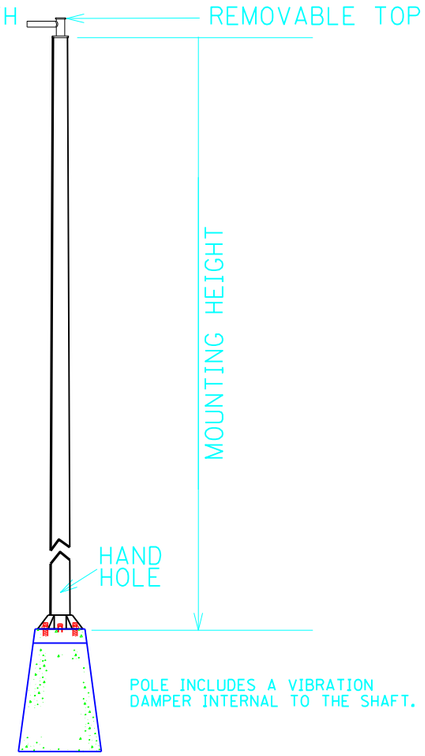
COUNTY OF	ITEM NO.	SHEET NO.
FAYETTE	7-113.01	T17



DESIGN CRITERIA FOR LED LUMINAIRES IN MEDIAN WALL AND HIGH MAST AT INTERCHANGE

OVERALL BRIDGE CRITERIA
ILLUMINANCE:
AVERAGE: NOT LESS THAN .62 FOOTCANDLES
AND MORE THAN .68 FOOTCANDLES
MINIMUM: NOT LESS THAN .20 FOOTCANDLES
AVERAGE/MINIMUM: NOT MORE THAN 3.5:1

ALL POLE LOCATIONS, ARM LENGTHS, AND ORIENTATION OF LUMINAIRE (TO CURVE/ROAD) SHOULD BE MAINTAINED DUE TO UTILITIES/DRAINAGE/RIGHT-OF-WAY.

LUMINAIRE DESIGN:

MEDIAN WALL LUMINAIRES

DRIVER: NOT TO EXCEED 1050 mA
TYPE V DISTRIBUTION
LAMP WATTAGE: CAN NOT EXCEED 328 WATTS

HIGH MAST LUMINAIRES

DRIVER: NOT TO EXCEED 1050 mA
TYPE II & V DISTRIBUTION
LAMP WATTAGE: CAN NOT EXCEED 560 WATTS

LUMINAIRE DESIGNATION EXAMPLE

2 - 7 - A

- A — LUMINAIRE WATTAGE
- 7 — LUMINAIRE NUMBER IN CIRCUIT
- 2 — CIRCUIT NUMBER

NOTE:

ALL TYPE A LUMINAIRES ARE MOUNTED AT 40' LED LUMINAIRE

10/15/2014

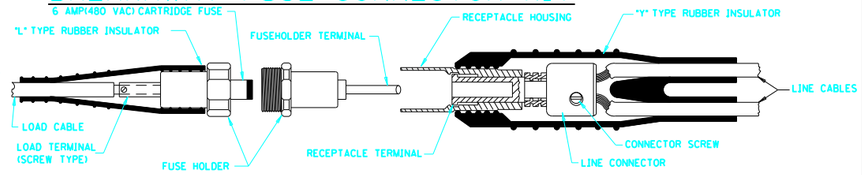
LED Luminaire Specifications

The following are the required Specifications for the LED Fixture:

