

Evaluation Table

736 Highway and Sign Lighting

736 Underdeck Diode LED Luminaires

ADOT Standard Specification: 736-2.01, 736-2.05

Responsible Section: Traffic Group

Product Property	Specification/ Test Method	Requirement
Highway Lighting Materials: LED	736-2.01	Highway lighting materials shall be Light Emitting Diode (LED), conforming to the requirements of this section and be the type and size specified. The LED shall have a nominal Correlated Color Temperature (CCT) equal to 3,000 degrees K \pm 300 degrees K.
Highway Lighting Materials: LED	736-2.01	LED Luminaires shall be listed by a National Recognized Laboratory (NRTL), as defined by the US Department of Labor. The testing laboratory must be listed by OSHA. A list of the recognized testing labs may be found on the US Department of Labor website at; http://www.osha.gov
Highway Lighting Materials: Requirements	736-2.01(A)(1)	Each luminaire shall be listed by NRTL as being in compliance with UL 1598 and suitable for use in wet locations.
Highway Lighting Materials: Requirements	736-2.01(A)(2) 736-2.01(E)	Each luminaire shall have an (IEC)* 529, Ingress Protection (IP) of 65 or greater for the optical assemblies of the luminaire.
Highway Lighting Materials: Requirements	736-2.01(A)(3)	Each Luminaire shall comply with the Electro Magnetic Interference (EMI), as defined by FCC47 Sub Part 15; CISPR15, CISPR22 Class A (120 volt minimum), EN61000-3-2, -3-3, -4-4, -4-5.
Highway Lighting Materials: Requirements	736-2.01(A)(4)	Each Luminaire shall be tested according to the latest version of IESNA** LM-79. (Provide the LM-79 test results).

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Highway Lighting Materials:Requirements	736-2.01(A)(5)	Each Luminaire shall have Lumen maintenance measured per the most current version of IESNA** LM-80. (Provide the LM-80 test results).
Highway Lighting Materials: Requirements	736-2.01(A)(6)	Each Luminaire shall have long term maintenance documented according to IESNA** TM-21; per the latest Version. (Provide the TM-21 Test results).
Highway Lighting Materials: Requirements	736-2.01(A)(7)	Each Luminaire shall have LM-79, LM-80, and in-situ temperature testing conducted per the US Department of Energy, Lighting Facts Program, per an Approved LED Lighting Facts, Testing Lab (Provide the in-situ Temperature Test results).
Highway Lighting Materials: Luminaire Housing	736-2.01(B)	The luminaire housing shall be made of Cast Aluminum, Grade A383, A380, or A360.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)(1)	The luminaire housing shall be tested for 1000 hours of salt spray fog exposure per ASTM B117.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)(2)	The luminaire housing shall have corrosion resistance performance testing per ASTM D1654.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)	The luminaire housing shall be compliant (ANSI) IEEE C136.31, Table 2, Roadway Lighting Equipment-Luminaire Vibration, testing for both normal and bridge/overpass applications.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)	The luminaire shall fully operate from –40 degrees C to 40 degrees C (-40 degrees F to 104 degrees F).
Highway Lighting Materials: Electrical Requirement	736-2.01(C)	The LED engine is composed of the LED modules, the optical system, the electronic driver, & heat sink, shall have a minimum expected life of 100,000 hrs. at 25 degrees C and 70% of initial lumen output (L70) as calculated per TM21-11.
Highway Lighting Materials: Electrical Requirements:	736-2.01(C)	The Luminaire shall have an Integral Dimming Electronic Driver that will Operate over the following Voltage ranges, as specified in the project plans:
Highway Lighting Materials; Electrical Requirements	736-2.01(C)(1)	The Luminaire shall operate over the range of 120 to 240 VAC (rms) ± 10 % at 60 Hz or the voltage option 480 VAC (rms) ± 10 % at 60 Hz.

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Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(a)	The Electronic Driver shall have a power factor of .90 at full load.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(b)	The Electronic Driver shall have a total harmonic distortion of 20 % or less at full load per ANSI C82.77, Harmonic Emission Limits.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(c)	The Electronic Driver shall have thermal overload protection.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(d)	The Electronic Driver shall have 10 KA overload/overcurrent protection.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(e)	The Electronic Driver shall have a shielded and replaceable 20 KV surge protective device, that is compliant with ANSI C62.41 Category C
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(f)	The Electronic Driver shall have an NRTL certified dimming driver that is terminated with quick disconnect wire harnesses. Wire nut termination is not acceptable.

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Highway Lighting Materials: LED Performance Requirements	736-2.01(D)	The luminaire shall have a minimum luminaire efficacy of 115 lumens/watt at 3,000 degrees K CCT. The luminaire shall meet the chromaticity requirement as follows:
Highway Lighting Materials: LED Performance Requirements	736-2.01(D)(1)	The colors shall conform to the following color regions based on the 1931 CIE chromaticity diagram.
Highway Lighting Materials: LED Performance Requirements	736-2.01(D)(2)	The luminaire shall have a minimum <u>C</u> olor <u>R</u> endering <u>I</u> ndex (CRI) of 70. The Chromaticity as stated above must be confirmed by an independent test lab or as shown on the LM 79 test report.
Highway Lighting Materials: Warranty	736-2.01(F)	The LED unit, including auxiliary equipment shall have a factory warranty of 5 years against defects in workmanship or materials. The warranty shall cover repair or complete replacement.
Underdeck Diode LED Luminaries	736-2.05	The luminaries shall be LED, specifically engineered and designed by the manufacturer for ceiling or wall mount type applications for underdeck lighting that is purposed to operate during dark hours.
Underdeck Diode LED Luminaries: Luminaire Housing	736-2.05(A)	The luminaire housing shall have glass lens and hinged, removable door that opens downward to allow access to electronic components and terminal block. The door shall be secured to prevent accidental opening or dropping.
Underdeck Diode LED Luminaries: Luminaire Housing	736-2.05(A)	The underdeck luminaire housing shall be painted bronze or dark bronze.
Underdeck Diode LED Luminaries: Luminaire Housing	736-2.05(A)	Maximum luminaire weight shall not exceed 50 pounds

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Underdeck Diode LED Luminaries: Mounting	736-2.05(B)	The luminaire housing shall be designed to mount directly on a wall or ceiling for surface wiring or over a recessed outlet box for embedded wiring. All mounting hardware shall be made from corrosion resistant material. Grommets shall be installed for all cable entry holes.
Underdeck Diode LED Luminaries: Electrical Requirements	736-2.05(C)	The terminal block shall be 3-station, tunnel lug terminal board that will accommodate AWG #6 thru #12