

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: P319836

Luminaire Tested: **GLEON-SA2B-830-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P319836  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA2B-830-U-SL3  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(2) 80 CRI, 3000K, 800mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 9293 lumens  
Efficiency: N/A  
Efficacy: 109.3 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G3

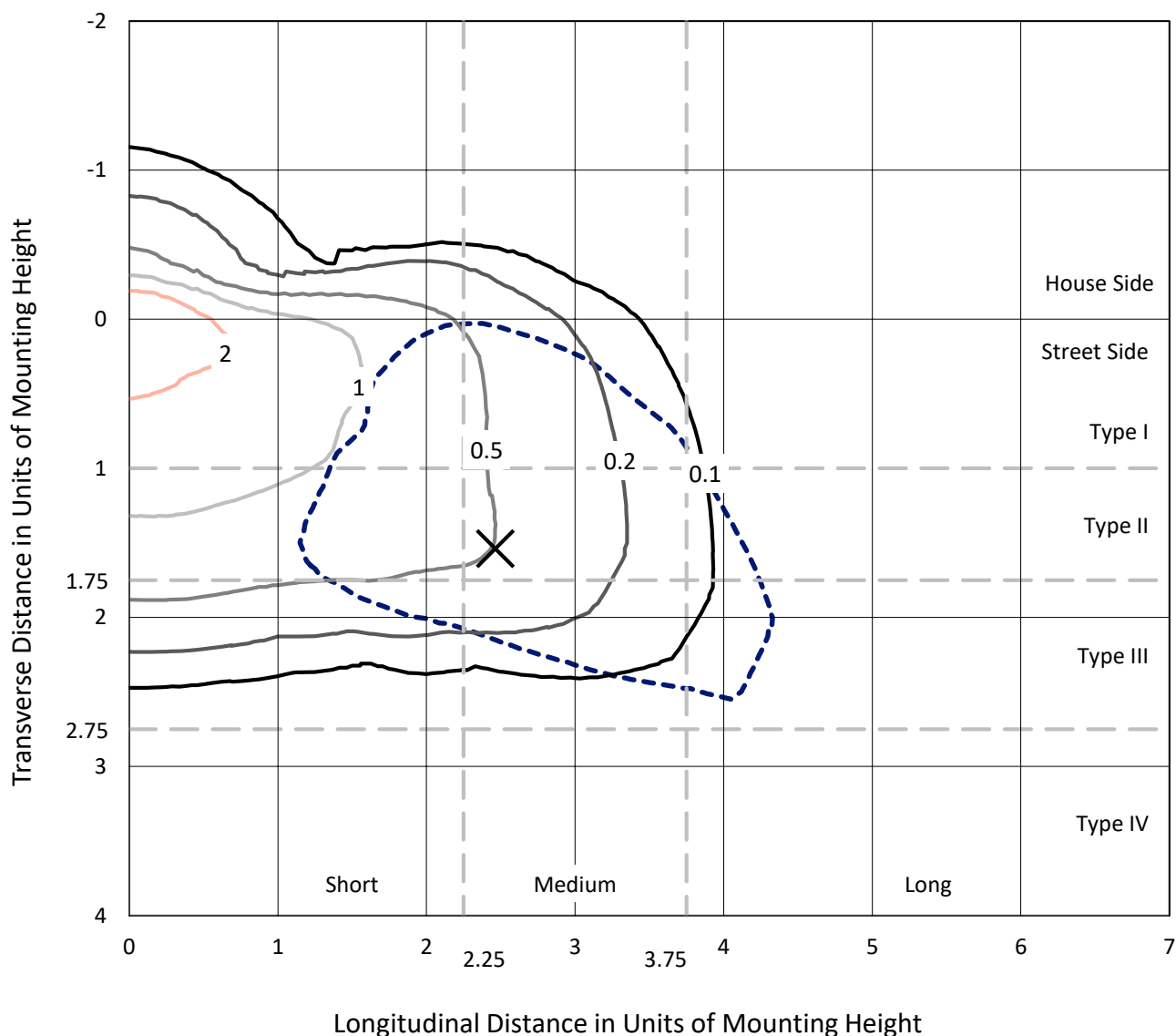
Input Watts (W): 85  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



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 CATALOG NUMBER: GLEON-SA2B-830-U-SL3

