

Evaluation Table

736 Highway and Sign Lighting

736 Luminaire – Vertical Mount (with Shield)

ADOT Standard Specification: 736-2.01, 736-2.04

Responsible Section: Traffic Group

Product Property	Specification/ Test Method	Requirement
Vertically Mounted LED Luminaires	736-2.04	Vertically Mounted LED Luminaires shall meet the requirements of subsection 2.01 and as specified herein.
Highway Lighting Materials: LED	736-2.01	Highway lighting materials shall be a 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 or as specified in the project plans.
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)	Shall be listed as UL 1598 and suitable for use in wet locations.
Highway Lighting Materials: Requirements	736-2.01(A)(2) 736-2.01(E)	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 Magnet 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)	Shall be tested according to the latest version of IESNA** LM-79. (Provide the Lab LM-79 test results).
Highway Lighting Materials: Requirements	736-2.01(A)(5)	Lumen maintenance Shall be measured per IESNA** LM-80. (Provide the Lab LM-80 test results).
Highway Lighting Materials: Requirements	736-2.01(A)(6)	Shall be documented according to IESNA** TM-21; Latest Version. (Provide the Lab TM-21 Test results).

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Highway Lighting Materials: Requirements	736-2.01(A)(7)	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 Laboratory in-situ Temperature Test results).
Highway Lighting Materials: Luminaire Housing	736-2.01(B)	Shall be made of Cast Aluminum Grade A383, A380, or A360.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)	Shall be painted gray.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)(1)	1000 hours of salt spray fog exposure per ASTM B117.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)(2)	Corrosion resistance performance test per ASTM D1654.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)	Shall be compliant (ANSI) IEEE C136.31, Table 2, Roadway Lighting Equipment-Luminaire Vibration, for both normal and bridge/overpass applications.
Highway Lighting Materials: Luminaire Housing	736-2.01(B)	Shall have a (NEMA)*** standard decal that is visible inside the housing that states; operating voltage, wattage, current range (in milliamps), light type & be compliant with ANSI C136.15-2015.
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 Requirements	736-2.01(C)	The LED engine is composed of the optical system, electronic driver, & heat sink, and shall have a minimum 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 Voltages:

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Highway Lighting Materials: Electrical Requirements	736-2.01(C)(1)	120 to 240 VAC (rms) \pm 10 % at 60 Hz or the voltage option 480 VAC (rms) \pm 10 % at 60 Hz.
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)(2b)	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)	Shall have thermal overload protection.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(d)	Shall have 10 KA overload/overcurrent protection.
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(2)(e)	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)	Shall have an NRTL certified dimming driver that is terminated with quick disconnect wire harnesses. Wire nut termination is not acceptable.
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)(1)	The luminaire shall have a minimum Color Rendering Index (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.

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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.
Vertically Mounted LED Luminaires	736-2.04	Vertically mounted LED luminaires shall be a pole-top-type fixture and shall be mounted with a vertical slip fitter, designed to illuminate roadways from offsets of up to 50 feet.
Vertically Mounted LED Luminaires: Luminaire Housing	736-2.04(A)	The Luminaire housing shall have a hinged, removable door.
Vertically Mounted LED Luminaires: Luminaire Housing	736-2.04(A)	The maximum weight for the high mast fixture when fully assembled shall not exceed 55 lbs.
Vertically Mounted LED Luminaires: Luminaire Housing	736-2.04(A)	The Luminaire housing shall have an Effective Projected Area (EPA) of no more than 3.5 square feet when tilted at 45 degrees.
Vertically Mounted LED Luminaires: Luminaire Housing	736-2.04(A)	The luminaire housing shall be equipped with a seven-pin, <u>Photo-Electric Control Receptacle</u> (PECR) conforming to ANSI C136.10 and shall be provided with a shorting cap.
Vertically Mounted LED Luminaires: Luminaire Mounting	736-2.04(B)	The luminaire housing shall have a slip fitter type mounting on normal 1-1/2" (1-2/3" OD ^a) to 2-1/2" (2-7/8" OD ^a) by 5" pipe (Tenon); provided with 2 stainless or zinc plated clamps fixed with four, 2" by 3/8" zinc plated hexagonal bolts with spring washers (Outside Diameter ^a).
Vertically Mounted LED Luminaires: Luminaire Mounting	736-2.04(B)	The slip fitter mounting shall be equipped with a swivel joint support that enables tilting the fixture from, 0 degrees to 45 degrees and supplied with a tilt angle indicator to enable correct aiming.
Vertically Mounted LED Luminaires: Electrical Requirements	736-2.04(C)	The terminal block shall be a three-station, tunnel lug terminal board that will accommodate American Wire Gauge (AWG) #6 thru #12 wires.

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Vertically Mounted LED Luminaires: Optical Requirements	736-2.04(D)	At the horizontal position, at zero degree tilt angle, the luminaire shall have zero up light.
Vertically Mounted LED Luminaires: Optical Requirements	736-2.04(D)	Optional shields shall be available for the luminaire upon request; the shields shall be mountable to the sides, the front and the back of the fixture.