

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: P317594

Luminaire Tested: **GLEON-SA0A-830-U-T2R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P317594  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA0A-830-U-T2R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(10) 80 CRI, 3000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 38187 lumens  
Efficiency: N/A  
Efficacy: 118.2 lumens/watt  
Luminous Opening: Rectangular (W 2.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G4

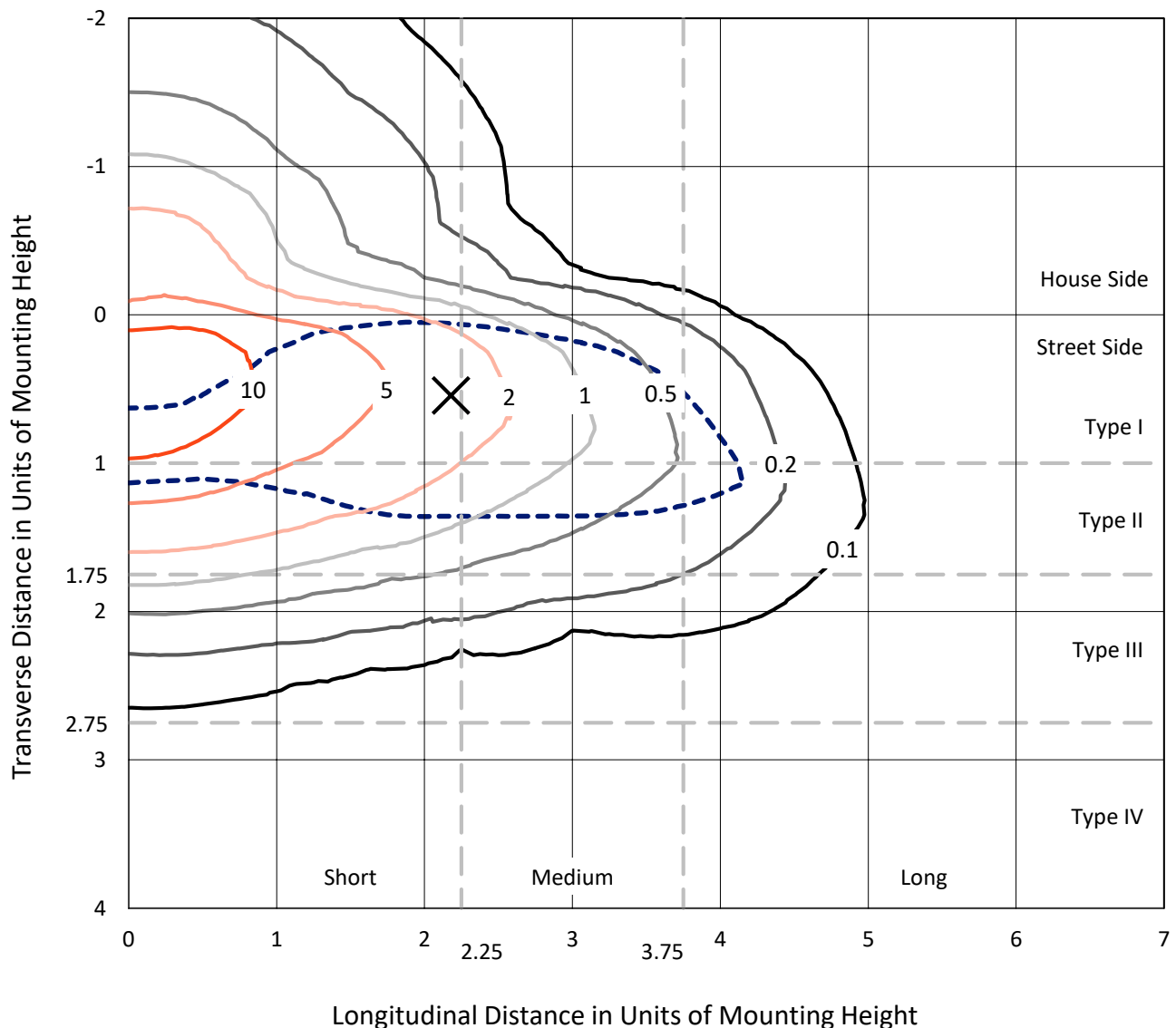
Input Watts (W): 323  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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## Iso-Footcandle Lines of Horizontal Illumination

