

SECTION 16500

LIGHTING DEVICES, SWITCHES, AND RECEPTACLES

PART 1 - GENERAL

1.1 Description

A. This Section includes the following

1. Exterior lighting.
2. Receptacle outlet power systems.
3. Luminaires.
4. All necessary mounting, wiring and accessories required.

B. Related Work Specified Elsewhere

Relays, Switches, Circuit Breakers, and Transient voltage surge suppressors.....Section 16180
Field TestingSection 16950

1.2 References

1. American National Standards Institute (ANSI)

ANSI C73 Series - Plugs and Receptacles.

ANSI C78 series:

Electric Discharge Lamps (Fluorescent).

Electric Discharge Lamps (H.I.D.).

ANSI C81 Series - Electric Lamp Bases and Holders.

ANSI C82 Series - Lamp Ballasts.

2. Certified Ballast Manufacturers (CBM) - Ballasts.

3. Illuminating Engineering Society of North America (IESNA)

4. **National Electrical Code (NEC)**
5. **National Electrical Manufacturers Association (NEMA)**
6. **Reflector and Lamp Manufacturers (RLM) Standards Institute** - Industrial Lighting Units.
7. **Underwriters' Laboratories, Inc. (UL)**
8. **Federal Specification (Fed. Spec.)**

W-C-596 - Connector, Electrical Power.

W-S-896 - Switches, Toggles (Toggle and Lock), Flush Mounted.
9. **National Electrical Safety Code, IEEE C2.**
10. **Occupational Safety and Health Administration, OSHA.**
11. **Occupational Safety and Health Administration, OSHA.**
12. All electrical and control equipment and material shall bear the recognized Underwriters Laboratories, Inc. (UL) seal of approval. It is Vendor's responsibility to obtain local inspection approval for all non-UL labeled equipment and pay all fees in connection with the same.

1.3 Submittals

- A. Submit as specified in Section 1330.
- B. Includes, but not limited to, the following information for each luminaire for the lamp specified:
 1. Detailed construction drawings.
 2. Ballast information.
 3. Photometric data.
 4. Catalog data.

5. Lamp type and color.

PART 2 - MATERIALS

2.1 Acceptable Manufacturers

A. Fluorescent Lamp Ballast

1. Advance Transformer Company.
2. General Electric Company.
3. Jefferson Electric Company.
4. Universal Manufacturing Company.

B. Lamps

1. General Electric Company.
2. Sylvania Electric Products, Inc.

C. Luminaires

Acceptable manufacturer for each luminaire is specified in LUMINAIRES, this Section.

D. Switches

1. Bryant Electric Company (Bryant).
2. Daniel Woodhead Company (Woodhead).
3. Hubbell, Inc. (Hubbell).
4. Leviton Mfg. Co.
5. Pass & Seymour, Inc.

E. Ground Fault Receptacle

1. Arrow Hart, Inc.
2. Bryant Electric Company.

3. General Electric.
4. Leviton Mfg. Co.
5. Pass & Seymour, Inc.

2.2 General Requirements

- A. All equipment and materials to bear UL label.
- B. Equipment and materials to be designed to meet the quality and level of illumination established by specified luminaires.
- C. Provide all necessary wiring and accessories as required for complete installation.

2.3 Systems

- A. 208/120V three phase, 4 wire system with identified grounded neutral and separate ground wire for receptacles and small power loads.

2.4 Ballasts

A. General

1. Conform to ANSI and UL Standards regarding light output, reliable starting, radio interference, and dielectric rating.
2. Carry CBM and UL labels.

B. Fluorescent Lamp Ballasts

1. UL listed Class "P."
2. Power factor correction capacitor to provide not less than 0.9 pf.
3. Total Harmonic distortion shall not exceed 10%.

2.5 Lamps

- A. Type, rating, color and quantity as indicated or specified for each luminaire.

2.6 Luminaires

- A. Furnish luminaires in accordance with the specification sheets at the end of this Section.

2.7 Switches

- A. All single-pole switches as indicated.
- B. **Surface-Mounted, Tumbler, Self-Grounding, Heavy-Duty Switches**
 - 1. Rated 20A at 277Vac.
 - 2. "Specification" grade (Fed. Spec. W-S-896) switch with gray toggle.
 - 3. FS and FD single or multiple gang boxes.
 - 4. 302 stainless steel cover plates and matching countersunk screws.
 - 5. Locations indicated-if located outside-weatherproof.

2.8 Receptacle Outlets

- A. **Flush-Mounted:** Surface-mounted.
 - 1. Rated 20A at 125Vac.
 - 2. Duplex, arc-resistant, back- and side-wired, and 3-wire grounding type. (NEMA Reference 5-20R).
 - 3. 302 stainless steel wall plates and matching countersunk screws.
 - a. Gray receptacle with 302 stainless steel Specification grade wall plate.
 - 4. "Specification" grade type 5362, Fed. Spec. W-C-596 compliant.
 - 5. FS and FD single or multiple gang boxes.

6. Locations as indicated.

B. Weatherproof Receptacle Outlets

1. Flush or surface mounted.
2. Rated 20A to 125Vac, Fed. Spec. W-C-596.
3. Duplex, arc-resistant and pre-wired, 3-wire grounding type. (NEMA reference 5-20R).
 - a. Gray Receptacle.
4. 302 stainless steel, spring-hinged, PVC-gasketed doors and stainless steel PVC-gasketed coverplate.
 - a. "Specification" grade.
5. "Specification" grade, type 5362.
6. FS and FD boxes.
7. Locations as indicated.

C. Ground-Fault Interrupter Receptacles (GFI):

1. Flush or surface mounted as indicated.
2. Terminal installation as indicated.
3. Rated 20A to 125Vac.
4. UL Standard 943 Class A, Group 1.
5. Leakage current sensitivity: 5 mA \pm 1 mA.
 - a. Opens circuit within 25 milliseconds of each 5 mA.
6. Duplex, arc-resistant and pre-wired.
 - a. Gray receptacle.
7. 302 stainless-steel coverplate.

8. FD boxes.
9. Locations as indicated.

PART 3 - EXECUTION

3.1 Installation

A. Luminaires

1. Install after pipe, conduit, air ducts and other equipment above luminaires are installed, unless otherwise acceptable to Engineer.
2. Place accurately as to line and level, and at elevations indicated.
3. Shift location if required to avoid interference with plant piping or other apparatus or material.
4. Clean and fully lamp with new lamps.
5. Complete with all required accessories just prior to final acceptance.
6. Install as indicated.

B. Switches

1. Mount 1.2 meters (4 feet) above floor, walkways, or finished grade unless indicated otherwise.

C. Receptacle Outlets

1. Mount receptacles outlets 600 mm (2'-0") above walkways.

D. Wiring Circuits

1. Home Run Groupings

- a. 120/208-volt, single-phase, 3-wire systems. Group in home runs with not more than one conductor of each

phase and its associate neutral and ground wire in one conduit.

2. Use circuit numbers as indicated.
3. Use type SVN3 wire for lighting and receptacle circuits unless indicated otherwise.
4. Do not install wire smaller than No. 12 AWG.
5. Install larger size wire as indicated or required to conform to requirement of NEC.
6. Install in concealed and exposed conduit systems as indicated.

3.2 Field Testing

Specified in Section 16950.

PART 4 MEASUREMENT AND PAYMENT

4.1 Measurement

- A. No measurement will be made for this item.

4.2 Payment

- A. Payment will be made at the contract lump sum price bid and shall be considered full payment for providing labor and materials to perform this work.

**** END OF SECTION 16500 ****