# Photometric Test Report

**Relevant Standards**

☑IES LM-79-2008

☑ANSI C82.77:2017

**Prepared For**

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**Test Date**

**2020/9/16**

**Issue Date**

**2020/9/18**

| **Prepared By** | **Approved By** |
|---|---|
| Wangzun Zhu | Kevin Jia |

## 1.0 Test Summary

| U-Bend Lamps<br>Internal Driver/Line Voltage Lamp-Style Retrofit Kits (UL Type B) | | | | |
|---|---|---|---|---|
| **Requirement Category** | **Test Method** | **Requirements** | | **Test value** |
| **Goniophotometer** | | | | |
| Luminaire Output (lm) | IES LM-79-2008 | - | | 1871 |
| Luminaire Efficacy (lm/W) | IES LM-79-2008 | - | | 141.85 |
| Beam Angle | IES LM-79-2008 | - | | 16540.0% |
| **Integrating Sphere** | | | | |
| Lamp light output (lm) | IES LM-79-2008 | - | | 1859 |
| Lamp Efficacy (lm/W) | IES LM-79-2008 | - | | 141.15 |
| Allowable CCTs* (K) | IES LM-79-2008<br>CIE 13.3-1995 | 7 step | 3045±175 | 3100 |
| Minimum CRI | IES LM-79-2008<br>CIE 13.3-1995 | - | | 86 |
| Minimum R9 | IES LM-79-2008<br>CIE 13.3-1995 | - | | 22 |

## 2.0 Test List

| Test Item | Test | Test Date | Model Number | Sample No. |
|---|---|---|---|---|
| 1 | Integrating Sphere Test | 2020/9/16 | LB48T8U6/830/13P-AB/LB48T8U6/830/13P-ID DE | A1 |
| 2 | Goniophotometer Test | 2020/9/16 | LB48T8U6/830/13P-AB/LB48T8U6/830/13P-ID DE | A1 |

| Remark(If any) |
|---|
| 1、This report shall not be used by the client to claim product endorsement by NVLAP, NIST or any agency of the US government. |
| 2、The results reported herein have been performed in accordance with the laboratory's terms of accreditation. This report shall not be reproduced except in full without the written approval of the Laboratory. The results in this report apply to the test sample(s) mentioned above at the time of the testing period only and are not to be used to indicate applicability to other similar products. This report does not imply that the product(s) has met the criteria for certification. |

## 3.0 Production Description

**Luminaire Description:** LB48T8U6/830/13P-AB/LB48T8U6/830/13P-ID DE

**Electrical Specification:** 120-277V,60HZ

**Photos of Luminaire Characteristics**

# 4.0 LM-79 Measurement and Test Results

## 4.1 Integrating Sphere Test - Bare Lamp

| | | | |
|---|---|---|---|
| Model No. | LB48T8U6/830/13P-AB/LB48T8U6/830/13P-ID DE | Sample ID. | A1 |
| Opreate time (Min.) | 90 | Stabilization time (Min.) | 70 |
| Temperature (°C) | 25.1 | Humidity (%RH) | 52.0 |

| **Test Method** |
|---|
| The samples were tested according to the IES LM-79-2008. |
| Photometric paramters were measured using an integrating sphere, a spectroradiometer and software. The ambient temperature condition inside the sphere was maintained at 25º C ± 1º C. |
| The sample measurements were made using a spectroradiometer connected by a fiber optic cable and detector through the detector port of the integrating sphere. |
| The voltage of an AC power supply (RMS voltage) or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. |
| The sample was measured using 4π geometry and operated at rated voltage and was stabilized before measurement. Chromaticity coordinates, correlated color temperature and color rendering index were calculated from the spectral radiant flux measurements taken at 1 nm intervals over the range of 380 to 780 nm. |

