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MATERIAL SPECIFICATION FOR HIGH PRESSURE SODIUM LUMINAIRES FOR UNDERPASS LIGHTING

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2434.01 SCOPE

This specification covers the requirements for underpass luminaires with integral ballast for use with 70 to 400 watt high pressure sodium lamps.

2434.02 REFERENCES

This specification refers to the following standards, specifications, or publications:

CSA Standards

C22.2 No. 89-15	Swimming-Pool Luminaires, Submersible Luminaires and Accessories
C863-16	Energy Efficiency of High-Intensity Discharge (HID) and Low-Pressure Sodium (LPS) Lamp Ballasts

ASTM International

B117-11	Standard Practice for Operating Salt Spray (Fog) Apparatus
D1654-08	Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

American National Standards Institute (ANSI)

C136.31-2010 Roadway and Area Lighting Equipment - Luminaire Vibration

International Electrotechnical Commission (IEC)

60598 (2014-05) Luminaires

62262 (2002-02) Degrees of Protection Provided by Enclosures for Electrical Equipment Against External Mechanical Impacts (IK code)

2434.04 DESIGN AND SUBMISSION REQUIREMENTS

2434.04.01 Submission Requirements

2434.04.01.01 Working Drawings

Three copies of Working Drawings shall be submitted to the Contract Administrator a minimum of 14 Days prior to the commencement of fabrication.

As a minimum, the Working Drawings shall include the following information:

a) All mechanical details, including dimensions, layouts, weights, shield details, and mounting arrangements for components.

b) All electrical details and certified test reports, including wiring diagrams and component ratings.

c) All photometric information and certified test reports regarding the luminaires, including, but not limited to lamp position, photometric data sheets, and photometric test reports.

d) Certified Test Reports for UL/CSA listing, IP rating, IK rating, and ANSI C136.31 vibration.

2434.04.01.02 Photometric Test Results

Photometric test results for the luminaires supplied shall be submitted to the Contract Administrator and include the following data:

a) Isolux curves and mounting height correction factors.

b) Utilization charts or graphs.

c) Candlepower distribution curves indicating peak intensity.

d) Luminous intensity tables to Illuminating Engineering Society format (I-tables).

e) Luminaire efficiency values.

f) Luminous outputs above and below horizontal.

g) Lamp lumen outputs and wattages.

2434.04.01.03 Luminaire Test Results

Certified test results for the luminaires supplied shall be submitted to the Contract Administrator and include the following data:

a) UL/CSA Listing Report according to CSA C22.2 No. 89.

b) Minimum IP65 Rating according to IEC 60598.

c) Minimum IK08 Rating according to IEC 62262.

d) 1.5G Vibration Test Report according to ANSI C136.31.

2434.05 MATERIALS

2434.05.01 Electrical Components

All electrical components and assembled luminaires shall be according to CSA C22.2 No. 89.

Ballasts, lamp sockets, ground connectors, internal wiring, and all other components shall be suitable for the supply voltage as specified in the Contract Documents and the maximum temperature encountered in totally enclosed, outdoor, weatherproof luminaires.

Ballasts shall be constant wattage auto-transformer or isolated secondary transformer type for grounded systems. Auto-transformer type ballasts shall have a maximum tolerance of 12% variation in lamp wattage for a 5% variation in line voltage. Isolated secondary transformer type ballasts shall have a maximum tolerance of 12% variation in lamp wattage for a 10% variation in line voltage.

Ballasts shall be Class H, 180°C insulation; 60 hertz; and low temperature, -35°C with a power factor not less than 0.90.

The minimum nominal secondary open circuit voltage of the ballast for various lamps shall be sufficient to provide reliable starting at -35°C.

Ballasts shall be suitable for the lamp's nominal operating voltage. Terminal blocks shall be held rigidly and shall provide a positive connection for terminating the field wiring.

The current crest factor of the ballast shall not exceed 1.8 for high pressure sodium lamps.

Energy efficiency of lamp ballasts shall be according to CAN/CSA C863.

All wiring within fixture shall have a minimum temperature rating of 125°C.

2434.05.02 Mechanical Components

The luminaire shall be comprised of a polycarbonate, aluminum, or stainless steel enclosure with a specular reflector and a glass prismatic refractor. Enclosure shall meet a scribe creepage rating of 7 according to ASTM D1654, when tested for 5,000 hours according to ASTM B117.

