APPLICATION

THE LED ACORN STYLE LUMINAIRE MAY BE USED FOR:

1. NEW INSTALLATION OF ACORN LUMINAIRES ON NEWLY PLACED POLES AS PER PLAN.

2. REPLACING EXISTING HID LUMINAIRES ON EXISTING POLES WHERE SPACING REMAINS UNCHANGED.

LED ACORN 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 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 50 POUNDS.

G. LUMINAIRE SHALL NOT HAVE AN EPA OF MORE THAN 1.38 SQ. FT.

HOUSING

A. THE HOUSING SHALL BE FLUTED, AND BE CONSTRUCTED OF RUST RESISTANT DIE-CAST OR SAND-CAST ALUMINUM.

B. THE HOUSING SHALL BE EQUIPPED WITH A TOOL-LESS ENTRY DOOR TO ALLOW ACCESS TO THE ELECTRICAL COMPONENTS INSIDE THE LUMINAIRE.

C. ALL EXTERNAL SCREWS SHALL BE STAINLESS STEEL. NO PARTS SHALL BE CONSTRUCTED OF POLYCARBONATES.

OPTICAL SYSTEM

A. THE OPTICAL SYSTEM SHALL BE CONSIST OF A THERMAL RESISTANT BOROSCILIATE GLASS REFRACTOR RESEMBLING A TRADITIONAL ACORN SHAPE.

B. THE OPTICAL SYSTEM SHALL CONTAIN A TOP REFLECTOR MOUNTED WITHIN THE DECORATIVE GLASS OPTIC.

C. THE OPTICAL SYSTEM SHALL BE IP-66 RATED.

PAINT FINISH

A. THE PAINT FINISH SHALL BE POWDER COATED BLACK, OR AS DIRECTED BY THE CITY OF COLUMBUS DIVISION OF POWER.

B. THE PAINT FINISH SHALL EXCEED A SCRIBE CREEPAGE 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 500 HOURS OF UV TESTING AT 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

D. GENERAL REQUIREMENTS

1. THE LED DRIVER SHALL BE MOUNTED INSIDE THE LUMINAIRE HOUSING, REPLACEABLE, PRE-WIRED TO 480V,120V OR AS SPECIFIED AND READY FOR INSTALLATION.

2. THE DRIVER AND LED ARRAYS SHALL BE DESIGNED FOR MULTI-CURRENT INPUT OPERATIONS WITH 0-10V DRIVER ADJUSTABLE OUTPUT.

3. OUTPUT OPERATING FREQUENCY MUST BE $\geq$ 120HZ, AND INPUT OPERATING FREQUENCY MUST BE 60 HZ.

4. THE LED DRIVER SHALL TOLERATE SUSTAINED OPEN CIRCUIT AND SHORT CIRCUIT OUTPUT CONDITIONS WITHOUT DAMAGE. THE LED DRIVER SHALL HAVE AN INDEPENDENTLY VERIFIED AND DOCUMENTED FAILURE RATE OF $\leq$ 0.01% PER 1000 HOURS.

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5. ANY WIRING INSIDE THE DRIVER HOUSING SHALL HAVE A 600V/105°C RATING OR HIGHER.

6. THE LED DRIVER SHALL BE UL CERTIFIED FOR DRY AND DAMP LOCATIONS. ALL OTHER ELECTRICAL COMPONENTS SHALL BE UL LISTED FOR WET LOCATIONS.

7. THE LED DRIVER SHALL COMPLY WITH FCC RULES AND REGULATIONS, TITLE 47 CFR PART 15 NON-CONSUMER, AND HAVE A CLASS "A" SOUND RATING.

8. THE DRIVER SHALL BE RoHS COMPLIANT.

LED SURGE PROTECTION DEVICE

A. THE SURGE PROTECTION DEVICE SHALL COMPLY WITH ANSI C136.37, AND ANSI/IEEE C62.41.2.

B. EACH SURGE PROTECTION DEVICE SHALL BE INTERNALLY MOUNTED INSIDE THE LUMINAIRE HOUSING, AND BE SPECIFIED FOR 480V OR 120V OPERATION, OR AS SPECIFIED.

