SP-150040
(New)

SPECIAL PROVISIONS
FOR
EXTERIOR LED LIGHTING

Woodbury County
IM-NHS-029-7(49)149--03-97

Effective Date
December 15, 2015

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150040.01 GENERAL.

A. Section Includes.

1. Exterior LED luminaires.

2. Luminaire accessories.

B. Reference Standards.

1. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.

2. IESNA LM-79-08, IESNA Approved Method for the Electrical and Photometric Measurements of Solid-Sate Lighting Products.

3. IESNA LM-80-08, IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources.

4. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

5. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems.

6. ANSI/NEMA/ANSLG C78.377-2008 - American National Standard for the Chromaticity of Solid State Lighting Products.

7. NFPA 70 - National Electrical Code; National Fire Protection Association.

8. UL 1598 - Luminaires.

C. Submittals.

1. Refer to the Article 1105.03 of the Standard Specifications for submittal procedures.

2. Additional submittal procedures: Each bound submittal must be reviewed, stamped, signed, and dated by the Contractor. Submittals must be sent via the Contractor. Submittals sent directly from suppliers or subcontractors will not be reviewed by the Engineer.

3. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

4. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

5. Performance Reports - Submit the following for approval:
- **a.** Luminaire photometric reports per IESNA LM-79-08 including: Verifiable third-party test results, laboratory name, report number, date, luminaire catalog number, and luminaire/light source specifications. Report must contain light distribution classification if applicable, luminous Intensity, zonal lumen summary, and an iso-footcandle diagram per LM-31 as well as documentation that specified standards and test methods were followed.
- **b.** Provide Department of Energy Lighting Facts Label or Design Lights Consortium documentation.
- **c.** Provide IESNA LM-80-08 documentation of the expected useful life of LEDs from verifiable third-party test results.

6. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

7. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

8. Project Record Documents: Record actual luminaire type installed at locations where different from the type originally scheduled in the contract documents. Provide record of any other deviations from the contract documents. Deviations from the contract documents shall not be allowed without approval from Engineer prior to installation.

D. Quality Assurance.

1. Conform to requirements of NFPA 70.

2. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

3. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience and has specified luminaire types installed and operating commercially in the field for 5 years.

E. Delivery, Storage, and Handling.

1. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

2. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

F. Warranty.
The manufacturer shall provide a written 5 year warranty on each luminaire type specified herein which includes:

1. Replacement due to material and fixture finish failures, and workmanship deficiency.
- **a.** The material warranty includes but is not limited to failure of fixture housing components, defective or non-starting LED source assemblies, or failure of driver power supply units.
- **b.** The finish warranty includes but is not limited to failure or substantial deterioration such as blistering, cracking or peeling.

2. Warranty period shall not begin until final acceptance of the lighting by the Engineer. The supplier will provide the Contracting Authority with appropriate signed warranty certificates. The Contracting Authority must receive certificates prior to final payment.

3. Other warranty stipulations specific to and stated in each luminaire section below.

150040.02 MATERIALS.

A. General Requirements.

1. All luminaires specified herein shall be solid state lighting (SSL) sources (a.k.a. LED).

2. Provide products that comply with requirements of NFPA 70.

3. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

4. Unless specifically indicated to be excluded, provide all required wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

5. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

6. Provide luminaires listed and labeled as Wet Location/IP66 unless otherwise indicated.

7. All exposed hardware shall be either stainless steel or manufactured using corrosion resistant materials finished with the same finishing process as the luminaire.

8. All luminaires shall be capable of withstanding relative humidity from 0 to 95%, non-condensing.

9. Provide luminaire assemblies that are RoHS Compliant.

B. Underdeck Light Luminaire.

1. High intensity white light LED wall-mount flood lighting luminaire assembly used for illuminating horizontal surfaces/areas.

2. Luminaire Requirements.
- **a. Housing.**
  - **1)** Material: Die-cast aluminum alloy.
  - **2)** Metallic finned heat sink built integral to the housing to conduct heat away from the LEDs and driver. The heat sink is a passive cooling device with no active fan or

moving parts. Provide metallic screen material over heat sink fins to exclude dirt and contaminants.

3) Lens: Clear flat glass in a door frame with memory-retentive gasket.

b. Light Source Characteristics.

1) Ambient Operating Temperature Range Rating: -40°C to +70°C.
2) Correlated Color Temperature (CCT): 4000K
3) Color Rendering Index (CRI): Equal to or greater than 70.
4) Operating Drive Current: 530 mA maximum.
5) Sealed optical system rated IP66.
6) Light Distribution: IES Type IV, Short, Cutoff.

c. Driver Power Supply Units.

