



**CONSTRUCTION SPECIFICATION FOR
INSTALLATION OF UNDERPASS LUMINAIRES**

TABLE OF CONTENTS

611.01	SCOPE
611.02	REFERENCES
611.03	DEFINITIONS - Not Used
611.04	DESIGN AND SUBMISSION REQUIREMENTS
611.05	MATERIALS
611.06	EQUIPMENT - Not Used
611.07	CONSTRUCTION
611.08	QUALITY ASSURANCE - Not Used
611.09	MEASUREMENT FOR PAYMENT
611.10	BASIS OF PAYMENT

APPENDICES

611-A	Commentary
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611.01 SCOPE

This specification covers the requirements for the installation, replacement, and relamping of underpass luminaires.

611.01.01 Specification Significance and Use

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

Use of this specification or any other specification shall be according to the Contract Documents.

611.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

611.02 REFERENCES

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

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

Ontario Provincial Standard Specifications, Construction

OPSS 603	Installation of Ducts
OPSS 604	Installation of Cables
OPSS 609	Grounding
OPSS 610	Removal of Electrical Equipment and Materials

Ontario Provincial Standard Specifications, Material

OPSS 2434	High Pressure Sodium Luminaires for Underpass Lighting
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CSA Standards

C22.2 No. 49-18	Flexible Cords and Cables
C22.2 No. 65-18	Wire Connectors
C22.2 No. 197-M83 (R2018)	PVC Insulating Tape
C22.2 No. 227.2.1-19	Liquid-Tight Flexible Nonmetallic Conduit
C22.2 No. 248.8-11 (R2020)	Low-Voltage Fuses - Part 8: Class J Fuses
G40.20-13/G40.21-13 (R2018)	General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel
G164-18	Hot Dip Galvanizing of Irregularly Shaped Articles
W59-18	Welded Steel Construction

American National Standards Institute (ANSI)

C78.380-2016	Electric Lamps – High-Intensity Discharge Lamps - Method of Designation
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Illuminating Engineering Society of North America (IESNA)

LM-63-19	Standard File Format for the Electronic Transfer of Photometric Data and Related Information
LM-79-19	Optical and Electrical Measurements of Solid State Lighting Products

611.04 DESIGN AND SUBMISSION REQUIREMENTS

611.04.01 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.

611.05 MATERIALS

611.05.01 Luminaires

Underpass luminaires shall be according to OPSS 2434.

611.05.02 Lamps

Lamps shall be clear or coated as specified in the Contract Documents and shall meet the requirements of ANSI C78.380.

611.05.03 Low-Voltage Cables

Single conductor low-voltage cables for use in conduit systems shall be according to OPSS 604.

Low-voltage cable for entry to luminaires shall be single conductor stranded copper and shall be according to CAN/CSA C22.2 No. 49, Type GTF.

611.05.04 Wire Connectors

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

611.05.05 Ground Wire

Ground wire shall be Type GTF.

611.05.06 Fuses

Fuses shall be according to CSA C22.2 No. 248.8, 600V, 10 amps rating.

611.05.07 Ducts and Fittings

Non-metallic flexible liquid-tight ducts and connectors shall be according to CAN/CSA C22.2 No. 227.2.1.

611.05.08 **Tape**

Electrical insulating tape shall be according to CSA C22.2 No. 197 rated for 600 V and -10 to 90 °C working temperature.

611.05.09 **Luminaire Mounting Brackets**

Luminaire brackets shall be steel according to CSA G40.20/G40.21, Grade 260W, and shall be hot dip galvanized according to CSA G164.

Welding of members shall be carried out according to CSA W59.

611.05.10 **Protective Guard**

Luminaires shall be supplied with the luminaire manufacturer's protective guard as specified in the Contract Documents.

611.07 **CONSTRUCTION**

611.07.01 **General**

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

The work for the installation, replacement, or relamping of the luminaires shall include all required hardware and fixtures to ensure operation of the unit.

611.07.01.01 **Ordering Luminaires**

Luminaires shall be ordered immediately following Contract award.

The Contract Administrator shall be notified of the delivery dates of the luminaires within 72 hours after Contract award.

Communication with both the Owner and the supplier regarding the delivery, schedules, and requirements for the luminaires shall be timely and accurate.

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

611.07.02 **Removals**

Removals shall be according to OPSS 610.

611.07.03 **Surface-Mounted Ducts**

Non-metallic, flexible, liquid-tight ducts and connectors shall be used for connecting the underpass luminaires to the closest junction boxes as specified in the Contract Documents.

Surface-mounted ducts shall be installed according to OPSS 603.

611.07.04 **Luminaire Mounting Brackets**

When specified in the Contract Documents, the luminaries shall be installed on mounting brackets.