C. THE SURGE PROTECTION DEVICE SHALL HAVE A MINIMUM 10 KV / 5KA SURGE PROTECTION.

D. THE SURGE PROTECTION DEVICE SHALL BE A UL 1449 TYPE 4 RECOGNIZED COMPONENT FOR TYPE 2 LOCATIONS.

LED MODULE / ARRAY REQUIREMENTS

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

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

C. 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 FACTOR (LDD) SHALL BE 0.85 FOR UV STABILIZED ACRYLIC OPTICS, AND 0.90 FOR GLASS OPTICS.

3. THE LIGHT LOSS FACTOR (LLF) 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 TEMPERATURE.

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

E. LUMINAIRE CIRCUITRY SHALL INCLUDE QUICK CONNECT / DISCONNECT FOR EASY SEPARATION. SEE FIGURE 1.

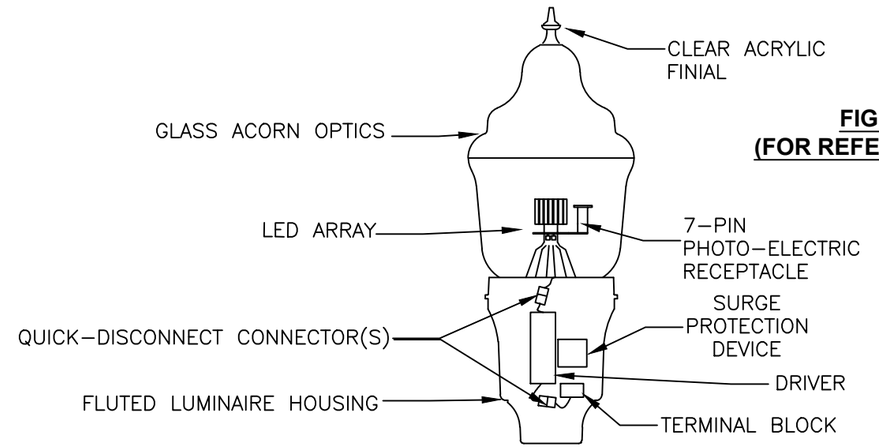


FIGURE 1
(FOR REFERENCE ONLY)

7-PIN PHOTO-ELECTRIC RECEPTACLE

A. THE LUMINARE SHALL BE FURNISHED WITH A 7-PIN PHOTO-ELECTRIC RECEPTACLE INSTALLED IN THE TOP OF THE LUMINAIRE HOUSING. THE RECEPTACLE SHALL BE TWIST LOCK TYPE, AND HAVE THE CAPABILITY TO BE DIRECTIONALLY ADJUSTED.

B. THE 7-PIN PHOTO -ELECTRIC RECEPTACLE SHALL BE SUITABLE FOR OPERATION WITH LED LUMINAIRES, AND CONFORM TO ANSI DESIGN STANDARD C136.10.

C. 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.

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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.

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
- DESCRIPTIVE WIRING DIAGRAM SHOWING INPUT TERMINALS, DRIVER, PHOTO-CONTROL RECEPTACLE AND LED ARRAY.

INSTALLATION

A. THE LUMINAIRE SHALL SLIP FIT OVER A 2-7/8" TO 3-1/8" OUTSIDE DIAMETER POST TOP TENON.

B. THE LUMINAIRE SHALL BE SECURED TO THE POLE TENON BY A MINIMUM OF FOUR HEX HEAD STAINLESS STEEL SET SCREWS.

C. THE POLE TENON SHALL BE TOTALLY ENCLOSED IN THE LUMINAIRE HOUSING. 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. THIS INCLUDES THE POWER SUPPLIES / DRIVER, ELECTRICAL AND NON-ELECTRICAL PARTS, 7-PIN PHOTOCONTROL RECEPTACLE, AND LIGHT SOURCE FOR A PERIOD OF TEN (10) YEARS FROM THE DATE OF MANUFACTURING. NO LUMINAIRE SUPPLIED FOR USE WITH THE CITY OF COLUMBUS STREET LIGHTING SYSTEM SHALL BE MANUFACTURED PRIOR TO THE APPROVAL DATE OF THE MATERIAL SUBMITTAL PACKAGE PROVIDED BY THE DIVISION OF POWER, OR ITS AUTHORIZED REPRESENTATIVE.

