

SECTION 16511

LIGHTING FIXTURES AND LAMPS

PART 1 GENERAL

1.01 SUMMARY

A. Related Sections:

1. 09200 - Metal Studs, Lath, Suspension Ceiling, Plaster, and Stucco.
2. 09510 - Acoustical Ceilings.
3. 16112 - Raceways and Conduits.
4. 16120 - Wire and Cable.

1.02 SYSTEM DESCRIPTION

- A. Performance Requirements: Materials shall bear Underwriters Laboratories (UL) labels.
- B. Explosion-proof, shielded, and vapor tight and wet location fixtures shall bear UL labels appropriate for the type of application.

1.03 SUBMITTALS

- A. Submit manufacturer's literature and technical data before starting work.
- B. Furnish certified photometric data for fixtures.
- C. Upon request, a sample of each fixture proposed for use and specified unit shall be submitted to the A/E for review.
- D. Provide lighting calculations to comply with Florida Building Code (FBC) and IES minimum footcandle level when required.

1.04 QUALITY ASSURANCE

- A. Lighting fixtures and lamps requirements shall comply with FPL Commercial/Industrial Energy Conservation Programs Standards, if FPL is the available utility company.
- B. For classroom lighting, use only the manufacturers and products listed in the latest edition of FPL

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Commercial/Industrial Lighting Approved Products.

C. Comply with Florida Building Code (FBC).

PART 2 PRODUCTS

2.01 EQUIPMENT

A. Fixtures in student areas shall be provided with solid lenses.

B. Surface mounted fixtures in student areas or outdoors shall be vandal resistant, with 10 year lens warranty. Fixture bases shall be metal and fastened to mounting locations with metal components.

C. Exterior fixture shall be of aluminum or plastic construction.

D. Lighting Fixtures:

1. Provide lighting fixtures as indicated on the drawings and as specified.

2. The schedule and details of lighting fixtures, appearing on the drawings, indicate the type, construction, appearance, quality, and performance of the fixtures required.

a. Any proposed deviation from the fixtures specified requires the proposed substitute product be listed in the latest FPL Commercial/Industrial Lighting Approved Products.

b. Any proposed deviation from the fixtures specified shall equal or be superior to the item specified under these headings.

c. Proposed substitute lighting fixtures will be judged on overall quality on construction.

d. Provide 120V working sample of proposed substitution with cord, plug, and lamp.

e. The fixture manufacturers products scheduled are considered acceptable, based on the equivalency of individual units as determined by the A/E.

3. Materials used in the manufacture of fixtures shall be new and the best of their respective kind, and shall be formed and assembled in a neat, accurate, and professional manner.

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- a. Sheet metal shall be of sufficient thickness or shall be ribbed, flanged, or otherwise reinforced so that lighting fixtures and their component parts will withstand the stresses of normal handling and installation and service without undue distortion of shape.
- b. Plastering or other installation procedures shall not be relied on to reinforce lighting fixtures or their component parts.
- c. Fixture bases shall be metal and fastened to mounting location with metal components.

NOTE TO SPECIFIER: Modify the following paragraph to list specific areas requiring impact resistant light fixtures. Coordinate with the Light Fixture Schedule.

- d. Lighting fixtures in gymnasium areas shall have solid, protective lenses and be impact resistant or have protective covers, with 10 year lens warranty.

4. Finishes:

- a. Painted steel sheet shall be processed with Bonderize or equal phosphate treatment or shall be Paintlok or Galvanneal.
 - b. Unpainted sheet steel shall be Galvanneal, by Republic Steel or accepted equivalent.
 - c. Springs shall be of full hard temper stainless steel.
 - d. Fasteners of ferrous metal shall be cadmium plated or zinc plated with chromate.
 - e. Screws mounting fixture housing in plaster ring shall be minimum #8, pointed to facilitate installation.
 - f. Plaster frame rings shall be of sufficient strength to withstand deformation during installation, and of suitable materials or finish to prevent corrosion from ceiling plasters and mortars.
- 1) The contractor shall furnish the fixture manufacturer a complete list of fixtures that will be installed in acoustical plaster ceilings with types and quantities.

- g. Painted finishes shall be baked epoxy, polyester

powder coated, acrylic or accepted equivalent finish suitable for the service required including temperature and accepted by A/E. Finish shall be applied after fabrication.

