

APPLICATION

THE LED TEARDROP LUMINAIRE MAY BE USED FOR:

- A. NEW INSTALLATION OF TEARDROP LUMINAIRES ON NEWLY PLACED POLES AS PER PLAN.
- B. REPLACING EXISTING HID LUMINAIRES ON EXISTING POLES WHERE SPACING REMAINS UNCHANGED.

LED TEARDROP GENERAL REQUIREMENTS

- A. CORRELATED COLOR TEMPERATURE (CCT): 3000K.
- B. COLOR RENDERING INDEX (CRI): MINIMUM 70
- C. AMBIENT OPERATING ENVIRONMENT: -40°C TO +40°C (-40°F TO 104°F)
- D. VOLTAGE SHALL BE 480V, 120V, OR AS SPECIFIED BY THE CITY OF COLUMBUS.
- E. COOLING SYSTEM: PASSIVE HEAT SINK WITH NO FANS, PUMPS, OR LIQUIDS, AND SHALL BE RESISTANT TO DEBRIS BUILD-UP THAT DOES NOT DEGRADE HEAT DISSIPATION PERFORMANCE.
- F. LUMINAIRE SHALL NOT WEIGH MORE THAN 75 POUNDS.
- G. LUMINAIRE SHALL NOT HAVE AN EPA OF MORE THAN 2.70 SQ. FT.

HOUSING ASSEMBLY

- A. THE HOUSING SHALL BE CONSTRUCTED OF RUST RESISTANT DIE-CAST OR SAND-CAST ALUMINUM.
- B. THE LUMINAIRE HOUSING SHALL ALLOW FOR TOOL-LESS ENTRY. ALL SCREWS AND MOUNTING HARDWARE SHALL BE STAINLESS STEEL. NO PARTS SHALL BE CONSTRUCTED OF POLYCARBONATES.

OPTICAL ASSEMBLY

- A. THE LUMINAIRE OPTICAL ASSEMBLY SHALL BE HINGED FROM THE ELECTRICAL ASSEMBLY AND SECURED IN PLACE WITH A STAINLESS STEEL WING NUT STYLE LATCH ASSEMBLY.
- B. THE OPTICAL ASSEMBLY SHALL BE IP-66 RATED.

PAINT FINISH

- A. THE PAINT FINISH SHALL BE APPLIED BY A MULTI-STAGE PRE-TREATING AND PAINTING PROCESS AND SHALL BE POWDER COATED BLACK, GREEN, OR AS DIRECTED BY THE CITY OF COLUMBUS DIVISION OF POWER.

- B. THE PAINT FINISH SHALL ACHIEVE A SCRIBE CREEPAGE RATING RATING OF EIGHT PER ASTM D 1654 AFTER 5000 HOURS OF EXPOSURE TO SALT FOG TESTING PER ASTM B117.
- C. PAINTED OR FINISHED LUMINAIRE COMPONENTS EXPOSED TO THE ENVIRONMENT SHALL EXHIBIT NO GREATER THAN 30% REDUCTION OF GLOSS PER ASTM D523, AFTER 5000 HOURS OF UV TESTING PER ASTM G154 CYCLE 6

