

ENERGY

PURCHASE SPECIFICATION

FOR

LUMINAIRES,DISTRIBUTION,OH,1PH,100W,250W,400W,120-277V,HIGH PRESSURE SODIUM,COBRAHEAD

<u>DATE</u>	<u>PREPARED BY</u>	<u>ISSUANCE/REVISION</u>	<u>APPROVAL</u> <u>DIVISION MANAGER/STANDARDS MANAGER</u>
12/14/94	Steve Booher	Issuance	Richard Dreiss / Peter G. Soosay
01/25/95	Steve Booher	Revision	Richard Dreiss / Peter G. Soosay
01/31/95	Steve Booher	Revision	Carl Lynch / Richard Dreiss
11/30/95	Steve Booher	Revision	Peter G. Soosay / Steve Booher
06/03/96	Steve Booher	Revision	Brian Davison / Peter G. Soosay
07/08/96	Steve Booher	Revision	/ Steve Booher
06/27/97	Raymond Green	Revision	Carl Lynch / William Germany
09/22/97	Herman Millician	Revision	Matt Monroe / William Germany
02/04/99	George Martinez	Revision	Arastou Oskoui / David Sloan
04/26/02	Peter G. Soosay	Revision	Peter Soosay
01/03/03	Steve Booher	Revision	Steve Booher
10/04/07	Marvin Johnson	Revision	Ted Schoenberg
10/21/08	Arthur Gonzalez	Revision	Ted Schoenberg

<u>REASON FOR REVISION</u>	<u>AFFECTED PARAGRAPHS</u>
Basic Housekeeping	Various

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein.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

THIS PAGE BLANK

AUSTIN ENERGY
PURCHASE SPECIFICATION
FOR
HIGH-PRESSURE SODIUM LUMINAIRES

1.0 SCOPE

This specification shall define the minimum physical and electrical characteristics required by Austin Energy (AE) for high-pressure sodium (HPS) luminaires of the enclosed, side-mounted, horizontal-burning type which have integral ballasts and photoelectric control receptacles.

2.0 CLASSIFICATION

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

- 2.1 100-watt, high-pressure sodium, flat glass, 120-volt "cobrahead" with photo control receptacles and photometrics in compliance with section 9.1 of this specification.
- 2.2 250-watt, high-pressure sodium, flat glass, 120/208/240/277-volt "cobrahead" with photo control receptacles and photometrics in compliance with section 9.2 of this specification.
- 2.3 400-watt, high-pressure sodium, flat glass, 120/208/240/277-volt "cobrahead" with photo control receptacles and photometrics in compliance with section 9.3 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 C 78.1350
Electric lamp - 400-watt, 100-volt, S51 single-ended high-pressure sodium lamps.
- 3.2 ANSI C 78.1351
Electric lamp - 250-watt, 100-volt, S50 single-ended high-pressure sodium lamps.
- 3.3 ANSI C 78.1354
Electric lamp - 100-watt, 55-volt, S54 single-ended high-pressure sodium lamps.
- 3.4 ANSI C82.4
Ballasts for high-intensity discharge and low-pressure sodium
- 3.5 ANSI C82.6
Reference, ballasts for high-intensity discharge lamps.
- 3.6 ANSI C82.9
High-intensity discharge and low-pressure sodium lamps, ballasts, and transformers.
- 3.7 ANSI C136.2
Roadway lighting luminaires - voltage classification.
- 3.8 ANSI C136.3
Roadway lighting equipment luminaire attachments.
- 3.9 ANSI C136.10
Roadway lighting equipment locking-type photocontrol devices and mating receptacles physical and electrical interchangeability and testing.

- 3.10 ANSI C136.1110
Roadway lighting equipment - multiple sockets.
- 3.11 ANSI C136.14
Roadway lighting equipment, enclosed side-mounted luminaires for horizontal burning high-intensity discharge lamps.
- 3.12 ANSI C136.15
Roadway lighting high-intensity discharge and low-pressure sodium lamp in luminaires - Field identification.
- 3.13 ANSI/IES RP-8
Practice for roadway lighting.

