

## Section 16500

### Lighting Fixtures

#### Part One: General

##### 1.1 General Requirements

###### 1.1.1 Provisions

The provisions of Section 16000, General Requirements for Electrical Work, and section 16150, Raceway and Fittings, apply to the work of this section.

##### 1.2 Applicable Codes and Standards

###### 1.2.1 Products

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 Required

###### 1.3.1 Data Sheets, Photometrics and Installation Instructions

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.

###### 1.3.2 Ballast Requirements

Submit on a separate sheet for each HID and fluorescent fixture type specified, the ballast manufacturer, type and technical data for that ballast.

###### 1.3.3 Lamp Requirements

Submit on a separate sheet for each light fixture specified, the proposed lamp and manufacturer's data for that lamp.

##### 1.4 Manufacturers

###### 1.4.1 General

The fixture types, manufacturers and model numbers are shown on the lighting schedule in the Contract Drawings. These fixtures and manufacturers are listed to establish a baseline type, style and quality of fixture to be provided. Although one manufacturer may be listed on this lighting schedule, other manufacturers' representatives may submit fixtures for consideration as "equal" fixtures to facilitate the "packaging" of the lighting fixtures within the representative's product lines. The architect and engineer however reserve the right to require certain individual fixtures be provided of the model and manufacturer specified in order to meet specific design intent by the architect or engineer.

## Part Two: Products

### 2.1 General

#### 2.1.1 Light Fixtures

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.

#### 2.1.2 Electrical Wiring

Provide electrical wiring within light fixtures suitable for connecting to branch circuit wiring in accordance with N.E.C. Article 410, Paragraph 25.

#### 2.1.3 Packaging

Deliver interior lighting fixtures shall be delivered in factory fabricated containers and wrapping, in order to properly protect fixtures from damage.

#### 2.1.4 Storage

Interior lighting fixtures shall be stored 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.

#### 2.1.5 Ceiling Fixtures

Fixtures installed in ceilings, suspended from ceilings or on walls shall be installed with a plastic film covering protecting the lens, louver and lamps from dust, dirt and debris during construction. Plastic film shall be removed upon the completion of construction.

### 2.2 Fluorescent Fixtures

#### 2.2.1 General

Provide fluorescent fixtures of sizes, types and ratings indicated and specified in the Lighting Fixture Schedule on the Contract Drawings.

#### 2.2.2 Fluorescent-Lamp Ballasts

Provide low-energy solid state fluorescent lamp ballasts, capable of operating lamp types indicated, with a minimum power factor of 0.90 and Class A sound rating. Ballasts shall have lamp current crest factor of 1.7 or less and total harmonic distortion less than 20%. Ballast factor shall be 0.88-0.90. Ballast shall be instant start for maximum efficiency and parallel wired such that if one lamp fails the remaining lamps stay lit.

##### 2.2.2.1 Manufacturers

Subject to compliance with the requirements, provide ballasts by one of the following:

- Osram Sylvania
- General Electric
- Magnetek
- Advance

#### 2.2.3 Compact Fluorescent Ballasts

Provide solid-state electronic ballasts capable of operating lamp types specified. Ballasts shall have a total harmonic distortion not to exceed 20%. Ballasts shall have an end of lamp life sensing circuit capable of shutting the lamp down to prevent lamp glass from cracking and preventing lamp base and sockets from melting. Ballasts shall have a ballast factor of 0.90-1.00.

##### 2.2.4.1 Manufacturers

Subject to compliance with requirements provide dimming ballasts by one of the following:

- Osram Sylvania
- Magnetek
- Advance

## **2.3 Lamps**

### **2.3.1 Lamp Requirements**

Provide fluorescent lamps of types as indicated on the contract drawings. Acceptable lamp manufacturers are Osram Sylvania, Inc. and Philips Lighting Co.

## **Part Three: Execution**

### **3.1 General**

#### **3.1.1 Prior Examination**

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 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.

#### **3.1.2 Coordinate Installation**

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 ductwork to allow for proper clearance.

### **3.2 Installation**

#### **3.2.1 Locations and Heights**

Install all lighting fixtures at locations and heights indicated, in accordance with the architectural reflected ceiling plans.

#### **3.2.2 Recessed Lighting Fixtures**

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.

#### **3.2.3 Fastening and Supporting Fixtures**

Provide fixtures and/or fixture outlet boxes with hangers, channel or other method of fastening and supporting fixtures required for proper installation.

#### **3.2.4 Pendant Mounted Fixtures**

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.

#### **3.2.5 Tightening Values**

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**

#### **3.3.1 General**

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**

#### **3.4.1 Replacement of Lamps**

At date of substantial completion, all lamps that are not functioning, have color deficiencies, or are noticeably dimmed shall be replaced with new lamps as determined by the Engineer.

#### **3.4.2 Temporary Lighting Replacement**

All lamps used for temporary lighting in new light fixtures shall be replaced with new lamps.

**3.4.3 Cleaning Light Fixtures**

All light fixtures shall be cleaned of dirt and debris upon completion of construction. All finger prints and smudges shall be cleaned.

**3.4.4 Protection During Construction**

All installed fixtures during remainder of construction shall be protected in accordance with section 2.1.5 of this specification section.

**3.4.5 Grounded**

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.

**3.4.6 Damaged Light Fixtures**

All light fixtures damaged in shipping or during installation shall be replaced with new fixtures at no cost to the owner.

---

**End of Section 16500**

---