabilized plastic with a minimum thickness of 0.1 ± 0.01 inches. |  | *Provide product literature, specifications, user manual,or similar information that shows the product meets this requirement.* | Document Review and  Physical Inspection |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 22), VTSA002 (Step 26) |  |  | Init.: |
| 37 |  | The plastic formulation provides the following physical properties:  • Specific Gravity, 1.17 minimum, ASTM D 792  • Vicat Softening Temp., 305-325 °F; ASTM D 1525  • Brittleness Temp., Below -200 °F; ASTM D 746  • Flammability, Self-extinguishing; ASTM D 635  • Tensile Strength, Yield, 8500 PSI minimum; ASTM D 638  • Elongation at yield, 5.5 - 8.5%; ASTM D 638  • Shear Strength, Yield, 5500 minimum PSI; ASTM D 732  • Izod impact strength, 15 ft-lb/in;  ASTM D 256  • Fatigue strength, 950 PSI at 2.5 mm cycles;  ASTM D 671 |  | *Provide product literature, specifications, user manual,or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 23) |  |  | Init.: |
| The following compliance matrix criteria are for all signal head assemblies. | | | | | |
| 38 | 650-4 | Signal housings, backplates, and any other signal assembly components have a manufacturer’s warranty covering defects for a minimum of five years from the date of final acceptance in accordance with 5-11 and Section 608. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 24) |  |  | Init.: |
| 39 |  | Warranty includes providing replacements, within 10 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the Department or the maintaining agency. |  | *Provide product literature, specifications, user manual, or similar information that shows the product meets this requirement.* | Document Review |
|  |  |  |  | *Indicate location of requested information in submittal.* |  |
|  |  | TERL Test Cases (Steps): VTSA001 (Step 25) |  |  | Init.: |

**Document History for:**

**Vehicular Traffic Signal Assembly Compliance Matrix**

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| --- | --- | --- | --- | --- | --- | --- |
| Rev | Description | Authored and Checked | Reviewed | Approved | Approval Date | Rev More Stringent? |
| 1.0 | Update CM to reflect changes from A650 of MSTCSD to 650 of SSRBC. Revised document approver title. | R. Meyer  A. Burleson | J. Morgan | J. Morgan | 10/27/2014 | No |
| 2.0 | Update to latest FA date (12-23-14). No criteria change. | D. Bremer | J. Morgan | J. Morgan | 09/09/2015 | No |
| 3.0 | Updated CM to reflect spec changes for FA 8/1/2019 update. Added fail-safe to prevent turning and 740/7400 lb static loading requirements. | J. Morgan | M. DeWitt | D. Vollmer | 12/18/2019 | Yes |
| 4.0 | Remove requirement for secondary fail safe. | W. Geitz | C. Raimer  M. DeWitt | D. Vollmer | 12/29/2020 | No |
| 5.0 | Move Division 2 to \*995. Added warranty information to the CM. | W. Geitz | M. DeWitt  C. Raimer | D. Vollmer | 12/29/2021 | No |
| 6.0 | Update to the latest FA Date 10-24-22. Add test cases/steps. | W. Geitz  S. Cook | R. Washington  D. Bremer  M. DeWitt | D. Vollmer | 06/19/2023 | No |