

---

**Part 1            GENERAL**

**1.1            REFERENCES**

- .1    American National Standards Institute (ANSI)
  - .1    ANSI C82.1(2004), Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
  - .2    ANSI C82.4(2017), Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps Multi Supply Type.
- .2    American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
  - .1    ANSI/IEEE C62.41(1991), Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
- .3    ASTM International Inc.
  - .1    ASTM F1137-(2011), Standard Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .4    Canadian Standards Association (CSA International)
- .5    Underwriters' Laboratories of Canada (ULC)

**1.2            ACTION AND INFORMATIONAL SUBMITTALS**

- .1    Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Product Data:
  - .1    Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
  - .2    Provide complete photometric data prepared by independent testing laboratory for luminaires where specified, for approval by Departmental Representative.
  - .3    Photometric data to include: VCP Table where applicable spacing criterion.
- .3    Quality assurance submittals: provide following in accordance with Section 01 45 00 - Quality Control.

**1.3            QUALITY ASSURANCE**

- .1    Provide mock-ups in accordance with Section 01 45 00 - Quality Control.

**1.4            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 and recycling of fluorescent lamps as per local regulations.
- .5 Disposal of old PCB filled ballasts.

## **Part 2 PRODUCTS**

### **2.1 LAMPS**

- .1 as indicated in luminaire schedule on drawings

### **2.2 BALLASTS**

- .1 Fluorescent ballast: CBM and CSA certified, energy efficient type, IC electronic.
  - .1 Rating: 120 V, 60 Hz, for use with 2-32W, rapid start lamps.
  - .2 Totally encased and designed for 40 degrees Celsius ambient temperature.
  - .3 Power factor: minimum 95% with 95% of rated lamp lumens.
  - .4 Current crest factor: 1.7 maximum.
  - .5 Harmonics: 10% maximum THD.
  - .6 Operating frequency of electronic ballast: 20 kHz minimum.
  - .7 Total circuit power: 62 Watts.
  - .8 Ballast factor: greater than 0.90.
  - .9 Sound rated: Class A.
  - .10 Mounting: integral with luminaire.
- .2 Metal halide ballast: design B.
  - .1 Rating: 60 Hz voltage as indicated, for use with metal halide lamp as indicated. 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 or 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 Current crest factor: 1.7 maximum current.
- .3 LED Drivers:
  - 1. General Requirements:
    - .1 Designed for 10 year operational life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
    - .2 Designed and tested to withstand electrostatic discharges without impairment of performance when tested according to IEC 61000-4-2.
    - .3 UL 8750 recognized or listed as applicable.
    - .4 Complies with IEC 61347-2-13 as applicable.

- .5 Surge Tolerance: Designed and tested to withstand Category A surges of 4,000 V according to IEEE C62.41.2 without impairment of performance.
- .6 Manufactured in a facility that employs ESD reduction practices in compliance with ANSI/ESD S20.20.
- .7 Class A sound rating; inaudible in a 27 dBA ambient.
- .8 No visible change in light output with a variation of plus or minus 10 percent line voltage input.
- .9 Total Harmonic Distortion (THD): Less than 20 percent for loads greater than 25W; complies with ANSI C82.11.
- .10 Drivers to track evenly across multiple lamp lengths and all light levels

## **2.3 FINISHES**

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

## **2.4 OPTICAL CONTROL DEVICES**

- .1 As indicated in luminaire schedule.

## **2.5 LUMINAIRES**

- .1 As indicated in luminaire schedule.

# **Part 3 EXECUTION**

## **3.1 INSTALLATION**

- .1 Locate and install luminaires as indicated.
- .2 Provide adequate support to suit ceiling system.
  - .1 as indicated on drawings.

## **3.2 WIRING**

- .1 Connect luminaires to lighting circuits:
  - .1 Install flexible or rigid conduit for luminaires as indicated.

## **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            CLEANING**

- .1        Clean in accordance with Section 01 74 11 - Cleaning.
- .1        Remove surplus materials, excess materials, rubbish, tools and equipment.

**END OF SECTION**