

# Minimum Specifications for Luminaires Sold through the Province of B.C. CSA (Corporate Supply Arrangement) for LED Street Light Luminaires

**Note:** While minimum luminaire specifications were established within the above CSA, all LED street light luminaires that meet the following specifications (and including variances on wattage, voltage and CCT ratings, mounting configuration, brackets , etc.) will be made available through the CSAs at the prices provided.

## 1. LUMINAIRE PHYSICAL REQUIREMENTS

### 1.1. Components

- .1 All materials will be new.
- .2 Each LED street light luminaire will include:
  - Driver (power supply);
  - Weather-resistant housing;
  - LED driver; and
  - Optical system.

### 1.2. Aesthetics

- .1 LED luminaires will be aesthetically acceptable to the evaluation team.

### 1.3. Housing and Finish

- .1 Single piece unit primarily constructed of A360 aluminum alloy (or better), die-cast or extruded.
- .2 Will be designed to eliminate emission of noise from wind, and to resist build-up of icicles.
- .3 CSA or ULC rated for wet locations.
- .4 3G vibration rating is preferred, however 1G may be accepted as minimum rating for roadway applications. Purchasers will specify vibration rating at time of Draw Down.
- .5 Finish will be powder coat or equivalent.
- .6 Powder coat will be Polyester Triglycidyl Isocyanurate (TGIC) super durable polyester powder coat. The nominal thickness of the powder coat will be at least 2-3 mils. The finished surface will have minimum pull-off strength exceeding 1000 PSI as tested in accordance with ASTM D4541. Finish colour will be grey however alternate standard colours such as bronze and black will be available at no extra cost. Respondents may submit cost adder for custom colours.
- .7 Tool-less entry is preferred. The driver will be mounted internally with quick disconnect and be easily replaceable.
- .8 All screws will be stainless steel. Captive screws are required on any components that require maintenance after installation.
- .9 The luminaire will have a casting designed to accept an ANSI C136.41 locking NEMA 7 pin photocell receptacle. An alternate 7 pin twist-lock photocell may also be used where specified by the Purchaser.
- .10 Provision for future use of house-side external or internal shielding specifying attachment means.

- .11 Salt/fog testing will be performed in compliance with the ASTM B117 standard which defines the Standard Practice for Operating Salt Spray (Fog) Apparatus. Results in accordance with rating system in ASTM D1654-08 will yield a rating of #5 or better at 1000 hours.

#### **1.4. Thermal Management System**

- .1 Will consist of heat sink fins integrated within the housing with no fans, pumps, or any moving parts and/or liquids, and will be resistant to debris build-up including bird droppings.
- .2 The heat sink system will be designed to maintain a junction temperature for the LED's such that the light engine will achieve a minimum lifespan of 88,000 hours (IESNA LM-80) at 10 degree C.

#### **1.5. Mounting**

- .1 Luminaires will be mounted horizontally on a standard davit style pole and will be designed to attach to 60mm (OD) diameter x 180mm long tenon on the pole via bolted attachment. The attachment will use no more than four (4) bolts and will allow for a vertical tilt adjustment of  $\pm 5^\circ$ .

#### **1.6. Weight**

- .1 Will not weigh more than 15.9kg and maximum EPA of 0.1 m<sup>2</sup>.

#### **1.7. Labelling**

- .1 Will have waterproof printed product label with full ratings located inside the housing.
- .2 Will have waterproof NEMA wattage rating label meeting ANSI C136.15-2011 located outside the cover and visible from the ground.

#### **1.8. LED Driver and Optical Assembly**

- .1 Optional provision for removal and replacement of LED units or LED array or LED circuit board assembly to accommodate an advanced LED module/new LED technology or increasing wattage without altering/replacing the housing.
- .2 Circuiting will be designed so individual LED failures will not impact the operation of the other LED's.
- .3 No parts will be constructed out of polycarbonate or any other synthetic material (unless it can be proved it is UV stabilized). Lens discolouration at any point in the warranty period will be considered a product failure.
- .4 Optical system will be rated IP -66 or better.
- .5 Salt/fog testing will be performed in compliance with the ASTM B117 standard which defines the Standard Practice for Operating Salt Spray (Fog) Apparatus. Results in accordance with rating system in ASTM D1654-08 will yield a rating of #5 or better at 1000 hours.

#### **1.9. Operating Environment**

- .1 Luminaire will be able to operate normally in:
  - Ambient temperatures from -40 degrees C to 40 degrees C;
  - Winds up to 160kph;
  - Driving rain;
  - Snow and sleet; and
  - Fog

## **2. POWER SUPPLY / DRIVER REQUIREMENTS**

### **2.1. Power Factor**

- .1 Power supply will have a minimum Power Factor of 0.90

### **2.2. Operating Voltage**

- .1 Luminaires will operate from 120V-277V, 60 HZ and optional 347V-480V, 60 HZ, as specified by Purchasers at time of Draw Down
- .2 Voltage fluctuation tolerance will be  $\pm 10\%$ .
- .3 Dimming control signal will be industry standard 0 – 10 volts DC.