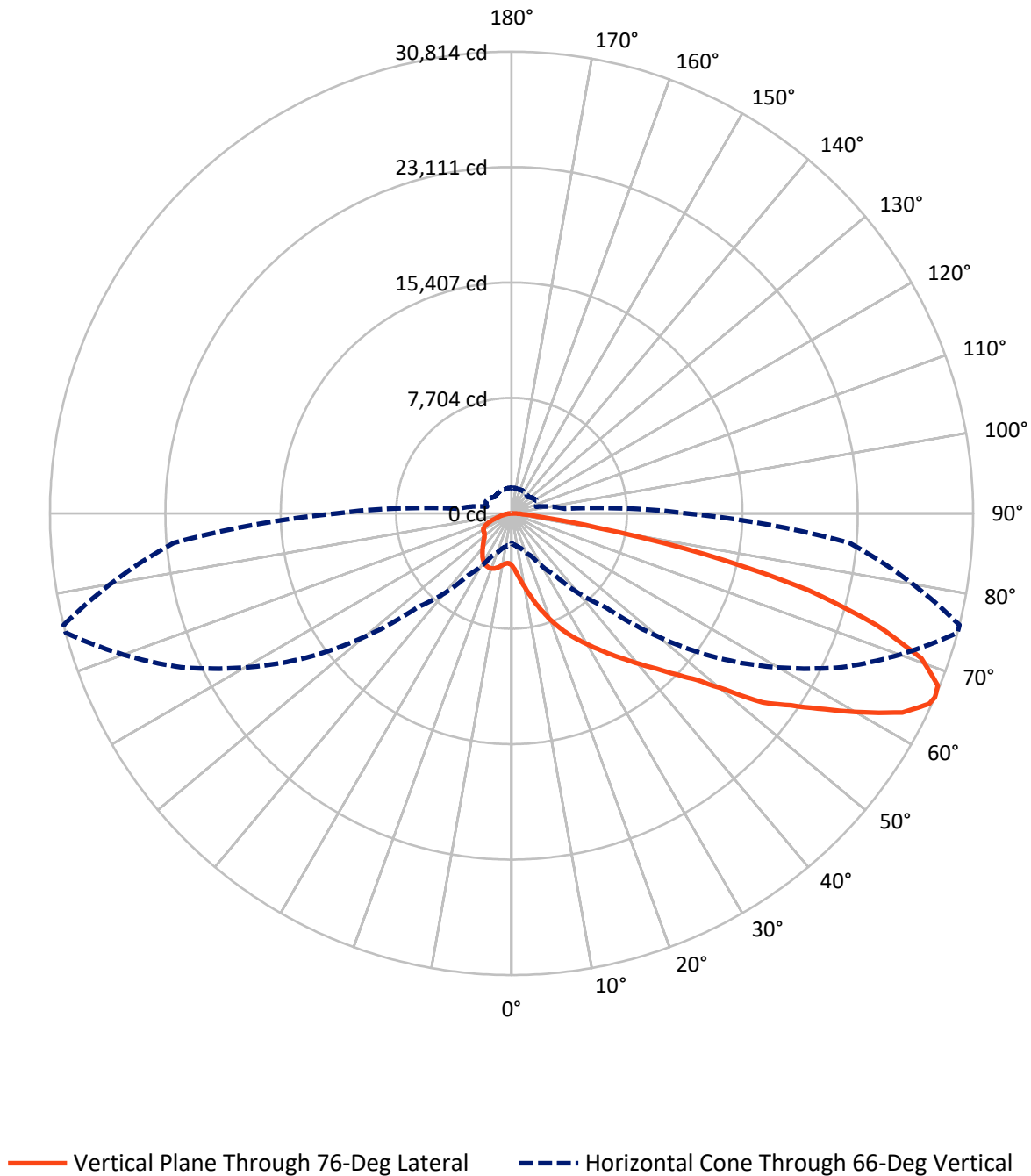
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 14.8 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA0A-830-U-T2R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 6425.6   | 0.0    | 6425.6  |
|                    | % Fixture | 16.8     | 0.0    | 16.8    |
| <b>Street Side</b> | Lumens    | 31761.4  | 0.0    | 31761.4 |
|                    | % Fixture | 83.2     | 0.0    | 83.2    |
| <b>Total</b>       | Lumens    | 38187.0  | 0.0    | 38187.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 421.7   | 1.1       |
| 10°-20°   | 1665.3  | 4.4       |
| 20°-30°   | 3236.1  | 8.5       |
| 30°-40°   | 5282.1  | 13.8      |
| 40°-50°   | 7216.6  | 18.9      |
| 50°-60°   | 8405.9  | 22.0      |
| 60°-70°   | 7536.0  | 19.7      |
| 70°-80°   | 3808.4  | 10.0      |
| 80°-90°   | 615.0   | 1.6       |
| 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°    | 38187.0 | 100.0     |
| 0°-180°   | 38187.0 | 100.0     |

