

Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P318253

Luminaire Tested: **GLEON-SA9C-830-U-T2**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P318253  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-12)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA9C-830-U-T2  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(9) 80 CRI, 3000K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 49310 lumens  
Efficiency: N/A  
Efficacy: 98.4 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B4 - U0 - G5

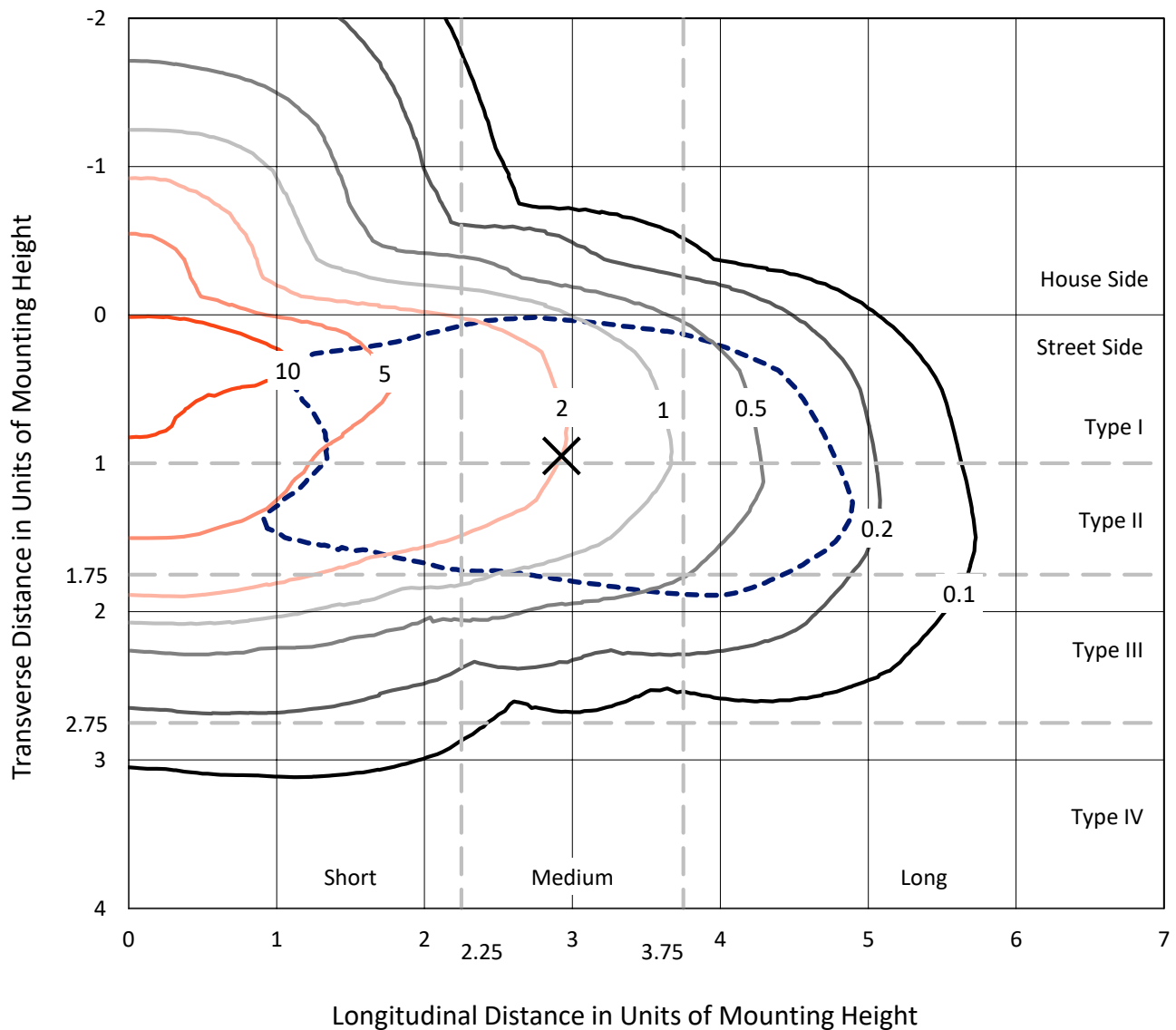
Input Watts (W): 501  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



