# SECTION 26 05 10

# BUILDING LIGHTING

## PART 1 – GENERAL

### 1.1 DESCRIPTION OF WORK

A. Lighting fixture work is indicated by specifications, drawings and schedules.

B. Types of lighting fixtures in this section include the following:

1. Fluorescent.
2. Incandescent.
3. High Intensity Discharge.
4. LED

C. Applications of lighting fixtures required for the project include the following:

1. General Lighting.
2. Supplementary Lighting.
3. Emergency Lighting.

### 1.2 SUBMITTALS

A. Product Data: Submit manufacturer's data on building lighting fixtures.

B. Shop Drawings: Submit dimensioned drawings of lighting fixture installations, including but not necessarily limited to, layout, relation to associated panelboards, and connections to panelboards. Submit fixture shop drawings 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.

## PART 2 – PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

A. Available Manufacturers: Subject to compliance with project specifications and requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

1. Refer to "Lighting Fixture Schedule", on the drawings, for fixture types and acceptable manufacturers.

B. Each lighting fixture type specified represents a specific style and quality of fixture acceptable for this project. Equivalent manufacturers listed are consider to have lighting fixtures which meet or exceed those of the originally specified manufacturer.

C. The Engineer reserves the right to reject any shop drawing and to request a resubmission should the contractor submit a shop drawing of an equivalent manufacturer which is viewed as being of an incompatible style or inferior quality.

D. No fixture shop drawing shall be submitted, nor will any be accepted, for any manufacturer which is not specifically listed for that fixture type. When a fixture manufacturer is listed for a specific fixture type, this does not provide him with the right to submit for fixtures he is not listed under. A bidding Contractor may elect to submit non listed fixtures for the Engineer's review, a minimum of ten (10) working day prior to bid, if the Engineer agrees that the submitted fixture meets the intended design than a written addendum will be issued, if no addendum is issued than the manufacturer shall not submit shop drawings for that fixture type. The Engineer, and only the Engineer shall make the final decision on whether the submitted fixture meets the project's requirements.

E. Should the Contractor be unable to obtain approval of the resubmitted manufacturer, than he should submit a fixture from one of the other equivalent manufacturers listed or from the originally specified manufacturer.

2.2 LIGHTING FIXTURES

A. Provide lighting fixtures of the size, type and rating indicated complete with, but not necessarily limited to, housings, lamp holders, reflectors, ballast, lamps, mounting frames, pendants and wiring; wired and connected in place, complete, tested and left in satisfactory operating condition.

B. Fluorescent Lamp Ballasts:

<u>Section 1 - Physical Characteristics</u>

1. The ballast shall be physically interchangeable with a standard core & coil electromagnetic ballast.

2. The electronic ballast shall be provided with integral leads, color coded to ANSI standard C82.11 (latest version).

<u>Section 2 - Performance Requirement</u>

1. The "High Frequency" electronic ballast shall operate lamps at a frequency of 20 KHz or higher without visible flicker.

2. The electronic ballast's input current shall have Total Harmonic Distortion (THD) of less than 20% when used with primary lamp.

3. The electronic ballast shall have a Power Factor greater than 98% when used with primary lamp.

4. The electronic ballast shall have Lamp Current Crest Factor of less than 1.7, in accordance with lamp manufacturers' recommendations and ANSI C82.11.

5. The electronic ballast shall support a sustained short to ground or open circuit of any output lead without damage to the ballast.

6. The electronic ballast shall have an audible noise rating of Class A or better.

Section 3 - Regulatory Requirements

1. Ballast shall meet the requirements of the Federal Communications Commission Rules and Regulations, Part 18, for non-consumer equipment.

2. The electronic ballast shall meet ANSI C82.11 standards regarding harmonic distortion.

3. Ballast shall meet ANSI C62.41 Cat. A for transient protection.

4. The electronic ballast shall comply with all applicable state and federal efficiency standards.

5. The electronic ballast shall be Underwriters' Laboratories (UL) listed (Class P) and CSA Certified where applicable.

Section 4 - Other

1. The electronic ballast shall not contain Polychlorinated Biphenyls (PCB's).

2. The electronic ballast shall carry a five year (5) warranty.

C. High Intensity Discharge Ballasts

Section 1 - Physical Characteristics

1. The ballast shall be either a open core and coil mounted within the fixture or an encapsulated core and core.

2. With both types the capacitor and the igniter are mounted separately within the fixture.

Section 2 - Performance Requirement

1. Where quiet performance is required the standard open core and coil shall be potted in a cube-shaped steel can utilizing Class H (180 Deg. C.) polyester compound.

