



**SPECIAL PROVISIONS
FOR
EXTERIOR LED LIGHTING**

**Woodbury County
IM-029-7(42)149--13-97**

**Effective Date
December 20, 2011**

**THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING
MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND SHALL PREVAIL
OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

PART 1 GENERAL

1.01 SECTION INCLUDES.

- A. Exterior LED luminaires.
- B. Luminaire accessories.

1.02 REFERENCE STANDARDS.

- A. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.
- B. IESNA LM-79-08, IESNA Approved Method for the Electrical and Photometric Measurements of Solid-State Lighting Products.
- C. IESNA LM-80-08, IESNA Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- D. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.
- E. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems.
- F. ANSI/NEMA/ANSLG C78.377-2008 - American National Standard for the Chromaticity of Solid State Lighting Products.
- G. NFPA 70 - National Electrical Code; National Fire Protection Association.
- H. UL 1598 - Luminaires.

1.03 SUBMITTALS.

- A. Refer to the Iowa DOT Standard Specifications, Article 1105.03, for submittal procedures.
- B. Additional submittal procedures:
 - 1. 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.
- C. Shop Drawings:
 - 1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
- D. 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.
- E. Performance Reports - Submit the following for approval:
 - 1. 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.
 - 2. Provide IESNA LM-80-08 documentation of the expected useful life of LEDs from verifiable third-party test results.
- F. 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.
- G. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

- H. Project Record Documents: Record actual connections and locations of luminaires and any pull or junction boxes.
- I. 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.
 - 1. NOTE: No deviations from the Plans and Specifications shall be allowed without approval from Engineer prior to installation.

1.04 QUALITY ASSURANCE.

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience and has specified luminaire types installed and operating commercially in the field for five years.

1.05 DELIVERY, STORAGE, AND HANDLING.

- A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.
- B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.06 WARRANTY.

- A. The manufacturer shall provide a written three-year warranty on each luminaire type specified herein which includes:
 - 1. Replacement due to material and fixture finish failures, and workmanship deficiency. Replacement includes transportation/shipping of new products.
 - 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, peeling, chalking, or fading.
 - 2. Warranty period shall not begin until final acceptance of the project by the Contracting Authority or when the product is put into operation. The supplier will provide the Contracting Authority with appropriate signed warranty certificates. The Contracting Authority must receive certificates prior to final payment.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS.

- A. All luminaires specified herein shall be solid state lighting (SSL) sources (a.k.a. LED).
- B. Provide products that comply with requirements of NFPA 70.
- C. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
- E. Unless specifically indicated to be excluded, provide all required wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. Provide luminaires listed and labeled as Wet Location/IP66 unless otherwise indicated.

- H. All exposed hardware shall be either stainless steel or manufactured using corrosion resistant materials finished with the same finishing process as the luminaire.
- I. All luminaires shall be capable of withstanding relative humidity from 0 to 95%, non-condensing.
- J. Provide luminaire assemblies that are RoHS Compliant.

2.02 LED FLOOD LIGHT.

- A. High intensity white light LED flood lighting luminaire assembly used for illuminating/highlighting architectural/structural features.
- B. Luminaire Requirements.
 - 1. Housing.
 - a. Material: Die-cast low copper content aluminum alloy.
 - b. 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.
 - 2. Light Source Characteristics.
 - a. Ambient Operating Temperature Range Rating: -40°C to +50°C.
 - b. Correlated Color Temperature (CCT): 2,700K
 - c. Color Rendering Index (CRI): Equal to or greater than 82.
 - d. Sealed optical system rated IP66.
 - e. Lens: Tempered Frosted Flat Glass.
 - f. Light Output Beam Spread: 21 degrees both horizontal and vertical.
 - g. Mixing Distance of Individual LED Outputs: 6 inches to uniform light.
 - 3. Driver Power Supply Units must meet the following requirements:
 - a. Driver shall be built integral to the luminaire assembly.
 - b. Minimum Efficiency: 85%.
 - c. Ambient operating temperature range: -40°C to +50°C.
 - d. Input Voltage: Capable of 120 to 277 ($\pm 10\%$) volts, single phase, AC.
 - 1) Source voltage: 120 VAC, all locations.
 - e. Drivers can be UL Class I or II output.
 - f. Operating Frequency: 50/60 Hz.
 - g. Minimum Power Factor (PF): 0.90.
 - h. Maximum Total Harmonic Distortion (THD): 20%.
 - i. Comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.
 - j. Provide with surge protection: L-L or L-N, and L-G.
 - k. Driver housing rated IP66.
 - l. Dimming compatible.
 - 4. Minimum LM-79 Absolute Lumen Efficacy Rating: 38.2 Lumens per Watt.
 - 5. Luminaire Power Consumption: 50 Watts maximum at full output, steady state.
 - 6. Expected Useful Life (Light Output) and Depreciation.
 - a. Simplified L70 threshold: Each luminaire shall have a minimum expected useful life of 70,000 operating hours at 25°C ambient before reaching the L70 lumen output degradation point with no catastrophic failures.
 - 7. Mounting.
 - a. Provide die-cast aluminum canopy base for mounting to standard flush-mount electrical outlet box in a masonry wall. Provide with gasket to weatherproof seal canopy to box/wall surface.
 - b. Luminaire housing assembly shall be mounted to canopy with a swivel and tilt adjustment mechanism to provide minimum 350 degree rotation and 110 degree tilt to facilitate aiming of light beam. Adjustment mechanism shall be constructed of die-cast components with corrosion resistant fasteners.
 - c. Provide pigtail cord from luminaire through mounting mechanism and canopy base for connection to branch circuit in outlet box.

