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**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions and the following specification sections apply to all Work herein:
1. Section 26 00 10 - General Requirements
  2. Section 26 00 20 - Scope of Work
  3. Section 26 05 19 - Electrical Conductors - 600 Volts
  4. Section 26 05 26 - Grounding and Bonding
  5. Section 26 08 13 - Testing

**1.2 SUMMARY**

- A. Furnish and install all lighting fixtures complete with lamps at all points where indicated on the Drawings and as specified herein.

**1.3 REFERENCE STANDARDS**

- A. Each lighting fixture, lamp and all components shall be designed, manufactured and tested in accordance with the latest applicable industry standards including the following:
1. UL Standard 57 - Electric Lighting Fixtures
  2. UL Standard 844 - Electric Lighting Fixtures for Use In Hazardous Locations
  3. UL Standard 924 - Emergency Lighting and Power Equipment
  4. UL Standard 935 - Ballast's, Fluorescent Lamp
  5. UL Standard 1029 - Ballast's, High Intensity Discharge Lamps
  6. UL Standard 1570 - Fluorescent Lighting Fixtures
  7. UL Standard 15771 - Incandescent Lighting Fixtures
  8. UL Standard 15772 - High Intensity Discharge Lighting Fixtures
  9. ANSI C82.1,2,3 - Ballast's
  10. NFPA 70 - National Electrical Code (NEC)
- B. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

**1.4 SUBMITTALS**

- A. The following submittal data shall be furnished according to the General Conditions and Section 26 00 10 and shall include, but not be limited to:
1. Lighting fixtures complete with physical dimensions, materials, connector details, voltage, current, installation details, air handling capability, etc.
  2. Lamps complete with base or pin configuration, lumen rating, life expectancy, color temperature, starting characteristics, etc.
  3. Samples where required by these Specifications and/or the fixture schedule on the Drawings.
- B. All items or equipment listed above with asterisks (\*) shall be certified by the manufacturer using Manufacturer Certification "MCA" as set forth in Section 26 00 10. See Section 26 00 10 for certification requirements.

**1.5 WARRANTY**

- A. Comply with the requirements of the General Conditions and Section 26 00 10.

**PART 2 PRODUCTS****2.1 ACCEPTABLE MANUFACTURERS**

- A. Lighting Fixtures:
1. The schedule of lighting fixtures on the Contract Documents has been taken from manufacturer's catalogs of leading lighting fixtures of all types in order to give a description of what is required. If it complies with these specifications, one of the listed manufacturers for each fixture shall be used.
- B. If it complies with these Specifications, fluorescent lamps manufactured by one of the following manufacturers will be acceptable:
1. General Electric
  2. Osram Sylvania
  3. Phillips
- C. If it complies with these Specifications, high intensity discharge lamps manufactured by one of the following manufacturers will be acceptable:
1. General Electric
  2. Osram Sylvania
  3. Phillips
- D. If it complies with these Specifications, electronic fluorescent ballasts manufactured by one of the following manufacturers will be acceptable:
1. Advance - Centium
  2. Universal Triad - HP
  3. Osram Sylvania – Quicktronic QTP/ISN
- E. If it complies with these Specifications, electromagnetic fluorescent ballasts manufactured by one of the following manufacturers will be acceptable:
1. Advance - Mark III
  2. Universal Plus

**2.2 GENERAL**

- A. Prior to the application of any finish, all metal parts of all fixtures shall be protected by a rust inhibiting process approved by the Architect. The rust inhibiting process shall be chemical. No type of sprayed, painted or dipped primer may be used as the basic rust inhibitor. Any fixtures and/or parts of any fixtures, which shall have begun to show signs of rusting or corroding at the time of completion of the job, shall be removed and replaced by properly protected metal parts, subject to the approval of the Architect and this shall be done before Substantial Completion is reached.
- B. All fixtures specified herein, included in any alternates and scheduled and/or detailed on the Drawings, shall conform to the standards and bear the label of the Underwriters Laboratories, Inc.
- C. Where required, fixtures shall be furnished complete with internal wiring and ballasts. All fluorescent fixtures shall have external primary ballast fusing, if required by code. All joints and splices within the fixture housing shall be made as specified in Section 26 05 19 titled "Electrical Conductors - 600 Volts".
- D. Where specified, all ballasts shall be UL listed, electronic type, high power factor (0.98 or higher), crest factor of 1.7 or less, Class P, Type 1 Outdoor, internal thermal protection, "A" sound rating, normal light output instant or rapid start, 120 or 277 Volts (as specified). The electronic ballast shall be suitable and guaranteed for use on a 120 Volt service with a voltage range of 108 Volts to 132 Volts or on a 277 Volt service with a voltage range of 249 Volts to 305 Volts. Ballast shall comply with FCC Regulations for Radio Frequency Interference (RFI) and Electromagnetic Interference (EMI) for Class A (Industrial) installations and IEEE Publication 587 Category A for transient protection. All ballasts exposed to outside temperature shall be rated for 0°F. Fluorescent lighting fixture submittals must state in writing the ballast manufacturer, model number and characteristics. See lighting fixture schedule on the Drawings for ambient temperature requirements for ballasts. See additional requirements hereinafter for the Type "A" lighting fixture ballast.