5. Fixtures shall be complete with canopies, suspensions of proper lengths, hickey, casing, sockets, holders, reflectors, hardware, and shall be completely wired and assembled. Each troffers shall have 2 earthquake clips minimum, positive enclosed spring loaded catches, and safety hinges.
6. Furnish suitable plaster rings or plaster stops for fixtures set in plaster ceilings. Consult the "Finish Schedules" on drawings for locations and extent of plaster ceilings. Coordinate the mounting methods of recessed fluorescent lighting fixtures with ceiling suspension system and ceiling trades.
7. Fluorescent and HID ballasts shall be low wattage, high efficiency 480, 277 volt, or 120 volt as noted on Drawings.
 - a. Ballasts shall be individually fused and shall be high power factor, non-PCB construction UL listed Class P and be listed by Electric Testing Laboratories.
 - b. Ballasts used outdoors shall be suitable for 32 degrees F. operation.
 - c. Provide electronic ballasts, with a Total Harmonic Distortion (THD) of not more than 15 percent and a 5-year manufacturer's warranty, for fluorescent fixtures compatible with 32 watt T-8 lamps.
 - d. Ballast sound rating shall be ASA "A" for fluorescent ballasts.
 - e. Provide emergency fluorescent fixtures with magnetic ballasts. Type B-30 by Bodine or accepted equivalent where indicated.
 - f. HID Ballasts shall be constant wattage type.
8. Fluorescent Lampholders shall be General Electric Leviton or Bryant.
 - a. Silicone-fiberglass insulated wire rated at 150 degrees or 200 degrees C. or Teflon-fiberglass insulated wire rated at 250 degrees C. shall be provided as required with recessed incandescent and HID fixtures for connection of fixtures to adjacent boxes.

- b. Medium and mogul screw base lampholders shall have porcelain bodies.
 - c. Screw-shell sockets shall be nickel plated and shall have spring contacts wherever possible.
9. Provide a positive device to assure proper axial alignment of lamps with asymmetric distribution when relamping.
- a. This device may be preset or adjustable as required by the specifications.
 - b. Axial and angular lamp adjustments shall have provision for locking in adjusted position by hex head or hex socket bolts or nuts with special toothed washers that resist turning in both directions.
10. Fluorescent ballasts and lampholders shall be readily and simply replaceable without demounting the fixture.
- a. Bottom and one side of ballast shall be in full contact with metallic fixture surfaces for maximum heat conductance.
 - b. Exposed lamp fluorescent sockets shall be telescoping type or be provided with lamp support brackets.

NOTE TO SPECIFIER: The following subparagraph applies only to non-student areas.

11. Exposed bare lamps on fluorescent fixtures shall be protected with wire guards or a protective tubular shield. For HID lamps, consult with respective manufacturer for requirements of enclosure made of suitable material capable of withstanding the glass lamp particles if the outer jacket of the lamp bursts or shatters.
12. Incandescent and HID reflectors shall be fabricated from minimum 0.050 Alcoa #12 reflector sheet or accepted equivalent, free from forming lines and other visible imperfections.
- a. Black anodized finish shall be minimum 0.001 thick guaranteed against fading and discoloration.
 - b. Plain anodized finish used indoors shall be Alcoa MI Alzak or accepted equivalent.

- c. Plain anodized finish used outdoors shall be Alcoa SI Alzak with fixture protected with glass cover or other means.
13. Fluorescent Specular Reflectors: Specular reflectance shall be 86 percent minimum.
 - a. Concealed fluorescent specular reflectors shall be Alcoa MI Alzak finish or accepted equivalent.
 - b. Visible reflectors shall be Alcoa reflector sheet type 1 or accepted equivalent.
 14. Glass lenses for incandescent and HID fixtures shall be borosilicate glass with maximum coefficient of expansion of 0.33×10^{-7} . Glass lenses for fluorescent fixtures shall be Corning Glass or accepted equivalent.
 15. Plastic lenses and diffusers used on fluorescent fixtures shall be 100 percent prime virgin acrylic KSH K-12 or accepted equivalent, minimum unpenetrated thickness of 0.125" and be furnished with antistatic treatment. Injection molded lenses shall be as manufactured by Holophane or accepted equivalent.
 16. Exposed fixture housings or frames shall have a continuous, smooth surface with no visible seams and a neat and finished quality appearance. Hinges and fastening devices shall be fully concealed except with special permission of the A/E.
 17. The thickness of visible edges of mounting frames and rings at the ceiling line shall be between 0.035" and 0.050". Light leaks around trim frame or lens or between any of these are unacceptable.
 18. Where fixture type is not indicated on drawings, fixture type used in similar locations shall be provided, as accepted by the A/E.
 19. Components of the same type, size, rating, functional characteristics, and make of similar interior lighting fixtures shall be interchangeable.
 20. Fixture stems shall be furnished by the manufacturer of the fixture specified or as shown on the drawings.
 21. Fixtures for use outdoors or in wet areas shall suitably gasketed to prevent access of moisture or insects into fixture or diffuser.
 22. Metal parts of fixtures for use in damp locations, specified as requiring painting, shall be painted with suitable weather and moisture resistant paints exhibiting moisture resisting qualities equal to epoxy based coatings.

