



**CONSTRUCTION SPECIFICATION FOR  
INSTALLATION OF ROADWAY LUMINAIRES**

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**617.01 SCOPE**

This specification covers the requirements for the installation of luminaires and brackets on poles complete with associated wiring and connections.

**617.02 REFERENCES**

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

**Ontario Provincial Standard Specifications, Construction**

OPSS 604	Installation of Cable
OPSS 609	Grounding
OPSS 610	Removal of Electrical Equipment and Materials

**Ontario Provincial Standard Specifications, Material**

OPSS 2432	High Pressure Sodium Luminaires for Highway Lighting
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## **CSA Standards**

C22.2 No. 9.0-96 (R2016)	General Requirements for Luminaires
C22.2 No. 65-18	Wire Connectors
C22.2 No. 211.2-06 (R2016)	Rigid PVC (Unplasticized) Conduit
C22.2 No. 248.8-11 (R2016)	Low-Voltage Fuses - Part 8: Class J Fuses
C83-96	Communication and Power Line Hardware

## **American National Standards Institute (ANSI)**

C78.380-2016 High-Intensity Discharge Lamps, Method of Designation

## **Illuminating Engineering Society of North America (IESNA)**

LM-63-02	Standard File Format for Electronic Transfer of Photometric Data and Related Information
LM-79-08	Electrical and Photometric Measurements of Solid-State Lighting Products

### **617.04 DESIGN AND SUBMISSION REQUIREMENTS**

#### **617.04.01 Submission Requirements**

A photometric test report shall be submitted for each photometric curve used in the luminaires to be installed under the Contract. The testing and test reports for high intensity discharge (HID) luminaires (e.g., high pressure sodium) shall be according to IESNA LM-63. The testing and test reports for LED luminaires shall be according to IESNA LM-79. The testing and test reports shall be completed by an independent laboratory or a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory, which is accredited for testing the type of luminaire to be installed under the Contract (i.e., accredited for IESNA LM-63 for HID luminaires or IESNA LM-79 for LED luminaires). Each test report shall be dated and signed. The test reports shall be submitted to the Contract Administrator prior to the commencement of fabrication.

#### **617.05 MATERIALS**

##### **617.05.01 Luminaires**

###### **617.05.01.01 Roadway Lighting Type**

Roadway lighting luminaires shall be according to OPSS 2432 and the Contract Documents.

###### **617.05.01.02 High Mast Lighting Type**

High mast lighting luminaires shall be according to OPSS 2432 and the Contract Documents.

###### **617.05.01.03 Floodlighting Type**

Floodlighting luminaires shall be according to CSA C22.2 No. 9.0 and the Contract Documents.

###### **617.05.01.04 LED Roadway Lighting Type**

LED roadway lighting luminaires shall be according to the Contract Documents.

###### **617.05.01.05 LED High Mast Lighting Type**

High mast lighting luminaires shall be according to the Contract Documents.

**617.05.02                    Lamps**

Lamps shall be high pressure sodium according to ANSI C78.380 with ANSI lamp designations shown in Table 1. Lamp wattages shall be permanently marked using a label affixed to the underside of the luminaires as specified in the Contract Documents.

**617.05.03                    Low-Voltage Cables**

Single conductor low-voltage cables shall be according to OPSS 604.

**617.05.04                    Wire Connectors**

Wire connectors shall be of the compression type and shall be according to CAN/CSA C22.2 No. 65.

**617.05.05                    Insulating Covers**

Insulating covers for connectors shall be of the vinyl snap lock type or heat shrink tubing type and rated at 600 V.

**617.05.06                    Brackets**

Brackets shall be as specified in the Contract Documents.

**617.05.07                    Conduit and Fittings**

Conduit and fittings required for wooden pole mounting shall be of the rigid PVC type according to CSA C22.2 No. 211.2.

**617.05.08                    Hardware**

Hardware for wooden pole mounting shall be according to CSA C83.

**617.05.09                    Grounding Materials**

Ground wire and connectors shall be according to OPSS 609.

**617.05.10                    Fuse Holders and Fuses**

Fuse holders shall be of the in-line type suitable for use with #12 AWG conductors, rated 600 V, and shall be complete with protective boots. Fuses shall be according to CSA C22.2 No. 248.8, 600 V with a current rating as specified in the Contract Documents.

**617.07                        CONSTRUCTION**

**617.07.01                    General**

General requirements for electrical work shall be as specified in the Contract Documents.

**617.07.01.01                Ordering Luminaires**

Immediately following the award of the Contract, the Contractor shall order the luminaires as required for this Contract.

The Contractor shall obtain verification of the delivery dates of the luminaires from the supplier and notify the Contract Administrator of the delivery dates within 72 hours after the award of the Contract.

