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9100 East Michigan Ave. Galesburg, MI 49053

269 629 4440 phone 269 629 4439 fax

www.TecNiqInc.com

Certified Test Report –L10WCF-230302E1

LED LICENSE LAMP

TECNIQ, INC. MODEL L10-WXXX-1

SINGLE WHITE LED WITH CLEAR LENS

PASSES ALL TEST SPECIFICATIONS



L10 LICENSE LAMP

Date: March 2nd, 2023
Summary: L10-WXXX-1 License Lamp FMVSS 108 Conforming
Tested By: Mark Williams
Report Certified By: Mark Williams
Report Prepared For: TecNiq, Inc. Galesburg, MI

Unless otherwise noted, all included tests follow these criteria:

Test date(s): February 2023 (various)
Test standard(s): FMVSS 108 October 2021
Lamp type(s): License
Output color(s): White

Included tests (in report order):

Photometry
Color Test
Vibration Test
Moisture Test
Dust Test
Corrosion Test
Plastic Optical Material Test

Edit(s):

E1, 240709: Numbered test locations had been mislabeled, order was corrected. Table 4, Test Location 5 was entered incorrectly as 130, corrected to 13.0

**PHOTOMETRIC INTENSITY TEST OF
LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

- S7.7.13 License plate lamps: Photometry
- S14.2.2 License plate lamp photometry
- Figure 19 License plate lamp target locations
- Figure 20 License plate lamp measurement of incident light angle

Test Procedure:

Testing conducted according to procedures of FMVSS S14.2.2.

Testing was conducted with a single lamp configuration. The DUT (device under test) was mounted at the centerline of the test plate, illuminating the plate from the top or from the side. In both mounting configurations, photometry values were measured with the DUT mounted at varying distances to the corresponding edge of the plate, as measured from the closest edge of the DUT to the edge of the plate. The range of distances was dictated by the geometry of the lamp and the incident light angle requirement of 7.7.15.4. Based on geometry alone, the side-mounted lamp must be between 0" and 2" from the plate while the top-mounted lamp must be between 0" and 7" from the plate. Permissible mounting distances in each mounting configuration were determined through photometry measurement at varying distances within the range of distances. The measured data presented below represents the minimum and maximum permissible mounting distances in each configuration.

