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SECTION 16513

INCANDESCENT LUMINAIRES
04/05

NOTE: Delete, revise, or add to the text in this section to cover project requirements. Notes are for designer information and will not appear in the final project specification.

This section covers incandescent lighting fixtures and energy efficient lamps. Incandescent lighting should be avoided where other types of lighting can be applied.

Incandescent lamps should be used where there are physical limitations and where radio frequency interference (RFI) constraints exist.

Commercial fixtures including recessed, surface, and pendant-mounted luminaires for direct, semidirect, direct/indirect, semi-indirect, and indirect lighting distribution.

Industrial fixtures including pendant- and chain-mounted luminaires for direct and semidirect lighting distribution and enclosed and gasketed fixtures.

Drawings should show a three-dimensional detail of each fixture and mounting with letter designation keyed to the drawings and electrical symbols describing the type, style, class, kind, and size of fixture as follows:

All fixture drawings should indicate the materials and finishes for reflectors, refractors, diffusers, and shielding; fixture mounting details; the number, size, and description of lamps; and electrical characteristics of branch-circuit or feeder connections. This information should be shown in a fixture schedule.

Industrial incandescent fixture drawings should indicate type of luminaire, including dome, deep bowl, symmetrical angle, medium, and high bay for direct and semidirect lighting distribution.

Industrial enclosed and gasketed fixture drawings should indicate type of luminaire including

vapor-tight or explosionproof for NEMA Class I or Class II hazardous locations.

PART 1 GENERAL

1.1 REFERENCES

NOTE: The following references should not be manually edited except to add new references. References not used in the text will automatically be deleted from this section of the project specification.

The publications listed below form a part of this section to the extent referenced:

ASTM INTERNATIONAL (ASTM)

- ASTM A 123/A 123M (2002) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- ASTM A 368 (1995a; R 2000) Standard Specification for Stainless Steel Wire Strand
- ASTM A 467/A 467M (2001) Standard Specification for Machine Coil and Chain
- ASTM A 47/A 47M (1999) Standard Specification for Ferritic Malleable Iron Castings
- ASTM B 26/B 26M (2003) Standard Specification for Aluminum-Alloy Sand Castings

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 (2005) National Electrical Code 2005 Edition

UNDERWRITERS LABORATORIES (UL)

- UL 1571 (1992) UL Standard for Safety Incandescent Lighting Fixtures
- UL 844 (1999; Rev thru Mar 1999) UL Standard for Safety Electric Lighting Fixtures for Use in Hazardous (Classified) Locations

1.2 GENERAL REQUIREMENTS

NOTE: If Section 16003 GENERAL ELECTRICAL PROVISIONS is not included in the project specification, applicable requirements therefrom should be inserted and the following paragraph deleted.

Section 16003 GENERAL ELECTRICAL PROVISIONS applies to work specified in this section.

Equipment and Performance Data shall be submitted for incandescent lighting fixtures consisting of life, test, system functional flows, safety features, mechanical automated details, automatic interlocks, and such features as electrical system protective device ratings.

1.3 SUBMITTALS

NOTE: Review submittal description (SD) definitions in Section 01330 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control. Include a columnar list of appropriate products and tests beneath each submittal description.

The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES in sufficient detail to show full compliance with the specification:

SD-03 Product Data

Equipment and Performance Data shall be submitted for incandescent lighting fixtures in accordance with paragraph entitled, "General Requirements," of this section.

Manufacturer's catalog data shall be submitted for the following items:

- Commercial Incandescent Lighting Fixtures
- Industrial Incandescent Lighting Fixtures
- Enclosed and Gasketed Vapor-Tight Fixtures
- Incandescent Lamps
- Lowering Devices

SD-02 Shop Drawings

Fabrication drawings shall be submitted for the following items consisting of fabrication and assembly details to be performed in the factory.

- Commercial Incandescent Lighting Fixtures
- Industrial Incandescent Lighting Fixtures
- Enclosed and Gasketed Vapor-Tight Fixtures
- Incandescent Lamps
- Lowering Devices

Installation Drawings shall be submitted for the incandescent lighting fixtures in accordance with the paragraph entitled, "Installation," of this section.

SD-06 Test Reports

Test reports shall be submitted for Operational Tests on incandescent lighting fixtures in accordance with the paragraph entitled, "Field Testing," of this section.

PART 2 PRODUCTS

2.1 PRODUCT STANDARDS

Incandescent lighting fixtures shall conform to UL 1571. Fixtures in hazardous areas shall conform to UL 844.

Lighting fixtures shall be furnished completely assembled with wiring and mounting devices and ready for installation at the locations noted. Recessed fixtures in suspended ceilings shall be designed and equipped for installation in the type of ceiling in which the fixture is to be installed. Fixtures shall be designed to be supported independent of the ceiling. Fixtures shall be equipped with the lamps required.

