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MATERIAL SPECIFICATION FOR HIGH PRESSURE SODIUM LUMINAIRES FOR HIGHWAY LIGHTING

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2432.01 SCOPE

This specification covers the requirements for highway lighting luminaires with integral ballasts for use in conventional and high mast lighting.

2432.02 REFERENCES

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

CSA Standards

C22.2 No. 9.0-96 (R2011)	General Requirements for Luminaires
C653-13	Photometric Performance of Roadway and Street Lighting Luminaires
C811-13	Performance of Highmast Luminaires for Roadway Lighting
C863-11	Energy Efficiency of High-Intensity Discharge (HID) and Low-Pressure Sodium (LPS) Lamp Ballasts

2432.04 DESIGN AND SUBMISSION REQUIREMENTS

2432.04.01 Design Requirements

2432.04.01.01 Photometric Requirements

As a minimum, the photometric performance of the luminaires for conventional lighting shall be according to CSA C653.

As a minimum, the photometric performance of the luminaires for high mast lighting shall be according to CSA C811.

Photometric test results shall be provided for the luminaires supplied and shall 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.

2432.04.01.02 Electrical Requirements

All electrical components and assembled luminaires shall be according to CSA C22.2 No. 9.0.

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.

2432.04.01.03 Mechanical Requirements

The luminaire shall be comprised of a cast aluminum ballast housing, spun or formed aluminum optical housing with a glass lens or refractor, and stainless steel hardware.

The ballast housing shall form a watertight enclosure for the ballast components that shall be readily interchangeable without removing the luminaire from the mounting bracket. The ballast housing shall be either integral or modular design. If it is of modular design, it shall be attached to the housing using stainless steel hardware.

Mounting arrangements shall consist of a slip fitter assembly for a 50 mm diameter internal pipe size tenon. The slip fitter shall be secured using stainless steel hardware with an independent levelling device. Adjustment of the luminaire in the vertical plane shall be 3 degrees minimum.

The lamp socket shall be a mogul type with 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 optical assembly shall consist of a precision formed specular aluminum reflector with an anodized finish and accurately positioned within the luminaire outer housing. The assembly shall be sealed at the top by a high temperature neoprene or silicone rubber gasket between the ballast casting and reflector and at the bottom by a hinged door assembly.

Alternatively, the optical assembly shall consist of a pressed borosilicate glass reflector and refractor of open ventilated design. The reflector shall have a smooth non-porous inner surface and be encased within the luminaire outer housing. The refractor shall be attached to the reflector using stainless steel hardware. The reflector or refractor assembly shall be readily removable without removing the luminaire from the mounting bracket.

The door assembly shall consist of a gasketed doorframe and a clear tempered shock-resistant glass lens and shall be attached to the reflector housing using stainless steel toggle latches, one of which shall be hinged.

2432.04.02 Submission Requirements

2432.04.02.01 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, and mounting arrangements for components.
- b) All electrical details, including wiring diagrams and component ratings.
- c) All photometric information regarding the luminaires, including, but not limited to lamp position and photometric data sheets.
- d) Shield details.
- e) Certification by an Engineer that the luminaires for conventional lighting comply with CSA C653.
- f) Certification by an Engineer that the luminaires for high mast lighting comply with CSA C811.

Each Working Drawing shall be sealed and stamped by an Engineer certifying that the Working Drawings comply with the Contract Documents.

One copy of the final accepted Working Drawings shall be returned to the supplier, along with written notification to commence fabrication. Within 14 Days of receipt of notification to commence fabrication, the supplier shall submit 3 copies of all final accepted Working Drawings to the Contract Administrator.

Fabrication of the equipment shall not commence until the Working Drawings have been accepted by the Contract Administrator.

Once fabrication of the equipment has commenced, materials and dimensions shown on the final accepted Working Drawings shall not be changed.

2432.05 MATERIALS

2432.05.01 Marking

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.

2432.07 PRODUCTION

2432.07.01 Ballast Assemblies

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

2432.07.02 Lamp Socket Positions

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

2432.08 QUALITY ASSURANCE

2432.08.01 Inspection

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

The Owner's representative shall have free 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 luminaires are being fabricated.

All luminaires are subject to an inspection by the Owner's representative prior to shipment.