



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

**PROCEDURE FOR BENCH TESTING, FIELD TESTING,
AND APPROVAL LIST REQUIREMENTS FOR 12 in.
LIGHT EMITTING DIODE (LED) TRAFFIC SIGNAL MODULES
ITM No. 933-15**

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 an approval 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 approval listing 12 in. LED Traffic Signal Modules which are placed on the Department List of Approved Traffic Controller Equipment. 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 Material Evaluation Form (Appendix A) for each model type of 12 in. LED Traffic Signal Modules, which the manufacturer is requesting to be added to the listing.
- 7.2** The manufacturer of the material shall submit with the Evaluation Form 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 approval 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 approved 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 approved 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 APPROVAL LIST.**
- 12.1 Approval of 12 in. LED Traffic Signal Modules.** The 12 in. LED Traffic Signal Modules model may be placed on the approval list 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
- 12.2 Maintaining Approval.** To maintain approval, the manufacturer shall submit an annual certification of compliance in accordance with ITM 804 to the Highway Operations Division.
- 12.2.1** The Highway Operations Division Evaluations Section shall be notified each time an update or revision is made, and the changes and benefits of

the change shall be submitted for approval. Operations 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 an approved 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 an approved 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 Approval List. 12 in. LED Traffic Signal Modules will be removed from an approval 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

**INDIANA DEPARTMENT OF TRANSPORTATION
OFFICE OF TRAFFIC ENGINEERING
PRELIMINARY INFORMATION FOR PRODUCT MATERIAL EVALUATION**

Trade Name _____ Date _____

Manufacturer _____ Patented? Yes _____ No _____ Applied for _____

Address _____
Street No (P. O. Box) _____ City _____ State _____ Zip Code _____

Representative _____ Phone No () _____

Address _____
Street No (P. O. Box) _____ City _____ State _____ Zip Code _____

Product Information _____

Materials Composition _____

** Is this product considered HAZARDOUS MATERIAL when disposing of non-used or surplus materials? Yes _____ No _____

** What is the shelf life of this material? Years _____ Months _____ N/A _____

Recommended Use-Primary _____

Recommended Use-Alternate _____

Advantages and/or Benefits _____

** Materials specifications by manufacturer, installation/operation manual, maintenance manual, literature, test results, guarantee, hazardous material data sheets, plan, picture or sketch must be submitted with this form. In the case of electronic devices the schematic diagram, parts list, and parts layout diagram must be submitted for each printed circuit board within the device.

Meets following specifications:

AASHTO _____

ASTM _____

OTHER _____

Use by highway authorities or similar agencies in other states.

Agency	Years Used	Remarks
_____	_____	_____
_____	_____	_____
_____	_____	_____

** Has product ever been evaluated by and rejected for use by a governmental agency?

Yes _____ No _____ If yes, by what agency and for what reason?

Will demonstration be provided? Yes _____ No _____

Availability: Seasonal _____ Nonseasonal _____ Delivery at site _____

After receipt of order, are quantities limited? Yes _____ No _____

** Will FREE SAMPLES be furnished? Yes _____ No _____
If yes, Quantity Furnished _____

** If the sample is salvageable, do you desire to have it returned Yes _____ No _____

(Desired return of salvageable samples will be at the supplier's expense.)
(The manufacturer agrees upon the return of salvageable samples, such samples may be damaged or non-operable. Normal care will be taken that the samples, when returned, are in operable condition; INDOT, however, does not guarantee that the returned samples are operable.)

Will laboratory analysis be furnished? Yes _____ No _____

** Approximate cost _____ Royalty Cost _____

When was the product introduced to the market? _____

This product is an alternate for what product? _____

Will warranty be provided? Yes _____ No _____ If yes, for how long? _____

Background of company, including principal products _____

What offices of the Indiana Department of Transportation have been contacted?

Additional Information _____

(Attach additional sheets as necessary)

Person furnishing information _____
Name Title

Address _____
Street No (P. O. Box) City State Zip Code

Items marked ** MUST BE RESPONDED TO or further consideration may not be given for this product.

Please mail this form to: Director, of Traffic Engineering
100 N. Senate Ave., Room N758-TE
Indianapolis, IN 46204

If INDOT elects to evaluate your product/material - traffic signal equipment shall be shipped to:

Electronic Technician Supervisor
Indiana Department of Transportation
8620 E. 21st Street
Indianapolis, IN 46219

While all other materials to be evaluated will be shipped to:

Traffic Evaluations
Indiana Department of Transportation
8620 E. 21st Street
Indianapolis, IN 46219