LED POWER SUPPLY / DRIVER

- A. POWER FACTOR, MINIMUM 0.90
- B. DRIVER OUTPUT CURRENT, mA VARIABLE
- C. DIMMING SIGNAL, CONTROL RANGE, VDC 0 TO 10

GENERAL REQUIREMENTS

1. THE LED DRIVER SHALL BE MOUNTED INSIDE THE HOUSING, REPLACEABLE, AND SHALL BE PRE-WIRED TO 480V, 120V, OR AS SPECIFIED AND READY FOR INSTALLATION.
2. THE LED DRIVER AND LED ARRAYS SHALL BE DESIGNED FOR MULTI-CURRENT INPUT OPERATIONS WITH 0-10V DRIVER ADJUSTABLE OUTPUT.
3. THE LED DRIVER SHALL TOLERATE SUSTAINED OPEN CIRCUIT AND SHORT CIRCUIT OUTPUT CONDITIONS WITHOUT DAMAGE. LED DRIVER SHALL HAVE AN INDEPENDENTLY VERIFIED AND DOCUMENTED FAILURE RATE OF $\leq 0.01\%$ PER 1000 HOURS.
4. OUTPUT OPERATING FREQUENCY MUST BE $\geq 120\text{HZ}$ AND INPUT OPERATING FREQUENCY OF 60 HZ.
5. WIRING INSIDE THE HOUSING SHALL COMPLY WITH 600V/105°C RATING OR HIGHER.
6. THE LED DRIVER SHALL BE UL RECOGNIZED FOR DRY AND DAMP LOCATIONS. ALL OTHER ELECTRICAL COMPONENTS SHALL BE UL LISTED FOR WET LOCATION.
7. THE LED DRIVER SHALL COMPLY WITH FCC RULES AND REGULATIONS, TITLE 47 CFR PART NON-CONSUMER, AND HAVE A CLASS "A" SOUND RATING.
8. THE DRIVER SHALL BE RoHS COMPLIANT.

MIS-801	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	LUMINAIRE, LED, TEARDROP		
	DRAWN BY: SAW	DATE: 12/21/23	
	SCALE: NONE	SHEET: 1 OF 5	801

LED SURGE PROTECTION DEVICE

- A. THE SURGE PROTECTION DEVICE SHALL COMPLY WITH ANSI C136.37, ANSI/IEEE C62.41.2.
- B. THE SURGE PROTECTION DEVICE SHALL BE INTERNALLY MOUNTED INSIDE HOUSING AND SPECIFIED FOR 480V, 120V OR AS SPECIFIED BY THE CITY OF COLUMBUS.
- C. THE SURGE PROTECTION DEVICE SHALL HAVE A MINIMUM 10KV/5KA SURGE PROTECTION.
- D. THE SURGE PROTECTION DEVICE SHALL BE A UL 1449 3RD EDITION TYPE 4 RECOGNIZED COMPONENT FOR USE IN TYPE 2 LOCATIONS

LED MODULE / ARRAY REQUIREMENTS

- A. LED MODULE(S) / ARRAY(S) SHALL DELIVER A MINIMUM OF 70% OF INITIAL LUMENS WHEN INSTALLED FOR 100,000 HOURS WHEN OPERATING AT TEMPERATURES OF 40°C (104°F) OR LESS AND MEET L70 STANDARDS. LESS THAN THIS VALUE WILL BE CONSIDERED A LUMINAIRE FAILURE, AND SUBJECT TO REPLACEMENT UNDER THE MANUFACTURER'S 10 YEAR WARRANTY.

- B. THE LED MODULE(S) / ARRAY(S) SHALL PRODUCE LIGHTING DISTRIBUTION TYPES IN ACCORDANCE WITH IESNA LIGHTING DISTRIBUTION TYPES PER RP-08 (latest version).

LLD, LDD, AND LLF CALCULATIONS

- 1. THE LAMP LUMEN DEPRECIATION FACTOR (LLD) SHALL BE SUPPORTED BY TM-21 DATA @ 25 °C FOR 50,000 HOURS. IT IS THE RESPONSIBILITY OF EACH MANUFACTURER TO PROVIDE A CALCULATION OF LAMP LUMEN DEPRECIATION (LLD).

