

AUSTIN ENERGY

PURCHASE SPECIFICATION

FOR

LUMINAIRES, DIST, ST LIGHT, LIGHT EMMITING DIODE (LED)

<u>DATE</u>	<u>PREPARED BY</u>	<u>ISSUANCE/REVISION</u>	<u>APPROVAL</u> <u>DIVISION MANAGER/STANDARDS MANAGER</u>
7/18/14	Danny McReynolds/Lee Emmick	Issuance	

REASON FOR REVISION

AFFECTED PARAGRAPHS

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein.
Retain for future reference.

AUSTIN ENERGY
PURCHASE SPECIFICATION
FOR
LIGHT EMITTING DIODE (LED) LUMINAIRES

1.0 SCOPE

This specification shall define the minimum physical and electrical characteristics required by Austin Energy (AE) for Light Emitting Diode (LED) luminaires of the enclosed, side-mounted, which have integral drivers and photoelectric control receptacles. The LED luminaires shall be used as equivalents to AE standard 100, 250 and 400W, high pressure sodium (HPS), mast arm mounted, "cobrahead" style road way luminaires.

2.0 CLASSIFICATION

The requirements herein shall apply to LED luminaires of the following wattages, style, and voltage.

- 2.1 100-watt equivalent LED, U0 dark sky compliant 120/208/240/277-volt "cobrahead" with ROAM compatible photo control receptacles and photometrics in compliance with section 7.1 of this specification.
- 2.2 250-watt equivalent, LED, U0 dark sky compliant 120/208/240/277-volt "cobrahead" with ROAM compatible photo control receptacles and photometrics in compliance with section 7.2 of this specification.
- 2.3 400-watt equivalent LED, U0 dark sky compliant 120/208/240/277-volt "cobrahead" with ROAM compatible photo control receptacles and photometrics in compliance with section 7.3 of this specification.

3.0 APPLICABLE STANDARDS

All characteristics, definitions, and terminology, except as specifically covered in this specification shall be in accordance with the latest revision of the following ANSI standards:

- 3.1 ANSI C136.2
Roadway lighting luminaires - voltage classification.
- 3.2 ANSI C136.3
Roadway lighting equipment luminaire attachments.
- 3.3 ANSI C136.10
Roadway lighting equipment locking-type photocontrol devices and mating receptacles physical and electrical interchangeability and testing.
- 3.4 ANSI C136.25
Roadway lighting equipment – ingress protection (IP 66)
- 3.5 ANSI C136.31
Roadway lighting vibration – 3G vibration test
- 3.6 ANSI C136.37
Roadway lighting equipment – solid state light sources
- 3.7 ANSI C136.41
Roadway and area lighting equipment – dimming control between an external locking type photocontrol and driver

- 3.8 ANSI C136.1110
Roadway lighting equipment - multiple sockets.
- 3.9 ANSI/IES RP-8
Practice for roadway lighting.
- 3.10 ANSI/IES LM-79
Electrical and Photometric Measurements of Solid-State Lighting Products.
- 3.11 ANSI/IES TM-15-11
Luminaire Classification System for Outdoor Luminaires (B-U-G).
- 3.12 ANSI/IES LM-63
Standard File Format for Electronic Transfer of Photometric Data and Related Information.

4.0 GENERAL

- 4.1 The light shall be commercially available. Prototypes will not be accepted unless approved by Engineering Standards.
- 4.2 The fixture shall use at least 55% less energy compared to its commercially available High Pressure Sodium counterpart. Maximum wattage acceptable would be 58W for HPS 100W equivalent, 138W for HPS 250W equivalent and 220W for HPS 400W equivalent.
- 4.3 A full sheet of product specifications shall be submitted prior to award of contract. IES files must be available on manufacturer's website. Warranty information shall be submitted prior to award of contract and warranty shall cover all parts including the driver and have a minimum 10 year warranty.
- 4.4 Fixture shall be designed to meet IESNA lighting standards per RP-8. Types II, III, and V distribution patterns should be readily available. Fixture shall also meet IES TM-15 for B-U-G rating. Electronic IES Files shall be submitted prior to award of contract. Fixture shall also meet Designlights Consortium Qualified Products List (DLC QPL) specifications and requirements.
- 4.5 Fixture shall be tested by a third party or NVLAP lab in accordance with the latest revision of LM-79 and LM-80. Documentation shall be submitted electronically to Engineering Standards after request from Austin Energy.