Test Result

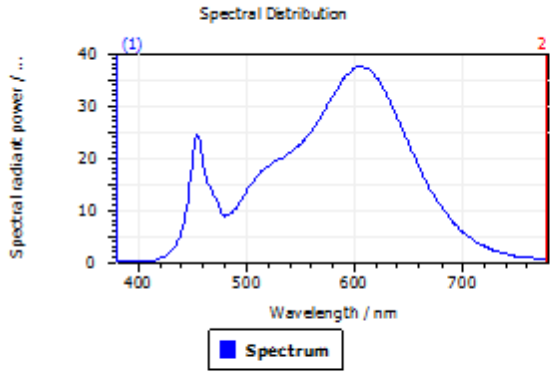
| Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | THD |
|---|---|---|---|---|---|
| 120.03 | 60 | 0.112 | 13.17 | 0.976 | 19.80% |
| 276.98 | 60 | 0.051 | 12.86 | 0.913 | 18.62% |

Test Result

| CCT (K) | CRI | R9 | Duv | Lamp Light Output (lm) | Lamp Efficacy (lm/W) |
|---|---|---|---|---|---|
| 3100 | 86 | 22 | 0.0016 | 1859 | 141.15 |

## 4.1 Integrating Sphere Test

**Results**




Spectral Distribution

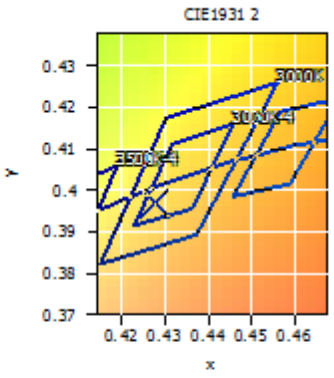
**Spectral values**

| | |
|---|---|
| DominantWavelength | 583.01 nm |
| Purity | 0.476 |
| PeakWavelength | 605.92 nm |
| Radiant Power | 5.788 W |
| Width50%: | |
| Luminous Flux | 1.859 klm |

**Color Coordinates**

| | | | | | |
|---|---|---|---|---|---|
| Correlated Color Temperatu | | 3100 K | | | |
| x: | 0.4279 | u: | 0.2478 | u': | 0.2478 |
| y: | 0.3969 | v: | 0.3448 | v': | 0.5172 |

| | | | |
|---|---|---|---|
| CRI01 | 86.0 | CRI09 | 21.5 |
| CRI02 | 94.9 | CRI10 | 88.3 |
| CRI03 | 94.8 | CRI11 | 85.5 |
| CRI04 | 84.7 | CRI12 | 76.2 |
| CRI05 | 86.7 | CRI13 | 88.5 |
| CRI06 | 94.0 | CRI14 | 98.0 |
| CRI07 | 83.6 | CRI15 | 79.0 |
| CRI08 | 64.4 | CRI16 | 75.5 |
| ResultsCRI | 86.1 | | |




PlanckDistance 1.6E-003

# 4.0 LM-79 Measurement and Test Results

## 4.2 Goniophotometer Test - Bare Lamp

| | | | |
|---|---|---|---|
| Model No. | LB48T8U6/830/13P-AB/LB48T8U6/830/13P-ID DE | Sample ID. | A1 |
| Opreate time (Min.) | 90 | Stabilization time (Min.) | 70 |
| Temperature (°C) | 25.1 | Humidity (%RH) | 52.0 |

| **Test Method** |
|---|
| The samples were tested according to the IES LM-79-2008. |
| Photometric paramters were measured using a type C goniophotometer and software. |
| The ambient temperature shall be maintained at 25° C ± 1° C, measured at a point not more than 1 m from the sample and at the same height as the sample. |
| The voltage of an AC power supply (RMS voltage)or DC power supply (instantaneous voltage) applied to the device under test shall be regulated to within ±0.2 percent under load. |
| The samples were operated at rated voltage and was stabilized before measurement. Luminous flux, luminaire efficacy, zonal lumen were calculated from the software taken at 0.5$^{o}$ vertical intervals and 10$^{o}$ horizontal intervals. |

