



**INDIANA DEPARTMENT OF TRANSPORTATION
DIVISION OF MATERIALS AND TESTS**

**PROCEDURE FOR BENCH TESTING, FIELD TESTING,
AND QPL REQUIREMENTS FOR 12 in.
LIGHT EMITTING DIODE (LED) TRAFFIC SIGNAL MODULES
ITM No. 933-23**

1.0 SCOPE.

- 1.1** This test procedure covers the methods that a 12 in. LED Traffic Signal Module is bench tested, evaluated in the field, and is placed, maintained, or removed from a qualified products list.
- 1.2** This ITM may involve hazardous materials, operations, and equipment and may not address all of the safety problems associated with the use of the test method. The user of the ITM is responsible for establishing appropriate safety and health practices and determining the applicability of regulatory limitations prior to use.

2.0 REFERENCES.

2.1 ITE Standards.

ITE Purchase specification for Vehicle Traffic Control Signal Heads

Vehicle Traffic Control Signal Heads Circular Supplement – 2005

Vehicle Arrow Traffic Signal Supplement-2004

2.2 NEMA Standards.

2003 NEMA Standards Publication TS-2 Traffic Signal Controller Assemblies

3.0 TERMINOLOGY. Definitions for terms and abbreviations shall be in accordance with the Department's Standard Specifications, Section 101 and NEMA TS-2 Section 1.

4.0 SIGNIFICANCE AND USE. This ITM is used to evaluate, approve, maintain approval, and remove from the QPL 12 in. LED Traffic Signal Modules which are placed on the Department QPL of Traffic Signal and ITS Devices. Each model of the 12 in. LED Traffic Signal Modules will be bench tested and field tested separately.

5.0 APPARATUS.

- 5.1** Complete TS-2 fully functional controller assembly and traffic signal head for typical deployment of a 12 in. LED Traffic Signal Module.

- 6.0 SAMPLING.** The manufacturer shall furnish, at no cost to the Department, three randomly selected production-run 12 in. LED Traffic Signal Modules of each model for bench testing and field testing.
- 7.0 PROCEDURE.**
- 7.1** The manufacturer of the material shall submit the Preliminary Product Evaluation Form (TD-477) for each model type of 12 in. LED Traffic Signal Modules, which the manufacturer is requesting to be added to the QPL.
- 7.2** The manufacturer of the material shall submit with the Evaluation Form (TD-477) the following:
- 7.2.1** An invoice showing an initial zero dollar amount (\$0.00) for the use of the evaluation sample material during the evaluation. The invoice shall also list the deferred cost of the material that the Department would pay if the material is purchased instead of returned upon the successful completion of the evaluation.
- 7.2.2** A certification of compliancy from an independent testing laboratory shall be furnished with each major unit evaluation request, specifically indicating that each model by number has been fully and completely tested according to the ITE testing procedures and is in complete compliance with all required specifications from the applicable ITE purchase specification. The certification shall specify the model and serial number of the 12 in. LED Traffic Signal Modules tested. A complete log of each test shall be provided to the Department and will be maintained by the Department. The log shall show which, if any, component failed during the test, when the component failed, and what steps were taken to repair the module.
- 7.2.3** Three randomly selected production run LED Modules for bench testing and field testing.
- 8.0 SUBMITTAL REVIEW.** The documentation, including the independent laboratory test results and certification, will be reviewed for usability of the 12 in. LED Traffic Signal Modules with Department qualified NEMA TS-2 traffic control equipment. The manufacturer's recommended schedule and extent of maintenance will be reviewed for acceptability.
- 9.0 BENCH TESTING.** The 12 in. LED Traffic Signal Modules will be bench tested for compatibility with all NEMA TS-2 signal controller assemblies used by the Department. The 12 in. LED Traffic Signal Modules will be verified for full functional ITE compliancy and full manufacturer's claimed optional functionality.

10.0 FIELD TESTING.

10.1 The field testing of the 12 in. LED Traffic Signal Modules will consist of installing the 12 in. LED Traffic Signal Modules in an actual traffic signal system for a period of up to 12 months to log the following:

10.1.1 Any failures of the 12 in. LED Traffic Signal Modules

10.1.2 The relative ease of use for the field personnel

10.1.3 Overall build and display quality of 12 in. LED Traffic Signal Modules. The requirements shall be comparable with existing **qualified** 12 in. LED Traffic Signal Modules.

11.0 REPORT. A final report will include the notations and findings from the electronic bench test and field testing results and documentation.

12.0 QPL.

12.1 Consideration of Inclusion of 12 in. LED Traffic Signal Modules. The 12 in. LED Traffic Signal Modules model may be placed on the **QPL** when the following conditions are met:

12.1.1 A potential net benefit to the Department is realized by inclusion of the item on the list

12.1.2 The unit meets the requirements of the listed in the ITE purchase specification

12.1.3 The bench and field testing are completed with satisfactory results

12.1.4 The required documentation is submitted

12.1.5 No excessive amount of routine or periodic maintenance is required

12.1.6 No failure with any of the different types of NEMA TS-2 traffic controller assemblies or individual traffic control components used by the Department

12.1.7 Only minimal maintenance operations were necessary during the field testing.

12.1.8 The standard warranty for the LED Traffic Signal Modules will be 15 years

12.2 Maintaining Standing on QPL..

- 12.2.1** The **Technology Support Division** shall be notified each time an update or revision is made, and the changes and benefits of the change shall be submitted for **review**. **The Technology Support** Division will determine if and to what extent a revision is to be placed into field operation and may fully re-evaluate the LED Module with the revision.
- 12.2.2** If the manufacturer makes any changes to **a qualified** model to correct a non-NEMA or non-ITE compliant or other safety issue, the Department shall be notified immediately. The manufacturer shall correct all existing equipment purchased by the Department either directly, by contract, or through agreement prior to the change being incorporated at the manufacturer's production level.
- 12.2.3** A design change to **a qualified** model shall require a submittal of documented changes. At the discretion of the Department, resubmission of the model for testing and evaluation may be required. Permanent addition or removal of component parts or wires, printed circuit board modifications, or revisions to memory or processor software are examples of items that are considered to be design changes.
- 12.3** **Removal from QPL.** 12 in. LED Traffic Signal Modules will be removed from **the qualified products** list for, but not limited to, the following reasons:
- 12.3.1** Changes in the 12 in. LED Traffic Signal Module ES components or production process that fail testing and/or evaluation
- 12.3.2** If three consecutive years elapse without furnishing a model of 12 in. LED Traffic Signal Modules
- 12.3.3** Performance of the 12 in. LED Traffic Signal Modules no longer meets the intended purpose
- 12.3.4** Recurring similar product failures indicative of a manufactures defect.