5.0 FIXTURE

- 5.1 The luminaire fixture shall be constructed of precision die cast aluminum with an extruded aluminum heat-sink element. The fixture shall enclose the slip fitter, LED's, surge protective device (SPD), and driver components. These components shall be mounted to the fixture by means of a quick disconnect for ease of maintenance.
- 5.2 The fixture shall be adequately enclosed with a metal wildlife guard to prevent entrance of birds in the electrical connection area and insects in the lamp area.
- 5.3 The upper and lower sections of the fixture shall be joined by an integrally cast hinge pin at the mounting end with a positive spring loaded latch or a stainless steel bail at the latch end.
 - 5.3.1 The hinge shall hold the lower section firmly in place when closed and shall be designed so that the lower section, when free-swinging, will not accidentally disengage.
 - 5.3.2 The latch shall secure the lower section of the fixture to the upper one, permit access to the lamp and electrical connection compartment and be operable with protective gloves but without tools.
- 5.4 Provisions shall be made within the luminaire to permit leveling of the unit.
 - 5.4.1 A leveling bubble device shall be mounted so as to be viewable from ground level.

- 5.5 The luminaire fixture shall be sufficiently sized to allow the operation of all components within their designed operating temperatures.
- 5.6 The complete luminaire shall have an effective projected area (EPA) not to exceed 1.5 sq. ft. and weight (including lamp) of less than 35 lbs.
- 5.7 Color of the luminaire shall be light gray polyester powder coat finish. The coating needs to be applied only to the outside of the fixture.
- 5.8 Materials and protective coatings used for the luminaire assembly, including but not limited to screws, bolts, latches, hinges and mounting assembly shall individually and as a system be resistant to atmospheric conditions, including the corrosive and erosive action of conditions of service encountered in industrial and seaboard areas. All screws, bolts, latches and hinges shall be made of stainless steel.
- 5.9 The optics enclosure of the fixture, driver, and SPD shall be rated IP 66 or better.
- 5.10 US, UL, DLC QPL, Outdoor and Wet Listed.
- 5.11 All LED fixtures shall be similar in shape and appearance to the Cooper NVN Navion LED light fixture.

6.0 SLIPFITTER

- 6.1 The slipfitter shall be capable of accepting a 1-1/4 in. through 2 in. O.D. pipe tenon with maximum allowable insertion lengths of 7-1/2 and 10 in. respectively, in accordance with table 2 of ANSI C136.3 latest revision thereof.
- 6.2 The slipfitter shall provide a shoulder or stop to limit the depth of insertion of the pipe tenon during installation.
- 6.3 The slipfitter shall have provisions for clamping the luminaire securely to the tenon and for leveling through no less than three (3) degrees from the axis of the attachment with respect to the horizontal.
- 6.4 The slipfitter shall be equipped with a fixed-in-place metal wildlife guard capable of accepting both 1-1/4-in. and 2 in. tenons.
- 6.5 Slipfitter shall be secured to the mast arm by a minimum of two (2) bolts or threaded studs for secure mounting.

7.0 PHOTOMETRICS

7.1 100 Watt Equivalent LED Luminaires

- 7.1.1 The 100-watt equivalent LED mast arm mounted luminaire shall be IES upright rating U0 and, when mounted 25 feet above the midpoint of either long side of a rectangular area 80 feet by 45 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of the area. The roadway width shall be thirty (30) feet wide with a mounting height of 25 feet when calculating photometrics. Luminaire location shall have a minimum spacing of 150 feet apart and maintain a minimum average of 0.5 footcandles. Grid point spaced according to IESNA RP-8 for a roadway with two 15 foot lanes.
- 7.1.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 12:1 within the above mentioned rectangular area.
- 7.1.3 The average to minimum ratio shall not exceed 4.0:1 within the above mentioned roadway area.
- 7.1.4 The luminaries shall meet the photometric requirements shown above, when energized at 100 percent of rated line voltage. Tests shall be run with the fixture in the level position.