### **2.3. Operating Current**

- .1 The driver current options will be a full range of ratings. The driver current will be less than 525mA unless it can be proven that drivers with higher driver currents can meet the Mean Time Between Failure (MTBF) requirements.
- .2 Operating current should be equal to or less than 50% of the maximum LED chip design.

### **2.4. Transient (Surge) Protection**

- .1 Stand-alone (easy to be replaced) surge protection device (SPD) compliant with ANSI/IEEE C.62.41-2-2002, Rating Category C – High Operation to meet 10KV/10KA Surge level. Reference Table - Test 1: 0.5  $\mu$ S – 100Hz Ring Wave Specification, Table - Test 2: 1.2/50 $\mu$ S – 8/20  $\mu$ S Combination Wave Specification Table - Test 3: Electrical Fast Transient (EFT) Specification.

### **2.5. Rated Life**

- .1 Minimum 88,000 hrs.

### **2.6. Operating Temperature**

- .1 Power supply will operate between -40 degrees C and 40 degrees C.

### **2.7. Frequency**

- .1 Output operating frequency will be > 120 Hz (to avoid visible flicker) and input operating frequency of 60 Hz.

### **2.8. Radio Frequency Interference**

- .1 Power supplies will meet a FCC 47 CFR Part 15/18 (Consumer Emission Limits).

### **2.9. Total Harmonic Distortion**

- .1 Total Harmonic Distortion less than 20%.

### **2.10. Ingress Protection**

- .1 Driver will be rated for wet locations if installed in IP66 rated housing. If not installed in IP 66 rated housing the driver will have an IP66 rating.

### **2.11. Noise Protection**

- .1 Power supply will have a Class A sound rating per ANSI Standard C62.41.

### **2.12. Controls**

- .1 Luminaires will have 7 pin NEMA standard receptacle and shorting cap and will be wired for adaptive controls. An alternate 5 pin twist-lock photocell may also be used where specified by the Purchaser.
- .2 PEC/dimming controls must fail on.

### **2.13. Power Terminals**

- .1 Sized from #14 to #8 AWG wire accessible underside of luminaire (HD brass screw capable of copper to copper connection).

#### **2.14. Reliability (MTBF)**

- .1 MTBF is preferred to be not be less than 2 million hours however lower MTBF will also be considered but will be rated lower than luminaires with a higher MBTF.

### **3. LED PERFORMANCE REQUIREMENTS**

#### **3.1. Minimum Luminaire Efficacy**

- .1 70 lumen/watt per IES LM-79.

#### **3.2. Correlated Colour Temperature (CCT)**

- .1 Nominal CCT (degree K) 4000K.
- .2 Nominal CCT (degree K) 3000K.

#### **3.3. Colour Rendering Index (CRI)**

- .1 Minimum CRI of 70.

#### **3.4. Lumen Depreciation of LED Light Sources**

- .1 Lumen Depreciation (LLD) will be determined by the manufacturer and be based on the percentage of initial output at 88,000 operating hours calculated in accordance with IESNA LM-80 and TM-21.

#### **3.5. Light Distribution**

- .1 Roadway luminaires will be in accordance with IESNA Type 1, 2 or Type 3 or type 4 distribution.

#### **3.6. Luminaire Cut Off**

- .1 International Dark-Sky Compliant
- .2 BUG rating provided in IES LM -79 report. BUG rating will be as follows:
  - B - As low as possible sidewalk lighting meet light level and uniformity requirements defined;
  - U - zero (0) up-light rating;
  - G - Lowest possible "G" rating in order to meet light level requirements however should not be over a rating of G1.

#### **3.7. LLF (Light Loss factor)**

- .1 Light loss factor will be determined in this format:
- .2  $LLF = LLD \times LDD \times LATF$ 
  - Lamp Lumen Depreciation (LLD) will be determined by the manufacturer and be based on the percentage of initial output at 88,000 operating hours calculated in accordance with IESNA LM-80 and TM-21.
  - Luminaire Dirt Depreciation (LDD) = 0.9, as per IES DG-4 for an enclosed and gasketed roadway luminaire installed in an environment with less than  $150 \mu\text{g}/\text{m}^3$  airborne particulate matter and cleaned every ten years.
  - Luminaire Ambient Temperature Factor (LATF) = 1.04 (+10° C). (supplier to confirm)

#### **3.8. UPD**

- .1 Luminaires will not exceed a Unit Power Density (UPD):
  - $0.25 \text{ W}/\text{m}^2$  for low pedestrian activity levels.
  - $0.35 \text{ W}/\text{m}^2$  for medium pedestrian activity levels.
  - $0.45 \text{ W}/\text{m}^2$  for high pedestrian activity levels.