REPORT NUMBER: P318253  
 CATALOG NUMBER: GLEON-SA9C-830-U-T2

## Iso-Footcandle Lines of Horizontal Illumination

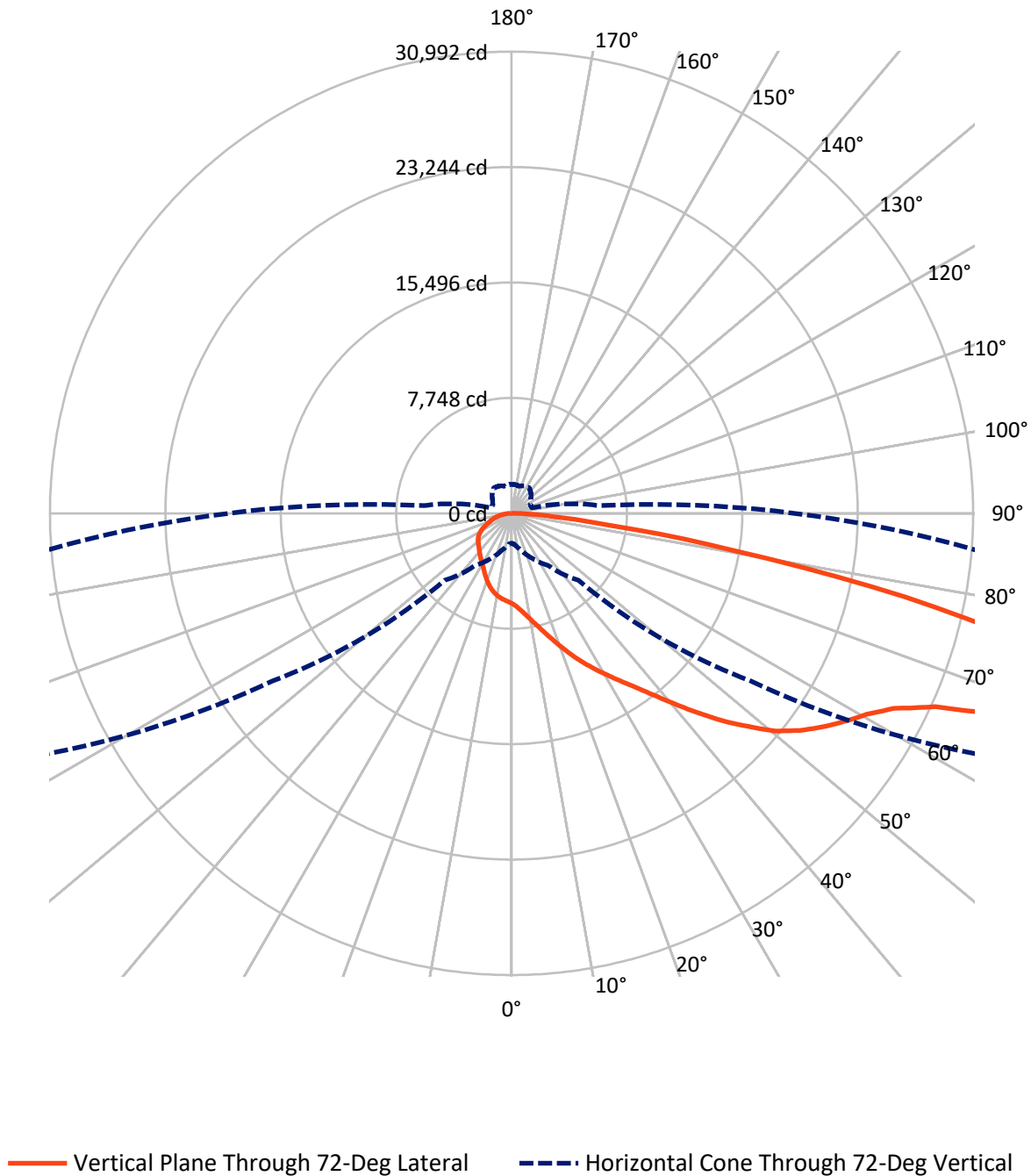
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 13.4 fc  
 Type III - Medium - N/A

REPORT NUMBER: P318253  
CATALOG NUMBER: GLEON-SA9C-830-U-T2

## Luminous Intensity Polar Plot



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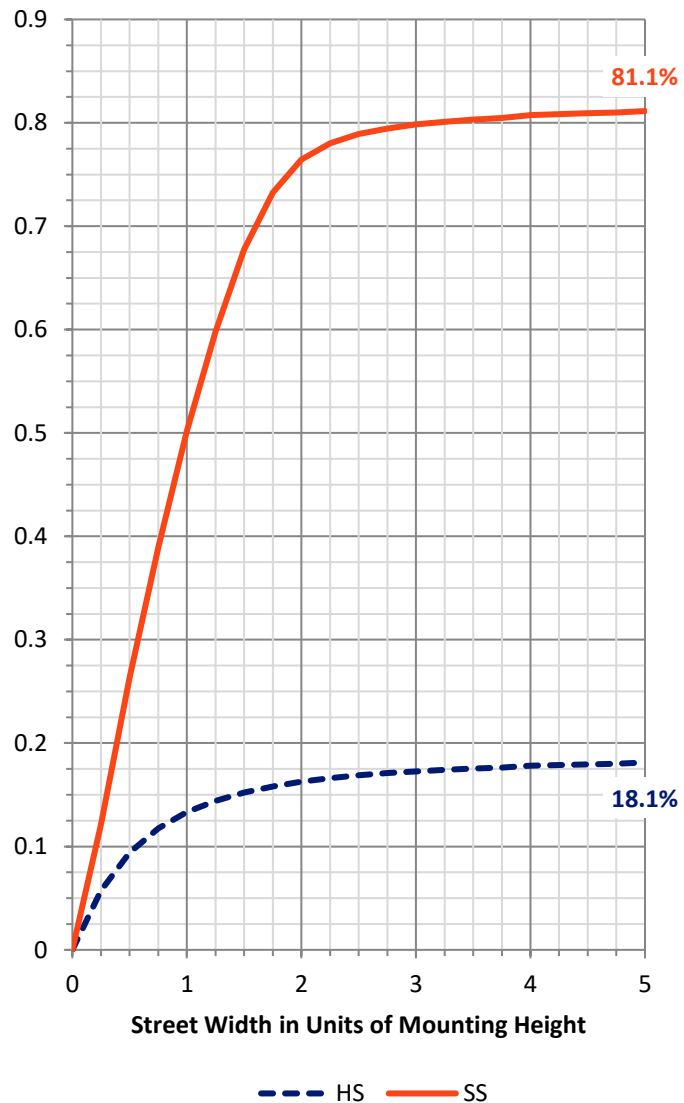
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 9147.3   | 0.0    | 9147.3  |
|                    | % Fixture | 18.6     | 0.0    | 18.6    |
| <b>Street Side</b> | Lumens    | 40162.7  | 0.0    | 40162.7 |
|                    | % Fixture | 81.4     | 0.0    | 81.4    |
| <b>Total</b>       | Lumens    | 49310.0  | 0.0    | 49310.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 607.9   | 1.2       |
| 10°-20°   | 1964.3  | 4.0       |
| 20°-30°   | 3442.2  | 7.0       |
| 30°-40°   | 5103.6  | 10.4      |
| 40°-50°   | 7464.5  | 15.1      |
| 50°-60°   | 10271.1 | 20.8      |
| 60°-70°   | 11434.8 | 23.2      |
| 70°-80°   | 7748.2  | 15.7      |
| 80°-90°   | 1273.5  | 2.6       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 49310.0 | 100.0     |
| 0°-180°   | 49310.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P318253

