

SECTION 16500

LUMINAIRES AND ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The general provisions of the contract including General and Special Conditions and General Requirements shall apply to all work under this Section.

1.2 DESCRIPTION OF WORK

- A. Provide luminaires and lamps as indicated on the drawings and in the fixture schedule and as required herein.

1.3 RELATED WORK IN OTHER SECTIONS

- A. Related work in other sections:
 - 1. Electrical General Provisions Section 16010
 - 2. Raceways and Boxes Section 16110
 - 3. Wire and Cable Section 16120
 - 4. Wiring Devices Section 16140
 - 5. Electrical Identification Section 16195

1.4 STANDARDS

- A. Except as modified by governing codes and by the Contract Documents, comply with the latest applicable provisions and latest recommendations of the following:
 - 1. Luminaires - UL 57, UL 1570, UL 1571, UL 1572, UL 676.
 - 2. Exit and Egress Luminaires - NFPA 70 and 101, UL 924.
 - 3. Ballasts - UL 936, UL 1029, CBM, ANSI C82-Ballasts.
 - 4. Lamp Holders and Starters - UL 496, UL 542, UL 879.
 - 5. Hazardous Location UL 1225, UL 1203, UL 506, UL 844, UL 886.
 - 6. Cords - UL 62.
 - 7. Metal Halide and Mercury Vapor Lamps - Federal Standard 21 CFR 1040.30.
 - 8. IES-SPI-NEMA Joint Standards for Class A and Class C acrylic compounds for plastic enclosures.
 - 9. Local code requirements.

1.5 SUBMITTALS

- A. Submit shop drawings and manufacturers' data for the following items in accordance with the conditions of the contract and as specified below.
 - 1. Major luminaires and special luminaires shall show full-size cross sections. Indicate finished dimensions, metal thicknesses, and materials.
 - 2. Show mounting details, including hung ceiling construction.
 - 3. Indicate type of ballast and manufacturer and ballast quantity and location. Include information as to power factor, input watts, and ballast factor.
 - 4. Indicate lamps to be utilized and quantity and submit photometry. Where the lamps to be utilized and/or the ballasts are other than ones which published photometric data is available for, additional test data shall be submitted to the engineer. These tests shall be performed by a certified independent testing laboratory or approved equal.

5. Shop drawings shall include a complete listing of all luminaires on a single sheet. This listing shall contain the luminaire type, manufacturers' catalog number, applied voltage, lamps, ballast type and luminaire quantities.
6. The Architect/Engineer reserves the right to require submittal of a complete sample fixture for any fixture type.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Luminaires

1. Acceptable manufacturers are listed in the lighting fixture schedule shown on the Drawings.
2. The designations indicated on the lighting fixture schedule are a design series reference (not necessarily a complete catalog number) and do not necessarily represent the number, size, voltage, wattage, type of lamp, ballast, finish trim, ceiling type, mounting hardware or special requirements as specified hereinafter on as required by the particular installation(s) and code. Contractor shall verify these requirements and other fixtures as required to give proper installation per the contract documents and per codes.

B. Ballasts

1. It is preferred that all ballasts shall be of the same manufacturer. Every effort shall be made to eliminate ballasts from multiple manufacturers. Ballasts within luminaires of a given type must however be of the same manufacturer. Multiple manufacturers will not be permitted.
2. Approved Manufacturers:
 - a) Motorola
 - b) Advance Transformer Co.
 - c) Magnetek
 - d) General Electric

C. Lamps

1. All lamps shall be of the same manufacturer. Multiple manufacturers are not permitted.
2. Approved Manufacturers:
 - a) General Electric
 - b) Philips
 - c) Osram Sylvania

2.2 FIXTURE QUALITY AND DESCRIPTION

- A. Manufacture luminaires to the specifications described herein and on the drawings.

2.3 FABRICATION

- A. Provide luminaires, complete factory-assembled and wired and equipped with necessary sockets, ballasts, wiring, shielding, reflectors, channels, lenses, etc., and deliver to job ready for installation.

