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ELECTRICAL TESTING BRANCH
OFFICE OF ROADWAY MATERIALS TESTING
CALIFORNIA DEPARTMENT OF TRANSPORTATION

AUTHORIZATION PROCEDURES AND ACCEPTANCE CRITERIA FOR LED TRAFFIC SIGNAL MODULES

All LED Traffic Signal Modules to be used by the State of California Department of Transportation shall be on the Caltrans Authorized Material List before incorporation into any construction project.

Authorization of this material requires the following:

1. Manufacturer/Supplier Provides:
 - a. Model/Part Number
 - b. Test Report from a Nationally Recognized Testing Laboratory (NRTL), verifying the following parameters:
 - i. Max Power (watts) (at 70 °F & 120 VAC)
 - ii. LEDs utilized in the modules shall be AllInGaP technology for red, amber and yellow indications, or GaN for green indications, and shall be the ultra bright type rated for 100,000 hours of continuous operation from -40°C to +74°C.
 - iii. The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients as stated in Section 2.1.6 of NEMA Standard TS-2, 1992.
 - iv. The modules and associated on-board circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, SubPart B, Section 15 regulations concerning the emission of electronic noise.
 - v. The LED signal module shall be protected against dust and moisture intrusion per the requirements of NEMA Standard 250-1991 for Type 4 enclosures to protect all internal components.
 - vi. Mechanical vibration testing shall be as per MIL-STD-883, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 HZ to 120 HZ. The loosening of the lens, of any internal components, or other physical damage shall be cause for rejection.
 - vii. Temperature cycling shall be performed as per MIL-STD-883, Test method 1010. The temperature range shall be per "Environmental Requirements" from Caltrans Specifications. Module(s) being tested shall be energized and functioning throughout the duration of the test. Failure of a module to function properly or any evidence of cracking of the module lens or housing after temperature cycling shall be cause for rejection.
 - c. Required Documents and Test Reports:
 - i. Product spec sheet
 - ii. LED spec sheet
 - d. Description of Manufacturers Quality Control Procedures



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- e. Two LED traffic signal module samples for each submittal
- f. Ship the required reports and LED traffic signal module samples to the Caltrans' Transportation Laboratory in Sacramento:

**California Department of Transportation
Materials Engineering and Testing Services
MS #5: Electrical Testing Branch
5900 Folsom Boulevard
Sacramento, CA 95819-4612**

- 2. Caltrans will:
 - a. Ensure all required documentation is received.
 - b. Review the technical information.
 - c. Evaluate submitted samples for Compliance with Caltrans specifications. Caltrans testing will verify the photometric, electrical and physical/mechanical performance of the traffic signal modules per Caltrans Standard Specifications, Section 86-1.02R(4)(b).
 - d. Upon evaluation of the submitted technical information and Caltrans test results, issue an acceptance letter valid for two years or a rejection letter.
 - e. Update the Caltrans Authorized Material List, if applicable.
 - f. Request re-submittal of the qualification package from the manufacturer every two years.
- 3. For more information, you may contact the Electrical Testing Branch: James Rhodes at (916) 227-7112 or james.e.rhodes@dot.ca.gov