- E. Where electronic ballasts are not specified, all ballasts shall be CBM-ETL Class P approved high power factor, high efficiency, parallel circuit and encapsulated type with thermal protection. Ballast's shall be suitable and guaranteed for a voltage range of 112 Volts to 127 Volts for 120 Volt service or 255 Volts to 290 Volts for 277 Volt service, unless noted otherwise on the Drawings and shall be "A" sound rated. All ballasts exposed to outside temperature shall be rated for 0°F. Fluorescent lighting fixture submittals must state in writing the ballast manufacturer, model number and characteristics. See lighting fixture schedule on the Drawings for ambient temperature requirements for ballasts.
- F. Fixtures shall be furnished with special anodized finishes and colors as indicated in finish must conform to a color Sample supplied by the Architect. Full size finished Samples of each fixture with special finish and/or color shall be delivered to the Architect for written approval.
- G. Fixtures shall be provided with brackets, trim strips, hold down clips and other accessories required for proper mounting in the ceiling systems indicated on the Architectural Drawings.
- H. All exit lighting fixtures shall be UL listed and meet the requirements of federal, state and local codes.
- I. Fluorescent lamps shall be furnished and installed as indicated on the Drawings. Refer to the schedule on the Electrical Drawings for fixture/lamp specifications.

### 2.3 AIRCRAFT WARNING LIGHTS

- A. Furnish and install a complete system of aircraft warning lights on the building as required by the FAA, applicable regulations and as shown on the Drawings.

### 2.4 LIGHTING FIXTURE SCHEDULES

- A. See schedule on Electrical Drawings.

### 2.5 LIGHTING CONSULTANT FIXTURE SPECIFICATIONS

- A. Refer to Section 26 06 51 titled "Lighting Fixture Schedule" for a description of the lighting fixtures specified by the Lighting Consultant for this Project.
- B. See Section 26 50 10 titled "Architectural Lighting Fixtures, Lamps, Ballasts" for additional information.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Fixtures shall be installed so that no labels are visible under normal operating conditions of the fixture.
- B. If fixtures are installed in a fire rated ceiling, the Electrical Subcontractor shall preserve the fire rating according to the UL assembly number.
- C. Lighting poles shall be grouted to fill the space between the pole base plate and the concrete base.
- D. Install lamps in all fixtures.

### 3.2 FIXTURE SUPPORT AND MOUNTING

- A. Lighting fixtures shall be installed in accordance with the manufacturer's recommended mounting methods and the provisions of these Specifications and Drawings as noted. All lighting shall be supported from the building structure. The fixtures shall be supported in a manner that will insure the fixture weight being equally distributed from each support and the fixture remaining in a level position.
- B. Fluorescent fixtures and 2' x 2' H.I.D. fixtures flush mounted in exposed tee suspended acoustical tile ceilings shall be of the lay in type, which shall rest on and be supported by the main runners of the ceiling

- support systems. Each fixture installation shall be attached to the main runners at each end with clips intended for that purpose.
- C. Fluorescent fixtures flush mounted in concealed suspension system type suspended acoustical tile ceilings or in plaster, stucco or sheet rock ceilings shall be supported by adjustable brackets, integral with the fixture, resting on support channels of the ceiling suspension system. Brackets shall be adjustable from inside the fixture.
  - D. Flush mounted incandescent fixtures and H.I.D. fixtures smaller than 2' x 2' shall be supported by fixture mounting bars, furnished with the fixture, attached to two adjacent ceiling support system members with nylon tie straps.
  - E. Surface mounted fluorescent and H.I.D. fixtures on suspended ceilings shall be supported from light weight channel (16 ga., 3/4" x 0.5") above the ceiling attached by nylon tie straps to two (2) members of the ceiling suspension system. Two (2) support channels are required for each 4' fixture.
  - F. Surface mounted fixtures mounted to concrete structure, sheet rock or plaster ceilings or low density acoustical tile ceilings shall be mounted with two (2) 1/4" x 1-1/2" x 4" metal spacers between the fixture and ceiling. Do not place spacers directly over ballast.
  - G. Surface and wall mounted incandescent fixtures shall be mounted on fixture studs in an outlet box. Outlet boxes shall be supported as specified in Section 26 05 33 titled "Raceways and Boxes".
  - H. Where fixtures are specified to be pendant mounted types on suspended ceilings, the pendants, hanger rods or conduits used for mounting shall be attached to the fixture mounting stud installed in the outlet box. Outlet boxes shall be attached with light weight channel (16 ga., 3/4" x 5") secured by nylon tie straps to two (2) members of the ceiling suspension system or the boxes may be secured directly to the building structure with threaded rods.
  - I. Factory furnished safety cable or chain shall be installed on all pendant mounted H.I.D. fixture. Connect to structure and fixture as recommended by manufacturer.

### 3.3 CLEANING AND ADJUSTMENT

- A. All installed fixtures shall be cleaned and free of fingerprints prior to final acceptance.
- B. All lamps shall be illuminated and operational at the time of the final inspection. Relamp burned out, inoperative or other lamps not providing one hundred percent (100%) output.
- C. All fixtures with lamp positions, tilt, shutter rotation or other types of adjustment shall be roughly adjusted at the time of the installation. The Architect shall determine the final aiming and/or adjustments during the final inspection. Fixtures serving areas where daylight is predominant shall be adjusted after sunset.
- D. Metal Halide lamps with discernible color shift after one hundred (100) hours of operation shall be replaced at no additional cost to the owner.

### 3.4 FIELD TESTING

- A. Refer to Section 26 08 13 for additional testing requirements for lighting fixtures and lamps.

**END OF SECTION**