**Coefficient of Utilization**



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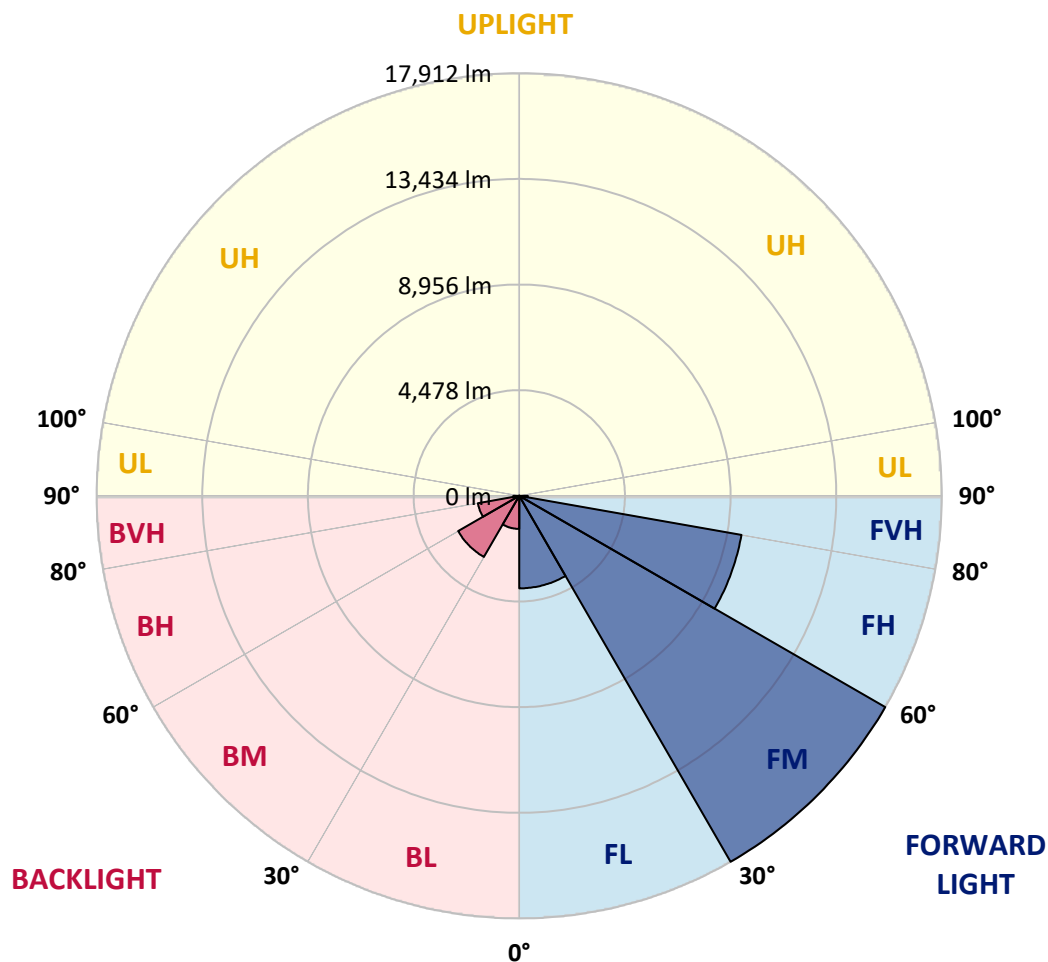
CATALOG NUMBER: GLEON-SA0A-830-U-T2R