4.0 HOUSING

- 4.1 The luminaire shall consist of precision die cast aluminum upper and lower housings. The housing shall enclose the slipfitter, reflector, lamp socket, terminal board, capacitor, starter circuit, and ballast components. These components shall be mounted to the housing.
- 4.2 The housing shall be adequately enclosed to prevent entrance of birds in the ballast area and insects in the lamp area.
- 4.3 The upper and lower housing 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.
 - 4.3.1 The hinge shall hold the lower housing firmly in place when closed and shall be designed so that the lower housing, when free-swinging, will not accidentally disengage or cause the refractor to break or fall out.
 - 4.3.2 The latch shall secure the lower housing to the upper one, permit access to the lamp and ballast compartment and be operable with protective gloves but without tools.
- 4.4 Provisions shall be made within the luminaire to permit leveling of the unit.
 - 4.4.1 A leveling bubble device shall be mounted so as to be viewable from ground level.
- 4.5 The luminaire housing shall be sufficiently sized to allow the operation of all components within their designed operating temperatures.
- 4.6 The complete luminaire shall have an effective projected area (EPA) not to exceed 1.6 sq. ft. and weight (including lamp) of less than 60 lbs.
- 4.7 Color of the luminaire shall be light gray polyester powder coat finish. The coating needs to be applied only to the outside of the housing.
- 4.8 Materials and protective coatings used for the luminaire assembly, including but not limited to screws, bolts, latches, hinges, mounting assembly and reflector 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.

5.0 SLIPFITTER

- 5.1 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.
- 5.2 The slipfitter shall provide a shoulder or stop to limit the depth of insertion of the pipe tenon during installation.
- 5.3 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.

- 5.4 The slipfitter shall be equipped with a fixed-in-place wildlife guard capable of accepting both 1-1/4-in. and 2 in. tenons.
- 5.5 Slipfitter shall be secured to the mast arm by a minimum of two (2) bolts or threaded studs for secure mounting.

6.0 LAMP SOCKET

- 6.1 The socket shall be multiple mogul type of the 600-volt classification, starting pulse rated, meeting or exceeding all electrical and physical requirements of ANSI C136.11, latest revision.
- 6.2 The socket shall be adjustable horizontally and vertically to provide light patterns in accordance with ANSI/IES RP-8-1983 Appendix E. The lamp socket shall be positioned such that lamp installation and removal can be accomplished in all possible socket light distribution positions. Sufficient markings shall be present to allow for pre-setting the socket for specific light distribution patterns.
- 6.3 The socket screw shell and other metal parts shall be made of copper, copper alloy, or stainless steel. Copper or copper alloy screw shells shall be plated with nickel.
- 6.4 The socket body shall be made of glazed porcelain. The socket base shall be constructed in such a manner that the socket contacts remain stationary. The center contact inside the socket ball shall be spring loaded to provide lamp gripping action and reduce lamp failures due to excessive vibration.
- 6.5 The socket shall include a lamp support/snubber/vibration dampener to minimize lamp vibration.

7.0 REFLECTOR

- 7.1 The reflector shall be of precisely contoured, one-piece aluminum construction, permanently polished and finished with alzak, or buyer approved equivalent, over the entire reflective surface.
- 7.2 The reflector shall be secured in such a manner that it remains securely in place with the lower housing open or closed and shall be effectively sealed from the refractor by cold and heat resistant, non-moisture absorbing, chemically treated polyester felt. The gasket splice shall be made to prevent a joint gap over time.
- 7.3 The reflector shall be designed to assure maximum utilization of all light without reflecting adverse amounts of light through the lamp ARC tube.

8.0 LENSES

- 8.1 The lens shall be secured to the lower housing by one or more movable support(s) so that it remains securely in place with the door open or closed and may be removed from the lower housing while the housing is open. The lens shall be removable without tools or with a blade-type screwdriver.
- 8.2 The lens' physical characteristics shall conform to ANSI C136.17 latest revision.
- 8.3 The refractor's optical characteristics shall conform to the latest IES Standards and its design shall insure maximum uniformity and utilization of the light generated for lighting the roadway surface.
- 8.4 Lenses for the 100, 250, and 400-watt luminaires shall be made of flat heat tempered glass.

9.0 PHOTOMETRICS

- 9.1 100 Watt, HPS Luminaires
 - 9.1.1 The 100-watt mast arm mounted luminaire shall be IES Type cutoff and, when mounted 26 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) ft wide when calculating Photometrics. Luminaire location shall have a minimum spacing of 135 ft apart and maintain a minimum average of 0.80 footcandles.

- 9.1.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 16:1 within the above mentioned rectangular area.
 - 9.1.3 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.
 - 9.1.4 The bidder shall provide certified test reports prior to award of contract for the 100 watt HPS 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.
- 9.2 250 Watt, HPS Luminaires
- 9.2.1 The 250-watt mast arm mounted luminaire shall be IES Type cutoff and, when mounted 40 feet above the midpoint of either long side of a rectangular area 190 feet by 45 feet, shall provide a measured minimum intensity of 0.2 footcandle at any point on the surface of the area. 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 90 feet on both sides of the luminaire and shall not be less than 0.3 footcandle at any point along such line.
 - 9.2.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 20:1 within the above mentioned rectangular area.
 - 9.2.3 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.
 - 9.2.4 The bidder shall provide certified test reports prior to award of bid for the 250 watt HPS 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.
- 9.3 400 Watt, HPS Luminaires
- 9.3.1 The 400-watt mast arm mounted luminaire shall be IES Type cutoff 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. 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.
 - 9.3.2 The maximum to minimum horizontal illuminance uniformity ratio shall not exceed 20:1 within the above mentioned rectangular area.
 - 9.3.3 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.
 - 9.3.4 The bidder shall provide certified test reports prior to the award of bid for the 400 watt HPS 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.