The Contractor shall ensure there is timely and accurate communication with both the Owner and the supplier regarding the delivery, schedules, and requirements for the luminaires.

Delivery and off-loading of the luminaires shall be completed in a timely and efficient manner.

**617.07.02                      Removals**

Removals shall be according to OPSS 610.

**617.07.03                      Lamp Installation**

Lamps shall be installed after poles have been installed and the brackets and luminaires mounted and levelled.

**617.07.04                      Brackets**

**617.07.04.01                  Roadway Lighting Type**

Brackets shall be installed at right angles to the centreline of the roadway being served. Bracket clamping assemblies shall be securely tightened. Brackets shall be mounted on wooden poles using 16 mm diameter galvanized steel square head through bolts, nuts, and 50 x 50 mm washers.

**617.07.04.02                  Floodlighting Type**

Bracket assemblies shall be oriented to give the floodlight aiming specified in the Contract Documents. Bracket clamping assemblies shall be securely tightened.

**617.07.05                      Luminaires**

**617.07.05.01                  General**

Luminaires shall be stored in conditions free of moisture, dirt, and other factors that could damage the ballasts or reflecting surfaces of the optical system.

Luminaires shall be mounted on brackets and shall be installed level along both the longitudinal and transverse axis.

Luminaire clamping assemblies shall be securely tightened upon completion of levelling.

Luminaires shall be orientated and aimed using the horizontal and vertical angles specified in the Contract Documents. When instructed by the Contract Administrator, each luminaire or luminaire component shall be readjusted once under nighttime operating conditions.

Glass refractors shall be installed complete with gaskets. Mounting hardware shall be securely tightened. The luminaire reflector and refractor shall be thoroughly cleaned prior to installing lamps. Lamps shall be installed with the installation date marked on the lamp base.

If required, the refractor and the lamp holder shall be reset or replaced according to manufacturer's instructions to give the proper type of light distribution specified in the Contract Documents.

When specified in the Contract Documents, the luminaires shall be equipped with shields. The shields shall be mounted in such a manner to prevent loosening, turning, or falling when subject to vibration or wind loading in the installed position and to permit relamping without removing or distorting the alignment of the shields.

The shield shall be installed according to the manufacturer's instructions. The orientation of each shield shall be as specified in the Contract Documents. After the shield is attached to the luminaire-retaining

ring, it shall be rotated such that its centre (the deepest point) is aligned with the specified angle. The angle specified is based on geometric rotation with the true north as its reference (0 degrees). Once the shield is aligned to the specified angle, it shall be secured in place by tightening the holding ring.

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

#### **617.07.05.02 High Mast Lighting Type**

A maximum of one luminaire shall be installed on each arm of the luminaire ring.

Each luminaire shall be bolted and secured onto its respective luminaire arm.

#### **617.07.06 Wiring and Connections**

Riser wires in metal and concrete poles shall be terminated at the luminaire terminal block and installed through the bracket and pole to the pole handhole.

Riser wires on wooden poles shall enter the bracket with a drip loop and shall be installed in conduit when the distance from the bracket to the low voltage bus exceeds 450 mm.

Connections or riser wires to the assigned feeder conductors shall be made with compression connectors insulated with insulating covers.

In-line fuse holders and fuses shall be installed in the pole handhole and placed in an accessible location. For wooden poles, in-line fuse holder and fuses shall be installed at the point of connection.

#### **617.07.07 Grounding**

Grounding shall be according to OPSS 609.

For metal or concrete pole mounting, a #12 AWG insulated (green) stranded copper ground wire shall be installed between the luminaire housing ground terminal and the ground stud in the pole handhole.

For wooden pole mounting, a #12 AWG insulated (green) stranded copper ground wire shall be installed between the luminaire housing ground terminal and the system ground.

#### **617.07.08 Replacing Luminaires**

Existing luminaires shall be removed and new luminaires installed according to the Contract Documents. Existing riser wires and luminaire ground wire shall be salvaged and connected to the new luminaires.

#### **617.07.09 Relamping**

When required, existing lamps shall be removed. The existing luminaires shall be thoroughly cleaned and new lamps installed according to the Contract Documents.

#### **617.07.10 Quality Control**

##### **617.07.10.01 Pre-Installation Testing and Inspection**

Luminaires, brackets, socket setting, refractor type, and ballast type shall be inspected to ensure they meet the requirements of the Contract Documents.

A Request to Proceed shall be submitted to the Contract Administrator after completion of the pre-installation testing and inspection.

The next operation after the completion of the pre-installation testing and inspection shall not proceed until a Notice to Proceed has been received from the Contract Administrator.

