

## Evaluation Table

<b>PEP ID:</b>	XXXXX
<b>Manufacturer:</b>	Name of Manufacturer
<b>Product Name:</b>	Name of Product

736 Highway and Sign Lighting

736 Luminaire – High Mast (Cutoff)

ADOT Standard Specification: 736-2.01, 736-2.03

Responsible Section: Traffic Group

Product Property	Specification/ Test Method	Requirement	Results	Pass/ Fail
High Mast LED Luminaires	736-2.03	High Mast 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 of 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 <u>N</u> ational <u>R</u> ecognized <u>L</u> aboratory (NRTL), as defined by the US Department of Labor. The testing laboratory must be listed by OSHA. A list of the recognized testing labs for products sold in the US may be found on the US Department of Labor website at; <a href="http://www.osha.gov">http://www.osha.gov</a>		
Highway Lighting Materials: Requirement	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(B) 736-2.01(E)	Each Luminaire shall have an (IEC)* 529, <u>I</u> ngress <u>P</u> rotection (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) requirements, 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 most current version of IESNA** LM-79. (Provide the Lab LM-79 test results).		
Highway Lighting Materials: Requirements	736-2.01(A)(5)	Each Luminaire shall have the lumen maintenance measured per the most current version of IESNA** LM-80. (Provide the Lab LM-80 test results).		
Highway Lighting Materials: Requirements	736-2.01(A)(6)	Each Luminaire shall have long term maintenance documented according to the most current Version of IESNA** TM-21; per. (Provide the Lab 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 Laboratory 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)	The luminaire housing shall be painted to increase corrosion resistance; the color of the paint shall be gray, unless otherwise specified.		
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 with (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)	The luminaire housing shall have a (NEMA)*** standard decal, with black lettering, that is visible inside the housing, that states; operating voltage, wattage, current range, 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 LED modules, the optical system, the electronic driver, & heat sink. It 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:		
Highway Lighting Materials: Electrical Requirements	736-2.01(C)(1)	The Luminaire shall operate over the range of 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)	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.		
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.		
High Mast LED Luminaires	736-2.03	High Mast LED luminaires shall be LED, specifically engineered and designed by the manufacturer for high mast lighting applications.		
High Mast LED Luminaires: Luminaire Housing	736-2.03(A)	The luminaire housing shall have a slip fitter type mounting on normal 1-1/2" (1-2/3" OD) to 2" (2-3/8" OD) by minimum 4" pipe (Tenon); provided with stainless or zinc plated clamps, fixed with four, 2" by 3/8" zinc plated hexagonal bolts with spring washers.		
High Mast LED Luminaires: Luminaire Housing	736-2.03(A)	The housing shall include an integral bubble level indicator and enable luminaire tilt adjustment of ± 5 degrees in 2.5 degree increments.		

High Mast LED Luminaires: Luminaire Housing	736-2.03(A)	The Luminaire housing shall have a hinged, removable door.		
High Mast LED Luminaires: Luminaire Housing	736-2.03(A)	The maximum weight for the high mast fixture when fully assembled shall not exceed 60 lbs.		
High Mast LED Luminaires: Luminaire Housing	736-2.03(A)	The Luminaire housing shall have an <u>E</u> ffective <u>P</u> rojected <u>A</u> rea (EPA) of no more than 2.1 square feet (when viewed from either side or either end.		
High Mast LED Luminaires: Luminaire Housing	736-2.03(A)	The luminaire housing shall be equipped with a seven-pin, <u>P</u> hoto- <u>E</u> lectric <u>C</u> ontrol <u>R</u> eceptacle (PECR) conforming to ANSI standard C136.10 and shall be provided with a shorting cap.		
High Mast LED Luminaires: Electrical Requirements	736-2.03(B)	The Luminaire terminal block shall be a three-station, tunnel lug, terminal board that will accommodate American Wire Gauge (AWG) #6 thru #12 wires.		
High Mast LED Luminaires: Optical Requirements	736-2.03(C)	The luminaire shall have an IESNA** up light rating shall not exceed 0		
High Mast LED Luminaires: Optical Requirements	736-2.03(C)	The luminaire shall have a rotatable optics assembly to enable proper light distribution alignment.		
High Mast LED Luminaires: Optical Requirements	736-2.03(C)	Optional 90 degree, 120 degree, and 180 degree shields, shall be available for the luminaire upon request.		