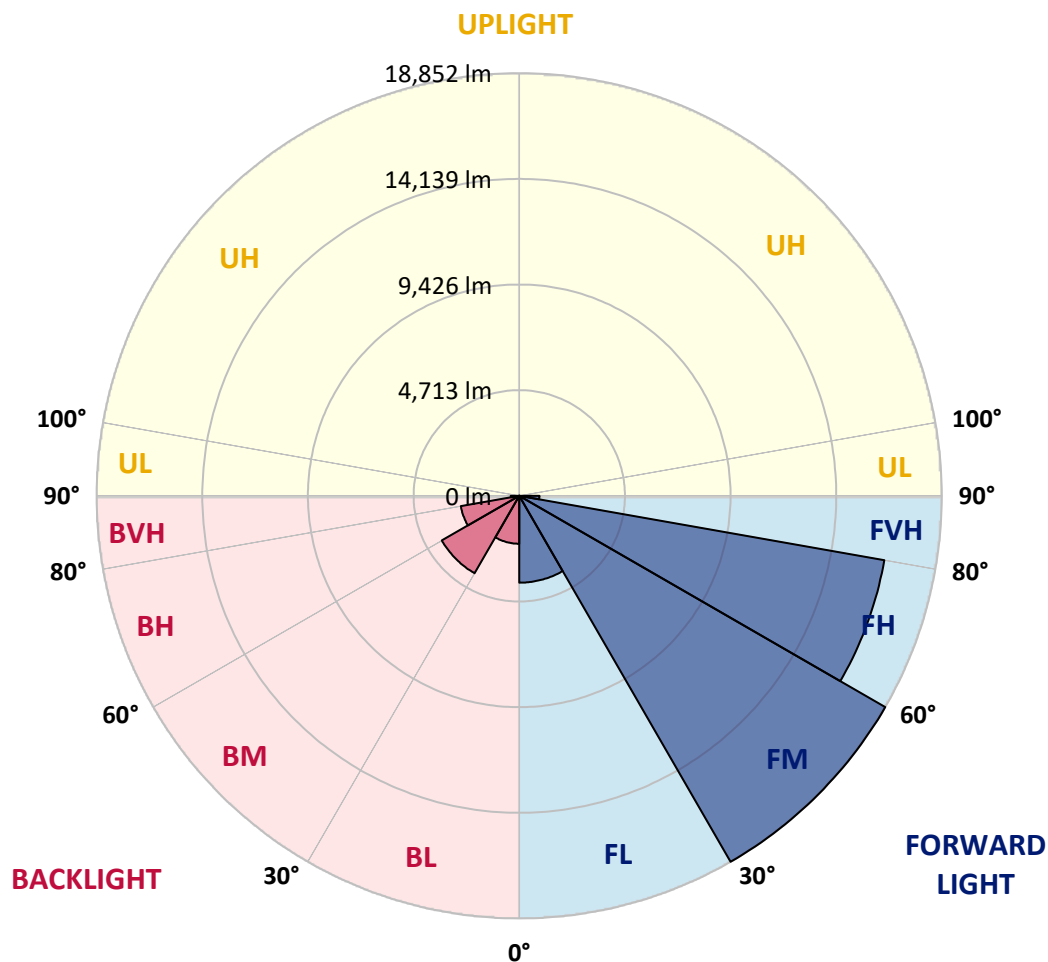
CATALOG NUMBER: GLEON-SA9C-830-U-T2

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 3876.1  | 7.9       |                         |      |         |
| FM   | (30°-60°)   | 18851.8 | 38.2      |                         |      |         |
| FH   | (60°-80°)   | 16536.5 | 33.5      |                         |      | G5      |
| FVH  | (80°-90°)   | 898.3   | 1.8       |                         |      | G5      |
| BL   | (0°-30°)    | 2138.3  | 4.3       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 3987.4  | 8.1       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 2646.4  | 5.4       | B4/5000                 |      | G4/5000 |
| BVH  | (80°-90°)   | 375.2   | 0.8       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G5**