- 7.1.5 The bidder shall provide certified test reports prior to award of contract for the 100 watt equivalent LED fixture, showing compliance to the specifications described herein. These test reports shall include, but not be limited to IES files and ISO ft.-candle contours with numeric points of light expressed in ft.-candles associated with each contour. The ISO ft.-candle contour shall be mapped on the horizontal planes with the location of the fixture clearly marked.
 - 7.1.6 The luminaries shall have a power factor > 0.90.
 - 7.1.7 The luminaries shall have a color temperature of 4000k, plus or minus 275k.
 - 7.1.8 The luminaries shall have a nominal CRI > 70 and a minimum CRI > 65.
 - 7.1.9 The luminaries shall have a efficacy of 92 lm/W or better.
 - 7.1.10 Fixture shall have > 92% lumen maintenance at 60,000 hours of minimum operational life at an average operating time of 11.5 hours per night at an ambient of 40 degrees Celsius.
 - 7.1.11 LLF as calculated in Section 8.
- 7.2 250 Watt Equivalent LED Luminaires
- 7.2.1 The 250-watt equivalent LED mast arm mounted luminaire shall be IES upright rating U0 and, when mounted 30 feet above the midpoint of either long side of a rectangular area 160 feet by 40 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of the area and an average of 0.60 footcandles or greater. Light intensities measured in footcandles along a line parallel to and 20 feet in from the long side of the previously defined rectangular area above which the luminaire is mounted shall decrease at a rate not to exceed 0.5 footcandle in any 10 foot interval along the aforementioned line from 10 to 80 feet on both sides of the luminaire and shall not be less than 0.3 footcandle at any point along such line. Grid point spaced according to IESNA RP-8 for a roadway with four 10 foot lanes.
 - 7.2.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 20:1 within the above mentioned rectangular area.
 - 7.2.3 The average to minimum ratio shall not exceed 3.0:1 within the above mentioned roadway area.
 - 7.2.4 The luminaires shall meet the photometric requirements shown above, when energized at 100 percent of rated line voltage. Tests shall be run with the fixture in the level position.
 - 7.2.5 The bidder shall provide certified test reports prior to award of contract for the 250 watt equivalent LED fixture, showing compliance to the specifications described herein. These test reports shall include, but not be limited to IES files and ISO ft.-candle contours with numeric points of light expressed in ft.-candles associated with each contour. The ISO ft.-candle contour shall be mapped on the horizontal planes with the location of the fixture clearly marked.
 - 7.2.6 The luminaries shall have a power factor > 0.90.
 - 7.2.7 The luminaries shall have a color temperature of 4000k, plus or minus 275k.
 - 7.2.8 The luminaries shall have a nominal CRI > 70 and a minimum CRI > 65.
 - 7.2.9 The luminaries shall have a efficacy of 92 lm/W or better.
 - 7.2.10 Fixture shall have > 92% lumen maintenance at 60,000 hours of minimum operational life at an average operating time of 11.5 hours per night at an ambient of 40 degrees Celsius.
 - 7.2.11 LLF as calculated in Section 8.

7.3 400 Watt Equivalent LED Luminaires

- 7.3.1 The 400-watt equivalent LED mast arm mounted luminaire shall be IES upright rating U0 and, when mounted 50 foot above the midpoint of either long side of a rectangular area 220 feet by 60 feet, shall provide a measured minimum intensity of 0.2 footcandles at any point on the surface of this area and an average of 0.60 footcandles or greater. Light intensities measured in footcandles along a line parallel to and 30 feet in from the long side of the previously defined rectangular area above when the luminaire is mounted shall decrease at a rate not to exceed 0.5 footcandles in any 10 foot interval along the aforementioned line from 10 to 90 feet on both sides of the luminaire and shall not be less than 0.3 footcandle at any point along such line. Grid point spaced according to IESNA RP-8 for a roadway with four 15 foot lanes.
- 7.3.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 20:1 within the above mentioned rectangular area.
- 7.3.3 The average to minimum ratio shall not exceed 3.0:1 within the above mentioned roadway area.
- 7.3.4 The Luminaires shall meet the photometric requirements shown above, when energized at 100 percent of rated line voltage. Tests shall be run with the fixture in the level position.
- 7.3.5 The bidder shall provide certified test reports prior to the award of contract for the 400 watt equivalent LED fixture, showing compliance to the specifications described herein. These test reports shall include, but not be limited to IES files and ISO ft.-candle contours with numeric points of light expressed in ft.-candles associated with each contour. The ISO ft.-candle contour shall be mapped on the horizontal planes with the location of the fixture clearly marked.
- 7.3.6 The luminaries shall have a power factor > 0.90.
- 7.3.7 The luminaries shall have a color temperature of 4000k, plus or minus 275k.
- 7.3.8 The luminaries shall have a nominal CRI > 70 and a minimum CRI > 65.
- 7.3.9 The luminaries shall have a efficacy of 92 lm/W or better.
- 7.3.10 Fixture shall have > 92% lumen maintenance at 60,000 hours of minimum operational life at an average operating time of 11.5 hours per night at an ambient of 40 degrees Celsius.
- 7.3.11 LLF as calculated in Section 8.

7.4 Luminaire Up Light

- 7.4.1 All Luminaires shall be U0 with no light above 90 degrees per the photometric requirements listed above. Luminaire shall have a B-U-G rating with an Uplight value of U0.
- 7.5 Individual LED's shall be constructed such that a catastrophic loss or failure of one LED will not result in the loss of the entire fixture.