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 3921.7  | 10.3      |                         |      |          |
| FM   | (30°-60°)   | 17912.4 | 46.9      |                         |      |          |
| FH   | (60°-80°)   | 9564.2  | 25.0      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 363.2   | 1.0       |                         |      | G3/500   |
| BL   | (0°-30°)    | 1401.4  | 3.7       | B3/2500                 |      |          |
| BM   | (30°-60°)   | 2992.1  | 7.8       | B3/5000                 |      |          |
| BH   | (60°-80°)   | 1780.2  | 4.7       | B3/2500                 |      | G3/2500  |
| BVH  | (80°-90°)   | 251.8   | 0.7       |                         |      | G3/500   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B3-U0-G4**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 76°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  | 3487.3  |
| 2.5°  | 4629.5  | 4559.5  | 4553.0  | 4450.6  | 4427.2  | 4231.5  | 4087.6  | 3937.2  | 3766.1  | 3732.4  | 3597.5  |
| 5°    | 5946.6  | 5940.1  | 5850.7  | 5683.4  | 5552.5  | 5218.0  | 4887.5  | 4537.4  | 4153.7  | 4091.5  | 3788.1  |
| 7.5°  | 7131.5  | 7121.2  | 7052.5  | 6872.3  | 6683.0  | 6272.0  | 5800.1  | 5263.4  | 4641.1  | 4549.1  | 4046.1  |
| 10°   | 8031.2  | 8027.4  | 8004.0  | 7871.8  | 7711.0  | 7316.9  | 6795.8  | 6063.3  | 5207.7  | 5081.9  | 4368.9  |
| 12.5° | 8726.1  | 8733.9  | 8749.4  | 8702.8  | 8626.3  | 8290.5  | 7756.4  | 6911.1  | 5811.8  | 5687.3  | 4728.0  |
| 15°   | 9196.7  | 9220.0  | 9300.4  | 9366.5  | 9406.7  | 9200.6  | 8683.3  | 7778.4  | 6488.5  | 6339.4  | 5126.0  |
| 17.5° | 9434.0  | 9459.9  | 9598.6  | 9798.2  | 9982.3  | 9961.6  | 9550.6  | 8605.5  | 7138.0  | 6994.1  | 5553.8  |
| 20°   | 9638.8  | 9658.2  | 9813.8  | 10053.6 | 10379.0 | 10522.9 | 10292.2 | 9401.5  | 7849.7  | 7678.6  | 6007.5  |
| 22.5° | 10232.5 | 10257.2 | 10303.8 | 10440.0 | 10727.8 | 10992.2 | 10880.7 | 10154.8 | 8501.8  | 8342.4  | 6438.0  |
| 25°   | 11378.6 | 11408.4 | 11307.3 | 11191.9 | 11246.3 | 11430.4 | 11451.2 | 10841.9 | 9163.0  | 8982.8  | 6900.8  |
| 27.5° | 12759.2 | 12802.0 | 12629.6 | 12332.7 | 12073.4 | 12002.1 | 11977.5 | 11404.5 | 9794.4  | 9585.6  | 7358.4  |
| 30°   | 14111.4 | 14185.3 | 13961.0 | 13576.0 | 13100.2 | 12765.7 | 12518.1 | 11955.5 | 10416.6 | 10217.0 | 7790.1  |
| 32.5° | 15432.4 | 15402.6 | 15077.2 | 14701.3 | 14143.8 | 13725.1 | 13126.1 | 12546.6 | 11116.7 | 10887.2 | 8219.2  |
| 35°   | 16337.3 | 16347.7 | 16045.6 | 15599.7 | 15068.1 | 14746.6 | 13940.3 | 13184.5 | 11831.0 | 11619.7 | 8706.7  |
| 37.5° | 17107.4 | 17059.4 | 16717.2 | 16301.0 | 15843.4 | 15706.0 | 14893.1 | 13887.1 | 12605.0 | 12374.2 | 9225.2  |
| 40°   | 17364.1 | 17308.3 | 17084.0 | 16784.6 | 16417.7 | 16406.0 | 15944.5 | 14683.1 | 13480.0 | 13251.9 | 9809.9  |
| 42.5° | 17208.5 | 17137.2 | 17045.2 | 16963.5 | 16850.7 | 16902.6 | 16932.4 | 15616.5 | 14442.0 | 14186.6 | 10486.6 |
| 45°   | 16634.2 | 16526.6 | 16591.4 | 16769.0 | 17014.0 | 17307.0 | 17824.3 | 16649.8 | 15519.3 | 15305.4 | 11281.3 |
| 47.5° | 15751.3 | 15654.1 | 15856.4 | 16236.2 | 16902.6 | 17644.1 | 18668.3 | 17790.6 | 16805.3 | 16592.7 | 12413.1 |
| 50°   | 14509.4 | 14537.9 | 14827.0 | 15518.0 | 16525.3 | 17799.7 | 19708.0 | 19300.9 | 18674.7 | 18476.4 | 13957.1 |
| 52.5° | 12471.4 | 12476.6 | 13290.8 | 14425.1 | 15856.4 | 17719.3 | 20284.9 | 21231.3 | 21227.4 | 20987.5 | 15427.2 |
| 55°   | 10578.7 | 10694.1 | 11338.4 | 12846.1 | 14772.6 | 17397.8 | 20688.1 | 22169.9 | 22903.6 | 22622.3 | 16797.5 |
| 57.5° | 8730.0  | 8797.4  | 9408.0  | 10922.2 | 13225.9 | 16540.9 | 21101.6 | 23296.4 | 24835.3 | 24657.7 | 18501.0 |
| 60°   | 6627.2  | 6730.9  | 7362.3  | 8761.1  | 11247.6 | 15020.2 | 21140.5 | 24472.3 | 27144.2 | 26965.3 | 20402.9 |
| 62.5° | 4301.5  | 4480.4  | 5071.5  | 6382.2  | 8854.5  | 12833.1 | 20238.2 | 25241.0 | 29332.5 | 29269.0 | 22090.8 |
| 65°   | 2472.2  | 2607.1  | 3018.0  | 4029.2  | 6108.7  | 10087.3 | 18092.7 | 24945.5 | 30679.5 | 30643.2 | 22722.1 |
| 66°   | 2019.8  | 2104.1  | 2419.1  | 3149.0  | 5040.4  | 8858.3  | 16845.5 | 24321.9 | 30813.0 | 30814.3 | 22649.5 |
| 67.5° | 1615.3  | 1652.9  | 1794.2  | 2254.5  | 3719.4  | 7021.3  | 14617.0 | 22946.4 | 30647.1 | 30692.4 | 22181.5 |
| 70°   | 1336.6  | 1356.0  | 1400.1  | 1511.6  | 2030.2  | 4234.1  | 10375.1 | 19372.2 | 28981.2 | 29016.2 | 20354.9 |
| 72.5° | 1199.2  | 1210.8  | 1227.7  | 1243.3  | 1432.5  | 2365.9  | 6336.8  | 15497.2 | 25409.6 | 25454.9 | 17571.5 |
| 75°   | 1086.4  | 1092.9  | 1090.3  | 1091.6  | 1201.8  | 1507.7  | 3274.7  | 11570.4 | 20545.5 | 20454.7 | 13460.6 |
| 77.5° | 954.2   | 960.6   | 947.7   | 950.3   | 1063.1  | 1159.0  | 1629.6  | 8099.9  | 13865.1 | 13224.6 | 7584.0  |
| 80°   | 806.4   | 811.6   | 806.4   | 815.4   | 925.6   | 875.1   | 947.7   | 4556.9  | 6130.7  | 5798.8  | 2696.5  |
| 82.5° | 609.3   | 631.4   | 646.9   | 683.2   | 762.3   | 622.3   | 633.9   | 1774.8  | 1866.8  | 1777.4  | 827.1   |
| 85°   | 267.1   | 325.4   | 487.4   | 522.5   | 573.0   | 373.4   | 416.1   | 723.4   | 759.7   | 736.4   | 300.8   |
| 87.5° | 70.0    | 76.5    | 241.1   | 303.4   | 317.6   | 168.5   | 216.5   | 329.3   | 347.4   | 329.3   | 99.8    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

