

SECTION 16500

LIGHTING FIXTURES

1. GENERAL

1.1. Related Documents:

- 1.1.1. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section.
- 1.1.2. The requirements of Section 16010 Electrical General Provisions shall apply to all work specified under this Section.

1.2. Scope:

- 1.2.1. Provide all labor, materials, equipment and services necessary for the installation of a complete system.
- 1.2.2. Regardless of the basic catalog number in the lighting fixture schedule, every fixture shall be of the type required for the conditions in which it is to be installed and mounted.

1.3. Commissioning:

- 1.3.1. Division 16 will be responsible to carry out the commissioning requirements specified in Section 16010 and other sections referenced in 15850.

1.4. Submittals:

- 1.4.1. Submittals for the items described in the section shall be in accordance with Section 16010.
- 1.4.2. Submittals shall be provided for, but not limited to the following items:
 - 1.4.2.1. Lighting Fixtures
 - 1.4.2.2. Ballasts.
 - 1.4.2.3. Lamps.
- 1.4.3. Full shop drawings indicating dimensions, layout of components, wiring diagrams, etc. shall be submitted for fabricated lighting systems, such as:
 - 1.4.3.1. Linear slot lighting systems.

2. PRODUCTS

2.1. Lamps:

- 2.1.1. All incandescent lamps shall be long life (i.e., 2500 hours when available) and 130 volt (when available). Fluorescent lamps shall be T-8 style, low mercury, with 4100°K color characteristics unless otherwise indicated on the drawings, minimum 15,000 hour rated life, and shall be energy efficient. Compact fluorescent lamps shall be twin-tube 10,000 hour average rated life. High intensity discharge lamps shall be

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minimum 20,000 hours lamp life. All lamps shall be as manufactured by Sylvania, General Electric, or Philips.

2.2. Fixtures:

- 2.2.1. Fixtures shall be as indicated on the Lighting Fixture Schedule.
Lighting fixtures not included in the schedule are not acceptable and should not be submitted as substitutions.
- 2.2.2. General: All materials, accessories, and other related fixture parts herein mentioned shall conform to the requirements of the drawings, specifications, and the agencies heretofore mentioned. They shall be new and free from defects which in any manner may impair their character, appearance, strength, durability and function, and shall be of prime quality intended for their respective purpose, and effectively protected from any damage or injury from the time of fabrication to the time of delivery and until final acceptance of the work. The above items shall meet with the approval of the Architect and the Engineer who reserve the right of rejection prior to or after installation if found not to be in strict accordance with the true intent of the Contract.
- 2.2.3. Sheet Metal Work: All sheet metal work shall be free from tool marks and dents, and shall have accurate angles bent as sharp as compatible with the gauges of the required metal. All intersections and joints shall be formed of adequate strength and structural rigidity to prevent any distortion after assembly. All sheet metal shall be void of light leaks. All edges shall be finished so there are no sharp edges exposed. All mitres shall be in accurate alignment with abutting intersecting members. Piecing of plates in individual runs on single plans, and the use of spliced pieces or filler material to cover defective workmanship will not be tolerated. Sheet metal work shall be properly fabricated in order that planes will not deform, that is, become concave or convex, due to normal expected ambient and operating conditions.
- 2.2.4. Castings: Castings shall be exact replicas of the approved patterns and shall be free of sand pits, blemishes, scale and rust, and shall be smoothly finished. Tolerance shall be provided for any shrinkage of the metal castings in order that the finished castings will accurately fit in their designated locations.
- 2.2.5. Lenses: Where optical lenses are used, they shall be free from spherical and chromatic aberrations and other imperfections which may hinder the functional performance of the lenses. All lenses for fluorescent fixtures shall be 100 percent acrylic with lens thickness of 0.125 (+.005) (-.010) inches, as manufactured by KSH. These lenses shall be supported by a lens frame with a durable white finish, positive action latches and hinges which allow reversing the opening side and provisions to enable lens replacement without the use of special tools.
- 2.2.6. All fixtures shall be completely wired at the factory.
- 2.2.7. It shall be the responsibility of the Contractor to make certain that all recessed fixtures have trims and mounting components compatible

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with the ceilings in which they are to be installed. Shop drawings shall clearly indicate the compatibility of the fixture to the ceiling.

- 2.2.8. Light leaks between ceiling trims of recessed lighting equipment and the ceilings will not be tolerated.
- 2.2.9. Yokes, brackets and supplementary supporting members needed to mount lighting fixtures to 2" carrier channels or other suitable ceiling members shall be furnished and installed by the Contractor.
- 2.2.10. The Contractor shall furnish and install any necessary extra channels, support wires or rods, and associated other items to provide a structurally sound system to support the fixture independently of the ceiling system.

