

SECTION 26 50 01

LED LIGHTING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Scope:
 - 1. Provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install LED lighting fixtures and associated controls.
- B. Coordination:
 - 1. Coordinate location of fixtures with piping, ductwork, openings, and other systems and equipment and locate clear of interferences.
- C. Related Sections:
 - 1. Section 26 05 02 - Basic Electrical Work

1.2 REFERENCES

- A. Standards referenced in this Section are:
 - 1. UL 1598, Safety of Luminaires.
 - 2. Design Lights Consortium (DLC) SSL Technical Requirements, V4.3, effective March 26, 2018.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with the following:
 - 1. NEC Article 410, Luminaires, Lampholders, and Lamps.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Product Data:
 - a. Manufacturer's technical information, specifications, standard wiring diagrams, and catalog cuts for lighting fixtures proposed.
 - b. Fixture construction details.
 - c. ETL photometric and isocandle curves for each fixture proposed.
 - d. Verification that recessed fixtures to be mounted in hung ceilings are compatible with ceiling suspension system proposed.
- B. Informational Submittals: Submit the following:
 - 1. Manufacturer's Instructions:
 - a. Instructions and recommendations for handling, storing, and protecting the equipment.
 - b. Installation instructions for the equipment, including setting drawings, templates, and directions and tolerances for installing anchorage devices.

- C. Maintenance Material Submittals: Submit the following:
 - 1. Spare Parts and Extra Stock Materials: Furnish spare parts for each type of unit required as indicated in Part 2 of this Section.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Upon delivery, inspect equipment for evidence of water that may have entered equipment during transit.
- B. Storage:
 - 1. Store lighting fixtures, controls, related materials, and equipment in clean, dry location. Protect materials and equipment with coverings.
 - 2. Store materials and equipment for easy access for inspection and identification. Keep materials and equipment off ground, using pallets, platforms, or other supports. Protect materials and equipment from corrosion and deterioration.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Type: Lighting fixtures required shall be in accordance with the Lighting Fixture Schedule or Legend on the Drawings. Fixtures shall be complete with supports, lamps, and incidentals, as required.
- B. Fixtures in hazardous locations shall be listed in accordance with UL 1598 and UL 844.
- C. Lamps:
 - 1. LED lamps are intended to meet the requirements of DLC Technical Requirements V4.3. Provide minimum lamp efficacy (lm/W) per DLC. Provide correlated color temperature (CCT) and Color Rendering Index (CRI) requirements per DLC. Provide lumen maintenance data with product submittals. Provide rated life warranty per DLC. All LED lamps shall have a power factor ≥ 0.9 and a THD $< 20\%$. All LED lamps shall be capable of continuous dimming, flicker and noise free, from 10-100 percent. All LED lamps shall be free of noise over the full range of operation from 10%-100% output.
- D. Fixtures located in area identified as hazardous in Section 26 05 02 - Basic Electrical Work, General Provisions for Electrical Systems, shall each be approved as a complete assembly, shall be clearly marked to indicate maximum wattage of lamps for which they are approved, and be protected against physical damage by suitable guards.
- E. Hardware: Provide necessary hangers, supports, conduit adaptors, reducers, hooks, brackets, and other hardware required for safe fixture mounting. Hardware shall have protective, non-corrosive finish.
- F. Outdoor Fixtures: Provide each fixture to be installed outdoors with cut-off lens to reduce the fixture's light pollution emissions.

- G. Photocell:
1. Products and Manufacturers: Provide one of the following:
 - a. 2100 Series by Tork Time Controls, Inc.
 - b. Or equal.
 2. Cadmium sulfide hermetically-sealed cell, fully temperature compensated, with time delay of not less than 15 seconds to prevent false switching.
 3. Built-in fail safe light level selector, adjustable within limits of two to 50 foot-candles and factory set at 25 foot-candles.

PART 3 EXECUTION

3.1 INSPECTION

- A. Examine conditions under which the Work will be installed and notify Engineer in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. General:
1. Fixture mounting heights and locations indicated on the Drawings are approximate and are subject to revision in the field where necessary to clear conflicts and obstructions.
 2. Mounting Heights: Mounting heights or elevations are to bottom of fixture or to centerline of device.
 3. Install fixtures in accordance with Laws and Regulations, the Contract Documents, and manufacturer instructions and recommendations.
 4. Mount fixtures so that sufficient access is available for ready and safe maintenance.
 5. Securely fasten equipment to walls or other surfaces on which equipment is mounted.
- B. Surface Mounted Fixtures:
1. Attach to appropriate outlet box.
 2. Attach to surface using fasteners and sealing washers when mounting fixture in damp or wet locations.
- C. Boxes and Fixtures:
1. For units mounted against masonry or concrete walls, provide suitable 1/4-inch spacers to prevent mounting back of box directly against wall.
 2. Bolt units rigidly to building with expansion anchors, toggle bolts, hangers, or Unistrut.
 3. Do not install boxes with open conduit holes.
 4. Cable each circuit and identify with tag.
- D. Mount photocells as shown and adjust foot-candle setting for proper dusk and dawn photo-control. Provide wiring in conduit from photocell to controls.

END OF SECTION