Streetlight Luminaire, LED, Side-Mount, Residential

1. Scope

This standard covers the requirements for 24-watt, side-mount, outdoor type, light-emitting-diode (LED) streetlight luminaires and their accessories. LED luminaires are also known as solid state light (SSL) source fixtures.

This standard applies to the following Seattle City Light stock numbers:

Stock Number	Description
014364	Luminaire
014365	House side shield for LED luminaire
014366	Cul de sac shield

2. Application

Side-mount LED streetlight luminaires are mounted on 2-in nominal pipe size (NPS) tenons on poles to provide light to residential neighborhoods.

The streetlights described in this standard are not intended for installation in bridge and overpass applications.

Side-mount LED streetlights are intended for installation at a 25 ft mounting height.

LED streetlights consume approximately 80 percent less energy than a conventional 100-watt high-intensity discharge (HID) luminaire.

In 2012, 52-watt LED streetlight luminaires replaced less-efficient 70-watt units for new construction. In 2013, City Light transitioned to a new 38-watt unit, for new construction, and in 2018, transitioned to the 24-watt unit described in this standard.

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LED life is greater than 100,000 hours.

LED streetlight luminaires are 100 percent mercury- and lead-free.

24-watt LED luminaires use either Stock No.014365 (house-side) or Stock No. 014366 (cul-de-sac) luminaire shields.

Streetlight Engineering shall pre-approve all installations of luminaire shields. Contact Streetlight Engineering for details.

LED side-mount streetlights are intended to meet the performance criteria set forth in the latest revision of Seattle City Light's Specification for LED Roadway Luminaires.

3. Industry Standards

LED side-mount streetlight luminaires shall meet the applicable requirements of the following industry standards:

ANSI/NEMA/ANSLG C78.377-2008; Specifications for the Chromaticity of Solid State Lighting (SSL) Products

ANSI C136.2-2015; American National Standard for Roadway and Area Lighting Equipment—Dielectric Withstand and Electrical Transient Immunity Requirements

ANSI C136.31-2010; American National Standard for Roadway Lighting Equipment **–** Luminaire Vibration

ANSI C136.37 2011; American National Standard for Roadway and Area Lighting Equipment **–** Solid State Light Sources Used in Roadway and Area Lighting

ASTM B117-09; Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM D1654-08; Standard Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments

ASTM D523-08; Standard Test Method for Specular Gloss

ASTM G154-06; Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

C136.15-2011 (or latest); American National Standard for Roadway and Area Lighting Equipment – Internal Labeling of Luminaires

C136.22-2004 (R2009); American National Standard for Roadway and Area Lighting Equipment – Ingress Protection (Resistance to Dust, Solid Objects and Moisture) for Luminaire Enclosures

Federal Trade Commission (FTC); Green Guides, 16 CFR Part 260; Guides for the Use of Environmental Marketing

IEC 60529; Degrees of protection provided by enclosures (IP Code), consolidated edition

IES LM-79-08; Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

IES LM-80-08; Approved Method: Measuring Lumen Maintenance of LED Lighting Sources

IESNA TM-15-11 (revised); Luminaire Classification System for Outdoor Luminaires

RoHS (European Union Directive 2002/95/EC for Restriction of Hazardous Substances)

Title 47 of the Code of Federal Regulations (CFR), Part 15; Radio Frequency Devices

UL 1598; Luminaires; UL

4. Requirements

4.1 Luminaire Performance

Operating temperature, range		
	°C	-20 to +50
	°F	-4 to +122
Correlated Color Temperature (CCT), nominal, °K, per ANSI/NEMA/ANSLG C78.377		3000 ±300
Color rendering index (CRI), minimum		74
Lumen depreciation of LED light sources per IES LM-80		LED module(s)/ array(s) shall deliver at least 90% of initial lumens (L_{70}), when installed for a minimum of 50,000 hours
Light distribution per IES Handbook, chapter 22		Type II Medium
Backlight, Uplight and Glare (BUG) rating per IESNA TM-15, Addendum A		B1, U0, G1
Uplight per IESNA TM-15		UL & UH = 0 (full cutoff)
High and very high light per IES TM-15, maximum of luminaire lumens		BH <5% BVH and FVH = 0.5%
Luminaire efficacy, type II distribution, lumens/watt, minimum, per IES LM-79, Section 11.0, lumens per watt		116
Off-state power consumption, W, maximum		0.5
On-state power consumption, excluding control device, watt, maximum		50 +/- 5
Luminous flux distribution at median driver current, lumens, minimum		3900
Effective projected area (EPA), maximum, ft^2		0.9
Total harmonics distortion at full power across specified voltage range, maximum		20%
Vibration withstand, minimum, per ANSI C136.31		Level 1 (normal application)