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CATALOG NUMBER: GLEON-SA0A-830-U-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3487.3  | 3487.3 | 3487.3 | 3487.3 | 3487.3 | 3487.3 | 3487.3 | 3487.3 | 3487.3 | 3487.3 | 3487.3 |
| 2.5°  | 3526.2  | 3462.7 | 3348.6 | 3247.5 | 3171.0 | 3119.2 | 3067.3 | 3041.4 | 3025.8 | 3010.3 | 3012.8 |
| 5°    | 3639.0  | 3510.7 | 3314.9 | 3176.2 | 3098.4 | 3049.1 | 3023.2 | 3012.8 | 3006.4 | 2990.8 | 2990.8 |
| 7.5°  | 3808.8  | 3627.3 | 3357.7 | 3215.1 | 3154.2 | 3116.6 | 3101.0 | 3095.8 | 3088.0 | 3069.9 | 3072.5 |
| 10°   | 4022.8  | 3768.7 | 3447.1 | 3308.4 | 3252.7 | 3211.2 | 3189.2 | 3181.4 | 3167.1 | 3146.4 | 3149.0 |
| 12.5° | 4274.3  | 3943.7 | 3565.1 | 3419.9 | 3352.5 | 3296.8 | 3260.5 | 3238.4 | 3213.8 | 3186.6 | 3187.9 |
| 15°   | 4549.1  | 4134.2 | 3692.2 | 3519.7 | 3427.7 | 3349.9 | 3291.6 | 3254.0 | 3215.1 | 3181.4 | 3180.1 |
| 17.5° | 4827.8  | 4318.3 | 3789.4 | 3574.2 | 3449.7 | 3347.3 | 3268.2 | 3209.9 | 3161.9 | 3120.5 | 3116.6 |
| 20°   | 5128.6  | 4484.3 | 3843.8 | 3569.0 | 3408.3 | 3286.4 | 3181.4 | 3108.8 | 3055.6 | 3014.1 | 3007.7 |
| 22.5° | 5434.5  | 4639.8 | 3852.9 | 3515.9 | 3316.2 | 3167.1 | 3056.9 | 2976.6 | 2922.1 | 2879.3 | 2863.8 |
| 25°   | 5714.6  | 4760.4 | 3815.3 | 3413.4 | 3187.9 | 3027.1 | 2919.5 | 2837.8 | 2793.8 | 2743.2 | 2727.6 |
| 27.5° | 5970.0  | 4844.7 | 3740.1 | 3282.5 | 3044.0 | 2885.8 | 2784.7 | 2714.7 | 2666.7 | 2627.8 | 2614.9 |
| 30°   | 6199.4  | 4890.0 | 3617.0 | 3126.9 | 2896.2 | 2752.3 | 2666.7 | 2618.7 | 2577.3 | 2528.0 | 2518.9 |
| 32.5° | 6417.2  | 4890.0 | 3458.8 | 2957.1 | 2749.7 | 2634.3 | 2583.7 | 2553.9 | 2507.3 | 2459.3 | 2446.3 |
| 35°   | 6635.0  | 4860.2 | 3272.1 | 2779.5 | 2614.9 | 2550.0 | 2547.4 | 2512.4 | 2441.1 | 2376.3 | 2359.5 |
| 37.5° | 6864.5  | 4799.3 | 3062.1 | 2613.6 | 2504.7 | 2512.4 | 2534.5 | 2456.7 | 2355.6 | 2263.5 | 2238.9 |
| 40°   | 7123.8  | 4715.0 | 2844.3 | 2469.7 | 2412.6 | 2495.6 | 2499.5 | 2376.3 | 2179.3 | 2095.0 | 2073.0 |
| 42.5° | 7428.4  | 4630.8 | 2642.1 | 2342.6 | 2340.0 | 2445.0 | 2433.4 | 2202.6 | 2084.6 | 2041.8 | 2030.2 |
| 45°   | 7829.0  | 4582.8 | 2450.2 | 2222.0 | 2283.0 | 2363.3 | 2320.6 | 2106.7 | 2057.4 | 2032.8 | 2022.4 |
| 47.5° | 8460.4  | 4607.4 | 2273.9 | 2126.1 | 2225.9 | 2281.7 | 2110.6 | 2067.8 | 2032.8 | 2002.9 | 1992.6 |
| 50°   | 9251.2  | 4593.2 | 2131.3 | 2060.0 | 2161.1 | 2196.1 | 2015.9 | 2017.2 | 1999.1 | 1965.4 | 1949.8 |
| 52.5° | 9846.2  | 4481.7 | 2039.2 | 2022.4 | 2104.1 | 2044.4 | 1956.3 | 1967.9 | 1958.9 | 1909.6 | 1892.8 |
| 55°   | 10420.5 | 4385.7 | 1992.6 | 2008.1 | 2062.6 | 1855.2 | 1886.3 | 1914.8 | 1905.7 | 1857.8 | 1850.0 |
| 57.5° | 11134.8 | 4367.6 | 1964.1 | 2012.0 | 2027.6 | 1760.5 | 1818.9 | 1856.5 | 1850.0 | 1829.2 | 1825.3 |
| 60°   | 12009.9 | 4372.8 | 1938.1 | 2018.5 | 1988.7 | 1690.5 | 1755.3 | 1803.3 | 1807.2 | 1803.3 | 1800.7 |
| 62.5° | 12490.9 | 4231.5 | 1873.3 | 2000.4 | 1920.0 | 1629.6 | 1689.2 | 1759.2 | 1760.5 | 1768.3 | 1767.0 |
| 65°   | 12082.5 | 3808.8 | 1752.7 | 1936.8 | 1804.6 | 1579.0 | 1632.2 | 1708.7 | 1689.2 | 1724.2 | 1724.2 |
| 66°   | 11685.8 | 3565.1 | 1693.1 | 1895.3 | 1755.3 | 1559.6 | 1614.0 | 1682.7 | 1658.1 | 1706.1 | 1706.1 |
| 67.5° | 10875.6 | 3154.2 | 1585.5 | 1807.2 | 1685.3 | 1532.4 | 1593.3 | 1640.0 | 1606.2 | 1677.6 | 1672.4 |
| 70°   | 9395.1  | 2439.8 | 1369.0 | 1607.5 | 1569.9 | 1492.2 | 1564.8 | 1554.4 | 1505.1 | 1614.0 | 1593.3 |
| 72.5° | 7921.0  | 1853.9 | 1099.4 | 1345.7 | 1394.9 | 1441.6 | 1524.6 | 1445.5 | 1383.3 | 1459.8 | 1414.4 |
| 75°   | 6146.3  | 1393.6 | 868.6  | 1046.2 | 1178.4 | 1362.5 | 1476.6 | 1319.7 | 1230.3 | 1222.5 | 1197.9 |
| 77.5° | 3322.7  | 956.7  | 688.4  | 798.6  | 936.0  | 1264.0 | 1444.2 | 1184.9 | 1050.1 | 1019.0 | 999.5  |
| 80°   | 1315.9  | 622.3  | 500.4  | 605.4  | 654.7  | 1121.4 | 1366.4 | 1028.1 | 866.0  | 834.9  | 805.1  |
| 82.5° | 543.2   | 368.2  | 322.8  | 405.8  | 426.5  | 959.3  | 1226.4 | 842.7  | 668.9  | 925.6  | 982.7  |
| 85°   | 233.4   | 202.2  | 191.9  | 210.0  | 241.1  | 672.8  | 976.2  | 643.0  | 722.1  | 644.3  | 512.1  |
| 87.5° | 70.0    | 85.6   | 81.7   | 80.4   | 88.2   | 160.8  | 519.9  | 357.8  | 530.2  | 200.9  | 150.4  |
| 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