2.2 COMMERCIAL INCANDESCENT LIGHTING FIXTURES

Commercial incandescent lighting fixtures include recessed, surface mounted, and pendant-mounted luminaires.

Metal parts of lighting fixtures shall be [corrosion-resistant nonferrous metal] [sheet steel with corrosion-resistant finish]. Solder or self-threading sheet metal screws shall not be used in the construction of the fixture enclosure.

Fixtures rated up to and including 300 watts shall be equipped with medium screw-base lampholders. Fixtures rated in excess of 300 watts but not more than 1,500 watts shall be equipped with mogul screw-base lampholders. Screw shells of lampholders shall be electrically connected to the metal part of lighting fixtures or equipment grounding-circuit conductor.

2.2.1 Surface-Mounted Fixtures

Surface-mounted fixtures shall be designed to be fastened to wall or ceiling flush-mounted outlet boxes. Combustible ceiling materials shall not be subject to temperatures in excess of 195 degrees F 90 degrees C.

2.2.2 Recessed Fixtures

Recessed fixtures in suspended ceilings shall be designed for the type of ceiling construction in which the fixture is to be installed. Combustible ceiling materials shall not be subject to temperatures in excess of 195 degrees F 90 degrees C. Where recessed fixtures are supported on suspended ceilings, the ceiling shall have a minimum of four support rods per fixture with no support further than [6] [_____] inches [150] [_____] millimeter from the edge of the fixture. Fixtures shall not be supported by acoustic panels.

2.2.3 Pendant-Mounted Fixtures

Pendant-mounted fixtures shall be equipped with stems, swivel ball-and-socket self-aligning hangers that allow a minimum of a [20] [_____] -degree angle swing, ceiling canopies, and fixture-hanging devices. Stems shall be seamless brass, aluminum, steel, corrosion-resistant steel tubing, or steel conduit not less than [1/2] [_____] inch [15] [_____] inch

millimeter in diameter. Stem length, material, and finish shall be as noted.

2.3 INDUSTRIAL INCANDESCENT LIGHTING FIXTURES

Industrial incandescent lighting fixtures shall be provided with industrial porcelain-enameled seamless dome reflectors with ventilated necks and hoods tapped for 1/2 inch 15 millimeter conduit for swivel suspension pendant mounting. Lampholders shall have medium or mogul bases as applicable, furnished with incandescent lamps having the wattage rating indicated. Fixtures shall meet the requirements of UL 1571. Reflectors and sockets shall be easily detached as a unit without the use of tools but shall be so arranged that they cannot inadvertently come loose.

2.4 ENCLOSED AND GASKETED VAPOR-TIGHT FIXTURES

Enclosed and gasketed vapor-tight fixtures suitable for wet or damp locations shall consist of a cast-aluminum body, cap or matching outlet box, porcelain lampholder, glass enclosing globe, cork gaskets, and cast-aluminum guards for wall, ceiling, or pendant mounting in accordance with UL 1571 and NFPA 70.

Exposed outlet boxes for wall- and ceiling-mounted fixtures shall be furnished with the fixtures and shall be cast aluminum with four tapped hubs 90 degrees apart circumferentially, with three cast-aluminum threaded pipe plugs to fit the tapped holes. Boxes shall have ears or lugs for surface mounting to wall or ceiling. Body shall be provided with mounting screws and gasket to ensure a vapor-tight joint between the body and outlet box.

Concealed outlet boxes for wall- and ceiling-mounted fixtures may be standard sheet metal boxes. Fixture body shall be provided with mounting screws and gasket to ensure a vapor-tight joint between the body and outlet box.

Body and cap for pendant-mounted fixtures shall be sealed with a gasket at the joint. Cap shall be cast aluminum with top hub tapped for 1/2 inch 15 millimeter tapered iron pipe threads.

Exposed outlet boxes for pendant-mounted fixtures shall be furnished with the fixtures and shall be cast aluminum with four tapped hubs 90 degrees apart circumferentially, with three cast-aluminum threaded pipe plugs to fit the tapped holes. Boxes shall have ears or lugs for surface mounting to the ceiling. Outlet-box covers for concealed and exposed outlet boxes shall be cast aluminum with the center hub tapped for 1/2 inch 15 millimeter tapered iron pipe threads. Cover and outlet box shall be provided with mounting screws and gasket to ensure a vapor-tight joint between the cover and outlet box. Stem for pendant-mounted fixtures shall be 1/2 inch 15 millimeter galvanized rigid steel conduit.

Glass enclosing globe shall be clear nondiffusing heat-resistant glass molded in one piece into a cylindrical shape with a closed bowl-shaped bottom and an open molded top bead or thread. Edges of the open end shall be either ground or molded to a smooth, true surface that will ensure a vapor-tight joint when the globe is fastened to the gasketed body.

Cast-aluminum guard shall be the same shape as the glass enclosing globe and shall be fastened to the fixture body with threads or setscrews.