Test Conditions

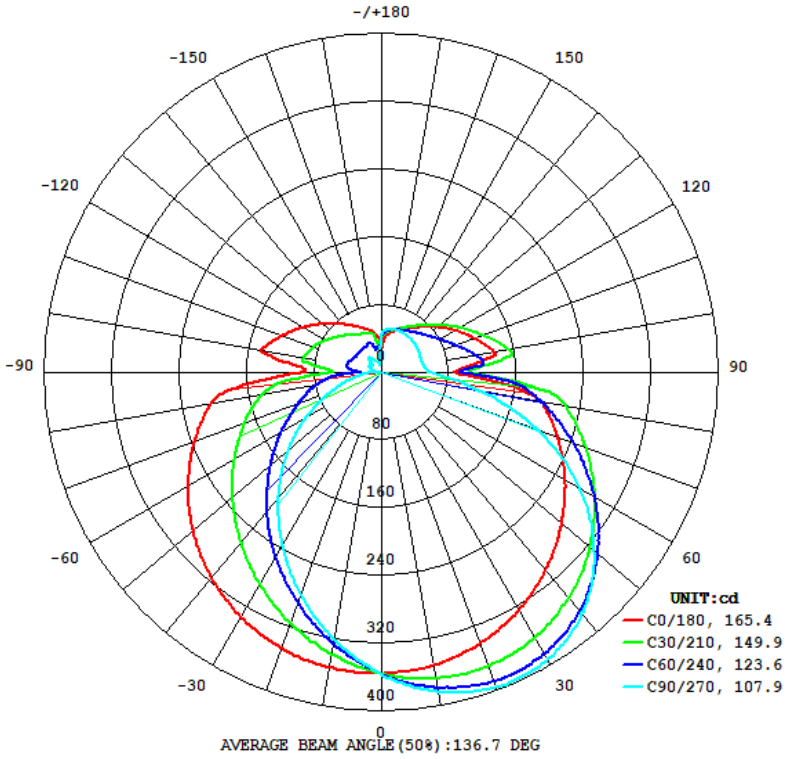
| Voltage (Vac) | Frequency (Hz) | Current (A) | Power (W) | Power Factor | THD |
|---|---|---|---|---|---|
| 119.99 | 60 | 0.113 | 13.19 | 0.974 | 19.75% |
| 277.00 | 60 | 0.051 | 12.88 | 0.912 | 18.46% |

Test Result

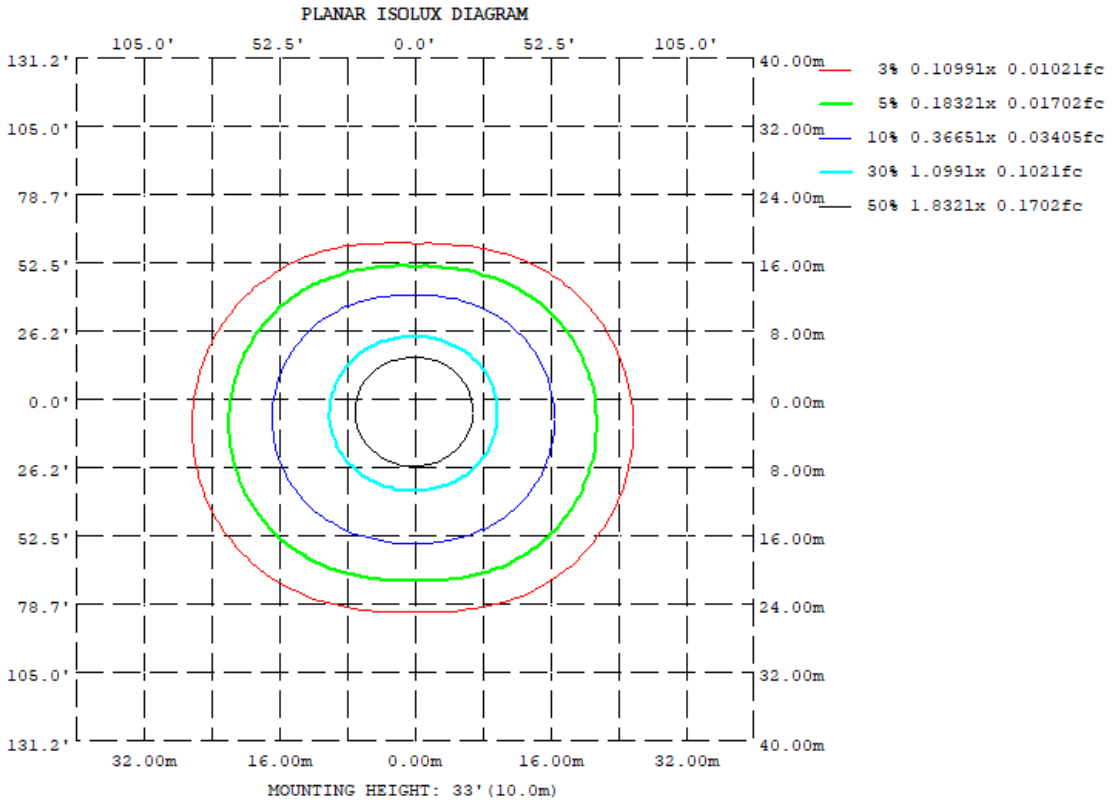
| Flux (lm) | Luminous Efficacy (lm/W) | Beam Angle |
|---|---|---|
| 1871 | 141.8 | 165.4 |

