# LED EVP Conformation Indication Specification

This indication is intended for use in traffic signal systems that have Emergency Vehicle Preemption (EVP) systems that utilize conformation (verify) indications for the emergency vehicle operators.
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## 1. Environmental

1. All exposed components shall be suitable for prolonged exposure to an outdoor environment.
2. The unit must operate over the temperature range of -40 Degrees F to +165 degrees F.
3. The lens shall not crack, craze or yellow due to solar UV irradiation.

## 2. Construction

1. Shall be constructed of UL94 flame retardant materials.
2. Shall be a single self-contained unit
3. Shall be a screw in replacement for a 120VAC RMS PAR 38 flood lamp.
4. Shall weigh 8 ounces or less.
5. Shall have a 2 ½ to 3 ½ inch diameter visible light target or face.
6. Shall have an optical lens that diffuses the source light to provide a larger perceived target value.

## 3. Electrical Characteristics

1. Shall operate from a 60 HZ +/- 3 HZ line over a voltage ranging from 80 - 135 VAC RMS
2. Operating voltage shall be 120 VAC RMS.
3. Shall have a maximum power consumption of 10 watts.
4. Shall have a Power Factor > 90%
5. Shall have no visible illumination when the applied voltage is less than 55 VAC RMS
6. Shall be capable of sinking a minimum of 20 milliamps of current in the off state. When a current of 20 mA AC (or less) is applied to the unit the voltage read across the leads shall be 14VAC RMS or less.
7. Shall not allow more than 14VAC RMS to be developed across the device due to leakage current from the loadswitch in the off state.
8. Shall be able to operate on a circuit that flashes at a rate of 50 to 60 times a minute at a 50 % duty cycle.
9. Shall have LED's configured that in the event of a single LED failure no more than ½ of the light output will be lost.
10. Life expectancy 10,000 hours.

## 4. Warranty

1. 5 years minimum from the date of installation.

## 5. Acceptance Testing

1. This unit will be subjected to the stated flash rate for a period of 24 hours at room temperature. If the unit passes this portion it will then be tested at the temperatures as stated above. The rate of temperature change will be 30 ° F per hour. The unit will then be subjected to testing as defined in Appendix A. The unit must continue to operate thru all of the testing without any failure.

## 6. Photometric Requirements

1. The photometric measurements shall be made by following the Institute of Transportation Engineers VTCS Chapter 2 Paragraph 11: Dated April 1985
2. The minimum initial luminous intensity values shall be as stated in Table 1-1. The ambient temperature shall be 25 Degrees C

**Table 1-1**

| Angle (v,h) | EVP Verify Lamp |
|---|---|
| 2.5D, 17.5R | 64.25 |
| 2.5D, 12.5R | 99.89 |
| 2.5D, 7.5R | 176.55 |
| 2.5D, 2.5R | 270.07 |
| 2.5D, 2.5L | 300.36 |
| 2.5D, 7.5L | 220.56 |
| 2.5D, 12.5L | 129.77 |
| 2.5D, 17.5L | 70.96 |
| 7.5D, 27.5R | 14.71 |
| 7.5D, 22.5R | 31.75 |
| 7.5D, 17.5R | 59.29 |
| 7.5D, 12.5R | 87.71 |
| 7.5D, 7.5R | 143.76 |
| 7.5D, 2.5R | 210.58 |
| 7.5D, 2.5L | 227.10 |
| 7.5D, 7.5L | 170.79 |
| 7.5D, 12.5L | 108.71 |
| 7.5D, 17.5L | 62.24 |
| 7.5D, 22.5L | 31.17 |
| 7.5D, 27.5L | 16.39 |
| 12.5D, 27.5R | 12.86 |
| 12.5D, 22.5R | 25.14 |
| 12.5D, 17.5R | 48.80 |
| 12.5D, 12.5R | 74.29 |
| 12.5D, 7.5R | 97.92 |
| 12.5D, 2.5R | 126.59 |
| 12.5D, 2.5L | 132.04 |
| 12.5D, 7.5L | 110.68 |
| 12.5D, 12.5L | 80.36 |
| 12.5D, 17.5L | 45.72 |
| 12.5D, 22.5L | 22.97 |
| 12.5D, 27.5L | 14.45 |
| 17.5D, 27.5R | 10.82 |

| | |
|---|---|
| **17.5D, 22.5R** | **16.78** |
| **17.5D, 17.5R** | **31.95** |
| **17.5D, 12.5R** | **55.50** |
| **17.5D, 7.5R** | **70.28** |
| **17.5D, 2.5R** | **79.87** |
| **17.5D, 2.5L** | **81.84** |
| **17.5D, 7.5L** | **72.58** |
| **17.5D, 12.5L** | **49.48** |
| **17.5D, 17.5L** | **29.49** |
| **17.5D, 22.5L** | **16.39** |
| **17.5D, 27.5L** | **11.95** |

***Note all values are in Candela**
*** Measurements taken after 30 minute warm up time.**

## 7. Chromaticity

1. The standard color for the LED Verify Lamp shall be White. The colors for this lamp shall conform to the following color regions based on the 1931 CIE chromaticity diagram.

**Coordinates**
X_Source = 0.3223
Y_Source = 0.2810
**Color Temperature**
T = 6255K
**Chroma**
Chroma = 33.5483
**Hue**
Hue = -46.0481
**Color Rendering Index**
CRI = 85.9470

Intensity and Chromaticity as stated above must be confirmed by an Independent test lab.

## 8. Dielectric Grease

1. The manufacturer shall supply with each conformation indication an individual package of compatible dielectric grease.
   This grease will be applied to the lamp base threads and pin at the time of field installation to prevent long term corrosion issues.

## 9. Specification Compliance Requirements

1. The manufacturer shall submit a complete set of test results from an independent test lab certifying that the modules meet the above requirements.

# Appendix A

**1. 24 hour room temperature test:**

a. connect to ped don't walk output of a cabinet
b. put the phase ped on recall and let controller cycle around for 24 hours
c. verify that the indication flashes and turns off completely both at the beginning and end of the 24 hours
d. remove the indication from the cabinet and hook it up to a variac and test for the voltage level that the device begins to glow and when it turns off completely (after finding the turn on level run the variac up to 120vac and then down to the turn off level)

**2. Environmental test chamber test:**

a. connect the indication to a variac and run the chamber to -35° as fast as the chamber will go and hold it there for one hour
b. test the indication for turn on and off voltage levels with the variac as done in the room temperature test
c. run the chamber up to 150° to 165° as fast as it will go and hold it there for one hour
d. test the indication again for the turn on and off voltage levels
e. return the chamber to room temperature
f. connect the indication to a flasher panel but do not turn the flasher on
g. run the temperature down to -35° and hold it there for 1 hour before applying power to the flasher to verify that it will start flashing at that temperature
h. run the temperature up to 150° to 165° and hold it there for 1 hour before applying power to the flasher to verify that it will start flashing at that temperature
i. return the chamber to room temperature test complete

**3. Mechanical test:**

a. Install the indication in the Mn/DOT approved conformation indication lamp holders (socket) to ensure proper electrical and mechanical mating of the socket and indication.