

**SECTION 16500**

**INTERIOR LIGHTING FIXTURES**

**PART 1 - GENERAL**

1.1 GENERAL

- A. Provisions of Section 16010 General Requirements for Electrical Work, Section 16060 Installation of Wire and Cable, and Section 16110 Raceway and Fittings apply to the work of this section.

1.2 CODES AND STANDARDS

- A. Products shall comply with the following codes and standards and shall be UL-listed and labeled:

CBM Labels	Certified Ballast Manufacturers Assoc.
NEC Art. 410	National Electrical Code
FCC, Part 18	RFI and EMI
ANSI C62.41	Line Transient Protection
UL 1570	Fluorescent Lighting Fixtures
UL 1572	HID Lighting Fixtures
UL 1571	Incandescent Lighting Fixtures
UL 924	Emergency Lighting and Power Equipment
UL 1088	Temporary Lighting

1.3 SUBMITTALS

- A. Submit manufacturer's product data, photometrics, and installation instructions for each type of light fixture specified. Fixture submittals will be in booklet form with separate sheet for each fixture assembled in "luminaire type" alphabetical order, with proposed fixture and accessories clearly indicated on each sheet.
- B. Submit on a separate sheet for each HID and fluorescent fixture type specified, the ballast manufacturer, type and technical data for that ballast.
- C. Submit on a separate sheet for each light fixture specified, the proposed lamp and manufacturers data for that lamp.

1.4 MANUFACTURERS

- A. Provide products of the manufacturers specified on the contract drawings and as listed under Part 2 of this section.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. Light fixtures shall be provided with housings, trims, ballasts, lamp holders, sockets, reflectors, wiring and other components required, as a factory-assembled unit for a complete installation.
- B. Provide electrical wiring within light fixtures suitable for connecting to branch circuit wiring in accordance with N.E.C. Article 410, Paragraph 25.
- C. Deliver interior lighting fixtures in factory fabricated containers and wrapping, which properly protect fixtures from damage.
- D. Store interior lighting fixtures in original packaging. Store inside well-ventilated area protected from weather, moisture, soiling, humidity, extreme temperatures, laid flat and on skids to keep off floors and ground.
- E. Fixtures installed in ceilings, suspended from ceilings or on walls shall have a plastic film covering protecting lens, louver and lamps from dust, dirt and debris. Plastic film shall not be removed until construction is completed.

## 2.2 FLUORESCENT FIXTURES

- A. General Provide fluorescent fixtures of sizes, types and ratings indicated and specified in the Lighting Fixture Schedule on the Contract Drawings.
- B. Fluorescent-Lamp Ballasts: provide low-energy solid state fluorescent lamp ballasts, capable of operating lamp types indicated; with high power factor, rapid-start, and low-noise features. Ballasts shall have lamp current crest factor of 1.5 or less and total harmonic distortion less than 10%.
- C. Manufacturers: Subject to compliance with the requirements, provide ballasts by one of the following:
  - a. Motorola Lighting, Inc.
  - b. ETTA Industries, Inc.
- C. Fluorescent Dimming Ballasts: Provide solid state electronic dimming ballasts, capable of operating lamp, types specified, with high power factor rapid start, and low noise features. Ballast shall have a lamp crest factor of 1.6 and below and a total harmonic distortion not to exceed 15%.
  - 1. Manufacturers: Subject to compliance with requirements provide dimming ballasts by one of the following:
    - a. Advance Mark X.
  - 2. Dimmer switches to be line voltage dimmers compatible with ballast listed above as manufactured by Lithonia or Leviton.
- D. Compact Fluorescent Ballast: Provide high power factor ballast capable of operating lamp types specified.

## 2.3 LAMPS

- A. Provide fluorescent and incandescent lamps of types as indicated on the contract drawings. Acceptable lamp manufacturers are Osram Sylvania, Inc. and Philips Lighting Co. Incandescent lamps to be rated 130 volt rough service.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Examine all areas and conditions under which lighting fixtures are to be installed and structure which will support lighting fixtures. Notify the Contractor in writing of any conditions which are detrimental to proper installation and completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Coordinate light fixture installations with other trades. Fluorescent light fixtures should be installed at least two feet away from smoke detectors. Coordinate all lighting fixtures with mechanical piping and duct work to allow for proper clearance.

#### **3.2 INSTALLATION**

- A. Install all lighting fixtures at locations and heights indicated, in accordance with the architectural reflected ceiling plans.
- B. All recessed lighting fixtures installed in ceiling which require a fire resistance rating shall be installed in accordance with the 1996 BOCA National Building Code Section 713.
- C. Provide fixtures and/or fixture outlet boxes with hangers, channel or other method of fastening and supporting fixtures required for proper installation.
- D. All pendant mounted fixtures shall be installed plumb and level or as detailed on the Contract Drawings. Pendant mounted fixtures longer than 18" shall have twin hangers of type specified.
- E. Tighten connectors and terminals, including screws and bolts in accordance with equipment manufacturer's published torque tightening values for equipment connectors. All screws and bolts shall have washers.

#### **3.3 SPLICES AND TERMINATIONS**

- A. Twist on wire connectors shall be installed which utilize square-wire spring grips and thermo plastic shells. Install connectors to meet the manufacturer's torquing requirements. Install wire connectors of size required as not to exceed the manufacturers UL-listed CSA recognized wire combinations.

#### **3.4 FIELD QUALITY CONTROL**

- A. At date of substantial completion, all lamps which are not functioning, have color deficiencies, or are noticeably dimmed shall be replaced with new lamps as determined by the Engineer.
- B. All lamps used for temporary lighting in new light fixtures shall be replaced with new lamps.

- C. All light fixtures shall be cleaned of dirt and debris upon completion of construction. All finger prints and smudges shall be cleaned.
- D. All installed fixtures during remainder of construction shall be protected in accordance with Section 2.1 Paragraph E of this specification section.
- E. All light fixtures shall be grounded in accordance with article 250 and 410 of the NEC. Tighten connections to comply with tightening torques specified in UL 486A to assure permanent and effective grounds.
- F. All light fixtures damaged in shipping or during installation shall be replaced with new fixtures at no cost to the Owner.
- G. Furnish stock or replacement lamps amounting to 15%, but no less than six lamps, of each type and size lamp used in each type of lighting fixture. Deliver replacement stock as directed to Owner's storage space.

**END OF SECTION 16500**