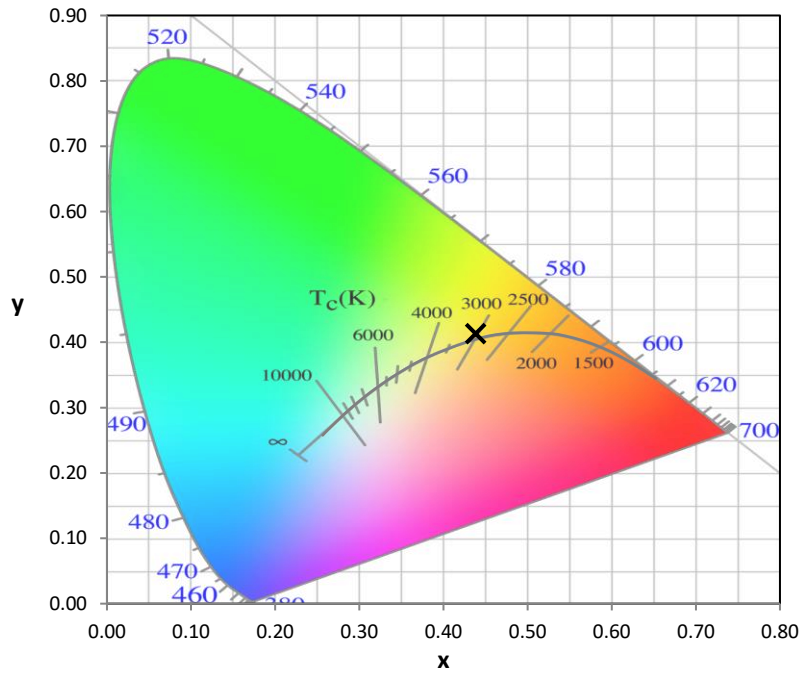
Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

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           |

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**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

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### Photopic Flux vs. Wavelength

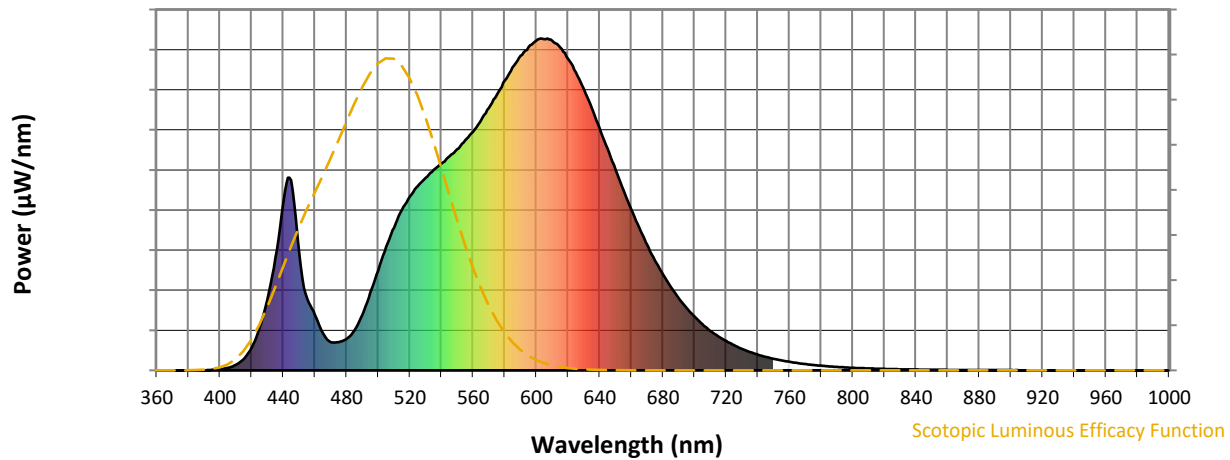


### Photopic Lumens: NR

| $\lambda$<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                             |                   |                                        |                                |