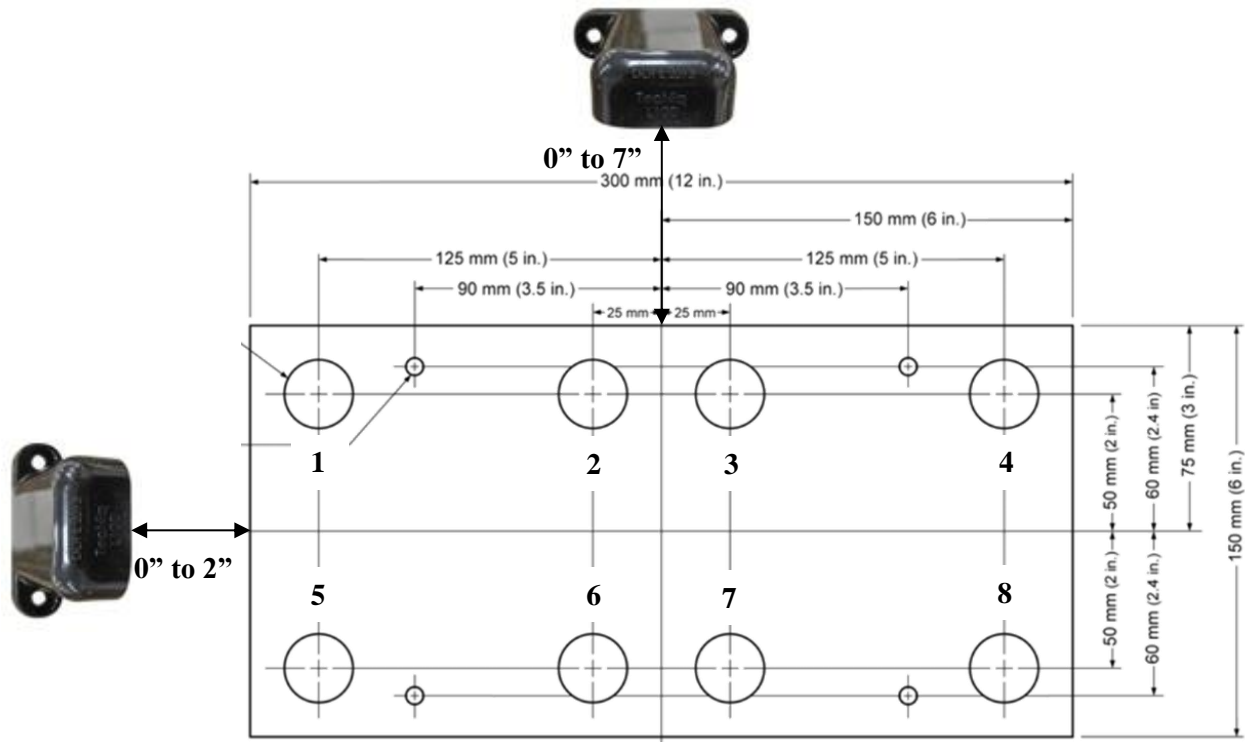


Figure 1: Photometric test locations (Figure 19 of FMVSS) and DUT position.

Note: Figure 1 is not the permissible range of mounting positions, that information is included below.

Measured Data and Corresponding Requirement(s):

Test Location (See Figure 1)	Required Minimum [lux]	Measurement [lux]
1	8	231.9
2	8	261.0
3	8	354.2
4	8	221.1
5	8	94.9
6	8	142.7
7	8	144.1
8	8	97.3

Average of two highest values	Required maximum ratio	Ratio of averages
307.6	20	3.2
Average of two lowest values		
96.1		

Table 1: Photometric test results as measured with the DUT mounted on center at **0” from the top** of the test plate

Test Location (See Figure 1)	Required Minimum [lux]	Measurement [lux]
1	8	38.1
2	8	45.9
3	8	44.9
4	8	35.5
5	8	13.5
6	8	13.3
7	8	13.4
8	8	12.8

Average of two highest values	Required maximum ratio	Ratio of averages
45.4	20	3.5
Average of two lowest values		
13.0		

Table 2: Photometric test results as measured with the DUT mounted on center at **7” from the top** of the test plate

Test Location (See Figure 1)	Required Minimum [lux]	Measurement [lux]
1	8	17.1
2	8	64.0
3	8	136.4
4	8	284.3
5	8	17.5
6	8	66.3
7	8	171.2
8	8	289.7

Average of two highest values	Required maximum ratio	Ratio of averages
287.0	20	16.6
Average of two lowest values		
17.3		

Table 3: Photometric test results as measured with the DUT mounted on center at **0” from the side** of the test plate

Test Location (See Figure 1)	Required Minimum [lux]	Measurement [lux]
1	8	12.5
2	8	37.5
3	8	89.5
4	8	218.8
5	8	13.0
6	8	39.8
7	8	97.0
8	8	239.4

Average of two highest values	Required maximum ratio	Ratio of averages
229.1	20	18.0
Average of two lowest values		
12.8		

Table 4: Photometric test results as measured with the DUT mounted at **1.25” from the side** of the test plate

Acceptance Criteria:

- S7.7.13.1: Each license plate lamp must be designed to conform to the photometry requirements of this section when tested according to the procedure of S14.2.2.
- S7.7.13.2: An illumination value of no less than 8 lx [0.75 fc] must be met at each test station target location shown in Figure 19.
- S7.7.13.3: The ratio of the average of the two highest illumination values divided by the average of the two lowest illumination values must not exceed 20:1 for vehicles other than motorcycles and motor driven cycles.

Results:

PASS—ABOVE ALL MINIMUMS AND BELOW MAXIMUMS

When mounted on center, the L10-WXXX-1 can be mounted between **0” and 7” from the top** of the license plate or between **0” and 1.25” from the side** of the license plate.