1) Driver shall be built integral to the luminaire assembly.
2) Ambient operating temperature range: -40°C to +70°C.
3) Input Voltage: Capable of automatically accepting and operating on 120 to 277 (± 10%) volts, single phase, AC.
4) Source voltage: 240 VAC, all locations.
5) Drivers can be UL Class I or II output.
6) Operating Frequency: 50/60 Hz.
7) Minimum Power Factor (PF): 0.90.
8) Maximum Total Harmonic Distortion (THD): 20%.
9) Comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.
10) Provide with surge protection: L-L or L-N, and L-G.
11) Driver housing rated IP66.

d. Minimum Initial Absolute Lumen Output: 5360 lumens.

e. Luminaire Power Consumption: 54 watts maximum at full output, steady state.

f. Minimum LM-79 Absolute Lumen Efficacy Rating: 100 lumens per Watt.

g. Expected Useful Life (Light Output) and Depreciation.
Simplified L70 threshold: Each luminaire shall have a minimum expected useful life of 150,000 operating hours at 25ºC ambient before reaching the L70 lumen output degradation point with no catastrophic failures.

h. Mounting.

1) Provide wall-mount junction box for surface mounting to LI-120 underdeck mounting assembly backplate. Junction box shall be manufacturer's standard offering fabricated of die-cast aluminum and finished of the same material and finishing process as the luminaire. The junction box shall have threaded hubs for top/side/bottom/rear conduit entry and shall house luminaire-to-supply conductor splices.
2) Luminaire housing shall be designed to mount directly to the wall-mount junction box utilizing a hanger bracket and locking screw.

i. Luminaire Dimensions.
Approximately 16.5 inches wide by 5.5 inches high by 9.25 inches deep (excluding junction box).

j. Luminaire Finish.

1) Provide same finish to entire luminaire assembly, including luminaire, mounting components, and luminaire accessories.
2) Coating.
a) Provide an electrostatically applied, textured polyester powder coat.
b) Heat the coated part to thermoset the polyester resin.
c) Finished coating shall be corrosion and UV resistant.
3) Color: Natural Aluminum.

C. Trail Light Luminaire.

1. High intensity white light LED, cylindrical style, wall-mount up-down lighting luminaire assembly.

2. Luminaire Requirements.

a. Construction.

1) Mounting Base / Driver Housing.
Die-cast low copper content aluminum alloy with galvanized steel wall-mount pressure plate.

2) Cylinder Housing.
Low copper content seamless extruded aluminum alloy.

3) Up/Down Lighting Module Assemblies.

a) Die-cast low copper content aluminum alloy sealed body and lens frame designed to passively dissipate heat from LEDs.

b) Clear flat tempered glass lens.

c) Faceted specular aluminum reflector.

d) One each LED lighting module assembly mounted in the top and bottom of cylinder housing.

b. Lighting Module Source Characteristics.

1) Ambient Operating Temperature Range Rating: -30°C to +60°C.

2) Correlated Color Temperature (CCT): 3500K

3) Color Rendering Index (CRI): Equal to or greater than 80.

4) Sealed optical system rated IP66.

5) Light Distribution: 60 degree wide symmetrical flood optics.

c. Driver Power Supply Units.

1) Driver shall be built integral to the luminaire assembly.

2) Ambient operating temperature range: -30°C to +60°C.

3) Input Voltage: Capable of automatically accepting and operating on 120 to 277 (± 10%) volts, single phase, AC.

4) Source voltage: 240 VAC or 208 VAC.

5) Drivers can be UL Class I or II output.

6) Operating Frequency: 50/60 Hz.

7) Minimum Power Factor (PF): 0.90.

8) Maximum Total Harmonic Distortion (THD): 20%.

9) Comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.

10) Provide with surge protection.

11) Driver housing rated IP66.

d. Minimum Initial Absolute Lumen Output: 5900 lumens luminaire total, 2950 lumens each lighting module.

e. Luminaire Total Power Consumption: 62 watts maximum at full output, steady state.

f. Minimum LM-79 Absolute Lumen Efficacy Rating: 95 lumens per watt.

g. Expected Useful Life (Light Output) and Depreciation.
Simplified L70 threshold: Each luminaire shall have a minimum expected useful life of 72,000 operating hours at 25ºC ambient before reaching the L70 lumen output degradation point with no catastrophic failures.

h. Mounting.

1) Surface wall-mount utilizing manufacturer's standard galvanized steel wall-mount pressure plate designed to fit over standard 4 inch flush octagonal junction box.

2) Install two additional concrete anchor screws through mounting plate into bridge pier concrete.

i. Dimensions.

1) Cylinder: Approximately 18.25 inches high by 8.0 inches in diameter.

2) Base Housing: Approximately 6.0 inches wide by 11.0 inches high.

3) Total Projection from Wall: Approximately 13.0 inches.

j. Luminaire Finish.

1) Provide same finish to entire luminaire assembly, including luminaire, mounting components, and luminaire accessories.

2) Coating.

a) Provide an electrostatically applied polyester powder coat.

b) Heat the coated part to thermoset the polyester resin.

c) Finished coating shall be corrosion and UV resistant.

3) Color: Black.

