

**STATE OF NEW JERSEY  
DEPARTMENT OF TRANSPORTATION  
TRENTON, NEW JERSEY 08625**

**METRIC SPECIFICATIONS FOR A GREEN LED (LIGHT EMITTING DIODE)  
TRAFFIC SIGNAL MODULE**

N.J. Specification No. EBM-GRNLED-TSM

Effective Date: July 1, 2001

New Jersey Department of Transportation Specifications for a GREEN LED (Light Emitting Diode) Traffic Signal Module.

The purpose of these specifications is to describe minimum acceptable requirements for a Green LED (Light Emitting Diode) Traffic Signal Module.

**GENERAL - I**

- 1-1 Green LED traffic signal modules shall conform to the following:
- A. Manual on Uniform Traffic Control Devices (MUTCD).
  - B. The current specification of the Institute of Transportation Engineering (ITE) standard titled Vehicle Traffic Control Signal Heads – Part 2: Light Emitting Diode (LED) Vehicle Traffic Signal Modules (VTCSH Part 2).
  - C. FCC Title 47, Subpart B, Section 15 on the Emission of Electronic Noise.

The manufacturer must supply a compliance certification to the current ITE VTCSH: Part 2 for chromaticity and intensity.

The manufacturer must supply certification, which includes a copy of the test report by an independent technical laboratory as to the module compliance with ITE specifications. The report shall also indicate that the tests were performed only after the modules received a thirty (30) minute operational warm-up period immediately preceding the tests.

**CONSTRUCTION - II**

- 2-1 The LED module shall replace the reflector, socket, gasket and lens assembly of the incandescent signal indication as specified in current New Jersey Department of Transportation Specification EBM-TS-1 "Specification for Adjustable Face Vehicle Traffic Control Polycarbonate Signal Head".
- 2-2 The LED module shall be watertight when properly mounted in the traffic signal housing and shall not allow the ingress of water into any section of the traffic signal assembly. A continuous soft rubber or silicone gasket completely surrounding the unit shall be provided with each unit.

- 2-3 The LEDs and required circuit components shall be encased in a rigid housing for protection in shipping, handling and installation.
- 2-4 The lens shall be ultraviolet stabilized material. The lens color shall be clear or uniformly tinted, provided the tinting does not affect the intensity or chromaticity. If polycarbonate material is used, the lenses must have a protective coating for scratch resistance.
- 2-5 The green LEDs shall be Gallium Nitride.
- 2-6 The beam color, beam intensity, and radiation pattern shall conform to the requirements for maintained minimum luminous intensity for LED signal modules and chromaticity as specified in the ITE (VTCSH, PART 2) standards.
- 2-7 The LED module must be certified to have passed the Environmental Simulation Vibration Test (MIL-Std 883 Method 2007).

### **ELECTRICAL - III**

- 3-1 The LED module shall connect directly to the line voltage, 120 volts nominal, and shall be able to operate over the voltage range of 80-130 volts AC. The variation in line voltage shall not cause the light intensity to vary by more than 10% over the entire operating voltage range.
- 3-2 A 200 millimeter nominal and 300 millimeter nominal LED module shall consume no more than 10 and 15 watts respectively.
- 3-3 The LEDs shall operate over the temperature range of -40 °C to +74 °C.
- 3-4 The forward current, as measured through each LED, shall not exceed 60% of the LED manufacture's maximum current rating when operating at +25 °C.
- 3-5 The LEDs shall be wired in series parallel strings. The failure of any one LED, and its associated string of LEDs, shall not cause the loss of more than 20% of the light output of the complete LED module.
- 3-6 The LEDs shall not emit visible light when subjected to a 120 volt AC, 4 milliamp leakage current from a NEMA solid state load switch (load switch in the off state).
- 3-7 Transient voltage suppression/protection shall be provided internal to the LED module to minimize the possibility of damage due to extreme over voltage.
- 3-8 The LED module shall be supplied with two conductors one (1) meter in length for each connection to the terminal board of the traffic signal indication. Each conductor shall be 600 volt, stranded No. 20 AWG minimum copper wire, rated for service at +105 °C, capable of withstanding all adverse effects of moisture, corrosive atmosphere and temperatures associated with the operation of the signal head. Spade lugs shall be installed on the ends of each conductor. The spade lugs must be capable of fitting under M4 screws.

**INSTRUCTION AND GUARANTEES - IV**

- 4-1 Upon request, one schematic wiring diagram and installation manual shall be provided with each LED module.
- 4-2 No changes or substitutions in these requirements will be accepted unless authorized in writing. Inquires regarding this specification shall be addressed to the Manager, Office of Traffic Signal and Safety Engineering, New Jersey Department of Transportation, 1035 Parkway Avenue, P.O. Box 613, Trenton, New Jersey 08625.
- 4-3 Green LED traffic signal modules shall be replaced or repaired if an green LED traffic signal module fails to function as intended due to workmanship material defects within the first 60 months from the date of delivery.
- 4-4 Green LED traffic signal modules which exhibit luminous intensities less than the minimum values specified in Section 4.1.1 of the current ITE VTSC, part 2 specification within the first 36 months of the date of delivery shall be replaced or repaired.
- 4-5 The company agrees upon the request of the Manager, Office of Traffic Signal and Safety Engineering to deliver to the Office, a sample of the LED module to be supplied in compliance with these specifications for test before acceptance. After completion of the test, the sample shall be returned.