Type III Medium



REPORT NUMBER: P318253

CATALOG NUMBER: GLEON-SA9C-830-U-T2

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 72°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  | 6066.4  |
| 2.5°  | 6701.4  | 6691.2  | 6655.6  | 6655.6  | 6587.7  | 6529.9  | 6421.3  | 6348.3  | 6261.7  | 6231.1  | 6129.2  |
| 5°    | 7350.0  | 7353.4  | 7309.2  | 7278.7  | 7178.5  | 7056.3  | 6871.2  | 6703.1  | 6535.0  | 6467.1  | 6258.3  |
| 7.5°  | 7895.0  | 7888.2  | 7876.3  | 7850.9  | 7757.5  | 7631.8  | 7382.2  | 7132.7  | 6884.8  | 6782.9  | 6423.0  |
| 10°   | 8244.8  | 8260.0  | 8270.2  | 8282.1  | 8243.1  | 8153.1  | 7917.1  | 7613.2  | 7288.9  | 7149.6  | 6619.9  |
| 12.5° | 8421.3  | 8448.5  | 8496.0  | 8577.5  | 8642.1  | 8631.9  | 8460.4  | 8137.8  | 7752.4  | 7577.5  | 6866.1  |
| 15°   | 8524.9  | 8560.6  | 8635.3  | 8781.3  | 8962.9  | 9066.5  | 9020.7  | 8728.6  | 8299.1  | 8083.5  | 7166.6  |
| 17.5° | 8589.4  | 8618.3  | 8733.7  | 8929.0  | 9198.9  | 9474.0  | 9594.5  | 9350.1  | 8917.1  | 8670.9  | 7511.3  |
| 20°   | 8633.6  | 8655.6  | 8800.0  | 9029.2  | 9378.9  | 9817.0  | 10153.1 | 10092.0 | 9597.9  | 9278.7  | 7871.2  |
| 22.5° | 8732.0  | 8750.7  | 8888.2  | 9119.1  | 9506.3  | 10071.6 | 10691.4 | 10783.0 | 10316.1 | 9954.5  | 8256.6  |
| 25°   | 9007.1  | 9007.1  | 9122.5  | 9283.8  | 9647.2  | 10292.4 | 11146.4 | 11552.2 | 11049.6 | 10628.5 | 8613.2  |
| 27.5° | 9531.7  | 9526.6  | 9569.1  | 9625.1  | 9900.2  | 10516.5 | 11552.2 | 12231.3 | 11810.2 | 11350.1 | 8959.6  |
| 30°   | 10153.1 | 10187.1 | 10192.2 | 10165.0 | 10294.1 | 10796.6 | 11927.4 | 12947.8 | 12576.0 | 12080.2 | 9314.4  |
| 32.5° | 10952.8 | 10974.9 | 10949.4 | 10859.4 | 10840.8 | 11193.9 | 12295.8 | 13698.3 | 13404.5 | 12842.5 | 9638.7  |
| 35°   | 11968.1 | 11925.7 | 11845.9 | 11662.5 | 11487.7 | 11725.3 | 12716.9 | 14448.7 | 14334.9 | 13764.5 | 10085.2 |
| 37.5° | 13056.5 | 13058.2 | 12959.7 | 12543.7 | 12302.6 | 12404.5 | 13297.6 | 15299.3 | 15460.6 | 14861.3 | 10657.4 |
| 40°   | 13929.2 | 13975.0 | 14036.1 | 13489.4 | 13177.0 | 13317.9 | 14036.1 | 16285.8 | 16791.7 | 16161.8 | 11402.8 |
| 42.5° | 14538.7 | 14591.3 | 14764.5 | 14421.5 | 14097.2 | 14358.7 | 14905.4 | 17338.4 | 18285.8 | 17662.7 | 12275.5 |
| 45°   | 15183.9 | 15212.7 | 15335.0 | 15187.3 | 14980.1 | 15569.3 | 15885.1 | 18428.5 | 19866.5 | 19262.1 | 13251.7 |
| 47.5° | 15863.0 | 15893.6 | 16019.2 | 15920.7 | 15812.1 | 16700.0 | 16907.2 | 19455.7 | 21381.0 | 21019.4 | 14294.2 |
| 50°   | 16701.7 | 16722.1 | 16841.0 | 16662.7 | 16696.7 | 17552.4 | 17820.6 | 20398.0 | 22968.5 | 22598.4 | 15340.1 |
| 52.5° | 17846.1 | 17851.2 | 18015.9 | 17854.6 | 17695.0 | 18177.2 | 18606.7 | 21285.9 | 24213.0 | 24038.2 | 16385.9 |
| 55°   | 18742.6 | 18796.9 | 19336.8 | 19302.9 | 19211.2 | 18744.3 | 19263.8 | 22131.5 | 25323.4 | 25406.6 | 17496.3 |
| 57.5° | 18170.4 | 18382.6 | 19476.0 | 20246.9 | 20997.3 | 20155.2 | 20151.8 | 23084.0 | 26355.7 | 26749.6 | 18717.1 |
| 60°   | 15913.9 | 16202.6 | 17813.8 | 19523.6 | 21871.7 | 22610.3 | 21995.6 | 24247.0 | 27398.2 | 28080.7 | 20246.9 |
| 62.5° | 11365.4 | 11840.8 | 14024.2 | 16754.4 | 20673.0 | 24236.8 | 25747.9 | 26092.6 | 28815.9 | 29622.4 | 22235.0 |
| 65°   | 5745.5  | 6105.5  | 7935.7  | 11224.5 | 16516.7 | 23173.9 | 29826.1 | 30133.4 | 31279.5 | 31996.0 | 25296.3 |
| 67.5° | 3490.8  | 3626.6  | 4519.7  | 6243.0  | 10126.0 | 18051.5 | 31157.2 | 36868.8 | 36047.0 | 36427.4 | 29661.4 |
| 70°   | 2572.2  | 2672.4  | 3229.3  | 4146.1  | 5823.6  | 10592.9 | 27072.2 | 41675.4 | 41135.5 | 41093.1 | 32887.3 |
| 72°   | 2003.5  | 2076.5  | 2568.8  | 3349.9  | 4258.2  | 6355.1  | 19622.0 | 39901.2 | 42592.3 | 42378.3 | 32591.9 |
| 72.5° | 1899.9  | 1964.4  | 2412.6  | 3152.9  | 4023.9  | 5760.8  | 17642.4 | 38704.2 | 42487.0 | 42390.2 | 32209.9 |
| 75°   | 1495.8  | 1541.6  | 1786.1  | 2438.1  | 3149.5  | 3268.4  | 9667.6  | 29994.2 | 37690.6 | 39257.7 | 28970.4 |
| 77.5° | 1237.7  | 1244.5  | 1373.6  | 1774.3  | 2455.1  | 2310.8  | 4748.9  | 20810.5 | 26989.0 | 28712.3 | 20521.9 |
| 80°   | 1008.5  | 1017.0  | 1078.1  | 1244.5  | 1857.4  | 1709.7  | 2254.7  | 11966.4 | 15110.9 | 15129.5 | 9759.2  |
| 82.5° | 803.1   | 804.8   | 872.7   | 910.0   | 1334.5  | 1222.5  | 1292.1  | 5618.2  | 6602.9  | 6351.7  | 3507.8  |
| 85°   | 565.4   | 553.5   | 852.3   | 747.1   | 872.7   | 784.4   | 713.1   | 2224.2  | 2730.1  | 2611.3  | 1098.5  |
| 87.5° | 188.5   | 195.3   | 378.6   | 483.9   | 509.4   | 444.8   | 317.5   | 852.3   | 1030.6  | 1022.1  | 348.1   |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |