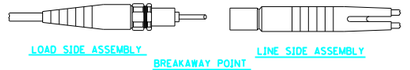
1. The Luminaire shall be listed by a National Recognized Testing Laboratory (NRTL) as defined by the U.S. Department of Labor. The testing laboratory must be listed by OSHA in its scope of recognition for the applicable tests being conducted as required by this specification. A list of recognized testing labs for products sold in the United States may be found on the U.S. Department of Labor's web site: http://www.osha.gov/
2. The Luminaire shall be listed and labeled by a NRTL or CSA as being in compliance with UL 1598 and suitable for use in wet locations.
3. Key components including LED drivers, LED light sources, and surge protection devices shall be RoHS compliant.
4. Shall have an International Electrotechnical Commission (IEC) 529 Ingress Protection (IP) rating of IP 65 or greater.
5. Shall be in compliance with Electro Magnetic Interference (EMI) requirements as defined by FCC 47 Sub Part 15; CISPR15, CISPR22 Class A (120Vmin), EN61000-3-2, -3-3, -4-4, -4-5.
6. Shall be tested according to the most current version of Illuminating Engineering Society of North America (IESNA) LM-79.
7. Shall have lumen maintenance measured in accordance the most current version of Illuminating Engineering Society of North America (IESNA) LM-80.
8. Shall have long term lumen maintenance documented according to the most current version of Illuminating Engineering Society of North America (IESNA) TM-21.
9. The fixture shall have a diecast aluminum housing.
10. The luminaire finish shall be corrosion resistant with a polyester powdercoat of 2.5 mil nominal thickness. Finish shall pass per ASTM D1654 after 3000 hours of testing per ASTM B117.
11. All hardware on the exterior of the housing including cover and latch shall be stainless steel, zinc or steel with zinc alloy electroplate and chromate top coat .
12. The luminaire shall be easy to open when properly mounted and shall have readily accessible internal parts. Access to all internal parts requiring replacement shall not require tools (i.e. "tool-less entry").
13. The luminaire shall have a vibration rating of 3G per the American National Standard (ANSI) IEEE C136.31, Table 2 Roadway Lighting Equipment -Luminaire Vibration for both normal applications and bridge and overpass applications.
14. The luminaire shall be designed to allow water shedding.
15. The luminaire shall have a passive cooling method shall be employed to manage thermal output of LED light engine and power supply.
16. The luminaire shall have a label per ANSI C136.22 that states operating voltage and current range. The label must be clearly visible on the inside of the housing.
17. The luminaire shall fully operate in a temperature range of -40 degrees C up to 40 degrees C (-40 degrees F to 104 degrees F).
18. In retrofit applications, the LED luminaire shall not be more wattage than the original HPS fixture if you are replacing one for one. For the optimized proposal, we will allow the wattage to be greater than the original proposed luminaire.
19. The luminaire shall have an integral power supply (electronic driver). The power supply shall not have a manual, field-adjustable setting for current output.
20. The luminaire shall have a power supply (electronic driver) that will operate on a 480 volt single phase at 60 hertz.
21. The luminaire shall have a power supply (electronic driver) that has a power factor of .90 or greater at full load.
22. The luminaire shall have a power supply (electronic driver) that has total harmonic distortion of 20% or less at full load.
23. The luminaire shall have power supply (electronic driver) output ripple of less than 10%.
24. The luminaire shall have power supply (electronic driver) with a rated life of 100,000 hours with a luminaire operated at an ambient temperature of 25°C (77°F).
25. The luminaire shall have an isolated power supply (electronic driver) output.
26. The luminaire shall have a power supply (electronic driver) that has thermal overload protection.
27. The luminaire shall have a power supply (electronic driver) that is self-limited short circuit protected and over load protected.
28. The luminaire shall not use any active thermal cutback, such as in order to achieve a higher thermal performance.
29. The luminaire shall have a power supply (electronic driver) that is terminated with quick disconnect wire harnesses for easy maintenance. Wire nut termination is not acceptable.
30. The luminaire shall have a terminal block for terminating wiring to the luminaire. The terminal block shall be a 3 station, tunnel lug terminal board that will accommodate #6 thru #18 AWG pole wire.
