

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENT 1097
LED (LIGHT EMITTING DIODE) LAMP
PREQUALIFICATION PROCEDURE
April 15, 2011**

1097.01 Description

1097.02 Approval

1097.03 Removal from the Prequalified List

1097.04 Reapproval

1097.05 Modifications to Prequalified LED Lamps

1097.06 Annual Recertification

1097.01 Description This Supplement describes the procedure by which the Department will prequalify LED (Light Emitting Diode) Lamps for inclusion on the Department's Qualified Products List (QPL).

1097.02 Approval Provide the following to the Office of Traffic Engineering:

- A. Certified test data (no older than 2 years) from an independent Laboratory which describes how each requirement of 732.04.C is met. The following test results should be provided:

1. Conditioning
2. Mechanical Vibration
3. Temperature Cycling
4. Moisture Resistance
5. Luminous Intensity
6. Luminance Uniformity
7. Chromaticity
8. Color Uniformity
9. Lens Abrasion Resistance
10. Current Consumption
11. Low Voltage Turn Off
12. Turn-On/Turn-Off Times
13. Transient Voltage Immunity
14. Electronic Noise
15. Power Factor and Total Harmonic Distortion
16. Load Switch Compatibility
17. Offstate Voltage Decay Test
18. Failed State Impedance Test

- B. Two samples of each color LED lamps for which approval is being requested.

The Department will test the samples to ensure conformance with 732.04.C.

The Department will also test the samples for DC Power Disconnect. This test is also called Dark Signal Head or Absence of Signal (ABS). To clarify this definition; the vehicle absence in presence of Walk function detects the absence of all three vehicle signals (R,Y,G) as a fault **regardless of the state of Walk** if Red Enable is active. The DC voltage source (wire or appropriate discrete component) is removed from circuit. This action should cause the voltage to the LED PC Board to drop to zero volts, causing all LEDs to go dark. If the LED lens is designed to ODOT's specification, the conflict monitor should see a Dark Signal Head conflict and transfer into flash operation. If the LED lens performs properly, the lens is graded as having passed the test.

C Schematic diagram

D. The manufacturer name, brand and model number of all LEDs used, along with the LED manufacturer's recommended drive current and degradation curves.

The Department will review the submitted test reports, schematic diagrams and its own test results. If the lamps meets the specification, the lamps will be added to the Department's Qualified Products List.

1097.03 Removal from the Prequalified List An LED lamp shall be removed from the prequalified list if the lamp has substantially or recurrently failed to perform satisfactorily in the field.

1097.04 Reapproval An LED lamp removed from the QPL due to unsatisfactory field performance shall not be returned to the list until the manufacturer identifies the reason for the failure and the problem has been corrected to the satisfaction of the Department. Experiences of other States and governmental agencies may be considered in this action. Also additional test dates may be required to satisfy that the problem have been corrected.

1097.05 Modifications to Prequalified LED Lamps It is recognized that manufacturers will occasionally modify certain aspects of their products in an effort to enhance performance, improve durability, reduce costs or for other similar reasons. Notify the Department whenever modifications are made to LED lamps contained on the QPL. Include descriptive literature of the modification and certify that the modified lamp meets or exceeds the requirements of 732.04.C. The Department will review the submittal and verify if the modified lamp meets the specifications. Modified lamps meeting the specifications will be retained on the QPL.

1097.06 Annual Recertification By January 1st of each calendar year manufacturers must recertify that the LED lamp supplied meets or exceeds the requirements of 732.04.C. Address modifications in accordance with 1097.05. Lamps not recertified will be removed from the QPL effective February 1st.

Designer's Note

None required. Supplement establishes procedures for becoming a certified Light Emitting Diode material supplier. Activation of the supplement will be through boiler plate proposal note and direct reference in the specifications