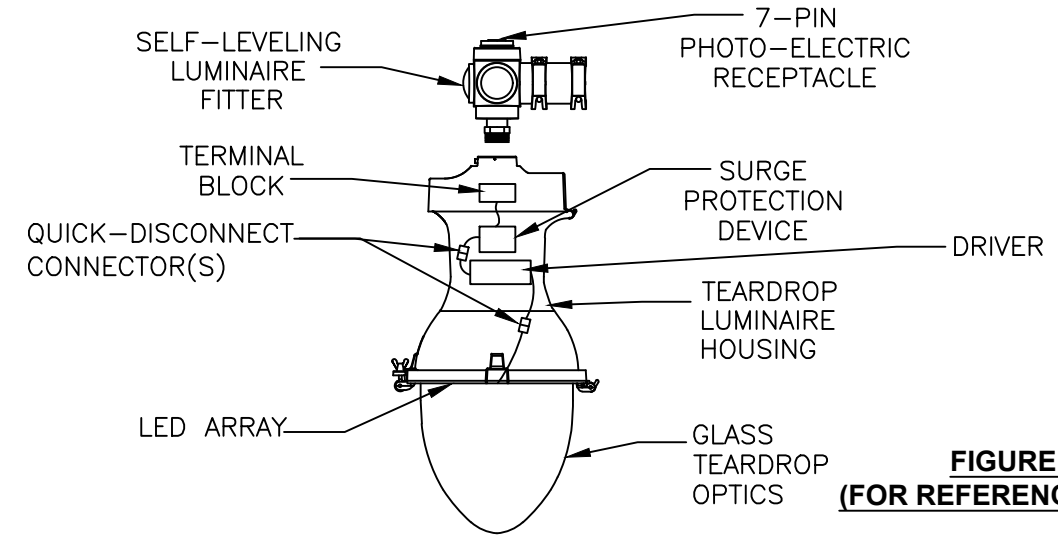
- 2. THE LUMINAIRE DIRT DEPRECIATION (LDD) SHALL BE 0.90 FOR GLASS OPTICS.

- 3. THE LIGHT LOSS FACTOR USED IN PHOTOMETRIC LAYOUT CALCULATIONS SHALL BE THE PRODUCT OF LDD AND THE MANUFACTURER'S PROJECTED LAMP LUMEN DEPRECIATION AT 100,000 HOURS AT 25°C AMBIENT TEMPERATUR

- D. THE OPTICAL SYSTEM COMPONENTS SHALL BE RATED AT IP66 TO PROTECT AGAINST WATER, DIRT, AND INSECT INFILTRATION, AND BE RoHS COMPLIANT.

- E. THE MINIMUM OPTICAL PERFORMANCE IS DEFINED BY THE APPLICATION INSTALLATION IN CONJUNCTION WITH THE "CITY OF COLUMBUS, DIVISION OF POWER GUIDELINES FOR STREET LIGHTING CIRCUIT LAYOUT".

- F. LUMINAIRE CIRCUITRY SHALL INCLUDE QUICK CONNECT/DISCONNECT FOR EASY SEPARATION OF THE OPTICAL ASSEMBLY FROM THE ELECTRICAL ASSEMBLY. SEE FIGURE 1.



**FIGURE 1
(FOR REFERENCE ONLY)**

7-PIN PHOTO-ELECTRIC RECEPTACLE

- A. THE LUMINAIRE SHALL BE FURNISHED WITH A 7-PIN PHOTO-ELECTRIC RECEPTACLE INSTALLED IN THE TOP OF THE LEVELLING FITTER HOUSING.
- B. THE RECEPTACLE SHALL BE TWIST LOCK TYPE, AND HAVE THE CAPABILITY TO BE DIRECTIONALLY ADJUSTED.
- C. THE 7-PIN PHOTO -ELECTRIC RECEPTACLE SHALL BE SUITABLE FOR OPERATION WITH LED LUMINAIRES, AND CONFORM TO ANSI DESIGN STANDARD C136.10. THE PHOTO-ELECTRIC RECEPTACLE SHALL ACCOMMODATE DIMMING AND/OR AUTOMATION INTEGRATION PER ANSI C 136.41 WITH THE INSTALLATION OF NODES OR EXTERNAL EQUIPMENT AS REQUIRED.

7-PIN LONG LIFE PHOTO CONTROL (AS REQUIRED BY THE ENGINEER)

- A. THE LUMINAIRE SHALL BE SUPPLIED WITH A "LONG LIFE" PHOTO CONTROL THAT SHALL BE SOLID STATE, AND SUITABLE FOR OPERATION WITH 7-PIN PHOTO CONTROL RECEPTACLES AND LED LUMINAIRES.
- B. THE PHOTO CONTROL SHALL HAVE A MINIMUM DESIGN LIFE OF 20 YEARS.

