

SECTION 16500

LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide complete interior lighting systems, including fixtures, hangers, supports, fittings, lamps, wiring, connections and controls, as indicated in the Contract Documents.
- B. The lighting layouts on the DRAWINGS are diagrammatic only. Fixtures, in general, have been specified for the particular type of ceiling in which they are to be installed. Verify the ceiling construction details and provide fixtures suitable for the respective ceiling types.
- C. Manufacturer's lighting fixture catalog numbers as indicated on the "Lighting Fixture Schedule" indicate quality, type, efficiency and style but may not cover special, required design details. Provide lighting fixtures having such special details as noted in the "Lighting Fixture Schedule" and as required for proper installation.
- D. Verify the availability of all fixtures proposed to be used in the execution of the work prior to submitting same for the Engineer's review. The discontinuance of production of any fixture after such review shall not relieve the Contractor from furnishing an alternate fixture of equivalent quality and design without additional cost to the Owner.

1.2 QUALITY ASSURANCE

- A. All fixtures shall be new and bear the U.L. label for the service intended.
- B. Lighting fixtures shall be standard products of manufacturer regularly engaged in the manufacture of the specific type lighting fixture specified as one of their principal products and shall be manufacturer's latest standard design that complies with specification requirements.
- C. Lighting fixtures shall be as specified in the "Lighting Fixture Schedule". Although only one manufacturer has been named, the phrase "or equal" may be applied to each fixture listed, unless otherwise noted. The lighting design is intended to be of the highest electrical efficiency and fixtures have been selected to provide the best illumination, at the lowest life cycle cost. The Engineer reserves the right to disapprove any lamp or fixture type submitted which is, in the Engineer's opinion, not equal in quality, appearance, efficiency or performance to the fixture specified.

1.3 SUBMITTALS TO THE ENGINEER

- A. The following equipment, materials, products, etc. shall be included in the "Subcontract and Material List Sheet" per SECTION 16010:
 1. Indicate each lighting fixture type, manufacturer's name and catalog number.
- B. Submit Shop Drawings per SECTION 16010. Lighting Fixture Shop Drawings shall include photometric data for each fixture utilizing the specified lens/louver type, lamp(s) and ballast(s). All lighting fixture types shall be submitted in a single complete brochure which shall be in the form of a soft cover binder with each

fixture separated by an identified index tab. Information on each fixture shall include:

1. Manufacturer and Catalog Number
2. Dimensioned Construction Drawing(s)
3. Standard Catalog "Cut" Sheet
4. Photometrics
5. Lens/Louver Type
6. Power Requirements
7. Ballast Type and Rating
8. Socket Type
9. Lamp Type

1.4 DELIVERY, STORAGE AND HANDLING

- A. Lighting fixtures and equipment shall be delivered with U.L. and manufacturer's labels intact and legible. Broken, cracked and damaged materials and equipment shall be removed from site immediately and be replaced with new materials and equipment. Fixtures and accessories shall be stored in protected dry locations in their original unbroken package or container. Fixtures shall be protected from dust and dampness both before and after installation. Fixtures shall be protected from paint and cleaning solvents during all phases of construction.

PART 2 - PRODUCT

2.1 MATERIALS

- A. Fixtures shall be identical in construction features, options and appearance to the fixtures specified in the Lighting Fixture Schedule.
- B. Lamps
 1. Fluorescent lamps shall be rapid start, F32T8/TL835, mid white (3500K, CRI 80+), unless otherwise noted.
 2. Acceptable Lamp Manufacturers: General Electric, Osram/Sylvania, Phillips or approved equal.
- C. Ballasts
 1. Ballasts shall be designed for continuous operation within the fixture provided and utilizing the lamp(s) specified without overheating or any other detrimental affects. Ballasts shall be quiet in operation and of the lowest noise level generally available. Fixtures shall in no way amplify ballast noise, but rather shall suppress ballast noise. Ballasts considered by the Engineer to have objectionable hum or noise shall be replaced immediately at no additional cost.
 2. Fluorescent Ballasts shall conform to U. L. and ANSI specifications and shall display symbols of approval by the U. L. and of certification by the C.B.M. as tested by the E.T.L. The component parts of the ballast shall be designed, fabricated, and assembled in accordance with the latest NEMA requirements. Ballasts shall be marked "Class P" indicating approved integral ballast protection. Fluorescent ballasts not "P" rated shall be individually fused at the ballast; fuses shall be cartridge type, sized as recommended by the

manufacturer. Ballasts shall be Electronic, high-power-factor, series-sequence type, with less than 20% THD. Fixtures with two lamps or multiples of two shall have two-lamp ballasts. Three-lamp ballasts shall not be used unless specified. Dimming ballasts shall have a 100% to 10% range of operation. Ballasts for interior fixtures shall be rated for starting operation at ambient temperatures to 50°F. Ballasts for exterior fixtures shall be rated for starting operation at ambient temperatures to minus 20°F. Acceptable ballast manufacturers: EBT, GE, Magnetek, Motorola, Osram/Sylvania, or approved equal.

3. All ballasts shall have a two (2) year material and labor guarantee.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount fixtures in true vertical and horizontal alignment.
- B. Offset fixtures as required to avoid obstructions.
- C. Provide all necessary hangers and supports for proper fixture installation. Such supports shall be anchored to channels in the ceiling construction or to the structural slab. Fixture supports shall be capable of supporting a minimum of two and one-half times the load normally carried at point of support.
- D. All fixture assemblies shall be grounded.

END OF SECTION