REPORT NUMBER: P318253

CATALOG NUMBER: GLEON-SA9C-830-U-T2

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 6066.4  | 6066.4 | 6066.4 | 6066.4 | 6066.4 | 6066.4 | 6066.4 | 6066.4 | 6066.4 | 6066.4 | 6066.4 |
| 2.5°  | 6097.0  | 6042.6 | 5962.8 | 5874.6 | 5804.9 | 5733.6 | 5681.0 | 5653.8 | 5623.3 | 5597.8 | 5628.4 |
| 5°    | 6161.5  | 6059.6 | 5889.8 | 5723.5 | 5601.2 | 5492.5 | 5414.4 | 5373.7 | 5336.3 | 5310.9 | 5314.3 |
| 7.5°  | 6266.8  | 6102.1 | 5816.8 | 5574.0 | 5404.3 | 5287.1 | 5207.3 | 5180.1 | 5156.4 | 5149.6 | 5158.1 |
| 10°   | 6378.8  | 6136.0 | 5720.1 | 5397.5 | 5203.9 | 5107.1 | 5071.5 | 5090.2 | 5107.1 | 5122.4 | 5139.4 |
| 12.5° | 6506.2  | 6166.6 | 5579.1 | 5190.3 | 5025.6 | 4988.3 | 5023.9 | 5105.4 | 5164.9 | 5200.5 | 5222.6 |
| 15°   | 6672.5  | 6193.8 | 5416.1 | 4983.2 | 4872.8 | 4915.3 | 5035.8 | 5176.7 | 5280.3 | 5346.5 | 5356.7 |
| 17.5° | 6825.4  | 6192.1 | 5207.3 | 4774.4 | 4748.9 | 4872.8 | 5054.5 | 5253.1 | 5392.4 | 5485.8 | 5504.4 |
| 20°   | 6983.3  | 6146.2 | 4964.5 | 4570.6 | 4623.2 | 4827.0 | 5063.0 | 5302.4 | 5470.5 | 5579.1 | 5604.6 |
| 22.5° | 7131.0  | 6066.4 | 4697.9 | 4385.5 | 4518.0 | 4765.9 | 5030.7 | 5273.5 | 5441.6 | 5529.9 | 5557.1 |
| 25°   | 7231.1  | 5927.2 | 4428.0 | 4229.3 | 4424.6 | 4691.2 | 4925.5 | 5120.7 | 5246.4 | 5290.5 | 5297.3 |
| 27.5° | 7282.1  | 5745.5 | 4173.3 | 4093.5 | 4327.8 | 4568.9 | 4730.2 | 4827.0 | 4862.6 | 4859.2 | 4852.5 |
| 30°   | 7288.9  | 5506.1 | 3954.3 | 3983.2 | 4215.8 | 4388.9 | 4465.3 | 4446.7 | 4400.8 | 4322.7 | 4329.5 |
| 32.5° | 7266.8  | 5236.2 | 3770.9 | 3877.9 | 4073.1 | 4169.9 | 4173.3 | 4083.3 | 3961.1 | 3837.1 | 3803.2 |
| 35°   | 7273.6  | 4971.3 | 3609.6 | 3759.0 | 3900.0 | 3942.4 | 3903.4 | 3770.9 | 3604.5 | 3444.9 | 3411.0 |
| 37.5° | 7348.3  | 4740.4 | 3470.4 | 3621.5 | 3708.1 | 3718.3 | 3662.3 | 3523.0 | 3400.8 | 3244.6 | 3231.0 |
| 40°   | 7526.6  | 4575.7 | 3338.0 | 3467.0 | 3516.2 | 3521.3 | 3441.5 | 3343.1 | 3353.3 | 3270.1 | 3268.4 |
| 42.5° | 7847.5  | 4504.4 | 3220.8 | 3305.7 | 3336.3 | 3346.5 | 3285.3 | 3222.5 | 3310.8 | 3256.5 | 3237.8 |
| 45°   | 8261.7  | 4521.4 | 3122.3 | 3147.8 | 3203.8 | 3251.4 | 3214.0 | 3137.6 | 3171.6 | 2935.6 | 2857.5 |
| 47.5° | 8740.5  | 4630.0 | 3044.2 | 3012.0 | 3108.8 | 3198.7 | 3141.0 | 3025.6 | 2905.0 | 2670.7 | 2626.6 |
| 50°   | 9300.8  | 4798.1 | 2972.9 | 2877.9 | 3005.2 | 3127.4 | 3069.7 | 2905.0 | 2723.4 | 2609.6 | 2594.3 |
| 52.5° | 9884.9  | 5003.6 | 2901.6 | 2730.1 | 2874.5 | 3073.1 | 3044.2 | 2877.9 | 2653.7 | 2541.7 | 2521.3 |
| 55°   | 10547.0 | 5210.7 | 2811.6 | 2558.7 | 2733.5 | 3047.6 | 3032.4 | 2779.4 | 2601.1 | 2538.3 | 2523.0 |
| 57.5° | 11370.5 | 5446.7 | 2692.8 | 2380.4 | 2601.1 | 2956.0 | 2908.4 | 2720.0 | 2546.8 | 2499.2 | 2494.1 |
| 60°   | 12443.5 | 5794.8 | 2521.3 | 2190.2 | 2439.8 | 2815.0 | 2804.8 | 2633.4 | 2460.2 | 2426.2 | 2419.4 |
| 62.5° | 14053.1 | 6370.3 | 2285.3 | 2000.1 | 2259.8 | 2575.6 | 2669.0 | 2516.2 | 2368.5 | 2366.8 | 2370.2 |
| 65°   | 16548.9 | 7236.2 | 2028.9 | 1833.7 | 2078.2 | 2373.6 | 2511.1 | 2395.7 | 2275.1 | 2309.1 | 2314.2 |
| 67.5° | 19442.1 | 7954.4 | 1777.6 | 1670.7 | 1893.1 | 2181.7 | 2368.5 | 2275.1 | 2151.2 | 2239.5 | 2241.2 |
| 70°   | 20404.8 | 7312.6 | 1556.9 | 1509.4 | 1701.2 | 1996.7 | 2214.0 | 2142.7 | 2017.0 | 2105.3 | 2096.8 |
| 72°   | 18988.7 | 5903.4 | 1414.3 | 1387.1 | 1556.9 | 1843.9 | 2076.5 | 2018.7 | 1894.8 | 1954.2 | 1932.2 |
| 72.5° | 18542.2 | 5628.4 | 1378.7 | 1356.6 | 1517.9 | 1804.8 | 2040.8 | 1988.2 | 1864.2 | 1915.2 | 1894.8 |
| 75°   | 16540.5 | 4888.1 | 1185.1 | 1190.2 | 1324.3 | 1614.7 | 1840.5 | 1823.5 | 1696.2 | 1701.2 | 1694.5 |
| 77.5° | 11997.0 | 3584.2 | 998.3  | 1032.3 | 1127.4 | 1419.4 | 1638.4 | 1628.2 | 1489.0 | 1463.5 | 1458.5 |
| 80°   | 5567.2  | 1828.6 | 813.3  | 828.6  | 927.0  | 1186.8 | 1397.3 | 1383.7 | 1271.7 | 1239.4 | 1220.8 |
| 82.5° | 1906.7  | 869.3  | 611.2  | 621.4  | 718.2  | 955.9  | 1212.3 | 1203.8 | 1110.4 | 1047.6 | 1008.5 |
| 85°   | 680.8   | 433.0  | 427.9  | 417.7  | 512.8  | 752.1  | 1056.1 | 1010.2 | 872.7  | 743.7  | 740.3  |
| 87.5° | 220.7   | 185.1  | 220.7  | 219.0  | 298.8  | 509.4  | 767.4  | 653.7  | 633.3  | 526.3  | 516.1  |
| 90°   | 0.0     | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