4.2 Power Supply/Driver

Input voltage, functional range, 60 Hz, Vac	120 to 277
Power factor, minimum	0.90
Driver output current, mA, range	300–700
Surge protection[1]	
High exposure	10 kV
Low exposure	6 kV
Interference	FCC 47 CFR part 15/18, Class A
Dimming signal, control range, Vdc	0 to 10

References:
1. ANSI C136.37 and ANSI/IEEE C62.41.2

4.3 Construction

Luminaire shall be designed and constructed to meet the requirements of ANSI C136.37.

Luminaire features conforming to ANSI C136.37 shall include, but not be limited to: mounting provisions, latching and hinging, terminal blocks, dimming, ingress protection, wiring and grounding, and photocontrol receptacle.

Luminaire housing shall be cast aluminum with a UV stabilized polycarbonate door.

Luminaire housing shall allow tool-less entry.

Luminaire external housing shall have a minimum rating of IP65 as specified in IEC 60529, with the ability to shed water from inside the housing (i.e. weep holes).

Luminaire door shall be securely hinged and incapable of involuntary separation from housing when accessed in field-installed position.

Luminaire shall be designed to mount on a 2-inch nominal pipe size (NPS) tenon with ±5 degrees of tilt.

Tenon mounting area opening shall be limited to 1/4-inch over the range of tenon sizes and leveling adjustment to prevent entrance of wildlife as specified in ANSI C136.37.

Methods of limiting tenon mounting area shall provide safe access for temporary service feeds entering directly through the tenon opening without damaging service wires.

Power supply/driver shall be field replaceable by means of quick-disconnect connectors and easy access mounting hardware.

Power supply/driver shall be provided with a control signal interface with operating range of 0 to 10 Vdc for dimming.

The luminaire optical chamber shall have a minimum rating of IP66 as specified in IEC 60529.

Luminaire cooling system shall consist of a passive heat sink with no fans, pumps, or liquids.

Luminaire shall be designed and constructed to accept a standard plug type, locking, three-pole, three-wire, streetlight photo control.

Rotational adjustment of the photo control shall be tool-less.

All fasteners shall be stainless steel.

All polycarbonate components shall be UV stabilized.

A three-pole terminal block capable of accepting #14 to #6 AWG wire shall be mounted to the housing inside the electrical compartment.

Terminal block shall be capable of operation with a standard #2 flat blade screwdriver.

Luminaires shall be provided with capability for optional backlight control.

Backlight control shall be installed using stainless steel fasteners.

Complete assembly weight shall not exceed 7 lb.

Luminaires shall be RoHS (European Union Directive 2002/95/EC for Restriction of Hazardous Substances) compliant. Luminaire shall have less than the maximum concentration values of the following RoHS restricted substances:

- Mercury (Hg)
- Cadmium (Cd)
- Chromium VI (Cr +6)
- Polybrominated biphenyl (PBB)
- Polybrominated biphenyl ether (PBDE)
- Lead (Pb)

Luminaires shall meet the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 15 – Radio Frequency Devices.

Luminaire design shall facilitate hose-down cleaning and discourage debris accumulation.

4.4 Finish

Luminaire housing finish shall be powder-coated gray.

Painted or finished luminaire components exposed to the environment shall exceed a rating of six per ASTM D1654 after 1000 hours of testing per ASTM B117.

Painted or finished luminaire components exposed to the environment shall exhibit no greater than 30% reduction of gloss per ASTM D523, after 500 hours of QUV testing at ASTM G154 Cycle 6.

5. Certification and Listing

Power supply/driver shall be UL recognized for dry and damp locations.

All other electrical components shall be UL listed or recognized for wet locations.

6. Testing

Test data that establishes compliance with the requirements of this material standard shall be provided upon request.

Certificate of RoHS (European Union Directive 2002/95/EC for Restriction of Hazardous Substances) compliance shall be provided upon request.

7. Product Approval

Manufacturers interested in having their luminaire(s) approved for purchase by Seattle City Light must participate in the stepped process summarized below:

- Review fixture test reports
- Computer modeling of fixture light distribution
- Laboratory testing of sample fixture and shield
- Field trial of sample fixture(s) and shield(s)
- Field trial review and evaluation.

Contact Streetlight Engineering for details on the process. Manufacturers are encouraged to plan accordingly. The approval process can take up to six months to complete.