## 4.2 Goniophotometer Test

Distribution




Isolux Plot



## 4.2 Goniophotometer Test

Zonal Lumen Summary

| γ | C0 | C45 | C90 | C135 | C180 | C225 | C270 | C315 |
|---|---|---|---|---|---|---|---|---|
| 10 | 351.2 | 373.4 | 382.5 | 376.1 | 354.3 | 331.8 | 321.1 | 330.5 |
| 20 | 340.8 | 380.2 | 395.6 | 385.2 | 346.8 | 301.9 | 280.2 | 298.6 |
| 30 | 325.2 | 375.9 | 392.3 | 383.0 | 333.8 | 268.8 | 236.0 | 263.9 |
| 40 | 303.9 | 359.7 | 370.8 | 368.9 | 315.2 | 234.3 | 190.5 | 228.6 |
| 50 | 279.6 | 333.3 | 330.1 | 342.6 | 291.8 | 200.3 | 145.8 | 193.5 |
| 60 | 252.0 | 298.2 | 270.7 | 307.0 | 265.2 | 167.6 | 102.4 | 159.3 |
| 70 | 223.3 | 257.7 | 195.6 | 265.5 | 236.3 | 138.2 | 62.15 | 130.6 |
| 80 | 191.3 | 214.7 | 114.2 | 221.0 | 204.5 | 109.5 | 28.69 | 99.70 |
| 90 | 87.32 | 106.0 | 58.45 | 107.7 | 92.71 | 42.28 | 3.188 | 39.53 |
| 100 | 137.4 | 143.4 | 52.10 | 147.0 | 145.3 | 66.47 | 11.55 | 64.77 |
| 110 | 119.1 | 118.3 | 50.99 | 121.5 | 127.5 | 64.05 | 13.10 | 59.73 |
| 120 | 100.7 | 97.51 | 52.08 | 100.4 | 107.7 | 56.94 | 17.07 | 52.59 |
| 130 | 84.28 | 81.26 | 53.42 | 83.98 | 89.97 | 50.59 | 16.93 | 46.64 |
| 140 | 70.50 | 69.09 | 54.26 | 71.62 | 75.31 | 47.04 | 24.43 | 42.03 |
| 150 | 59.92 | 60.49 | 54.51 | 62.77 | 63.73 | 45.30 | 17.98 | 40.10 |
| 160 | 52.79 | 54.80 | 54.05 | 56.69 | 55.15 | 44.30 | 13.68 | 15.32 |
| 170 | 45.75 | 50.76 | 52.30 | 51.96 | 47.15 | 35.30 | 17.43 | 20.35 |
| 180 | 33.81 | 40.61 | 41.42 | 39.27 | 35.54 | 39.56 | 40.96 | 40.44 |
| DEG | LUMINOUS INTENSITY:cd | | | | | | | |