## Iso-Footcandle Lines of Horizontal Illumination

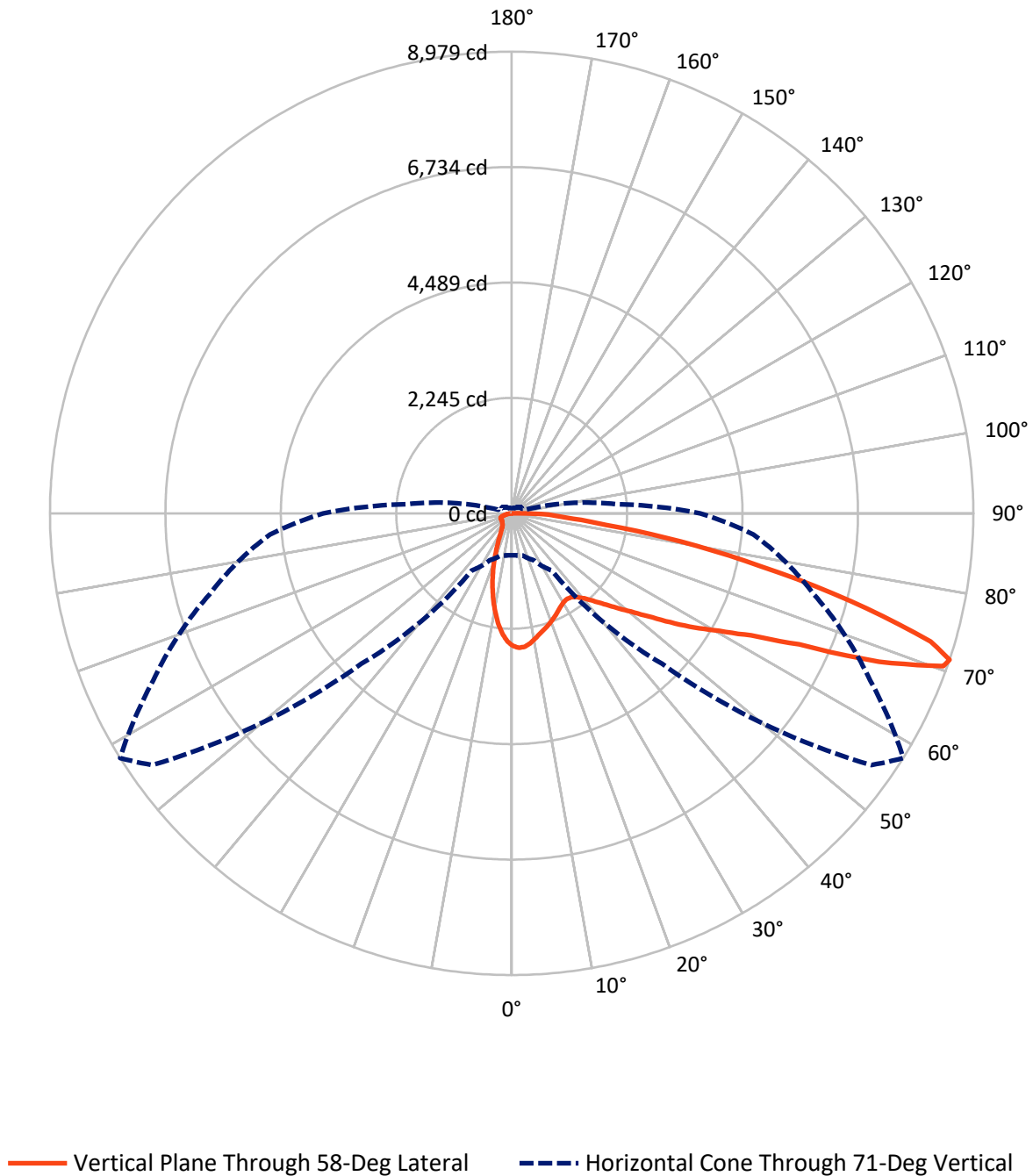
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 4.1 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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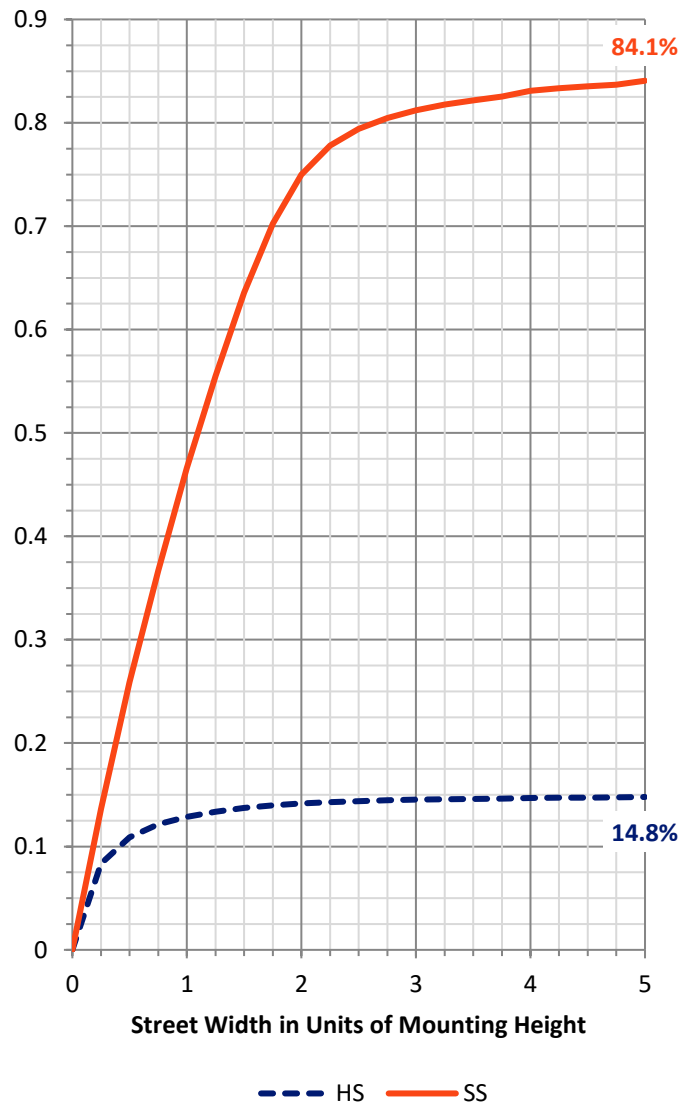
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1389.4   | 0.0    | 1389.4 |
|                    | % Fixture | 15.0     | 0.0    | 15.0   |
| <b>Street Side</b> | Lumens    | 7903.6   | 0.0    | 7903.6 |
|                    | % Fixture | 85.0     | 0.0    | 85.0   |
| <b>Total</b>       | Lumens    | 9293.0   | 0.0    | 9293.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 222.1  | 2.4       |
| 10°-20°   | 493.9  | 5.3       |
| 20°-30°   | 627.7  | 6.8       |
| 30°-40°   | 799.6  | 8.6       |
| 40°-50°   | 1133.9 | 12.2      |
| 50°-60°   | 1754.7 | 18.9      |
| 60°-70°   | 2388.8 | 25.7      |
| 70°-80°   | 1593.6 | 17.1      |
| 80°-90°   | 278.6  | 3.0       |
| 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°    | 9293.0 | 100.0     |
| 0°-180°   | 9293.0 | 100.0     |