B. NEGLIGIBLE LIGHT OUTPUT FROM MORE THAN 10 PERCENT OF THE LED PACKAGE CONSTITUTES LUMINAIRE FAILURE. THE LUMINAIRE WILL BE REPLACED UNDER THE MANUFACTURER'S 10 YEAR WARRANTY.

TESTING / CERTIFICATION / STANDARDS / RECOMMENDED PRACTICES

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

A. ANSI C136:31 2010 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 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 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 (Surge Protection Devices) R. IESNA TM-15 S. ANSI C136.10 T. RoHS

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CITY OF COLUMBUS, OHIO

LUMINAIRE, LED, ACORN

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DELIVERY, STORAGE AND HANDLING

A. DELIVERY

1. LED LUMINAIRES SHALL BE DELIVERED TO THE JOB SITE AS TO NOT CAUSE DAMAGE OR REQUIRED REPAIRS.

2. LUMINAIRE SHALL BE 100% FACTORY TESTED PRIOR TO SHIPMENT.

3. 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 MANUFACTURE'S RECOMMENDATIONS.

C. HANDLING

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

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 TEN (10) YEAR WARRANTY DOCUMENTATION

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 ACORN STYLE LUMINAIRES FOR USE IN THE CITY OF COLUMBUS.

1. HOLOPHANE LIGHTING (GRANVILLE GVD3U SERIES)
2. KING LUMINAIRE (K445 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.

BASIS OF PAYMENT

ITEM	UNIT	DESCRIPTION
MIS-802	EACH	LUMINAIRE, LED, ACORN

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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 **E**ffective **P**rojected **A**rea (EPA)		
	Luminaire Housing Finish Color		
MOUNTING METHOD	☐ Post-Top ☐ Side-Arm		
	Tenon Nominal Pipe Size (NPS)		
LENS:	☐ Flat ☐ Sag / Drop ☐ Teardrop ☐ Prismatic Acorn/Traditional		
IES FORWARD DISTRIBUTION TYPE	☐ I ☐ II ☐ III ☐ IV ☐ V ☐ VS		
IES LATERAL DISTRIBUTION TYPE	☐ Very Short ☐ Short ☐ Medium ☐ Long ☐ 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	☐ YES
		TWIST-LOCK	☐ YES
	Long Life Photo-control	7-PIN Compatible	☐ YES ☐ NO
	Shorting Cap Included		☐ YES ☐ NO
WARRANTY	Minimum 10 Year All–Inclusive (Full Replacement) Warranty		☐ YES ☐ NO
PERFORMANCE CRITERIA: LED LUMINAIRE			
NOMINAL CCT	Rated **C**orrelated **C**olor **T**emperature (3000K)		☐ YES ☐ NO
LIGHT LOSS FACTOR	(LDD + Projected Lumen Depreciation @ 100,000 HRS in 25°C Ambient Temperature)		
PHOTOPIC[2] DOWNWARD LUMINAIRE OUTPUT	***Initial*** Lumen Output Below Horizontal		
	Maintained Lumen Output Below Horizontal (From LM-79 Test)		
	Minimum ***maintained*** Luminaire Output Below Horizontal		
BUG RATING:	**B**acklight-**U**p light-**G**lare Rating		
ANSI VIBRATION TEST LEVEL	Level 1 (Normal) Level 2 (Bridge/Overpass)		
THERMAL ENVIRONMENT	Minimum Ambient Operating Temperature		
	Maximum Ambient Operating Temperature		

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