MIS-801	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	LUMINAIRE, LED TEARDROP		
	DRAWN BY: SAW	DATE: 12/21/23	
	SCALE: NONE	SHEET: 2 OF 5	801

SHORTING CAP FOR 7-PIN LED PHOTO-ELECTRIC RECEPTACLE

- A. THE LUMINAIRE SHALL BE SUPPLIED WITH A SHORTING CAP SUITABLE FOR OPERATION WITH A 7-PIN LED PHOTO ELECTRIC RECEPTACLE.
- B. THE SHORTING CAP SHALL CONTAIN A GASKET AROUND THE OUTER PERIMETER OF THE CAP FOR PROPER SEALING AGAINST DEBRIS.
- C. THE SHORTING CAP SHALL MEET OR EXCEED ANSI DESIGN STANDARD ANSI C136.10.

INTERNAL LABELING

- A. A VISIBLE LABEL SHALL BE ATTACHED TO THE INSIDE SURFACE OF EACH LUMINAIRE. THE INTERNAL LABEL SHALL MEET THE REQUIREMENTS OF ANSI C 136.22 THE LABEL SHALL INCLUDE THE FOLLOWING:
 - MANUFACTURER'S NAME, LUMINAIRE TYPE, AND CATALOG NUMBER
 - MONTH AND YEAR OF MANUFACTURE
 - LINE INPUT VOLTAGE AND WATTAGE
 - FREQUENCY IF OVER 60 HERTZ
 - DRIVER TYPE (MAY BE ON DRIVER)
 - LUMINAIRE TYPE, WATTAGE AND VOLTAGE(MAY BE ON DRIVER)
 - DESCRIPTIVE WIRING DIAGRAM SHOWING INPUT TERMINALS, DRIVER, PHOTO-CONTROL RECEPTACLE AND LED ARRAY

INSTALLATION

- A. THE LUMINAIRE SHALL BE INSTALLED ON SELF-LEVELING FITTER AND 2" OD BRACKET ARM AS SHOWN ON THE CONTRACT DRAWINGS AND MIS SPECIFICATIONS. THE SELF-LEVELING FITTER SHALL INCLUDE MEANS FOR SECURELY ATTACHING ITSELF TO THE BRACKET ARM WITH STAINLESS STEEL HARDWARE AND ALLOW ADJUSTMENTS OF +/-5 DEGREES HORIZONTAL AND +/- 4 DEGREES VERTICAL.
- B. ORIENTATION AND LEVELING OF THE UNITS SHALL BE SO AS TO PROVIDE FOR UNIFORM APPEARANCE, MAXIMUM LIGHTING EFFICIENCY AND EASE OF MAINTENANCE .

WARRANTY

- A. THE WARRANTY SHALL PROVIDE FOR THE FULL REPLACEMENT OF THE ENTIRE LUMINAIRE ASSEMBLY, WHICH INCLUDES THE POWER SUPPLIES / DRIVER, DEFECTIVE ELECTRICAL AND NON- ELECTRICAL PARTS, AND LIGHT SOURCE FOR A PERIOD OF TEN (10) YEARS FROM DATE OF ACCEPTANCE BY THE DIVISION OF POWER.
- B. NEGLIGIBLE LIGHT OUTPUT FROM MORE THAN 10 PERCENT OF THE LED PACKAGES CONSTITUTES LUMINAIRE FAILURE. LONG-LIFE PHOTO-CONTROL SHALL BE COVERED FOR FULL REPLACEMENT FOR A PERIOD OF TEN (10) YEARS FROM THE DATE OF ACCEPTANCE BY THE DIVISION OF POWER FOR ANY FAILURE AND / OR DEFECT IN WORKMANSHIP.

TESTING / CERTIFICATION / STANDARDS / RECOMMENDED PRACTICES

THE LUMINAIRE SHALL COMPLY WITH THE LATEST VERSIONS OF THE FOLLOWING STANDARDS :