**Zonal Lumen Summary**

| Zone | Lumens | %Lamp | %Fixt |
|---|---|---|---|
| 0-20 | 132.22 | N.A. | 7.10 |
| 0-30 | 285.84 | N.A. | 15.30 |
| 0-40 | 480.28 | N.A. | 25.70 |
| 0-60 | 918.80 | N.A. | 49.10 |
| 0-80 | 1305.31 | N.A. | 69.80 |
| 0-90 | 1428.48 | N.A. | 76.30 |
| 10-90 | 1394.63 | N.A. | 74.50 |
| 20-40 | 348.06 | N.A. | 18.60 |
| 20-50 | 565.45 | N.A. | 30.20 |
| 40-70 | 645.63 | N.A. | 34.50 |
| 60-80 | 386.51 | N.A. | 20.70 |
| 70-80 | 179.41 | N.A. | 9.60 |
| 80-90 | 123.17 | N.A. | 6.60 |
| 90-110 | 185.62 | N.A. | 9.90 |
| 90-120 | 263.94 | N.A. | 14.10 |
| 90-130 | 325.16 | N.A. | 17.40 |
| 90-150 | 405.45 | N.A. | 21.70 |
| 90-180 | 442.57 | N.A. | 23.70 |
| 110-180 | 256.95 | N.A. | 13.70 |
| 0-180 | 1871.06 | N.A. | 100.00 |

Total Luminaire Efficiency = N.A.%

**Zonal Lumen Summary**

| Zone | Lumens |
|---|---|
| 0-10 | 33.85 |
| 10-20 | 98.37 |
| 20-30 | 153.62 |
| 30-40 | 194.44 |
| 40-50 | 217.39 |
| 50-60 | 221.13 |
| 60-70 | 207.10 |
| 70-80 | 179.41 |
| 80-90 | 123.17 |
| 90-100 | 89.22 |
| 100-110 | 96.40 |
| 110-120 | 78.32 |
| 120-130 | 61.22 |
| 130-140 | 46.53 |
| 140-150 | 33.76 |
| 150-160 | 21.88 |
| 160-170 | 11.54 |
| 170-180 | 3.70 |

## 5.0 Equipment Information

| Test Equipment | | | |
|---|---|---|---|
| Equipment ID | Equipment Name | Last Calibration Date | Calibration Due Date |
| DLF107 | Integrating Sphere System | 2019/12/26 | 2020/12/25 |
| DLF108 | Auxiliary Lamp | 2019/12/26 | 2020/12/25 |
| DLF122 | Measurement Standard Lamp<br>Standard Lamp Type: 220 V, 0.4720 A, Tungsten, Omni-derectional | 2019/12/26 | 2020/12/25 |
| DLF116 | AC Power Source | 2019/12/26 | 2020/12/25 |
| DLF113 | Power Meter | 2019/12/26 | 2020/12/25 |
| DLF112 | Temperature Recorder | 2019/12/26 | 2020/12/25 |
| DLF114 | Temperature & Humidity Datalogger | 2019/12/26 | 2020/12/25 |
| DLF101 | Goniophotometer | 2019/12/26 | 2020/12/25 |
| DLF125 | Standard Lamp<br>Standard Lamp Type: 76.58 V, 6.7875 A, Tungsten, Omni-derectional | 2019/12/26 | 2020/12/25 |
| DLF104 | AC Power Source | 2019/12/26 | 2020/12/25 |
| DLF507 | DC Power Source | 2019/12/26 | 2020/12/25 |
| DLF102 | Power Meter | 2019/12/26 | 2020/12/25 |
| DLF111 | Temperature & Humidity Datalogger | 2019/12/26 | 2020/12/25 |
| DLF119 | Power Meter | 2019/12/26 | 2020/12/25 |
| DLF031 | Temperature data logger | 2019/12/26 | 2020/12/25 |
| DLF022 | Digital power meter | 2019/12/26 | 2020/12/25 |
| DLF003 | Temperature & Humidity Datalogger | 2019/12/26 | 2020/12/25 |

********** End of Test Report**********