### Spectral Parameters

CCT (K): 3050  
 CIE  $u'$ : 0.2476  
 CIE  $v'$ : 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

CRI (Ra): 81.0  
 R1: 79.6  
 R2: 85.6  
 R3: 92.0  
 R4: 82.6  
 R5: 78.9  
 R6: 81.7  
 R7: 85.2  
 R8: 62.0  
 R9: 7.1  
 R10: 67.0  
 R11: 82.7  
 R12: 63.2  
 R13: 80.3  
 R14: 95.0  
 R15: 71.7



### Test Conditions

Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2408-195-9

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2408-195-9

**CIE 1931 Chromaticity Diagram**



**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

### Photopic Flux vs. Wavelength

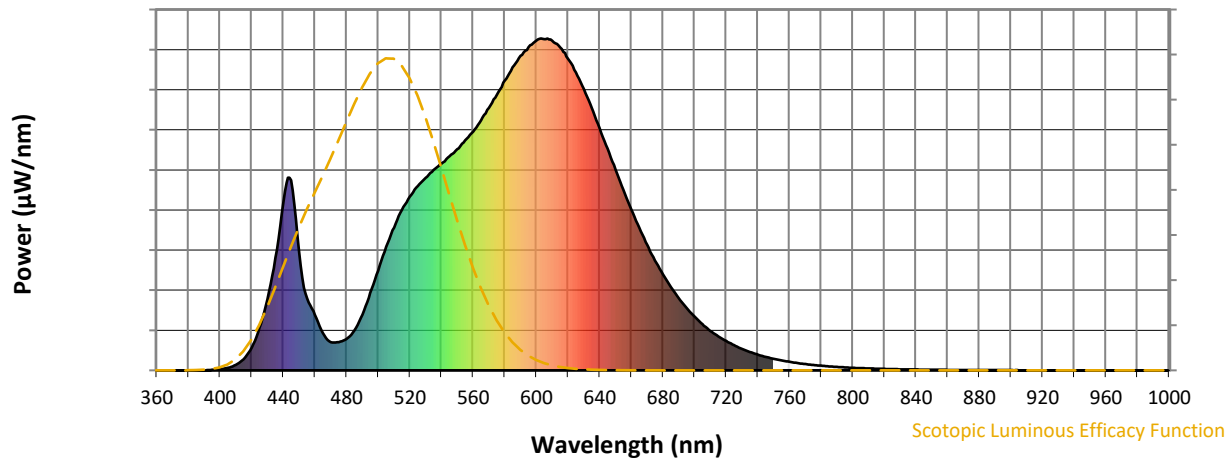


### Photopic Lumens: NR

| λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) | λ (nm) | Power W <sup>λ</sup> /nm | Lumens (φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2408-195-9

### Scotopic Flux vs. Wavelength



Scotopic Lumens: NR

S/P: 1.27

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2408-195-9

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.32**

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 168                                  | NR                             | 620               | 940                                  | NR                             | 750               | 35                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 233                                  | NR                             | 625               | 897                                  | NR                             | 755               | 30                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 300                                  | NR                             | 630               | 847                                  | NR                             | 760               | 26                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 372                                  | NR                             | 635               | 790                                  | NR                             | 765               | 22                                   | NR                             | 895               | 1                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 430                                  | NR                             | 640               | 730                                  | NR                             | 770               | 19                                   | NR                             | 900               | 1                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 483                                  | NR                             | 645               | 668                                  | NR                             | 775               | 16                                   | NR                             | 905               | 1                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 524                                  | NR                             | 650               | 605                                  | NR                             | 780               | 14                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 555                                  | NR                             | 655               | 545                                  | NR                             | 785               | 12                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 581                                  | NR                             | 660               | 485                                  | NR                             | 790               | 10                                   | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 604                                  | NR                             | 665               | 430                                  | NR                             | 795               | 9                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 17                                   | NR                             | 540               | 623                                  | NR                             | 670               | 378                                  | NR                             | 800               | 8                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 34                                   | NR                             | 545               | 645                                  | NR                             | 675               | 331                                  | NR                             | 805               | 7                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 68                                   | NR                             | 550               | 667                                  | NR                             | 680               | 290                                  | NR                             | 810               | 6                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 128                                  | NR                             | 555               | 693                                  | NR                             | 685               | 251                                  | NR                             | 815               | 5                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 214                                  | NR                             | 560               | 719                                  | NR                             | 690               | 218                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 339                                  | NR                             | 565               | 754                                  | NR                             | 695               | 188                                  | NR                             | 825               | 4                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 507                                  | NR                             | 570               | 791                                  | NR                             | 700               | 162                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 573                                  | NR                             | 575               | 830                                  | NR                             | 705               | 139                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 356                                  | NR                             | 580               | 873                                  | NR                             | 710               | 119                                  | NR                             | 840               | 3                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 217                                  | NR                             | 585               | 913                                  | NR                             | 715               | 102                                  | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 168                                  | NR                             | 590               | 948                                  | NR                             | 720               | 88                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 113                                  | NR                             | 595               | 974                                  | NR                             | 725               | 76                                   | NR                             | 855               | 2                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 85                                   | NR                             | 600               | 994                                  | NR                             | 730               | 65                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 85                                   | NR                             | 605               | 998                                  | NR                             | 735               | 55                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 94                                   | NR                             | 610               | 994                                  | NR                             | 740               | 47                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 120                                  | NR                             | 615               | 973                                  | NR                             | 745               | 41                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2408-195-9