- A. ANSI C136:31 FOR 100,000 CYCLES AT 1.5G ACCELERATION FOR NORMAL ROAD APPLICATIONS.
- B. UL/CUL LISTED, SUITABLE FOR WET LOCATIONS PER UL 1598 OR CSA C22.2 NUMBER 250.
- C. THE LED OPTICAL ASSEMBLY AND DRIVER SHALL BE IP66 RATED PER IEC60529.
- D. LUMINAIRE COMPONENTS AND APPLIED FINISHES SHALL COMPLY WITH THE 1000 HOUR SALT/FOG TEST PER ASTM B117 STANDARD.
- E. LM-79 OPTICAL PERFORMANCE TESTS SHALL BE CONDUCTED IN ACCORDANCE WITH IESNA STANDARD PRACTICES FOR SOLID STATE LIGHTING
- F. LUMINAIRE SHALL BE CERTIFIED WITH A BUG RATING (BACKLIGHT, UPLIGHT, GLARE)
- G. IESNA LM-80-15 H. ANSI C78.377 I. ANSI C136.41 J. TM-21 K. ANSI C136.37
- L. ASTM D1654 M. ANSI C136.22 N. IES LM-79 O. IEC 60529 P, IEEE C62.41.2
- Q. UL 1449 (For Surge Protection Devices) R. IESNA TM-15 S. ANSI C136.10 T. RoHS

DELIVERY, STORAGE AND HANDLING

- A. DELIVERY
 - 1. LED LUMINAIRES SHALL BE DELIVERED TO THE JOB SITE AS TO NOT CAUSE DAMAGE OR REQUIRED REPAIRS. LUMINAIRE SHALL BE 100% FACTORY TESTED PRIOR TO SHIPMENT.
 - 2. DELIVERY OF MATERIAL SHALL BE COORDINATED WITH OTHER TRADES TO AVOID DELAYS.
- B. STORAGE OF MATERIALS
 - 1. MATERIAL SHALL BE STORED IN STRICT COMPLIANCE WITH MANUFACTURER'S RECOMMENDATIONS.

MIS-801	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	LUMINAIRE, LED TEARDROP		
	DRAWN BY: SAW	DATE: 12/21/23	
	SCALE: NONE	SHEET: 3 OF 5	801

C. HANDLING

1. HANDLE ALL PRODUCTS WITH CARE. ONLY SOUND, UNDAMAGED PRODUCTS SHALL BE ACCEPTED.

BASIS OF PAYMENT

ITEM	UNIT	DESCRIPTION
MIS-801	EACH	LUMINAIRE, LED, TEARDROP

SUBMITTALS

A. THE FOLLOWING ITEMS SHALL BE INCLUDED IN THE SUBMITTAL PACKAGE:

1. LUMINAIRE SUBMITTAL FORM (see sheet 5)
2. LUMINAIRE CUT SHEET
3. LED DRIVER CUT SHEET
4. LM-79 TEST REPORT
5. TM-21 TEST REPORT
6. LUMINAIRE THERMAL TEST REPORT
7. MANUFACTURER'S 10 YEAR WARRANTY DOCUMENT

B. LM -79 DATA AND TM-21 TEST REPORTS MUST REFLECT THE EXACT CCT, WATTAGE AND VOLTAGE OF THE LUMINAIRE TO BE SUPPLIED. NO PRO-RATED TEST REPORTS WILL BE ACCEPTED.

C. THE LUMINAIRE THERMAL TEST REPORT MUST REFLECT THE EXACT WATTAGE AND VOLTAGE TO BE SUPPLIED. NO PRO-RATED TEST REPORTS WILL BE ACCEPTED.

SUGGESTED MANUFACTURERS

A. THE FOLLOWING ARE SUGGESTED LED TEARDROP STYLE LUMINAIRES FOR USE IN THE CITY OF COLUMBUS.

1. HOLOPHANE LIGHTING (ESPLANADE ESL SERIES)
2. PHILIPS/LUMEC LIGHTING (RENAISSANCE SERIES)
3. STERNBERG LIGHTING (LIBERTYVILLE SERIES)

B. A SUGGESTED LUMINAIRE HAS BEEN PREVIOUSLY USED BY THE CITY OF COLUMBUS, AND SHALL BE USED AS THE BASIS OF DESIGN FOR THE PROJECT IN WHICH THIS SPECIFICATION IS APPLICABLE.