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### Scotopic Flux vs. Wavelength



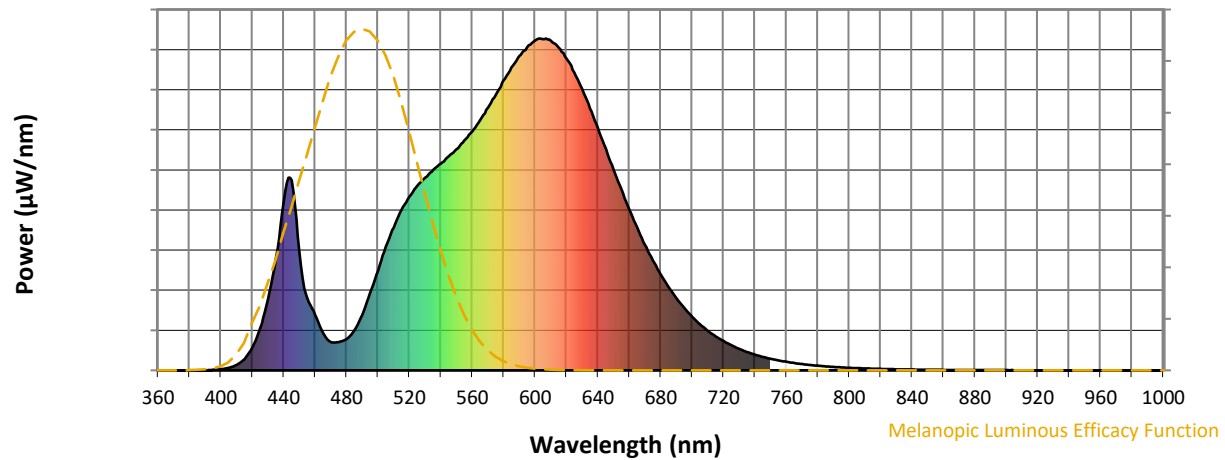
Scotopic Lumens: NR

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            |        |                          |               |

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### 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                             |                   |                                      |                                |

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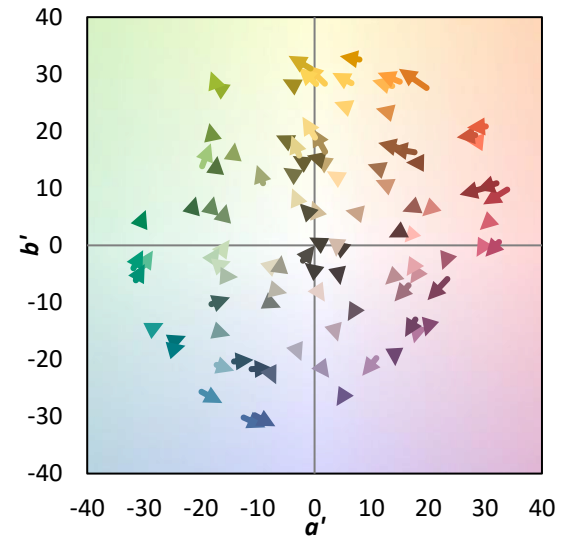
TM-30-18