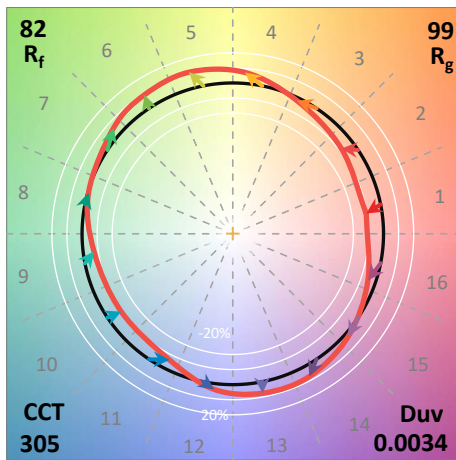
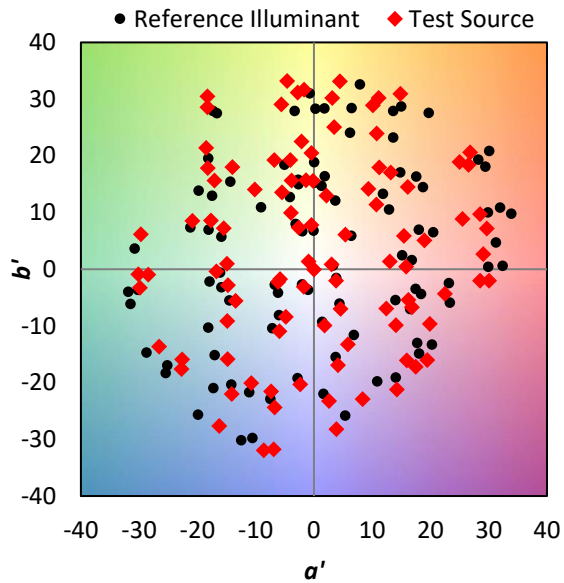
TM-30-18