2.4 MATERIALS

A. Plastic Lenses and diffusers:

1. Virgin acrylic unless otherwise noted. De-staticize after cleaning. Install and leave with no finger prints or dirt marks on the lens or diffuser. Use white gloves if necessary. Lenses shall be provided on all recessed metal halide luminaires.

2. Minimum unpenetrated thickness for Parabolic or conical element diffuser: 0.085 inch.
 3. Minimum nominal thickness: 0.125 inch.
- B. Parabolic Luminaire Care: Parabolic luminaires to be installed with mylar cover over louvers. Cover shall be U.L. listed for temporary lighting. Upon completion of work, remove mylar cover with white gloves and blow clean reflectors.
- C. Finish: Porcelain or baked enamel finish matte white on interiors with minimum tested reflectance of 90 percent matte white finish or as specified in visible exterior. Thoroughly clean base metal and bonderize after fabrication.
- D. Sockets: Incandescent lamp sockets - porcelain housings over copper screw shells, with medium base sockets rated at 660 watts and 250 volts. Insulating joint in pull chains. Fluorescent lampholder - white, heat-resistant plastic rated 660 watts and 600 volts. Fluorescent industrial sockets - heavy-duty, multi-socket, metal-clad, spring-loaded. Provide heavy-duty sockets for H.I.D. luminaires where mounted less than 8'-0" AFF.
- E. Luminaire Wiring: Minimum individual luminaire wiring - number 18 gauge with insulation at rated operating temperature of 105 degrees Centigrade or higher. Terminate wiring for recessed luminaires, except fluorescent units, in an external splice box.
- F. Ballasts
1. Ballasts for F32T8 lamps shall be:
 - a) High frequency solid state electronic.
 - b) Instant start, parallel operation.
 - c) 50 F minimum starting temperature unless otherwise noted
 - d) Minimum 0.87 ballast factor
 - e) Maximum total harmonic distortion (THD) 10%
 - f) High power factor, minimum 95 %
 - g) Sound rated A
 2. High-power factor (over 90 percent). Certified Ballast Manufacturers' Certification, ballast case temperature not to exceed 90 degrees Centigrade during normal operation in 30 degrees Centigrade ambient temperature. Ballast voltage: 120 or 277 volts, as required by circuiting. Ballast shall be provided with the best sound rating available.
 3. Built-in self-resetting thermal actuated device will remove ballast from line when excessive ballast temperature is reached. U.L. Class P, CBM certified 100% output.
 4. The conductors between ballasts and lampholders shall have an approved insulation for 1,000 volts. This includes conductors to and from remote ballasts.
 5. High-intensity discharge ballasts shall be constant wattage autotransformer type with built-in thermal protection, minimum power factor of 80%. 12" min. leads.
 6. Provide ballasts with voltage characteristics to match that of all related circuitry indicated on the Drawings. No extra compensation will be allowed for failure to properly coordinate ballast voltage with circuitry.
 7. Ballasts for control of lamps in one housing or fixture unit shall not control lamps of an adjoining unit, except as otherwise noted.
 8. Guarantee ballast for one full year and one year prorated as per standard manufacturer's warranty against defects for a period of 2 years. Guarantee to include replacing defective ballast with new ballast.
 9. Provide dimming ballasts as required for fixtures controlled by individual dimming or dimming systems.
- G. Lamps