8. Dimensions.
 - a. Approximately 12.5 inches wide by 6.5 inches high by 1.35 inches thick.
 - b. Approximately 7.1 inches high with mounting assembly.
9. Luminaire Accessories.
 - a. Provide each luminaire with a single "barn door" flap across one end of luminaire face to protect face/lens from dirt/contamination from falling debris and bird droppings. Flap shall be adjustable and shall be lockable in any position throughout the adjustment range to prevent movement due to bird roosting.
 - b. Half of the supplied luminaires shall have the flap on right side, the other half on the left side.
10. Luminaire Finish.
 - a. Provide same finish to entire luminaire assembly, including luminaire, mounting components, and luminaire accessories.
 - b. Coating:
 - 1) Provide an electrostatically applied polyester powder coat to 0.004 inch thickness.
 - 2) Heat the coated part to thermoset the polyester resin.
 - 3) Finished coating shall be corrosion and UV resistant.
 - c. Color:
 - 1) Dark Bronze.

2.03 STRIP LED DOWN LIGHT.

- A. High intensity white light LED strip style lighting luminaire assembly used for grazing/wall-washing architectural/structural faces/surfaces.
- B. Luminaire Requirements.
 1. Housing.
 - a. Material: Extruded aluminum forming a channel strip support for the LED array and to house the driver power supply.
 - b. Heat sink function designed integral to the housing extrusion to conduct heat away from the LEDs and driver. The heat sink is a passive cooling device with no active fan or moving parts.
 - c. Maximum housing cross sectional dimensions including driver:
 - 1) Height: 2.7 inches.
 - 2) Width: 2.8 inches.
 - d. Luminaire Length: 12 inches.
 2. Light Source Characteristics.
 - a. Ambient Operating Temperature Range Rating: -40°C to +50°C.
 - b. Correlated Color Temperature (CCT): 2,700K
 - c. Color Rendering Index (CRI): Equal to or greater than 84.
 - d. Sealed optical system rated IP66
 - e. Lens: Clear Polycarbonate.
 - f. Light Output Beam Spread:
 - 1) 30 degrees cross sectional to luminaire.
 - 2) 60 degrees longitudinal to luminaire.
 - g. Mixing Distance of Individual LED Outputs: 6 inches to uniform light.
 3. Driver Power Supply Units must meet the following requirements:
 - a. Driver shall be built integral to the luminaire assembly.
 - b. Minimum Efficiency: 85%.
 - c. Ambient operating temperature range: -40°C to +50°C.
 - d. Input Voltage: Capable of 120 to 277 ($\pm 10\%$) volts, single phase, AC.
 - 1) Source voltage: 120 VAC, all locations.
 - e. Drivers can be UL Class I or II output.

- f. Operating Frequency: 50/60 Hz.
 - g. Minimum Power Factor (PF): 0.90.
 - h. Maximum Total Harmonic Distortion (THD): 20%.
 - i. Comply with FCC 47 CFR part 15 non-consumer RFI/EMI standards.
 - j. Provide with surge protection: L-L or L-N, and L-G.
 - k. Driver housing rated IP66.
 - l. Dimming compatible.
 - m. Provide each luminaire with one male and one female weatherproof power connector jack to allow daisy-chain power connectability of multiple luminaires. Luminaires shall be rated to be served by a maximum 20A circuit.
- 4. Minimum LM-79 Absolute Lumen Efficacy Rating: 25.6 Lumens per Watt.
 - 5. Luminaire Power Consumption: 15 Watts maximum at full output, steady state.
 - 6. Expected Useful Life (Light Output) and Depreciation
 - a. Simplified L70 threshold: Each luminaire shall have a minimum expected useful life of 100,000 operating hours at 25°C before reaching the L70 lumen output degradation point with no catastrophic failures.
 - 7. Mounting.
 - a. Provide a cast aluminum hinge-style adjustable mounting device for mounting luminaire to flat surface/substrate. Tilt adjustment range of luminaire shall be minimum 110 degrees. Device shall be provided with set-screws to lock luminaire in chosen aiming position.
 - 8. Luminaire Accessories.
 - a. Provide each luminaire with a single glare shield fin to block stray light from passing motorists.
 - b. Provide factory assembled power leader cables and power jumper cables with the appropriate weatherproof plugs to connect the luminaire arrays as detailed on the Contract Document Plans.
 - 1) Provide leader cables with minimum 10 foot lead length.
 - 2) Provide jumper cables assembled to custom lengths to fit between luminaires with minimal slack for concealment of cables in soffit slot.
 - 9. Luminaire Finish.
 - a. Dark Bronze Anodized.
 - b. Provide same finish to luminaire and luminaire accessories.
 - c. Hinge-style luminaire mounting device shall be Dark Bronze polyester powder coat finish to match anodized finish color.

PART 3 EXECUTION

3.01 EXAMINATION.

- A. Verify that field measurements are as shown on the drawings.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION.

- A. Install products according to manufacturer's instructions.
- B. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).
- C. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- D. Install accessories furnished with each luminaire.
- E. Bond products and metal accessories to branch circuit equipment grounding conductor.

3.03 FIELD QUALITY CONTROL.

- A. Inspect each product for damage and defects.
- B. Operate each luminaire after installation and connection to verify proper operation.
- C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy power supplies as determined by Engineer.

3.04 ADJUSTING.

- A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Engineer. Secure locking fittings in place.
- B. Luminaires with Field-Rotatable Optics: Position optics according to manufacturer's instructions to achieve lighting distribution as indicated or as directed by Engineer.

3.05 CLEANING.

- A. 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.

3.06 PROTECTION.

- A. Protect installed luminaires from subsequent construction operations.