### Summary

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_9 = 7.1$



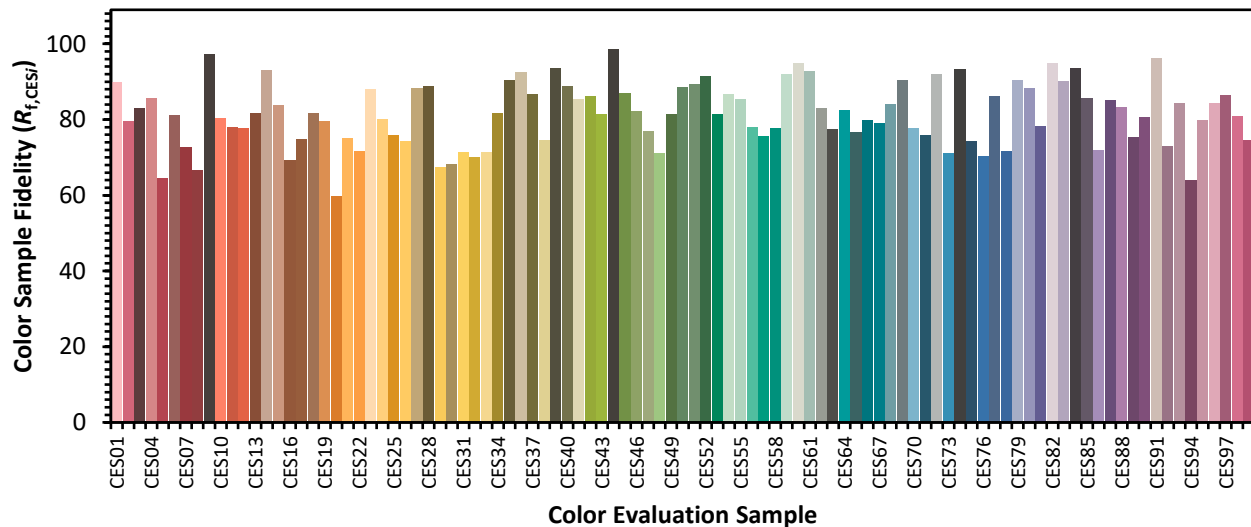
### Color Vector Graphics



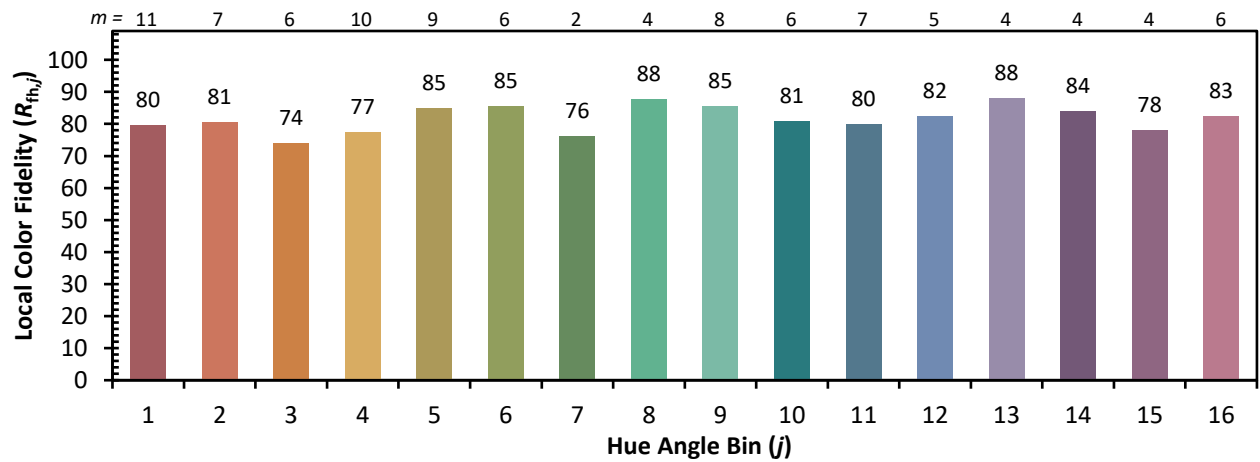
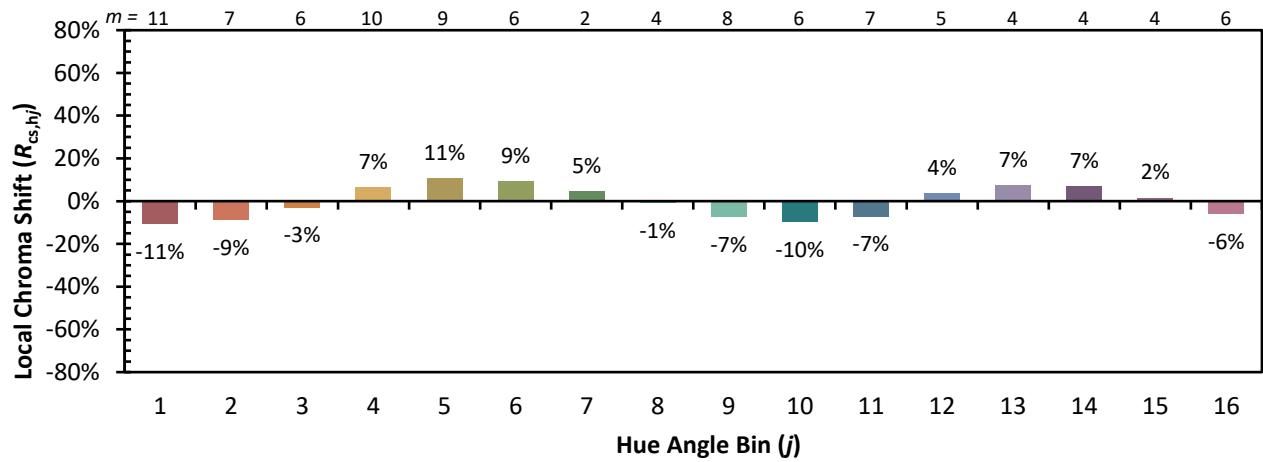


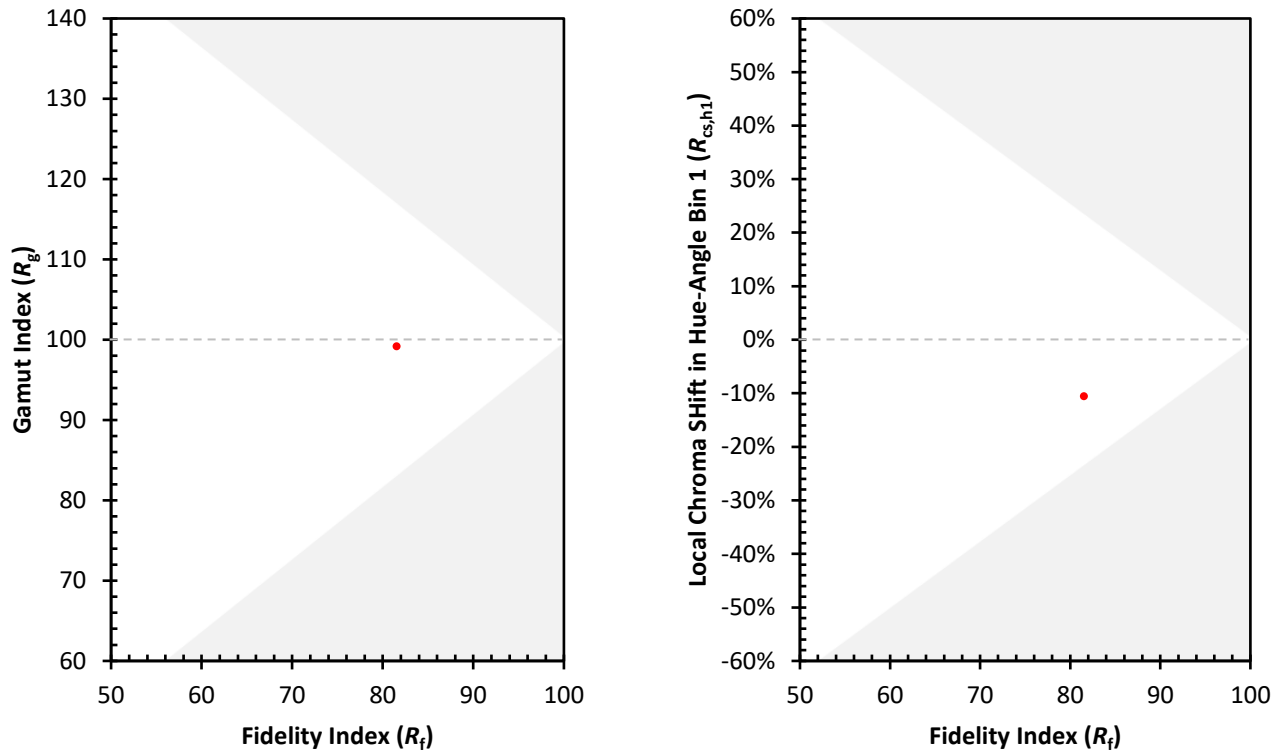
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)