### Summary

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



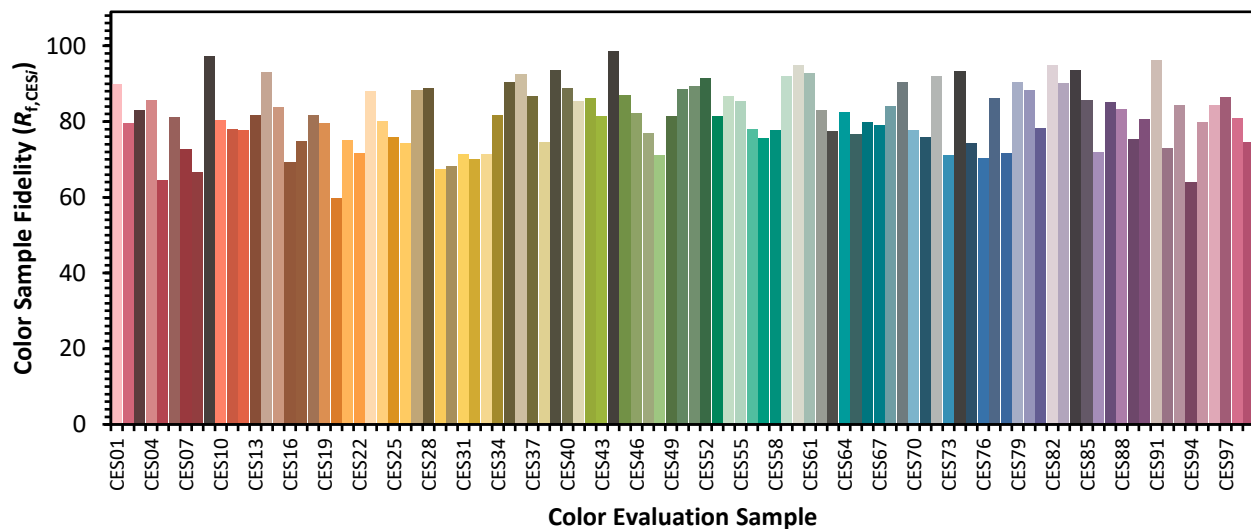
### Color Vector Graphics



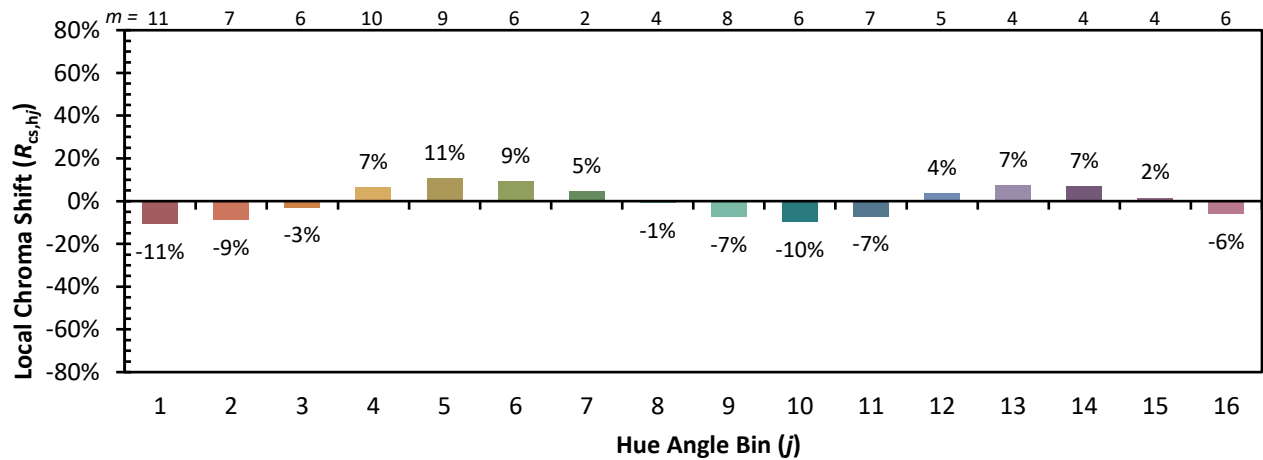


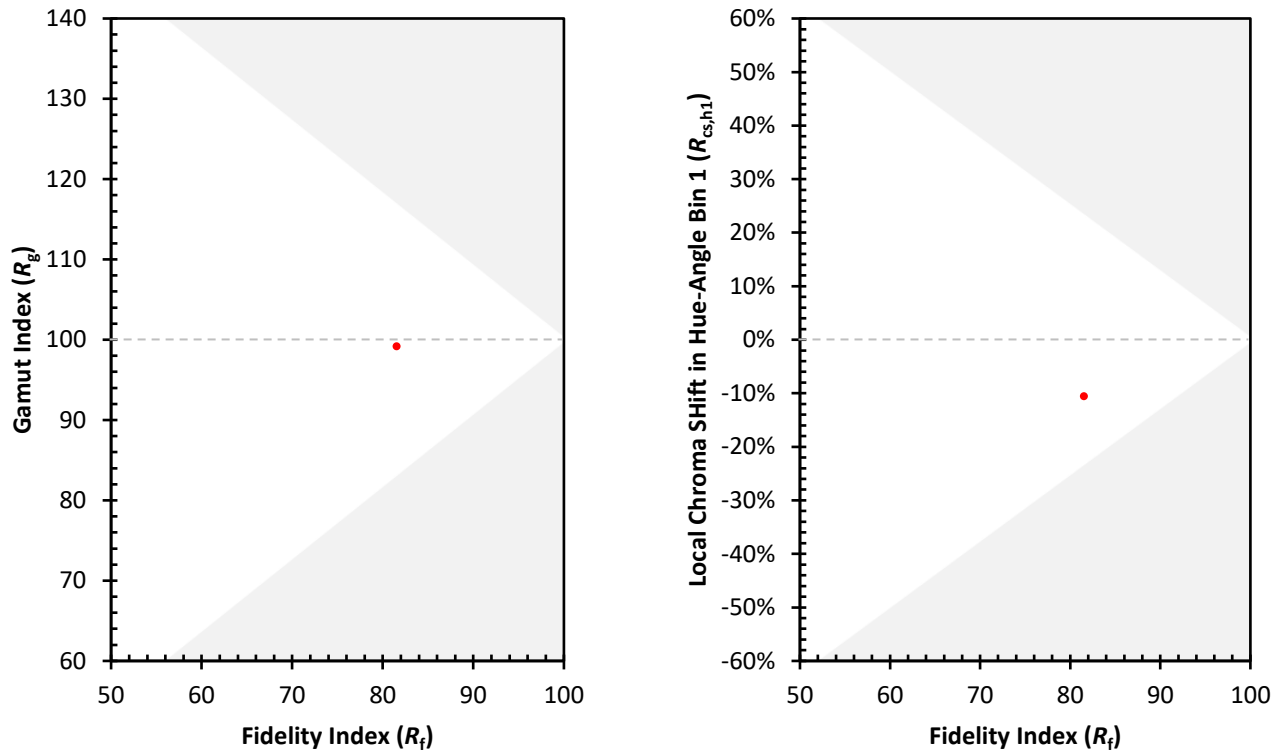
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| 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)