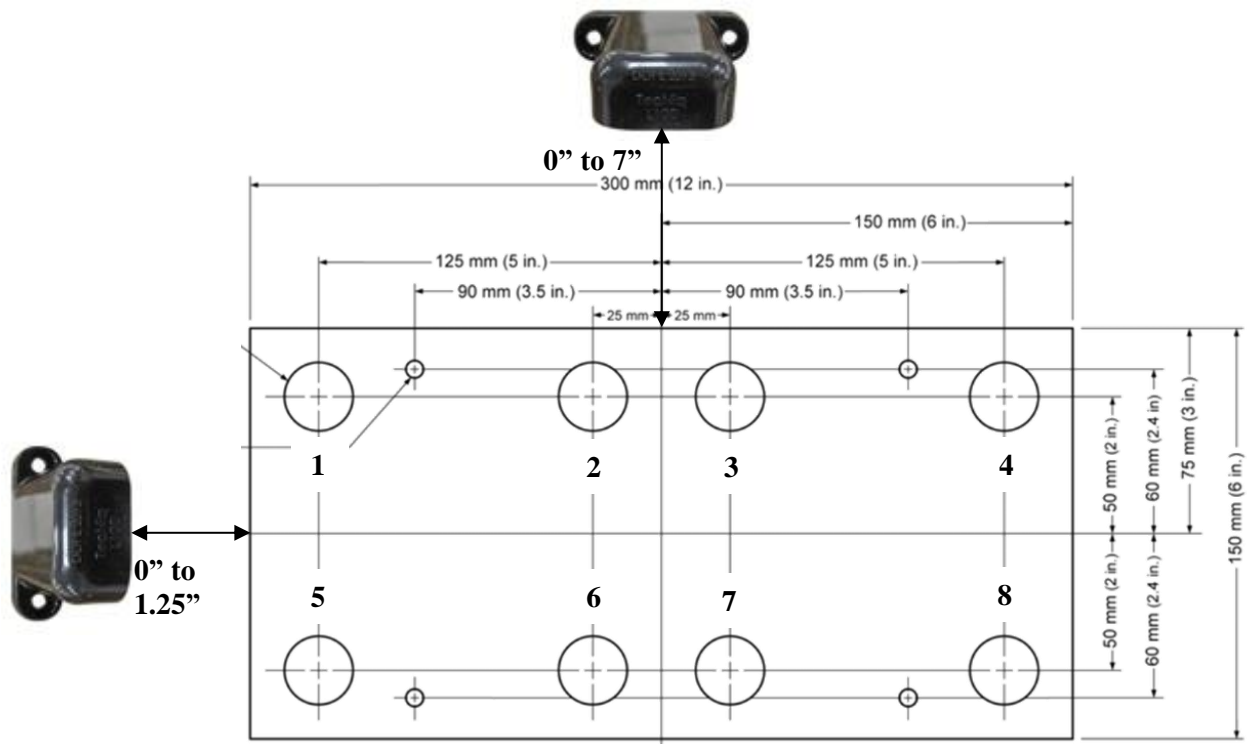


Figure 2: Permissible mounting locations for the L10-WXXX-1

**COLOR TEST OF LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

- S7.7.14 License plate lamps: Physical tests
- S14.4.1 Color test
- S14.4.1.4 Tristimulus method

Test Procedure:

Testing conducted according to procedures of FMVSS S14.4.1.4.1

Acceptance Criteria:

- S14.4.1.4.2.3 White (achromatic). The color of light emitted must fall within the following boundaries:
 - $x = 0.31$ (blue boundary)
 - $y = 0.44$ (green boundary)
 - $x = 0.50$ (yellow boundary)
 - $y = 0.15 + 0.64x$ (green boundary)
 - $y = 0.38$ (red boundary)
 - $y = 0.05 + 0.75x$ (purple boundary)

Results:

Chromaticity Coordinates (averaged from four measurements)
 $x = 0.3933$
 $y = 0.3928$

PASSED—CHROMATICITY COORDINATES FALL WITHIN SPECIFIED BOUNDARIES

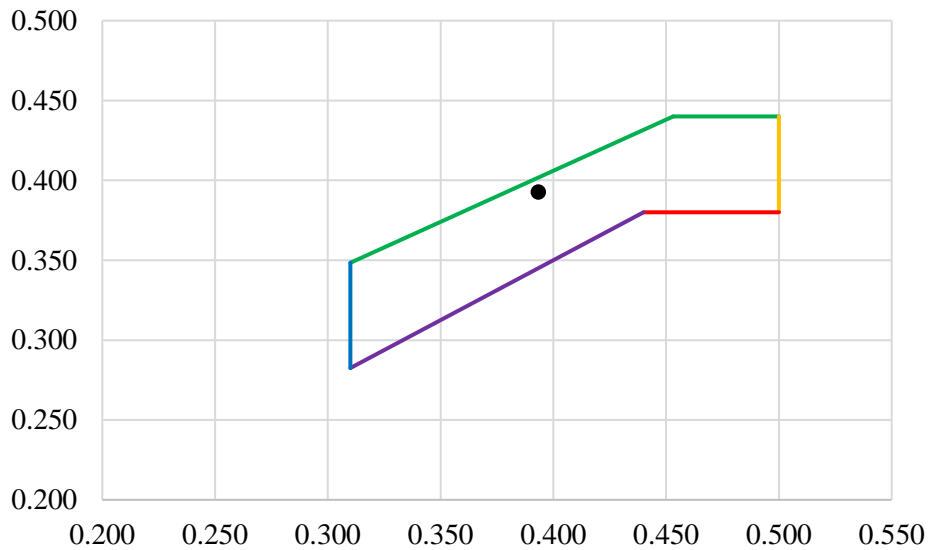


Figure 3: Measured color coordinate is within FMVSS specified boundaries

**VIBRATION TEST OF LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

- S7.7.14 License plate lamps: Physical tests
- S14.5.1 Vibration test

Test Procedure:

