

## BOSTON TRANSPORTATION DEPARTMENT

### SPECIFICATIONS FOR LIGHT EMITTING DIODE (LED) 12" VEHICLE TRAFFIC SIGNALS

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The purpose of this specification is to provide the minimum performance requirements for 300mm (12 inch) LED traffic signal indications. This specification refers to definition and practices described in **“Vehicle Traffic Control Signal Heads LED Circular Supplement and Vehicle Traffic Control Signal Heads, part 3 for Arrow Modules”** published in the *Equipment and Materials Standards of the Institute of Transportation Engineers*. This document shall be referred to herein as **“VTCSH”**. This specification applies to both circular ball and arrow LED vehicle signal indications.

LED units purchased under this specification shall comply with the Massachusetts Department of Public Works specification supplemented by the following requirements. Where requirements of the addenda conflict with the standard specifications, these addendum shall govern. The units shall be on the Massachusetts Highway “Approved List”.

#### **General**

LED traffic signal modules shall be designed as retrofit replacement for existing signal lamps and shall not require special tools for installation. Retrofit replacement LED signal modules shall fit into existing traffic signal housings built to the VTCSH standard and BTD 12 inch Traffic Signal Specifications dated November 8, 1993 without modification to the housing.

Installation of a retrofit replacement LED signal module into an existing signal housing shall only require removal of the existing signal lamp components, (i.e. lens, lamp module, gaskets and reflector), and shall be weather tight and fit securely in the housing. The LED signal shall be rated for 100,000 hours of continuous operation from -40 to +74 Degrees Celsius.

The LED signal module shall have prominent and permanent directional marking(s), that is, an “UP arrow”, the word “UP” or “TOP”, for correct indexing and orientation within a signal housing. The manufacturer’s name, trademark, serial number and other necessary identification shall be permanently marked on the backside of the LED signal module. A label shall be placed on the LED signal module certifying compliance to this specification.

### **LED Signal Module Lens**

The LED signal assembly shall replace the existing colored signal lens. The lens may be tinted with an appropriate color to reduce sun phantom effect and enhance on/off contrast. If the lens material is tinted, the tinting should be uniform across the face of the lens. The lens shall be capable of withstanding direct sunlight exposure for a minimum of 5 years without exhibiting evidence of deterioration.

### **Connections**

All wiring and terminal blocks shall meet the requirements of the VTCSH standard. Two captive, 2-color coded, 40 inch long, 600 volt, 16 AWG minimum, jacketed wires, conforming to the National Electric Code, rated for service at 105 Degrees Celsius, are to be provided for electrical connection. These wires shall be connected to the signal housing terminal block via standard fork/spade adapter to female slip termination and to the LED module via in-line Molex series 3191 type connectors located adjacent to the LED module. The fork/spade adapter shall allow for connection of wires to a screw terminal on a BTB standard terminal block or to a quick connect terminal block.

### **LED Drive Circuitry**

The individual LED light sources shall be wired so that a catastrophic failure of one LED light source will not result in the loss of illumination in more than 5 percent of the LED light sources. The LED signal module shall be operationally compatible with currently used controllers and conflict monitors. The LED signal circuitry shall prevent false controller conflict monitor action due to excessively high off-state input impedance.

### **Burn-in Procedure**

Each new LED signal module shall undergo the burn-in procedure in order to cause any electronic infant mortality to occur and to detect any electronic component reliability problem before the product is shipped to be installed. This procedure requires the LED module to be energized for a minimum of continuous 24 hours at operating voltage at a 100% duty cycle, and in an ambient temperature of 60 Degrees Celsius (140F).

### **Submittal**

Prior to manufacture of the order, the supplier shall submit a cut sheet with proposed mechanical and electrical features for approval by the Engineer. If so requested, the supplier shall provide a sample of the proposed product for evaluation and approval by the Engineer.

**Warranty Provision**

**MANUFACTURER SHALL PROVIDE A CERTIFICATE OF CONFORMANCE** to this specification for lot of LED signal modules shipped to the City of Boston Transportation Department. Each LED signal module shall be serialized by the manufacturer. Manufacturers shall comply with the following provisions:

1. Replacement or repair of an LED signal module that exhibits a failure due to workmanship or material defects within the first 60 months of operation.
2. Replacement or repair of LED signal modules that exhibit either greater than 40 percent light output degradation or that fall below the minimum intensity levels within the first 60 months of field operation.