C. SHOULD THE CONTRACTOR CHOOSE TO SUBSTITUTE THE BASIS OF DESIGN, THE CHOSEN LUMINAIRE MUST MEET ALL TARGET ILLUMINATION CRITERIA AS SPECIFIED BY THE PROJECT. NO MORE THAN A 10% INCREASE IN THE ACTUAL WATTAGE OF THE LUMINAIRE USED AS THE BASIS OF DESIGN WILL BE ALLOWED. THE SUBSTITUTED LUMINAIRE MUST MEET AND COMPLY WITH ALL ITEMS IN THIS SPECIFICATION.

MIS-801	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	LUMINAIRE, LED TEARDROP		
	DRAWN BY: SAW	DATE: 12/21/23	
	SCALE: NONE	SHEET: 4 OF 5	801

**CITY OF COLUMBUS: DIVISION OF POWER
LED LUMINAIRE SUBMITTAL FORM
MATERIAL SPECIFICATION**

Luminaire Catalog Number: _____ Manufacturer: _____

Project: _____ Drawing Number: _____

GENERAL CRITERIA: LED LUMINAIRE		
LUMINAIRE	Wattage of Luminaire	
	Voltage of Luminaire	
	Weight of Luminaire	
	Luminaire Effective Projected Area (EPA)	
	Luminaire Housing Finish Color	
MOUNTING METHOD	<input type="checkbox"/> Post-Top <input type="checkbox"/> Side-Arm	
	Tenon Nominal Pipe Size (NPS)	
LENS:	<input type="checkbox"/> Flat <input type="checkbox"/> Sag / Drop <input type="checkbox"/> Teardrop <input type="checkbox"/> Prismatic Acorn/Traditional	
IES FORWARD DISTRIBUTION TYPE	<input type="checkbox"/> I <input type="checkbox"/> II <input type="checkbox"/> III <input type="checkbox"/> IV <input type="checkbox"/> V <input type="checkbox"/> VS	
IES LATERAL DISTRIBUTION TYPE	<input type="checkbox"/> Very Short <input type="checkbox"/> Short <input type="checkbox"/> Medium <input type="checkbox"/> Long <input type="checkbox"/> Very Long	
DRIVER	Variable Output: (Specify Current Output Setting in mA)	
	Minimum Available Output	
	Maximum Available Output	
	Dimmable (0-10 Volts Required)	YES / NO
ELECTRICAL IMMUNITY	Surge Suppression Installed (Minimum 10 KV / 5 KA)	
PHOTOCONTROL	Photo-control Receptacle Style	7-PIN <input type="checkbox"/> YES
		TWIST-LOCK <input type="checkbox"/> YES
	Long Life Photo-control	7-PIN Compatible <input type="checkbox"/> YES <input type="checkbox"/> NO
	Shorting Cap Included	<input type="checkbox"/> YES <input type="checkbox"/> NO
WARRANTY	Minimum 10 Year All-Inclusive (Full Replacement) Warranty	<input type="checkbox"/> YES <input type="checkbox"/> NO
PERFORMANCE CRITERIA: LED LUMINAIRE		
NOMINAL CCT	Rated Correlated Color Temperature (3000K)	<input type="checkbox"/> YES <input type="checkbox"/> NO
LIGHT LOSS FACTOR	(LDD + Projected Lumen Depreciation @ 100,000 HRS in 25°C Ambient Temperature)	
PHOTOPIC² DOWNWARD LUMINAIRE OUTPUT	<i>Initial</i> Lumen Output Below Horizontal	
	Maintained Lumen Output Below Horizontal (From LM-79 Test)	
	Minimum <i>maintained</i> Luminaire Output Below Horizontal	
BUG RATING:	Backlight-Up light-Glare Rating	
ANSI VIBRATION TEST LEVEL	Level 1 (Normal) Level 2 (Bridge/Overpass)	
THERMAL ENVIRONMENT	Minimum Ambient Operating Temperature	
	Maximum Ambient Operating Temperature	

<h1>MIS-801</h1>	DEPARTMENT OF PUBLIC UTILITIES - DIVISION OF POWER CITY OF COLUMBUS, OHIO		
	<h2>LUMINAIRE, LED TEARDROP</h2>		
	DRAWN BY: SAW	DATE: 12/21/23	
	SCALE: NONE	SHEET: 5 OF 5	801