**Coefficient of Utilization**



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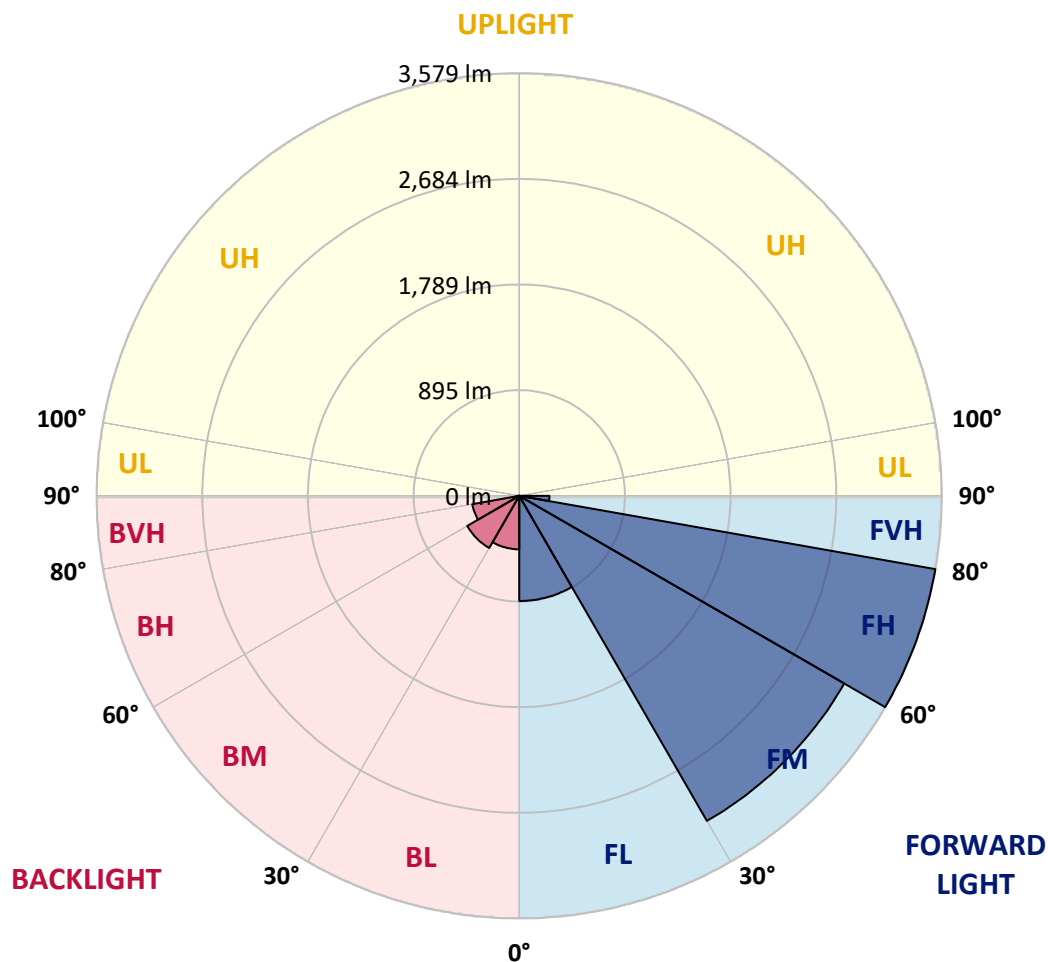
CATALOG NUMBER: GLEON-SA2B-830-U-SL3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 890.9  | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 3178.7 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 3578.6 | 38.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 255.5  | 2.7       |                         |      | G3/500  |
| BL   | (0°-30°)    | 452.9  | 4.9       | B1/500                  |      |         |
| BM   | (30°-60°)   | 509.5  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 403.8  | 4.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 23.2   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G3**

Type III Medium





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CATALOG NUMBER: GLEON-SA2B-830-U-SL3