8. Design Changes

Manufacturer shall inform Seattle City Light in writing of all design changes that could affect the product's understood or published capabilities.

9. Marking

9.1 Internal Labeling

A readily visible label shall be permanently affixed to the inside surface of each luminaire housing.

The internal label shall meet the requirements of ANSI C136.22.

The internal label shall include, but not be limited to, the following information:

- Manufacturer name and catalog number
- Month and year of manufacture
- Line input voltage
- Frequency if other than 60 hertz
- Driver type (if applicable) (may be on driver if readily visible)

- Photo control voltage if different from line input voltage
- Lamp type, wattage, and voltage (if applicable; may be on driver if readily visible)
- Descriptive wiring diagram showing input terminals, ballast, capacitors, starting aid, photocontrol receptacle, lamp, and the like, as necessary
- Plant location
- Input power consumption
- Driver output current
- Driver output adjustment
- IEC IP rating
- Correlated color temperature (CCT)
- IES light distribution type
- IESNA TM-15 BUG ratings
- Serial number

9.2 External Marking

A readily visible marker shall be permanently affixed to the outside surface of each luminaire housing.

External marker shall meet the requirements of ANSI C136.15.

External marker type shall be large per ANSI C136.15.

9.3 Barcode

A barcode label shall be provided as specified in the purchase order.

9.4 Component Identification

All UL listed components shall be labeled or recognized as such.

10. Packaging

Luminaires shall be individually packaged to prevent damage during shipping, inside storage, and casual handling prior to installation.

Each package shall be legibly marked with:

- Manufacturer name
- Manufacturer catalog number
- Product description
- Date of manufacture (month and year)
- Seattle City Light stock number
- Seattle City Light purchase order number

Accessories shall be individually packaged to prevent damage during shipping, inside storage, and casual handling prior to installation.

Each package shall be legibly marked with:

- Product description
- Seattle City Light stock number

11. Issuance

EA

12. Approved Manufacturers

12.1 Luminaire, Stock No. 014364

Manufacturer: Leotek
Catalog No.: GCJ0-15H-MV-WW-2R-GY-490-WL-PCR7-RWG-FFA

where:

GCJ0	=	LED streetlight
15H	=	LED code
MV	=	voltage, 120-277 Vac
WW	=	nominal color temperature, 3000 K
2R	=	light distribution, type 2
GY	=	finish, gray
490	=	maximum drive current
WL	=	utility wattage label
PCR7	=	ANSI 7-wire photocontrol receptacle
RWG	=	rubber wildlife guard
FFA	=	full field adjustability

12.2 Accessories, House-Side LED Shield, Stock No. 014365

Manufacturer: Leotek
Catalog No.: HSSGCJ

Description: Flush-mounted house-side shield for LED streetlight luminaires

Application: Installed on LED streetlight luminaires to cut light off at 1/2 mounting height behind luminaire. One shield per luminaire. Streetlight Engineering must pre-approve all installations of luminaire shields. Contact Streetlight Engineering for details.

12.3 Accessories, Cul-de-Sac LED Shield, Stock No. 014366

Manufacturer: Leotek
Catalog No.: CSSGCJ

Description: Cul-de-sac shield for LED streetlight luminaires

Application: Installed on LED streetlight luminaires to cut light off at 1/2 mounting height behind the pole and 1-1/2 mounting height on either side of luminaire. One shield per luminaire. Streetlight Engineering must pre-approve all installations of luminaire shields. Contact Streetlight Engineering for details.

13. Sources

Chao, Yaochiem; SCL Standards engineer and subject matter expert for 5723.47; (yaochiem.chao@seattle.gov)

City of Seattle, Standard Specifications, Section 9-31.1(2)-Luminaires

Federal Communications Commission Title 47 CFT; Part 15/18, revision 05/10/11

GE OLP-2858, bulletin, LED Roadway; GE Lighting System, Inc.; 1/10

IESNA Lighting Handbook; Chapter 22,9th edition; Roadway Lighting

IESNA Lighting Ready Reference, A Compendium of Materials from the IESNA Lighting Handbook; 9th Edition, RR-03 Fourth Edition

Leotek CN-022411, LED Street Lighting, Leotek bulletin, GCJ Series

Seattle City Light, Specification for LED Roadway Luminaires

Shipek, John; SCL Standards Engineer, originator and subject matter expert for 5723.47; (john.shipek@seattle.gov)

UL 1012 - Power Units Other Than Class 2

UL 1310 - Class 2 Power Units

UL 2108 - Low Voltage Lighting Systems

UL 8750 - Light-Emitting Diode (LED) Light Sources for Use in Lighting Products