31. Fixture shall have a surge protection that meets 10KV/5KA per ANSI/IEEEC62.41.
32. The luminaire shall have life rating on all electrical components of 100,000 hours or greater when operated at full lumen output at 25 degrees C.
33. All LED components shall be L70 rated when operated in a luminaire at 25 degrees C (77 degrees F) at 100,000 hours.
34. Electrical components shall be protected per ANSI/IEEE standard C62.41, for Class C applications.
35. The LED shall fully operate in a temperature range -40 degrees C to 40 degrees C (-40 degrees F to 104 degrees F).
36. The LED shall lose no more than a 15% optical intensity of initial delivered lumens due to thermal loading when operated at 25°C (77°F).
37. The LED shall deliver an average 80% of initial delivered lumens after 70,000 hours of operation when operated at 25°C (77°F).
38. The LED shall have a rated life of 100,000 hours when operated at 25 °C (77°F).
39. The LED shall have a minimum Luminaire efficacy of 80 lumens/watt.
40. The Correlated Color Temperature (CCT) shall be 4000K with a variance of 250K, white, that conforms to LM-79. The Correlated Color Temperature (CCT) shall be 5000K with a variance of 250K, white, that conforms to LM-79 (HIGH MAST ONLY).
41. The minimum color rendering index (CRI) shall not be less than 70.
42. The optics shall have a completely sealed optical system.
43. The optical system shall have a (IEC) (IP) rating of 66 or greater.
44. The optics shall have an Illuminating Engineering Society of North America (IESNA) Backlight, Uplight and Glare (BUG) rating as follows:
    a. Backlight rating shall not exceed 3; (highmast fixture backlight rating shall not exceed 5)
    b. Uplight rating shall not exceed 0;
    c. Glare rating shall not exceed 3/4
45. The Light Loss Factor (LLF) shall be calculated for each fixture as follows:
    LLF = LLD X LDD
    Lamp Lumen Depreciation Factor (LLD) shall be the specified percentage of LED lumen maintenance at
    70,000 hours at 25°C (77°F) from the TM-21 report. This LLD should be according to LM -80 and TM -21 reports. This report shall be submitted for verification.
    Luminaire Dirt Depreciation (LDD)= .9
46. The TM-21 Report must show the drive current used for the submitted luminaire. The report can show a larger drive current to represent a worst case scenario.
47. The Lumen Maintenance Life L_{70} from the TM-21 Report must not be below 80% at 70,000 hours at 25°C (77°F).
48. The manufacturer shall provide certified test laboratories IES photometrics which verify light levels. Product submittal shall be accompanied by IES TM-21 compliant test reports from a CALiPER qualified or NVLAP accredited testing laboratory for the specific model being submitted.
49. WARRANTY: The Manufacturer shall ensure that the LED Luminaires have a minimum standard warranty of 10 years for all parts, materials, paint finish, and shipping (both ways) required to repair or replace the luminaire. The warranty shall begin upon the date the luminaire is received. The warranty shall be transferable.
    The warranty shall cover all failures including:
    (1) Failure in luminaire LED, housing, wiring, connections, and drivers.
    (2) More than 10 percent decrease in lumen output.
    (3) Significant change in light output color.
    Technical Support. During the warranty period, technical support shall be available from the manufacturer via telephone within 24 hours of the time the call is made from KYTC, and this support shall be made available from factory certified personnel or factory certified installers at no additional charge to the Department.
50. MINIMUM REQUIRED SUBMITTALS:
    Luminaire specification sheet.
    LED driver specification sheet.
    LM-79 Luminaire photometric report.
    The vendor must submit LM-79 in-situ test data to confirm thermal operating temperatures of the luminaire.
    LM-80 Lumen maintenance report.
    TM-21 calculations as defined .
    Backlight, Uplight, Glare (BUG) rating of the luminaire.
    Written product warranty.
    Certified test lab IES photometric reports.
    Including IES electronic file.
    Including intensity and chromaticity data.
    Instructions for installation and maintenance.
51. The luminaire shall be equipped with a shorting cap and a 7-pin photocontrol receptacle that meets ANSI 2013 standard C136.41

BREAKAWAY FUSE CONNECTOR KIT

6 AMP(480 VAC) CARTRIDGE FUSE



DETAILS OF TYPE HEB-JW-RYC CONNECTOR



TYPE HEB-JW-RYC CONNECTOR SHOWN

LED LUMINAIRE/FUSE CONNECTOR DETAILS

MicroStation v8.11.7.443
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USER: ted.swansegar
DATE PLOTTED: September 12, 2016
FILE NAME: C:\PWWORK\TED.SWANSEGAR\DMS28754\LED LUMINAIRE SPEC 2015.DGN