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 |
| 2.5°  | 2643.1 | 2639.5 | 2640.8 | 2638.2 | 2632.1 | 2625.9 | 2616.9 | 2618.5 | 2605.9 | 2587.1 | 2563.8 |
| 5°    | 2593.2 | 2591.9 | 2601.7 | 2607.2 | 2611.7 | 2608.1 | 2605.5 | 2608.8 | 2590.3 | 2564.4 | 2524.0 |
| 7.5°  | 2488.7 | 2474.4 | 2486.7 | 2505.2 | 2522.7 | 2535.9 | 2553.4 | 2555.7 | 2544.0 | 2516.8 | 2463.8 |
| 10°   | 2340.1 | 2326.5 | 2344.6 | 2373.4 | 2408.4 | 2440.1 | 2475.4 | 2481.9 | 2484.1 | 2459.5 | 2395.1 |
| 12.5° | 2186.0 | 2175.6 | 2193.8 | 2234.2 | 2292.2 | 2341.1 | 2397.4 | 2407.1 | 2427.2 | 2410.7 | 2331.7 |
| 15°   | 2048.1 | 2044.2 | 2066.2 | 2106.1 | 2172.7 | 2247.5 | 2328.8 | 2346.6 | 2380.6 | 2375.1 | 2282.1 |
| 17.5° | 1929.0 | 1928.0 | 1944.8 | 1986.6 | 2060.4 | 2154.9 | 2260.5 | 2290.6 | 2341.1 | 2347.5 | 2241.4 |
| 20°   | 1840.3 | 1838.3 | 1850.0 | 1880.7 | 1956.8 | 2064.0 | 2186.7 | 2228.1 | 2300.9 | 2323.6 | 2199.3 |
| 22.5° | 1792.7 | 1792.4 | 1792.7 | 1807.3 | 1869.4 | 1969.1 | 2114.8 | 2165.3 | 2261.8 | 2304.5 | 2152.7 |
| 25°   | 1784.6 | 1783.6 | 1776.5 | 1774.9 | 1810.2 | 1889.8 | 2043.6 | 2099.3 | 2224.5 | 2291.2 | 2108.3 |
| 27.5° | 1805.6 | 1806.9 | 1797.6 | 1782.3 | 1789.5 | 1837.7 | 1981.7 | 2041.3 | 2194.7 | 2288.6 | 2077.6 |
| 30°   | 1849.4 | 1848.7 | 1840.6 | 1824.7 | 1810.8 | 1818.3 | 1937.7 | 1997.3 | 2174.7 | 2300.0 | 2056.5 |
| 32.5° | 1897.6 | 1901.1 | 1899.5 | 1890.8 | 1870.1 | 1840.3 | 1924.5 | 1982.7 | 2168.9 | 2327.1 | 2047.5 |
| 35°   | 1955.5 | 1959.4 | 1971.1 | 1977.9 | 1953.6 | 1905.7 | 1952.9 | 2003.4 | 2185.7 | 2378.3 | 2062.0 |
| 37.5° | 2010.6 | 2020.6 | 2053.3 | 2082.1 | 2061.4 | 2008.0 | 2028.7 | 2064.6 | 2237.8 | 2458.9 | 2101.2 |
| 40°   | 2074.0 | 2082.7 | 2136.2 | 2197.3 | 2194.1 | 2138.7 | 2150.7 | 2174.7 | 2329.7 | 2574.5 | 2172.1 |
| 42.5° | 2136.5 | 2154.0 | 2231.3 | 2318.1 | 2343.0 | 2294.1 | 2313.2 | 2325.8 | 2459.2 | 2727.6 | 2295.7 |
| 45°   | 2219.7 | 2238.4 | 2345.9 | 2450.5 | 2508.7 | 2481.2 | 2511.7 | 2516.5 | 2622.0 | 2936.0 | 2475.4 |
| 47.5° | 2345.6 | 2367.0 | 2492.2 | 2602.0 | 2691.0 | 2693.9 | 2744.1 | 2742.1 | 2825.3 | 3174.6 | 2701.7 |
| 50°   | 2541.8 | 2572.5 | 2675.1 | 2777.7 | 2885.9 | 2946.1 | 3013.1 | 3003.7 | 3069.1 | 3428.7 | 2962.3 |
| 52.5° | 2798.8 | 2813.0 | 2889.1 | 2964.9 | 3099.2 | 3234.2 | 3330.3 | 3321.9 | 3345.5 | 3690.0 | 3258.1 |
| 55°   | 3065.2 | 3075.9 | 3107.3 | 3148.7 | 3329.3 | 3549.5 | 3752.8 | 3739.5 | 3679.6 | 3961.2 | 3550.4 |
| 57.5° | 3304.7 | 3326.4 | 3348.1 | 3365.3 | 3561.1 | 3879.0 | 4184.9 | 4185.9 | 4042.2 | 4253.9 | 3852.5 |
| 60°   | 3342.0 | 3361.1 | 3504.5 | 3639.8 | 3957.7 | 4318.6 | 4647.5 | 4637.8 | 4417.3 | 4571.4 | 4189.1 |