**617.07.10.02                    Proof of Performance Testing and Inspection**

Luminaires shall be tested and inspected to ensure that they are levelled correctly and according to the Contract Documents. All luminaires shall have a minimum burning-in period of 100 nighttime hours prior to acceptance of the work by the Contract Administrator. All luminaire shielding shall be installed prior to the start of the burn-in period.

All tests required on the wiring system shall be according to OPSS 604.

A Request to Proceed shall be submitted to the Contract Administrator after completion of the proof of performance testing and inspection.

The next operation after the completion of the proof of performance testing and inspection shall not proceed until a Notice to Proceed has been received from the Contract Administrator.

**617.07.11                        Temporary Electrical Work**

The work for temporary electrical installations shall be the same as for permanent installations of the same type of work, except the work shall include the removal of the installations when they are no longer required.

**617.07.12                        Management of Excess Material**

Management of excess material shall be according to the Contract Documents.

**617.09                            MEASUREMENT FOR PAYMENT**

**617.09.01                        Actual Measurement**

**617.09.01.01                    Roadway Lighting Luminaires and Bracket Assemblies  
LED Roadway Lighting Luminaires and Bracket Assemblies**

For measurement purposes, a count shall be made of the number of roadway lighting luminaires and bracket assemblies installed.

**617.09.01.02                    High Mast Lighting Luminaires  
LED High Mast Lighting Luminaires**

For measurement purposes, a count shall be made of the number of high mast lighting luminaires installed.

**617.09.01.03                    Floodlighting Luminaires and Bracket Assemblies**

For measurement purposes, a count shall be made of the number of floodlighting luminaires and bracket assemblies installed.

**617.09.01.04                    Replace Roadway Lighting Luminaires  
Replace LED Roadway Lighting Luminaires**

For measurement purposes, a count shall be made of the number of roadway lighting luminaires replaced.

**617.09.01.05                    Replace High Mast Lighting Luminaires  
Replace LED High Mast Lighting Luminaires**

For measurement purposes, a count shall be made of the number of high mast lighting luminaires replaced.

**617.09.01.06                    Replace Floodlighting Luminaires**

For measurement purposes, a count shall be made of the number of floodlighting luminaires replaced.

**617.09.01.07                    Relamp Roadway Lighting Luminaires**

For measurement purposes, a count shall be made of the number of new lamps installed in existing roadway lighting luminaires.

**617.09.01.08                    Relamp High Mast Lighting Luminaires**

For measurement purposes, a count shall be made of the number of new lamps installed in existing high mast lighting luminaires.

**617.09.01.09                    Relamp Floodlighting Luminaires**

For measurement purposes, a count shall be made of the number of new lamps installed in existing floodlighting luminaires.

**617.09.02                        Plan Quantity Measurement**

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

**617.10                            BASIS OF PAYMENT**

- 617.10.01                        Roadway Lighting Luminaires and Bracket Assemblies - Item**
- LED Roadway Lighting Luminaires and Bracket Assemblies - Item**
- High Mast Lighting Luminaires – Item**
- LED High Mast Lighting Luminaires - Item**
- Floodlighting Luminaires and Bracket Assemblies - Item**
- Replace Roadway Lighting Luminaires - Item**
- Replace LED Roadway Lighting Luminaires - Item**
- Replace High Mast Lighting Luminaires - Item**
- Replace LED High Mast Lighting Luminaires - Item**
- Replace Floodlighting Luminaires - Item**
- Relamp Roadway Lighting Luminaires - Item**
- Relamp High Mast Lighting Luminaires - Item**
- Relamp Floodlighting Luminaires - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

- 617.10.02                        Roadway Lighting Luminaires and Bracket Assemblies (Temporary) - Item**
- LED Roadway Lighting Luminaires and Bracket Assemblies (Temporary) - Item**
- Floodlighting Luminaires and Bracket Assemblies (Temporary) - Item**
- High Mast Lighting Luminaires (Temporary) - Item**
- LED High Mast Lighting Luminaires (Temporary) - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

Progress payments for the above tender items shall be based on the following percentages of the Contract price:

80% for supply and installation

20% for removal



**TABLE 1  
Lamps for Roadway Lighting**

<b>Lamp Type</b>	<b>Lamp Wattage</b>	<b>Lamp Nominal Operating Voltage</b>	<b>Lamp Finish</b>	<b>ANSI Lamp Designation</b>
High Pressure Sodium (HPS)	100	55	Clear	S54-100
	150	55	Clear	S55-150
	200	100	Clear	S66-200
	200	100	Coated	S66/D-22
	250	100	Clear	S50-250
	310	100	Clear	S67-310
	400	100	Clear	S51-400
	600	105	Clear	S106-600
	750	120	Clear	S111-750
	1000	250	Clear	S52-1000