The luminaire shall be provided with a 20 mm threaded duct entry in each end of the enclosure and a cable entry hole in the rear of the enclosure together with a suitable waterproof gasket.

The luminaire shall have continuous captive gasket between the door and enclosure and between the refractor and the enclosure to provide a weatherproof seal.

All fixture hardware shall be Type 316 stainless steel and shall be captive. Proper dielectric insulation shall be provided between luminaire housing and fixture hardware of dissimilar metals, to prevent galvanic reaction.

The luminaire shall be provided with a ground terminal or lug for a single conductor #12 AWG stranded copper wire.

All unused cable and duct entry holes shall be plugged with approved filler caps.

The lamp socket shall be a porcelain-enclosed, nickel-plated brass shell rated for 4,000 volts, and spring-loaded centre contact. The lamp holder shall have an electrically insulated lamp stabilizer and shall hold the lamp's outer envelope to precise alignment with suitable means for vibration damping.

The refractor shall be heat-resistant and non-discolouring, with high resistance to breakage from thermal shock. It shall be securely attached to the housing by hinges and a safety device to hold it in the open position.

The reflector shall be fabricated of polished, chemically brightened, anodized aluminum not subject to distortion and shall be readily removable.

The luminaire shall be accessible with tool-less entry.

The luminaire shall not be subject to damage by vibration when closed and in the operating position.

2434.05.03 Marking

A permanent non-corrosive nameplate shall be attached to the exterior of the luminaire and located so that the marking is clearly visible after installation. The nameplate shall indicate the manufacturer’s name or trademark, catalogue number, lamp wattage, and nominal voltage.

A permanent label shall be attached to the interior of the luminaire indicating the manufacturer's name or trademark, catalogue number, date of manufacture, and the American National Standards Institute (ANSI) or Illuminating Engineering Society (IES) photometric classification and distribution type; the suitable supply voltage and frequency; the lamp type; the lamp wattage; and the nominal operating voltage of the lamp so that it is clearly visible during maintenance operations.

A label including a wiring diagram shall be attached to each ballast showing the ballast schematic wiring diagram and shall be visible during maintenance operations.

For asymmetrical luminaires with adjustable optical systems, a permanent embossed identification mark shall be located on the luminaire that is clearly visible and identifiable as an orientation mark.

2434.07 PRODUCTION

2434.07.01 Ballast Assemblies

Ballast assemblies shall be factory pre-wired with all connections clearly marked and identified.

2434.07.02 Lamp Socket Positions

The lamp socket position shall be pre-set and legibly marked at the factory for the specified distribution.

2434.08 QUALITY ASSURANCE

2434.08.01 Inspection

The supplier shall notify the Contract Administrator of the date that the fabrication of the luminaires is to commence.

The Contract Administrator shall have access to the place of fabrication for the purpose of inspecting and examining plant records, certificates, materials used, fabrication process, and to make any tests as may be considered necessary, while the work is being performed.

All luminaires are subject to an inspection by the Contract Administrator prior to shipment.

2434.09 OWNER PURCHASE OF MATERIAL

2434.09.01 Packaging and Shipment

The supplier shall provide 3 copies of the luminaire ballast engineering data and shielding data such as material type, gauge thickness, and mounting arrangement to the Owner.

Each luminaire shall be shipped complete with hardware suitably packaged to ensure that all parts are delivered as an entity. A complete parts list shall be included in the shipment. All cartons shall be marked with the ANSI or IES luminaire classification and distribution types.

The supplier is responsible for loading, delivery, and off-loading of luminaires to designated areas. Luminaires shall be subject to inspection during and on completion of off-loading. If any damage to the luminaires is encountered during the inspection, the supplier shall be responsible for the necessary corrective measures subject to the approval of the Owner.

The supplier shall advise the Owner 3 Working Days prior to the shipping date of the intent to deliver and confirm that arrangements for off-loading have been made.

2434.09.02 Measurement and Payment

For measurement purposes, a count shall be made of the number of the underpass luminaires delivered and accepted.

Payment at the price specified in the purchasing order shall be full compensation for the supply and delivery of the underpass lighting luminaires to the destination at the date and time specified.

The cost of all testing, except that performed in the Owner's laboratory, shall be included in the price.