1. Provide a complete set of new lamps in each fixture.
 2. Unless noted otherwise lamps must conform to the following:
 - a) Fluorescent: T-8, 35k color.
 - b) Incandescent: "A" lamps to be inside frosted rated at 130 volts.
 - c) Low voltage: MR-16.
- H. Thermal Protection
1. Recessed incandescent luminaires shall be furnished with thermal protection.
- I. Tube Guards
1. Where installed outdoors, in garage areas or in spaces open to the out of doors, provide each fluorescent lamp with an OSHA approved tube guard as manufactured by the McGill Manufacturing Company. Tube shall have 96% transmission properties.
- J. Luminaires installed recessed in a metal pan ceiling shall have a flange type trim to overlap abutment of adjacent pans.
- K. Where utilized as raceways, luminaires shall be suitable for use as raceways. Provide feed through splice boxes where necessary.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Architect's and/or interior designers reflected ceiling plans show actual location of luminaires. Report to the Architect/Engineer any conflict between these plans and the electrical documents. Perform the work in accordance with the Architects/Engineers' instructions. At the time of bid, include the most stringent requirement.
- B. Install luminaires in mechanical and unfinished areas after ductwork and piping installation. Adjust fixture locations to provide the best lighting for equipment access and service locations. Locate fixtures 8 feet 6 inches above floor, or at suitable locations within space on walls but not lower than 7'-0" AFF.
- C. The Contractor shall protect luminaires from damage during installation of same and up to time of final acceptance. Any broken luminaires, glassware, plastics, lamps, etc., must be replaced by the Contractor with new parts, without any additional expense to the Owner.
- D. Where fluorescent luminaires are surface mounted. They shall be labeled for such and in minimum of one-half (1/2) inch air space shall be maintained between top of luminaire and mounting surface by an approved means.
- E. Pendant mounted units shall comply with the following:
1. Each stem shall have a brass or steel swivel or other self-aligning device of type approved by the Architect/Engineer. The entire luminaire mounting (hickey, aligner, swivel, stem, etc.) shall be submitted to and approved by the Architect/Engineer before installation.
 2. An insulated malleable iron bushing shall be placed at luminaire end of stem through which wire passes.
 3. A pendant support using an approved sliding clevis bracket which firmly grips an indentation in rigid sides of the wiring channel will be acceptable.
 4. Connections between outlet boxes and luminaires shall be by means of approved flexible raceways. The application of raceways directly between luminaires is unacceptable.

- F. Where luminaires are mounted upon surface-mounted outlet boxes in surface mounted conduit runs, this Contractor shall furnish and install a luminaire canopy sufficiently deep to permit exposed conduits to pass through. Canopy shall have proper openings cut by luminaire manufacturer through which conduits may pass. Submit sample of canopy for approval before installation.
- G. Prior to final payment, clean all luminaires and replace all expended lamps. Touch up all scratch marks, etc., in an approved manner.
- H. Where ballasts are found to be producing excessive noise they shall be replaced.
- I. Install exit light as indicated on the drawings but not higher than 10'0" AFF. Size and color of lettering shall comply with local codes.
- J. Track luminaires, Adjustable luminaires, Floodlights and Accent lights shall be aimed as directed by the Architect/Engineer. Outdoor lighting shall be aimed in periods of darkness.
- K. Recessed luminaires to be installed in metal pan or acoustic modular ceilings shall be modified as required to fit into openings in ceiling construction. This contractor shall coordinate and verify this work with the General Construction Contractor. Shop drawings showing details shall be submitted for approval.
- L. Plumb all outdoor lighting standards to true vertical. For bolted poles, provide galvanized anchor bolts and nuts. Plumb using a nut above and below the base plate on the anchor bolts. Pack grout between base plate and concrete footing and provide drain hole below base plate to prevent accumulation of moisture inside pole base. Provide two piece or individual covers for nuts exposed above the baseplate of the same color as the pole. Ground all metal lighting standards.

3.2 COORDINATION WITH MOUNTING CONDITIONS

- A. This Contractor is responsible for coordinating the mounting accessories and luminaire trims with the ceiling conditions for which each luminaire will be installed. No extra compensation will be permitted for failure to coordinate.
- B. All luminaires in hung ceilings are to be installed with earthquake clips.

3.3 COORDINATION WITH AMBIENT CONDITIONS

- A. The Contractor is responsible for coordinating the characteristics and the U.L. labeling of the luminaires and their components with the ambient conditions which will exist when the luminaires are installed. No extra compensation will be permitted for failure to coordinate the luminaires with their ambient conditions. These areas of coordination include but are not limited to the following:
 - 1. Wet location labels
 - 2. Damp location labels
 - 3. Low temperature ballasts
 - 4. Dimming ballasts
 - 5. Very low heat rise ballasts
 - 6. Explosion proof
 - 7. Plenums and air handling spaces
 - 8. Fire rated ceilings
 - 9. Low density ceilings
 - 10. Insulated ceilings

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