9.4 Luminaire Up Light

- 9.4.1 All Luminaires shall be full cut-off with no light above 90 degrees per the photometric requirements listed above.

10.0 TERMINAL BOARD

- 10.1 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 housing of the luminaire.
- 10.2 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.
- 10.3 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.
- 10.4 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. The wiring diagram shall be permanent, apparent, legible, and affixed inside the luminaire. The diagram shall indicate the ballast, socket, photoelectric receptacle, starter circuit and coded terminal block connections.
- 10.5 All wire shall be insulated at a minimum to operate at 125 degrees centigrade.
- 10.6 All wire connectors shall be made with "amp type" push on terminal connectors. Wire nuts are unacceptable.

11.0 PHOTOELECTRIC CONTROL RECEPTACLE

- 11.1 Photoelectric control receptacle shall be molded plastic and shall be capable of securely positioning the photoelectric control in any necessary direction.
- 11.2 Electric contacts of the photoelectric control receptacle shall be tin plated bronze. Plated steel contacts are not acceptable.
- 11.3 Photoelectric control receptacle shall meet all applicable provisions of ANSI C136.10, latest revision.
- 11.4 Receptacle shall be 3-pole 3-wire locking type and shall be pre-wired to the terminal board.

12.0 BALLAST ASSEMBLY

- 12.1 Ballast core lamination shall be of high-quality electrical grade steel welded together. Coil winding shall be copper.
- 12.2 Ballast coils shall be bobbin or precision wound. Terminal shall be push-on type connection.
- 12.3 Starting circuit shall be easily accessible for removal and replacement without disturbing other components of the total ballast assembly and without the use of tools. The starter receptacle shall be of the plug-in type, capable of accepting a two-terminal replacement plug-in starter or a three-terminal replacement plug-in starter and must meet or exceed ANSI standards.
- 12.4 For all combinations of lamp voltage and line voltage variation within rating, the ballast shall operate the lamp within wattage limits as specified by the lamp manufacturer.
- 12.5 Ballast shall provide a minimum basic impulse level of 10 kV when tested in accordance with ANSI C82.4, sec. 6.2, latest revision.

- 12.6 Ballast and starting aid shall be designed to protect itself against normal lamp failure modes. Ballast shall be capable of operation with the lamps in the open circuit or closed circuit failure condition for at least six (6) months.
- 12.7 Ballasts shall be in full compliance with current lamp manufacturer's lamp-ballast specifications.
- 12.8 Ballasts for wattages of 100 watts shall be 10% regulated, for use in a single 120 volts source. Ballasts in wattages of 250 and 400 watts shall be, 10% regulated, with taps for multi-voltage operation (120V, 208V, 240V, 277V) but shall be connected at the factory for 120 volt operation unless otherwise specified at time of purchase. A permanent wiring diagram indicating voltage connections and circuitry shall be affixed on or near each ballast within the luminaire.
- 12.9 Ballasts shall be designed for the following nominal lamp voltage and wattage combinations:

LAMP WATTS	LAMP VOLTS
100	55
250	100
400	100

- 12.10 Ballasts shall be Constant Wattage Auto Regulated and shall conform to the following performance criteria:
 - 12.10.1 Power factor shall exceed 90% for nominal lamps and 65% end of life
 - 12.10.2 Starting current shall not exceed 100% of operating current
 - 12.10.3 Lamp current crest factor (the ratio of peak to RMS lamp operating current) shall not exceed 1.8 for any lamp voltage from nominal to end of life

13.0 IDENTIFICATION

- 13.1 Manufacturers shall permanently attach the following information to the inside wall of the upper or main housing:
 - 13.1.1 Manufacturers name
 - 13.1.2 Manufacturers catalog number and type
 - 13.1.3 Date of manufacturer (Codes are not accepted)
 - 13.1.4 Lamp Wattage
 - 13.1.5 Lamp IES designation and type
 - 13.1.6 Primary voltage
 - 13.1.7 Primary current
 - 13.1.8 Wiring diagram corresponding to the components and with the manufacturer's ballast installed.
- 13.2 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.
- 13.3 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.

14.0 PACKAGING

- 14.1 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.

14.2 AE commodity stock number will be two (2) in. block numerals on each box as follows:

14.2.1 100-watt, stock number
#6192

14.2.2 250-watt, stock number
#6193

14.2.3 400-watt, stock number
#6194

14.3 Boxes shall be palletized on 48-in. x 40-in. 4-way entry hardware pallets.