2.3. Ballasts and Transformers:

- 2.3.1. All fluorescent ballasts shall be solid state (electronic), "Class P" type with sound rating "A" as designated by U.L. and shall meet the requirements of Section 410-73 (e) of the National Electrical Code. The Contractor and his supplying lighting fixture manufacturer shall be responsible for the proper selection of ballasts for operation in their environs. Ballasts shall have ETL and CBM certification labels and shall be high power factor (greater than 95%) type and energy efficient. Compact fluorescent ballasts shall be program start, high power factor type, Class P, as designated by U.L. Ballasts shall comply with U.L. 935 and ANSI C82.11.
- 2.3.2. All high intensity discharge ballasts shall meet all applicable requirements of Section 410-73 of the National Electrical Code. Ballasts shall be high power factor reactor type, +/- 5% allowable line voltage variation.
- 2.3.3. All ballasts shall be covered by a two (2) year warranty against defects. Warranty shall include payment for informal labor costs for replacement of in warranty ballasts.
- 2.3.4. Luminaire assemblies, including ballasts, shall be reasonably devoid of objectionable "hum" in the normal ambient noise of the application as judged by the Engineer.
- 2.3.5. Ballasts shall conform to the electro-magnetic interference (EMI) limits established by the Federal Communications Commission (FCC), part 18, for industrial (Class A) applications
- 2.3.6. Electronic ballasts shall meet all applicable ANSI and IEEE Standards for total harmonic distortion (THD) and surge protection. Maximum THD shall be 10% (0.10).
- 2.3.7. All electronic ballasts shall utilize rapid start, programmed start, or instant start ignition of lamps, and shall be universal voltage, operating satisfactorily on 108-305 VAC.

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- 2.3.8. Lamp current crest factor shall not exceed 1.7. Ballast factor shall be minimum 85%.
- 2.3.9. Ballasts shall be as manufactured by Universal Lighting Technologies, Advance, Osram/Sylvania, or Valmont.
- 2.3.10. Ballasts for compact fluorescent fixtures shall be as manufactured by Energy Savings, Inc., or Robertson, or Universal Lighting Technologies.
- 2.3.11. Ballasts for fluorescent fixtures which require dimming shall be as manufactured by Lutron, "Hi-lume", with capabilities of dimming to 1% light output for T-8 lamps and 1% for compact fluorescent lamps.
- 2.4. Underwriters' Laboratories, Inc. Listing:
 - 2.4.1. The fixtures shall be manufactured in strict accordance with the appropriate and current requirements of the Underwriters' Laboratories Inc. "Standard for Safety", and others as they may be applicable.
 - 2.4.2. A U.L. listing shall be provided for each fixture type, and the appropriate label or labels shall be affixed to each fixture in a position concealing it from normal view.
- 2.5. Low Voltage Relay for Patient Lighting Control:
 - 2.5.1. Low voltage relay shall provide for isolated switching control of line voltage lighting fixtures by patient lighting control systems such as nurse call systems (patient station, pillow speakers, call cords, etc.), Hill-Rom Sidecom patient service module, or any discrete momentary relay control device.
 - 2.5.2. Relay inputs shall be discrete Class 2 circuits, with two input circuits and two output circuits, each rated 3 amperes at 277V, and 6 amperes at 120V.
 - 2.5.3. Relays where installed remotely (not as part of a luminaire assembly) shall be UL listed.
 - 2.5.4. Relay shall be Vista Lighting Model 90676-NRF, Healthcare lighting 1200 or approved equal.

3. EXECUTION

- 3.1. Lighting fixtures shall be supported independent of the ceiling grid system. The contractor shall furnish supporting means consisting of #12 gage support wires for fixtures installed in grid or solid ceilings. At least two (2) support wires shall be provided to support each fixture.
- 3.2. Where lighting fixtures are to be installed in areas without ceilings, the contractor shall furnish supports consisting of threaded rods and steel channels as required to provide a finished mounting height of 8'-0" to bottom of fixture, unless pendant or chain mounting is indicated in the lighting fixture schedule.

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- 3.3. Coordinate switching configuration of low voltage relay for patient control relay with the schematic details on the drawings, the nurse call manufacturer, and the Architect. In general, where two-button patient lighting controls are used by the owner, separate control is required. One-button controls shall utilize sequential control, unless control of a single circuit is indicated.

END OF SECTION