- S14.5.1.1 Vibration test: Procedure

Acceptance Criteria:

- S14.5.1.2 After completion of the vibration test a device showing evidence of material physical weakness, lens or reflector rotation, displacement or rupture of parts except bulb failures, must be considered to have failed, providing that the rotation of lens or reflector must not be considered as a failure when tests show compliance with specifications despite such rotation.

Results:

PASSES—NO APPARENT MATERIAL WEAKNESS OR DISPLACEMENT

**MOISTURE TEST OF LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

S7.7.14 License plate lamps: Physical tests
S14.5.2 Moisture test

Test Procedure:

Vacuum submersion exceeds FMVSS 108 S14.5.2.1 as it evaluates the lamp's seal against air egress. Submerge the sample in a sealed transparent tank containing water with small amount of chlorine. Pump air from the tank to create a vacuum of 12psi in the volume above the water, as measured relative to the ambient air pressure. The air in the sample was sealed at ambient pressure and will push outward at vacuum pressure. Failure is indicated by air bubbles emanating from the sample or internal moisture observed when the sample is removed.

Acceptance Criteria:

S14.5.2.2. Accumulation of moisture in excess of 2 cc or any visible moisture in a sealed reflex unit must constitute a failure.

Results:

PASSED—NO AIR BUBBLES DURING TEST OR MOISTURE APPARENT IN SAMPLE

**DUST TEST OF LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

S7.7.14 License plate lamps: Physical tests
S14.5.3 Dust test

Test Procedure:

Test not conducted. See acceptance criteria below.

Acceptance Criteria:

S14.5.3.1 A sealed unit it not required to meet the requirements of this test.

Results:

PASSES—SAMPLES ARE SEALED UNITS

**CORROSION TEST OF LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

S7.7.14 License plate lamps: Physical tests
S14.5.4 Corrosion test

Test Procedure:

Test conducted according to S14.5.4.1 in a salt fog chamber.

Acceptance Criteria:

S14.5.4.2 After the completion of the corrosion test there must be no evidence of excessive corrosion which would affect the proper function of the device.

Results:

PASSES—NO CORROSION APPARENT

**MATERIAL TEST OF LED LICENSE LAMP
TECNIQ, INC. MODEL L10-WXXX-1**

Relevant Sections from Test Standard(s):

S7.7.14 License plate lamps: Physical tests
S14.4.2 Plastic optical materials tests.

Test Procedure:

Test conducted by AMECA (Automotive Manufacturers Equipment Compliance Agency) for compliance with FMVSS outdoor exposure test. The list of acceptable plastics is published as the “AMECA List of Acceptable Plastics for Optical Lenses and Reflex Reflectors” online at <https://ameca.org/list-of-acceptable-plastics/>. The list is updated regularly—a copy will be provided with this certification report.

The Makrolon AL2647 polycarbonate resin used in the L10-WXXX-1 lens is manufactured by Covestro LLC and supplied by M. Holland. This formulation is found on page 28 of the AMECA document: <https://ameca.org/wp-content/uploads/2023/02/AMECA-List-of-Acceptable-Plastics-for-Optical-Lenses-and-Reflex-Reflectors-February-17-2023.pdf>.

From the AMECA List of Acceptable Plastics for Optical Lenses and Reflex Reflectors Used on Motor Vehicles:

1 STATUS: The following materials have been accepted by the Automotive Manufacturers Equipment Compliance Agency as meeting the 3-year weathering test of FMVSS 108 for plastics used in optical lenses and reflectors used on motor vehicles. No evaluation has been made as to the suitability of individual materials for particular automotive uses, or to the manufacturing methods.

NOTE: TecNiq reserves the right to use different resin formulations that are found on the AMECA list, depending on supply.

Acceptance Criteria:

S14.4.2.2.4 Outdoor exposure test: Performance requirements.
S14.4.2.3 Heat test: Performance requirements.

Results:

PASSES—MATERIAL USED IS ON THE AMECA LIST OF ACCEPTABLE PLASTICS