2.5 INCANDESCENT LAMPS

General-purpose lamps shall be [clear] [frosted inside]. Lamps with wattage ratings up to and including 300 watts shall have medium brass screw bases. Lamps with wattage ratings in excess of 300 watts shall have mogul brass screw bases.

Special-purpose lamps include PAR and R lamps. PAR lamps shall have clear, molded, heat-resistant, hard-glass bulbs with parabolic, aluminized, inner-bulb wall reflector for spot- or flood-lighting applications. R lamps shall have clear, soft, blown-glass bulbs with silver-deposited, inner-bulb wall reflector for spot or floodlighting applications. Lamps shall be designed for operation on 120 volts.

2.6 LOWERING DEVICES FOR HIGH-BAY LIGHTING FIXTURES

Lowering devices for high-bay lighting fixtures shall consist of a hand-operated mechanism that will connect, disconnect, raise, and lower the lighting fixture and permit the servicing and maintenance of fixtures and equipment at floor level. Lowering device shall include hangers, pulleys, beam clamps or suspension fittings, operating cable, hand chain, and cable and chain fittings.

Hanger shall consist of a two-piece latching spring-loaded mechanism with an upper and lower separable contact assembly and stem and guide assembly, with cast-aluminum protective housings. Contacts shall be two-pole for single 2-wire circuits and four-pole for 3- and 4-wire circuits rated 15 amperes at 600 volts and 30 amperes at 250 volts ac.

Upper contact assembly shall include an integrally mounted corner pulley with threaded hub for electrical-conduit connections and top flange with [lugs] [ears] for mounting.

Lower contact assembly shall include fixture adapters and swivel end fittings for anchoring operating cable in the stem of the hanger. Fixture adapters shall be hot-dip galvanized malleable iron.

Pulleys shall be open face with cast-aluminum alloy housings and deep-grooved pulley wheels closely shrouded to prevent lines from becoming wedged between wheel and housing. Pulleys shall be straight through for top and bottom mounted operating cables and corner type as required. Top mounted pulleys shall be hinged, with mounting lugs. Bottom mounted pulleys shall be fixed, with mounting lugs. All pulleys shall be bolted to the supporting structure. Horizontal runs of operating cable shall be supported with pulleys located not more than [35] [_____] -feet [10700] [_____] millimeter apart.

Terminal fittings shall include an enclosed lockbox with hub tapped for 3/4 inch 20 millimeter conduit, flared conduit end fitting, pulley wheel, locking hooks, and hinged cover with provisions for padlocking.

Lockbox and cover shall be cast-aluminum alloy, and the flared conduit end fitting shall be hot-dip galvanized malleable iron.

Lockbox shall be wall-mounted not less than [42] [_____] inches and not more than [54] [_____] inches [1100] [_____] millimeter and not more than [1370] [_____] millimeter above the floor at the operating level. Pulley shall permit horizontal pull operation of the lowering device at the operating level.

Operating cable shall be 1/8 inch 3 millimeter diameter, 7 by 19 stranded, heat- and corrosion-resistant steel aircraft cable with link, cable loops, and serving sleeves. Cable shall be preformed with detachable fittings designed for connection to the terminal fittings. Operating cable shall conform to ASTM A 368.

Hand chains shall be separate detachable hand lines to provide means for disconnecting, lowering, raising, and reconnecting fixtures after servicing and maintenance work has been completed. Hand chain shall be equal in length to the mounting height of the fixture and shall be equipped with a snap hook for connection to the terminal end of the operating cable. Hand chains shall be size 4, hot-dip galvanized steel, conforming to ASTM A 467/A 467M, Class MS machine, straight link, steel chain.

Cast-aluminum-alloy housings shall conform to ASTM B 26/B 26M.

Malleable-iron fittings shall conform to ASTM A 47/A 47M. Hot-dip galvanized coatings shall conform to ASTM A 123/A 123M.

PART 3 EXECUTION

3.1 INSTALLATION

Installation shall be performed in accordance with NFPA 70 and in accordance with the manufacturer's installation instructions.

A fixture shall be installed at each outlet indicated, and lamps of the proper type, voltage, and wattage shall be installed in each fixture.

New lamps shall be installed immediately prior to completion of the project. Lamps shall be installed with the light center at the focal point of the reflector and in the proper burning position.

Fixtures located in equipment rooms shall be so installed that they clear all obstructions such as duct, piping, bracing, and supports.

Installation Drawings shall be submitted for the incandescent lighting fixtures. Drawings shall indicate overall physical features, dimensions, ratings, service requirements, and weights of equipment.

3.2 FIELD TESTING

Incandescent lighting fixtures and their accessories, including lowering devices, shall be demonstrated to operate satisfactorily in the presence of the Contracting Officer.

Operational tests shall be performed in accordance with referenced standards in this section.

-- End of Section --