2. Encapsulated ballasts shall carry a Class A noise rating up through 175 watts and Class B for 250 and 400 watts.

3. The ballast shall be designed with multiple input voltage taps on the primary coil. The four (4) tap design shall operate on 120 volt, 208 volt, 240 volt and 277 volt.

Section 3 - Regulatory Requirements

1. Ballast shall be Underwriters' Laboratories (UL) listed in accordance with UL 1029.

2. Ballast shall be designed and manufactured in accordance with ANSI C82.4.

D. Fixture Lamps: For the type, number and color of the fixture lamps, refer to the Lighting Fixture Schedule on the drawings.

**PART 3 – EXECUTION**

3.1 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's "Standard of Installation", NEMA Standards and with recognized industry practices to ensure that lighting fixtures fulfill requirements of the project.

B. Install lighting fixtures in removable tile ceilings using 3/8" flexible metal conduit with 3 # 12 awg. conductor. Maximum length of flexible lead shall not exceed 60". Flexible lead shall extend from the fixture to the junction box. The junction box shall be securely fastened to the building structure above the removable tile ceiling and shall not serve more than two (2) lighting fixtures, nor shall the junction box support any of the lighting fixtures.

3.2 LIGHTING FIXTURE MOUNTING

A. 1' x 4', 2' x 2' and 2' x 4' fixtures installed in a removable tile ceiling shall be installed using T-Bar grid safety clips as provided by the fixture manufacturer and as required by the NEC.

B. 2'x 2' and 2' x 4' fixtures installed in a removable tile ceiling shall be installed using support wires at all four corners of the fixture. The support wires shall be carried up to the building structure and securely anchored using screwed or bolted hardware. Pressure type clips will not be acceptable. The Electrical Contractor shall be responsible for installing or having installed these two (2) support wires.

C. Downlights installed in a removable tile ceiling shall be installed using 24" spreader bars attached to the T-Bar grid system. Two (2) support wires shall be installed, one (1) on each side of the fixture and centered between the spreader bars, these support wires shall be carried up to building structure and securely anchored using screwed or bolted hardware. Pressure type clips will not be acceptable. The Electrical Contractor shall be responsible for installing or having installed these two (2) support wires.

D. Pendant lighting fixtures, either chain, cable or stem hung below a removable tile ceiling shall be installed in accordance with fixture manufacturer's written instructions and recommendations. The Electrical Contractor shall furnish and install support wire or threaded rod from the fixture mounting hardware up to building structure and securely anchor using screwed or bolted hardware. Pressure type clips will not be acceptable. These support devices shall be independent from the ceiling T-Bar grid system, the system may be used as a guide, but in no way shall the T-Bar grid system carry any of the weight produced by the fixture or it's support devices.

E. Surface mounted fixtures installed on removable tile ceilings or dry wall ceilings shall be installed in accordance with fixture manufacturer's written instructions and recommendations.

1. Fixtures installed on removable tile ceilings shall be anchored to the T-Bar grid system using snap-on clips with threaded studs and wing nuts. The Electrical Contractor shall furnish and install a support wire from each snap-on clip carried up to building construction and securely anchor using screwed or bolted hardware.

2. Fixtures installed on dry wall ceilings shall be mounted using spring-loaded toggle bolts. The number and location of the anchors shall depend on the fixture manufacture's written instructions and recommendations. It shall be the responsibility of the Electrical Contractor to follow these instructions and recommendations.

3.3 ADJUST and CLEAN

A. Clean lens, reflectors and interiors of all lighting fixtures of dirt and construction debris upon completion of installation.

B. Protect installed lighting fixtures from damage during the remainder of the construction period.

3.4 FIELD QUALITY CONTROL

A. Upon completion of the installation of the lighting fixtures, and after the building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with project requirements. Where possible, correct malfunctioning units at the site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

B. At the time of Substantial Completion, replace lamps in lighting fixtures which are observed to be noticeably dimmed after Contractor's use and testing, as judged by the Architect/Engineer. Furnish stock or replacement lamps amounting to 15% (but not less than one (1) lamp in each case) of each type and size used in each type of fixture. Deliver the replacement stock as directed to the Owner's storage area.

1. Refer to Division 1 sections for the replacement/restoration of lamps in lighting fixtures, where used for temporary lighting prior to the time of Substantial Completion.

C. Replace defective and burned out lamps for a period of one (1) year following the time of Substantial Completion.

3.5 GROUNDING

A. Provide tight equipment grounding connections for each lighting fixture installation, in accordance with fixture manufacturer's recommendations and the NEC's requirements.

**END OF SECTION 26 05 10**