| 62.5° | 2954.2 | 2997.2 | 3236.8 | 3596.7 | 4339.6 | 5122.7 | 5237.6 | 5225.6 | 4866.0 | 4962.8 | 4581.1 |
| 65°   | 2117.1 | 2165.9 | 2455.0 | 2995.9 | 4154.5 | 6008.7 | 6302.6 | 6141.4 | 5477.8 | 5444.1 | 5040.2 |
| 67.5° | 1221.4 | 1233.0 | 1358.3 | 1792.7 | 3163.3 | 6055.0 | 7927.3 | 7701.7 | 6427.9 | 5990.2 | 5264.8 |
| 70°   | 903.1  | 902.8  | 932.6  | 1103.2 | 1711.8 | 4941.7 | 8700.0 | 8902.3 | 7428.2 | 6169.9 | 4947.2 |
| 71°   | 816.7  | 817.7  | 851.0  | 1004.1 | 1355.7 | 4136.4 | 8535.9 | 8978.7 | 7691.7 | 6081.2 | 4717.4 |
| 72.5° | 698.6  | 701.8  | 748.1  | 900.6  | 1140.4 | 2852.5 | 7828.9 | 8520.3 | 7816.6 | 5862.4 | 4357.8 |
| 75°   | 529.9  | 537.4  | 601.5  | 759.1  | 1042.3 | 1446.7 | 5745.8 | 6803.7 | 6943.9 | 5172.9 | 3238.1 |
| 77.5° | 378.1  | 386.5  | 459.0  | 638.4  | 990.9  | 1090.3 | 3847.9 | 4962.8 | 5110.1 | 3315.1 | 1460.6 |
| 80°   | 238.9  | 248.9  | 303.6  | 507.9  | 931.0  | 1035.2 | 2418.1 | 3335.8 | 2786.5 | 1060.8 | 371.6  |
| 82.5° | 140.2  | 147.9  | 188.4  | 331.8  | 760.4  | 997.0  | 1422.7 | 1849.0 | 1084.4 | 320.5  | 169.0  |
| 85°   | 81.3   | 84.8   | 117.5  | 211.4  | 552.2  | 941.0  | 1045.3 | 1033.6 | 470.7  | 156.7  | 80.0   |
| 87.5° | 37.9   | 42.1   | 69.6   | 110.4  | 306.6  | 682.1  | 826.1  | 713.8  | 292.6  | 73.5   | 37.6   |
| 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-SA2B-830-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 | 2574.8 |
| 2.5°  | 2552.4 | 2546.9 | 2524.0 | 2503.6 | 2482.2 | 2454.4 | 2423.6 | 2419.7 | 2401.0 | 2404.5 | 2398.0 |
| 5°    | 2501.9 | 2488.0 | 2432.7 | 2382.5 | 2323.3 | 2270.2 | 2212.6 | 2186.0 | 2147.8 | 2145.2 | 2135.5 |
| 7.5°  | 2429.8 | 2403.9 | 2318.1 | 2222.9 | 2127.7 | 2037.1 | 1947.4 | 1888.5 | 1828.3 | 1802.7 | 1800.5 |
| 10°   | 2348.5 | 2304.5 | 2178.2 | 2037.4 | 1900.2 | 1767.8 | 1639.6 | 1544.7 | 1459.3 | 1418.8 | 1417.2 |
| 12.5° | 2271.5 | 2206.4 | 2033.2 | 1841.6 | 1653.8 | 1482.3 | 1306.5 | 1181.9 | 1074.7 | 1038.8 | 1023.6 |
| 15°   | 2206.1 | 2114.5 | 1892.1 | 1647.0 | 1419.1 | 1180.9 | 980.8  | 849.7  | 750.7  | 716.4  | 709.9  |
| 17.5° | 2142.6 | 2024.8 | 1747.4 | 1450.5 | 1175.1 | 913.2  | 712.8  | 615.4  | 562.6  | 548.7  | 548.4  |
| 20°   | 2079.5 | 1932.5 | 1596.2 | 1249.5 | 939.1  | 683.0  | 548.0  | 504.3  | 486.5  | 484.9  | 482.3  |
| 22.5° | 2008.0 | 1834.8 | 1437.3 | 1047.8 | 732.9  | 537.0  | 465.8  | 448.3  | 446.1  | 451.9  | 451.9  |
| 25°   | 1941.0 | 1737.7 | 1276.1 | 850.4  | 570.1  | 448.0  | 416.0  | 412.4  | 418.6  | 428.9  | 429.9  |
| 27.5° | 1878.5 | 1644.1 | 1118.7 | 674.9  | 456.8  | 394.6  | 381.3  | 385.5  | 396.5  | 408.5  | 408.8  |
| 30°   | 1827.0 | 1555.7 | 965.9  | 531.9  | 385.9  | 354.8  | 352.5  | 360.9  | 372.9  | 382.3  | 384.6  |