Luminaire mounting brackets shall be fastened to concrete surfaces by drilling and inserting metal expansion anchors and securing the bracket with 10 mm diameter stainless steel machine bolts and lock washers.

Luminaire mounting brackets shall be fastened to steel structural members as specified in the Contract Documents, using stainless steel hardware.

The luminaire mounting bracket shall be fastened to the surfaces to allow the level installation of the luminaire.

611.07.05 Wiring

Wiring shall be installed according to OPSS 604. Each luminaire shall be individually protected with a fuse. The fuse shall be located either in the junction box or in the luminaire. All connectors shall be insulated and secured with tape.

Each luminaire shall be wired with Type GTF conductors connected to the ballast leads with insulated spring connectors secured with tape. GTF conductors shall be connected to the underpass lighting circuits in the junction box with insulated spring connectors secured with tape.

611.07.06 Grounding

Underpass luminaires shall be connected to the system ground according to OPSS 609.

611.07.07 Installation of Luminaires

Luminaires shall be protected from conditions where moisture or dirt could damage the ballasts or reflecting surfaces of the optical system.

Luminaires shall be mounted on concrete surfaces as specified in the Contract Documents by drilling and inserting metal expansion anchors and securing the luminaires with 10 mm diameter stainless steel machine bolts, lock washers, and PVC spacers.

Luminaires shall be mounted on the steel structural members as specified in the Contract Documents, using stainless steel hardware.

All underpass luminaires are to be installed level using stainless steel hardware.

The luminaire reflector and refractor shall be thoroughly cleaned prior to installing lamps.

The wire guard and housing hardware shall be securely fastened in place.

611.07.08 Replacing Luminaires

When specified in the Contract Documents, existing luminaires, associated flexible conduit, and wiring shall be removed and new luminaires, associated flexible conduit, fittings, and wiring shall be installed.

When new luminaires are of a different style than the existing luminaires, new concrete anchors or mounting hardware shall be installed.

611.07.09 Relamping

Existing lamps shall be removed, the luminaires thoroughly cleaned, and new lamps installed.

611.07.10 Quality Control

611.07.10.01 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.

611.07.10.02 Proof of Performance Testing and Inspection

Luminaires shall be inspected and tested to ensure that they meet the requirements of the Contract Documents. All lamps installed in luminaires shall have undergone a minimum burning-in period of 100 consecutive nighttime hours prior to acceptance of the work by the Contract Administrator. For daytime tunnel illumination systems, the burn-in time is not required to be continuous and shall be achieved during normal daytime hours.

Low-voltage system tests required on the wiring system shall be performed according to OPSS 604.

611.07.11 Temporary Electrical Work

Temporary electrical work shall be the same as that of permanent electrical work, except it shall include removal when no longer required.

611.07.12 Management of Excess Material

Management of excess material shall be as specified in the Contract Documents.

611.09 MEASUREMENT FOR PAYMENT

611.09.01 Actual Measurement

611.09.01.01 Underpass Luminaires

For measurement purposes, a count shall be made of the number of underpass luminaires installed.

611.09.01.02 Replace Underpass Luminaires

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

611.09.01.03 Relamp Underpass Luminaires

For measurement purposes, a count shall be made of the number of underpass luminaires relamped.

611.09.02 Plan Quantity Measurement

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

611.10 BASIS OF PAYMENT

**611.10.01 Underpass Luminaires - Item
Replace Underpass Luminaires - Item
Relamp Underpass 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.

When the Contract contains separate items for the work required by this specification, payment shall be at the Contract prices and according to the specifications for such work.

611.10.02**Underpass Luminaires, Temporary - Item**

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

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

80% for supply and installation
20% for removal

**Appendix 611-A, November 2021
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS**

Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

Designer Action/Considerations

The designer should specify the following in the Contract Documents:

- Clear or coated lamps. (611.05.02)
- Luminaire protective guards to be supplied. (611.05.10)
- Location of junction boxes. (611.07.03)
- Location of luminaire installations. (611.07.07)

The designer should determine if the following are required and, if so, specify them in the Contract Documents:

- Luminaires mounted on brackets. (611.07.04)
- Luminaire replacement. (611.07.08)

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

OPSD 2305.020	Underpass Luminaires, Wall Mounted Installation
OPSD 2310.010	Underpass Luminaire, Ceiling Mounted Installation with Tee Bracket
OPSD 2310.020	Tee Bracket for Ceiling Mounted Underpass Luminaire
OPSD 2310.030	Wedge Mounting Bracket for Underpass Luminaire
OPSD 2310.040	Support Bracket for Column Mounted Underpass Luminaire
OPSD 2315.010	Underpass Luminaire Wiring Detail