

## **PART 1 GENERAL**

### **1.1 REFERENCES**

- .1 American National Standards Institute (ANSI).
  - .1 ANSI C82.1, Specification for Fluorescent Lamp Ballasts.
  - .2 ANSI C82.4, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.
- .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
  - .1 ANSI/IEEE C62.41, Recommended Practices for Surge Voltages in Low-Voltage AC Power Circuits.
- .3 American Society for Testing and Materials (ASTM)
  - .1 ASTM F 1137, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4 United States of America, Federal Communications Commission (FCC)
  - .1 FCC (CFR47) EM and RF Interference Suppression.

### **1.2 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Departmental Representative.
- .2 Photometric data to include: VCP Table and spacing criterion and luminaire coefficient of utilization (CU) tables.
- .3 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Quality assurance submittals: provide the following in accordance with Section 01 45 00 – Testing and Quality Control.
  - .1 Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence, cleaning procedures and relamping schedule.

### **1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .3 Divert unused metal materials from landfill to metal recycling facility.
- .4 Disposal of old PCB filled ballasts.

### **1.4 ACCEPTABLE PRODUCTS**

- .1 Luminaires described in the Lighting Fixture Schedule identify quality, performance criteria and other parameters, as indicated for this project. Named fixtures are acceptable with modifications and accessories, as indicated.
- .2 Fixtures from other manufacturers may be acceptable provided:
  - .1 Appearances and lighting performance are similar.
  - .2 Quality is equal or better.
  - .3 Lamp and ballast criteria remain the same.
  - .4 The fixture is provided with modifications and accessories to provide a complete product in keeping with the intent of the project.
  - .5 Approval in writing is obtained from the Departmental Representative to the supplier/manufacturer 5 days prior to tender closing date

## **PART 2 PRODUCTS**

### **2.1 LAMPS**

- .1 Incandescent lamps to be - clear, A19, 100 Watt with 1000 hour lamp life, rough-service rated; or as indicated.
- .2 Tungsten halogen lamps to be - clear, T-3, 300 Watt, RSC base, 2000 hour lamp life, 5000 lumens; or as indicated.

- .3 Fluorescent lamps to be - T8, 32 Watt, medium bi-pin, rapid or instant start to suit application, 4100 K, 30,000 hour lamp life, 2950 initial lumens, CRI 80; or as indicated.
- .4 Metal halide lamps to be - clear, BT37, 400 Watt, mogul base, horizontal burn, 4100 K, 15,000 hour lamp life, 36,000 initial lumens, CRI65, open or enclosed type to suit the luminaire; or as indicated.
- .5 Low pressure sodium lamps to be - clear, T21, 135 Watt, BY22d base, horizontal burn, 16,000 hour lamp life, 22,000 initial lumens; or as indicated.
- .6 High pressure sodium lamps to be - clear, ED18, 400 Watt, mogul base, 30,000 hour lamp life, 54,000 initial lumens; or as indicated.
- .7 Compact fluorescent lamps to be - 18 Watt, G24q-2 base, 12,000 hour lamp life, 12,000 initial lumens, 4100 K, CRI 80; or as indicated.

## 2.2 **BALLASTS**

- .1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.
  - .1 Rating: 120 V, 60Hz as indicated, for use with 2-32W, T8 octron imperial lamps.
  - .2 RFI/EMI suppression circuit to: FCC (CFR47) Part 18, sub-part C, Class A and Part 15, sub-part B, Class B.
  - .3 Totally encased and designed for 40 C ambient temperature.
  - .4 Power factor: minimum 98 % with 98% of rated lamp lumens.
  - .5 Crest factor: 1.5 maximum current.
  - .6 Capacitor: thermally protected.
  - .7 Thermal protection: non-resettable on coil.
  - .8 Harmonics: 10 % maximum THD.
  - .9 Operating frequency of electronic ballast: 20khz minimum.
  - .10 Total Circuit Power: 62 Watts.
  - .11 Ballast Factor: greater than 0.90.
  - .12 Sound rated: Class A.
  - .13 Mounting: integral with luminaire.
  - .14 Be warranted by manufacturer for five years.
- .2 Metal halide ballast: design B.

- .1 Rating: 60Hz voltage as indicated, for use with metal halide lamp as required. Provide circuitry for standby light to provide light for starting and restart.
  - .2 Totally encased and designed for 40 C ambient temperature.
  - .3 Power factor: minimum 95 % with 95% of rated lamp lumens.
  - .4 Type: constant wattage auto-transformer solid state.
  - .5 Input voltage range: plus or minus 10% of nominal.
  - .6 Minimum starting temperature: minus 29 C at 90% line voltage.
  - .7 Mounting: outdoor integral with luminaire.
  - .8 Crest factor: 1.7 maximum current.
- .3 High pressure sodium ballast: to ANSI C82.4 design C.
- .1 Rating: 60Hz voltage as indicated, for use with high pressure sodium lamp.
  - .2 Totally encased and designed for 40 C ambient temperature.
  - .3 Power factor: minimum 95% with 95% of rated lamp lumens.
  - .4 Type: reactor or solid state with matching igniter as recommended by manufacturer.
  - .5 Input voltage range: plus 10% to minus 10% of nominal.
  - .6 Minimum starting temperature: minus 34 C at 90% line voltage.
  - .7 Mounting: outdoor integral with luminaire.
  - .8 Crest factor: 1.7 maximum current.
- .4 Low pressure sodium ballast: design D.
- .1 Rating: 60Hz voltage as indicated, for use with low pressure sodium lamp.
  - .2 Totally encased and designed for 40 C ambient temperature.
  - .3 Power factor: minimum 95 % with 95% of rated lamp lumens.
  - .4 Type: constant wattage.
  - .5 Input voltage range: plus or minus 20% of nominal.
  - .6 Minimum starting temperature: minus 34 C at 90% line voltage.
  - .7 Mounting: outdoor integral with luminaire.

## **2.3 FINISHES**

- .1 Light fixture finish and construction to meet ULC listings and CSA certifications related to intended installation.

**2.4        LUMINAIRES**

- .1        As indicated in luminaire schedule on drawings. Provide 10% spare lamps of each type noted in luminaire schedule.

**2.5        OPTICAL CONTROL DEVICES**

- .1        As indicated in luminaire schedule on drawings.

**PART 3    EXECUTION**

**3.1        INSTALLATION**

- .1        Locate and install luminaires as indicated. Install lamps in all fixtures.
  - .1        Provide adequate support to suit ceiling system.

**3.2        WIRING**

- .1        Connect luminaires to lighting circuits:
  - .1        Install flexible conduit for vertical power supply drop to luminaires as indicated. Horizontal wiring using flexible conduit is not permitted.

**3.3        LUMINAIRE SUPPORTS**

- .1        For suspended ceiling installations support luminaires from ceiling grid in accordance with local inspection requirements.

**3.4        LUMINAIRE ALIGNMENT**

- .1        Align luminaires mounted in continuous rows to form straight uninterrupted line.
- .2        Align luminaires mounted individually parallel or perpendicular to building grid lines.

**3.5        FIELD QUALITY CONTROL**

- .1        Perform test in accordance with Section 26 05 00 – Common Work Requirements – Electrical.

**END OF SECTION**