| 32.5° | 1787.2 | 1480.3 | 818.3  | 427.6  | 339.6  | 325.0  | 326.9  | 334.1  | 341.5  | 346.7  | 350.3  |
| 35°   | 1768.7 | 1415.6 | 682.1  | 360.6  | 310.1  | 302.0  | 304.6  | 308.5  | 311.7  | 315.6  | 318.5  |
| 37.5° | 1772.0 | 1365.4 | 560.3  | 318.9  | 290.4  | 286.2  | 286.2  | 286.2  | 286.2  | 288.1  | 288.4  |
| 40°   | 1802.1 | 1336.6 | 461.3  | 292.3  | 277.1  | 272.6  | 269.0  | 265.8  | 263.2  | 264.5  | 263.8  |
| 42.5° | 1879.1 | 1334.0 | 388.8  | 275.5  | 266.4  | 259.0  | 251.8  | 247.3  | 244.1  | 245.4  | 246.0  |
| 45°   | 2009.9 | 1366.4 | 339.9  | 263.5  | 256.4  | 245.0  | 236.0  | 231.1  | 228.9  | 233.1  | 233.7  |
| 47.5° | 2179.2 | 1436.9 | 310.1  | 254.8  | 247.0  | 232.1  | 222.4  | 217.9  | 218.5  | 224.7  | 226.3  |
| 50°   | 2397.4 | 1551.5 | 295.9  | 249.3  | 240.5  | 221.1  | 211.1  | 207.2  | 209.1  | 217.9  | 219.8  |
| 52.5° | 2636.9 | 1716.6 | 297.5  | 247.6  | 236.3  | 213.0  | 202.3  | 197.8  | 201.0  | 209.1  | 210.7  |
| 55°   | 2913.4 | 1915.1 | 324.4  | 249.9  | 230.2  | 207.8  | 195.2  | 187.4  | 190.0  | 197.5  | 198.8  |
| 57.5° | 3220.6 | 2142.3 | 378.4  | 249.3  | 222.4  | 203.0  | 187.8  | 176.1  | 178.0  | 182.6  | 183.9  |
| 60°   | 3540.4 | 2416.8 | 462.3  | 251.2  | 218.8  | 197.1  | 177.7  | 163.1  | 162.5  | 166.4  | 167.0  |
| 62.5° | 3924.3 | 2734.4 | 558.1  | 252.5  | 221.1  | 189.7  | 164.4  | 150.2  | 148.3  | 149.2  | 149.9  |
| 65°   | 4319.9 | 2964.2 | 522.1  | 247.3  | 228.2  | 183.5  | 152.8  | 137.6  | 134.0  | 133.4  | 133.7  |
| 67.5° | 4332.2 | 2717.9 | 366.1  | 237.0  | 231.1  | 180.3  | 144.1  | 126.9  | 121.1  | 118.8  | 118.5  |
| 70°   | 3885.2 | 2208.0 | 285.2  | 225.9  | 219.5  | 175.1  | 136.0  | 118.2  | 109.4  | 105.9  | 105.5  |
| 71°   | 3667.0 | 2032.6 | 270.3  | 220.4  | 210.7  | 169.9  | 132.4  | 114.3  | 105.2  | 101.3  | 100.7  |
| 72.5° | 3324.8 | 1822.2 | 252.2  | 211.7  | 193.9  | 156.7  | 125.6  | 108.8  | 99.4   | 94.8   | 93.9   |
| 75°   | 2386.1 | 1191.6 | 216.6  | 188.7  | 160.6  | 125.0  | 110.1  | 97.8   | 89.7   | 84.2   | 83.5   |
| 77.5° | 919.3  | 474.2  | 163.8  | 157.0  | 123.0  | 97.8   | 90.6   | 84.5   | 78.7   | 73.2   | 72.8   |
| 80°   | 284.2  | 212.0  | 119.4  | 118.2  | 89.0   | 72.8   | 70.6   | 69.0   | 66.7   | 60.9   | 59.6   |
| 82.5° | 151.8  | 121.7  | 82.2   | 76.4   | 58.3   | 48.6   | 51.1   | 51.8   | 52.1   | 46.0   | 45.3   |
| 85°   | 72.5   | 64.4   | 46.3   | 43.4   | 34.0   | 27.2   | 31.4   | 34.0   | 34.3   | 28.2   | 26.2   |
| 87.5° | 34.6   | 33.7   | 21.7   | 16.5   | 12.6   | 9.1    | 11.0   | 13.6   | 14.9   | 10.7   | 9.4    |
| 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