23. Aluminum parts of fixtures for use in damp locations specified as requiring an unpainted finish shall be anodized.

E. Lamps:

1. Provide lamps for lighting fixtures. Lamps shall be as specified and indicated on the drawings.
2. Incandescent lamps shall be suitable to operate on 120 volts, 60 Hertz supply, with the following requirements:
 - a. Wattage rating as shown on fixture schedule.
 - b. Type of lamp as shown on fixture schedule.
 - c. Lamps shall be inside frosted unless noted otherwise.
 - d. Unless noted otherwise lamps shall be extended service type rated at 130V.
3. Fluorescent lamps shall be suitable to operate with specified ballasts on 277 or 120 volts, 60 Hertz supply as required, with the following requirements:
 - a. Wattage rating as shown on fixture schedule.
 - b. Lamp shall be rapid start energy saving type T-8, with 2900 minimum lumen output, by Sylvania or accepted equivalent.
 - c. Provide T-8 lamps with 4 foot lengths, whenever possible, and medium bi-pin bases, as shown on Drawings and fixture schedule.
 - d. Color: 3500 degrees Kelvin, 75 CRI.
4. Compact fluorescent "PL" lamps shall be used for down lighting applications and shall be suitable to operate with specified ballasts on 277 volts or 120 volts, 60 hertz supply as required with the following requirements:
 - a. High power factor ballasts only.
 - b. Wattage rating and lamp type as shown on fixture schedule.
 - c. Color: 3500 degrees Kelvin, 75 CRI.
5. HID lamps shall be suitable to operate with specified ballasts on 480 volts, 277 volts or 120 volts, 60 hertz supply as required with the following requirements:

- a. Wattage ratings and lamp designation as shown on fixture schedule.
- b. Lamp base shall be mogul base, whenever possible.
- c. Rated life shall be a minimum of 24,000 hours for high pressure sodium.
- d. Metal halide lamps shall be phosphor coated.

PART 3 EXECUTION

3.01 INSPECTION

- A. Do not proceed with the work of this section until conditions detrimental to the proper and timely completion of the work have been corrected in an acceptable manner.

3.02 INSTALLATION

- A. Install fixtures according to manufacturer's recommendations.
- B. Install "Lay-In" type fixtures with 6 foot lengths of flexible conduit to enable fixture relocation with minimum inconvenience. Fixture to be securely fastened to ceiling frame members by mechanical means as per the NEC.
- C. Exit lights:
 1. Install wall or ceiling mounted as shown on drawings.
 2. Provide directional arrows required to show correct path to exit.
 3. Install exit lights at a location and height to assure a clear line of sight from the egress passageway.
 4. Relocate exit lights that are not readily visible at no additional cost to the Board.
 5. Internally illuminated exit signs shall have LED light source on normal power.
- D. Fixture Supports:
 1. Support each fixture securely.
 2. Each recessed fluorescent troffer shall be lay-in supported by ceiling suspension system. Provide at least 2 earthquake clips.
 3. Where pendant fixtures are mounted in continuous rows, the number of hangers shall equal the number of 4 foot lengths, plus 1.

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4. Do not support fixtures to plaster or gypsum board ceilings.
 5. Furnish and install steel members and supports to fasten and suspend fixtures.
- E. Install lighting fixtures on ceilings or walls of mechanical and electrical equipment rooms after piping, ductwork, and equipment are installed therein.
1. Exact location and switching for such fixtures will be determined at the job site during the work.
 2. Fixtures shall be located to give maximum illumination to items of equipment requiring servicing, and moving machinery.
 3. Any lighting fixtures blocked, inaccessible, or improperly located shall be relocated at no extra cost.
 4. Where fan rooms are used as an air plenum, provide suitable gasketed vaportight lighting fixtures.

END OF SECTION