8.0 **LIGHT LOSS FACTOR CALCULATION**

- 8.1 Calculations shall be for maintained values, i.e. Light Loss Factor (LLF) < 1.0, where $LLF = LLD \times LDD \times LATF$, and
 - 8.1.1 Lamp Lumen Depreciation (LLD) factor shall be provided in the manufacturer's documentation per TM-21 calculations.
 - 8.1.2 Luminaire Dirt Depreciation (LDD) = 0.90, as per IES DG-4 for an enclosed and gasketed roadway luminaire installed in an environment with less than $150 \mu\text{g}/\text{m}^3$ airborne particulate matter and cleaned every four years.

8.1.3 Luminaire Ambient Temperature Factor (LATF) = 1.00

9.0 TERMINAL BOARD

- 9.1 The terminal board shall be a three (3) position type molded plastic, porcelain or buyer approved equivalent material with protective barriers between each contact the terminal board shall be mounted to the upper fixture section of the luminaire.
- 9.2 All contact on the terminal board shall be captive type corrosion resistant with slotted head screws and equipped with wire grips and capable of accepting number 6 to number 14 AWG stranded or solid aluminum or copper conductors.
- 9.3 The terminal board shall be located so that there is adequate accessibility to it for connecting the supply leads when wearing rubber protective gloves and without the removal or replacement of internal components.
- 9.4 Components shall be pre-wired to the terminal board requiring only power connection to clearly identified terminals. A green insulated #12 stranded wire shall be prewired from the housing ground terminal to the ground terminal on the terminal board. Ring terminals shall be used for the connecting of the wire. The wiring diagram shall be permanent, apparent, legible, and affixed inside the luminaire. The diagram shall indicate the photoelectric receptacle, SPD and driver circuit, the LED board and coded terminal block connections.
- 9.5 All wire shall be insulated at a minimum to operate at 125 degrees centigrade.
- 9.6 All wire connectors shall be made with "amp type" push on terminal connectors. Wire nuts are unacceptable.

10.0 PHOTOELECTRIC CONTROL RECEPTACLE

- 10.1 Photoelectric control receptacle shall be molded plastic and shall be capable of securely positioning the photoelectric control in any necessary direction.
- 10.2 Electric contacts of the photoelectric control receptacle shall be tin plated bronze. Plated steel contacts are not acceptable.
- 10.3 Photoelectric control receptacle shall meet all applicable provisions of ANSI C136.10 and ANSI C136.41, latest revision.
- 10.4 Receptacle shall be 7-pole 7-wire locking type and shall be pre-wired to the terminal board.
- 10.5 Receptacle shall be ROAM compatible with integral dimming control capabilities.

11.0 DRIVER/SURGE PROTECTOR DEVICE (SPD)

- 11.1 Fixture driver shall be dimmable and compatible with ROAM lighting control system.
- 11.2 The 120V, 10kA surge protection device (SPD) shall meet or exceed ANSI C136.2 10kV BIL, UL 1449 and ANSI/IEEE C62.41-2002 Category C High Exposure; MVOLT surge protection shall meet or exceed Category C. Surge protection shall be separate from the driver. If the SPD should fail in such a way, the luminaries will no longer operate and the SPD shall be field replaceable.

12.0 IDENTIFICATION

- 12.1 Manufacturers shall permanently attach the following information to the inside wall of the upper or main housing:
 - 12.1.1 Manufacturers name
 - 12.1.2 Manufacturers catalog number and type

- 12.1.3 Date of manufacturer (Codes are not accepted)
- 12.1.4 Lamp Wattage
- 12.1.5 Lamp IES designation and type
- 12.1.6 Primary voltage
- 12.1.7 Primary current
- 12.1.8 Wiring diagram corresponding to the components installed.
- 12.2 Fixture wattage decal shall be specified as in ANSI C136.15, latest revision. Decal shall resist cracking, peeling, and fading for a period of ten (10) years.
- 12.3 Luminaire wattage marking location shall be secured to the underside of the luminaire, approximately five (5) inches toward the pole from the edge of the glassware.

13.0 PACKAGING

- 13.1 Fixture shall be packaged in one (1) box with cushion support protection to prevent damage to the fixture and any of its components' parts during shipping and handling.
- 13.2 AE commodity stock number will be two (2) in. block numerals on each box as follows:
 - 13.2.1 100-watt equivalent, stock number
#22567
 - 13.2.2 250-watt equivalent, stock number
#23547
 - 13.2.3 400-watt equivalent, stock number
#23548
- 13.3 Boxes shall be palletized on 48-in. x 40-in. 4-way entry hardware pallets.