D. Sign Light Luminaire.

1. High intensity white light LED stem-mount flood lighting luminaire assembly used for illuminating/highlighting architectural/structural features.

2. Luminaire Requirements.

a. Construction.

1) Light Module Body.

a) Low copper aluminum machined billet with integral heat sink.

b) Tempered glass flat rectilinear lens adhered to cap to provide sealed optical and driver compartment.

c) Dimensions: 2.25 inch diameter by 3.875 inches long.

2) Cap.

a) Low copper aluminum machined cap, 45 degree cutoff.

b) Provide cap with weep hole to drain precipitation water from upward facing cap/lens.

3) Adjusting Knuckle.

Low copper aluminum machined billet with machined taper joint with O-ring seal and bolt to provide continuous 180 degree aiming adjustment.

4) Mounting Stem.

a) Low copper aluminum machined pipe with threads.

b) Provide with 90 degree fixed elbow for mounting of light module and knuckle.

c) Dimensions: 1 inch diameter by 24 inch long stem.

5) Base Canopy.

a) Low copper aluminum machined canopy to mount to standard 4 inch octagonal junction box.

b) Dimensions: 5 inch diameter by 0.375 inches thick.

b. Light Source Characteristics.

1) Ambient Operating Temperature Range Rating: -30°C to +90°C.

2) Correlated Color Temperature (CCT): 3100K

3) Color Rendering Index (CRI): Equal to or greater than 80.

4) Sealed optical system rated IP66.

5) Light Output Beam Spread: Medium flood, 25 degrees

c. Driver Power Supply Units.

1) Driver shall be built integral to the lighting module assembly.

2) Minimum Efficiency: 85%.

3) Ambient operating temperature range: -30°C to +90°C.

4) Input Voltage: 12 volts, AC/DC.

5) Operating Frequency: 50/60 Hz.

6) Maximum Total Harmonic Distortion (THD): 20%.

7) Dimming compatible.

d. Minimum Initial Absolute Lumen Output: 215 lumens.

e. Light Module Power Consumption: 8.4 watts maximum at full output, steady state.

f. Minimum LM-79 Absolute Lumen Efficacy Rating: 25 lumens per watt.

g. Expected Useful Life (Light Output) and Depreciation.

Simplified L70 threshold: Each luminaire shall have a minimum expected useful life of 50,000 operating hours at 25ºC ambient before reaching the L70 lumen output degradation point with no catastrophic failures.

h. Mounting.

Surface wall mounting to standard flush-mount electrical outlet box in a masonry wall. Provide with gasket/sealant to weatherproof seal canopy to box/wall surface.

i. Luminaire Accessories.

1) Provide each luminaire with a remote electronic transformer to be located inside

flush-mount junction box behind canopy.

2) Input Voltage: 105-300 VAC

3) Output Voltage: 12 VDC.

4) Maximum Load: 20 Watts.

5) Dimensions: 1.5 inches by 1.5 inches by 2.375 inches.

j. Luminaire Finish.

1) Provide same finish to entire luminaire assembly, including luminaire, mounting components, and luminaire accessories.

2) Coating.

a) Provide an electrostatically applied polyester powder coat.

b) Heat the coated part to thermoset the polyester resin.

c) Finished coating shall be corrosion and UV resistant.

3) Color: Black.

150040.03 CONSTRUCTION.

A. Examination.

1. Verify that field measurements are as shown on the drawings.

2. Verify that conditions are satisfactory for installation prior to starting work.

B. Installation.

1. Install products according to manufacturer's instructions.

2. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

3. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

4. Install accessories furnished with each luminaire.

5. Bond products and metal accessories to branch circuit equipment grounding conductor.

C. Field Quality Control.

1. Inspect each product for damage and defects.

2. Operate each luminaire after installation and connection to verify proper operation.

3. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy power supplies as determined by Engineer.

D. Adjusting.

1. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.

2. Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution as indicated or as directed by Engineer.

E. Cleaning.

Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

F. Protection.
Protect installed luminaires from subsequent construction operations.

150040.04 METHOD OF MEASUREMENT.

A. Underdeck Light Assembly
Method of measurement shall be by count of each LED Underdeck Light Assembly installed.

B. Trail Light
Method of measurement shall be by count of each LED Trail Light installed.

C. Sign Light
Method of measurement shall be by count of each LED Sign Light installed.

150040.05 BASIS OF PAYMENT.

A. Underdeck Light Assembly
Payment is full compensation for furnishing all labor, equipment, and materials required to provide and install each LED Underdeck Light Assembly including luminaire, specified accessories, fabrication and installation of mounting assembly, energization, and adjustments.

B. Trail Light Luminaire
Payment is full compensation for furnishing all labor, equipment, and materials required to provide and install each LED Trail Light including luminaire, specified accessories, energization, and adjustments.

C. Sign Light Luminaire
Payment is full compensation for furnishing all labor, equipment, and materials required to provide and install each LED Sign Light including specified accessories, energization, and aiming.