

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of light source and luminaire, or both.
- G. Luminaire: Complete lighting unit, including light source, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Submittal Process

1. Luminaires shall be submitted separately from lighting controls. Combined luminaire and controls submittals will be rejected without review.
2. Luminaire submittals shall be complete and contain all fixtures listed in the Lighting Fixture Schedule. Partial, incomplete, or preliminary submittals for luminaires will be rejected without review.
3. Luminaire submittals shall clearly indicate all equipment, features, models, accessories, and the like either by highlighting the appropriate options or by writing the manufacturer's complete model number on the product information sheet. Cutsheets without specific product characteristics indicated will be rejected without review.
4. Substitutions to the specified luminaires may be considered if submitted to the Designer at least fourteen days in advance of the bid. Substitutions not submitted within that deadline will not be considered.
5. Exceptions to the above are at the discretion of the lighting designer/reviewer.

B. Product Data: For each type of product.

1. Arrange in order as listed in Lighting Fixture Schedule.
2. Include data on features, accessories, and finishes.
3. Include physical description and dimensions of luminaires.
4. Include emergency lighting units, including batteries and chargers.
5. Include life, output (lumens, CCT, and CRI), and energy-efficiency data.

6. Photometric data and adjustment factors based on laboratory tests IES LM-79 and IES LM-80.

- a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.

- C. Product Schedule: For luminaires and lamps. Use same designations indicated on Lighting Fixture Schedule.

1.4 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Luminaires.
2. Suspended ceiling components.
3. Partitions and millwork that penetrate the ceiling or extend to within 12 inches of the plane of the luminaires.
4. Structural members to which equipment and luminaires will be attached.
5. Initial access modules for acoustical tile, including size and locations.
6. Items penetrating finished ceiling, including the following:
 - a. Other luminaires.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Access panels.
 - e. Ceiling-mounted projectors.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For luminaires and lighting systems to include in operation and maintenance manuals.
 1. List of all lamp types used on the Project; use ANSI and manufacturers' codes.
 2. Name and address of one or more service agencies for installed equipment.
 3. Approved shop drawings indicating all selected options for each piece of lighting equipment.
 4. Summary of required actions for routine maintenance and cleaning.

1.6 QUALITY ASSURANCE

- A. Provide luminaires from a single manufacturer for each luminaire type.
- B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.
- B. Store products in a clean, conditioned, dry space, protected from weather and in manufacturer's original packaging until ready for installation.

1.8 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Minimum five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Ambient Temperature: 41 to 104 deg F.
 - 1. Relative Humidity: Zero to 95 percent.
- B. Altitude: Sea level to 1000 feet.

2.2 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Factory-Applied Labels: Comply with UL 1598 or CSA C22.2. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.
- D. Nominal Operating Voltage: As indicated on Lighting Fixture Schedule.
- E. Color Rendering Index (CRI): As indicated on Lighting Fixture Schedule.
- F. Correlated Color Temperature (CCT): As indicated on Lighting Fixture Schedule.

- G. LED Lifetime: As indicated on Lighting Fixture Schedule. Lifetime shall be considered a predicted time where average lumen output reaches 70 percent of initial output as measured in accordance with IESNA LM-80 testing requirements.
- H. LED boards and drivers: Field replaceable. Access, service, and replacement of boards and drivers shall be accomplished without removal of ceiling system or other building systems.

2.3 MATERIALS

A. Metal Parts:

- 1. Free of burrs and sharp corners and edges.
- 2. Sheet metal components shall be steel unless otherwise indicated.
- 3. Form and support to prevent warping and sagging.

B. Steel:

- 1. ASTM A 36/A 36M for carbon structural steel.
- 2. ASTM A 568/A 568M for sheet steel.

C. Stainless Steel:

- 1. 1. Manufacturer's standard grade.
- 2. 2. Manufacturer's standard type, ASTM A 240/240 M.

D. Galvanized Steel: ASTM A 653/A 653M.

E. Aluminum: ASTM B 209.

2.4 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.5 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before luminaire installation.
- C. Verify luminaire quantities, lengths, clearances, and other characteristics with these specifications, the Drawings, the Lighting Fixture Schedule, and other contract documents. Discrepancies or variances in these documents shall be communicated to the Design Team and Owner at the time the bid submission is made.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 TEMPORARY LIGHTING

- A. If approved by the Architect, use selected permanent luminaires for temporary lighting. When construction is sufficiently complete, clean luminaires used for temporary lighting and install new lamps.

3.3 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install luminaires with reflectors, lenses, or lamps oriented in the same direction unless otherwise indicated.
- D. Install luminaires so labels are not visible under normal operating conditions.
- E. Install luminaires with hardware and accessories compatible with the approved ceiling system.
- F. Install remote drivers and low-voltage transformers in accessible and maintainable locations.
- G. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- H. Flush-Mounted Luminaires:
 - 1. Secured to outlet box.

2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

I. Wall-Mounted Luminaires:

1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.

J. Suspended Luminaires:

1. Ceiling or Structure Mount:
 - a. Two 5/32-inch- diameter aircraft cable supports adjustable to 10 feet in length.
2. Continuous Rows of Luminaires: Use tubing or stem for wiring at one point and wire support for suspension for each unit length of luminaire chassis, including one at each end.
3. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.

K. Ceiling-Grid-Mounted Luminaires:

1. Secure to any required outlet box.
2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

L. Fire Rating: Installation of luminaires in fire rated ceilings or walls shall maintain the fire rating of the assembly.

M. Insulation Contact Rating: Installation of luminaires in insulated ceilings shall have an enclosure rated for insulation contact (IC).

N. Comply with requirements in Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.4 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting the direction of aim of luminaires to suit occupied conditions. Make up to two visits to Project during other-than-normal hours for this purpose. Some of this work may be required during hours of darkness.
1. During adjustment visits, inspect all luminaires. Replace lamps or luminaires that are defective.
 2. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 3. Adjust the aim of luminaires in the presence of the Architect.

3.7 CLEANING

- A. Remove protective coverings, dirt, dust, debris, fingerprints, and any other foreign material upon completion of project.
- B. Replace broken, scratched, or otherwise damaged lenses, reflectors, or other luminaire parts upon completion of project without expense to Owner.

END OF SECTION