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| 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

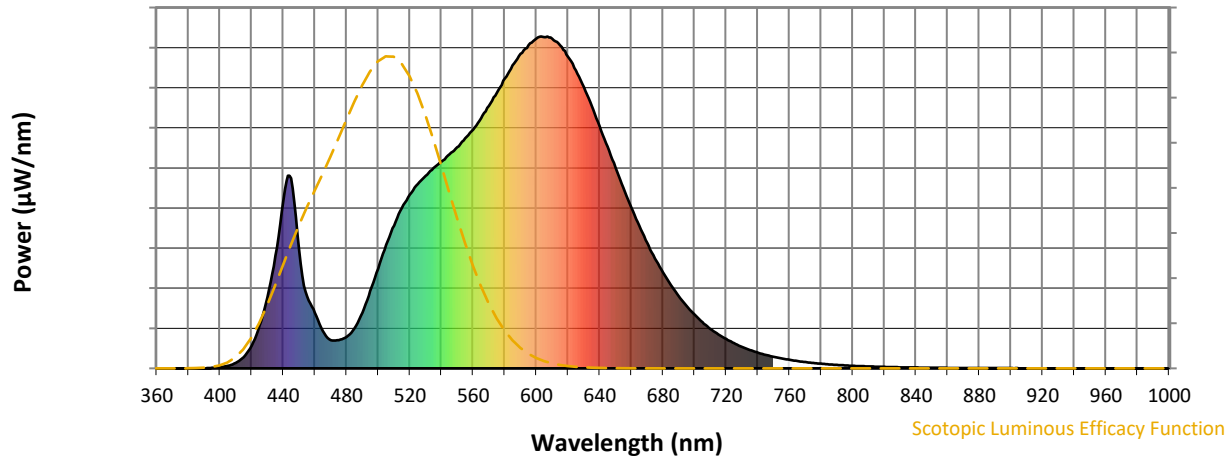


### Photopic Lumens: NR

| $\lambda$<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                             |                   |                                        |                                |

REPORT NUMBER: SP1-2408-195-9

### Scotopic Flux vs. Wavelength



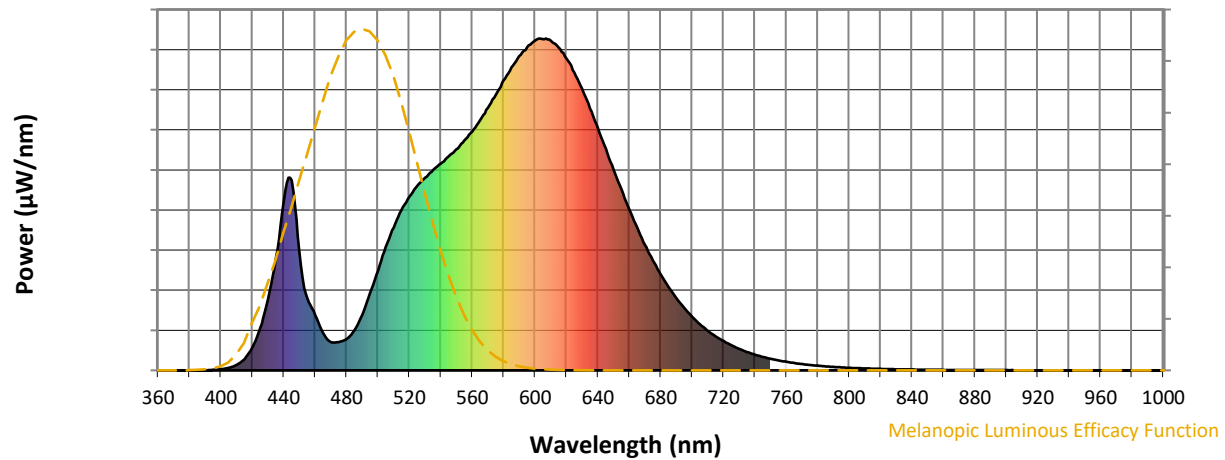
Scotopic Lumens: NR

S/P: 1.27

| $\lambda$<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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### 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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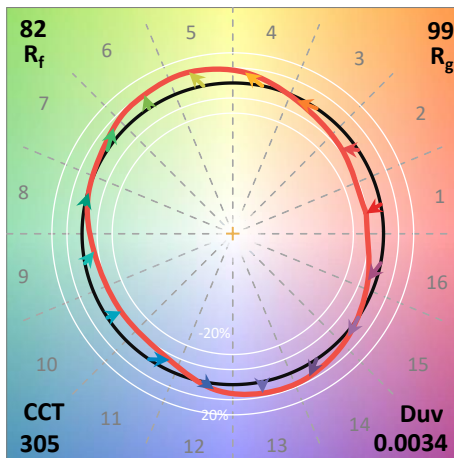
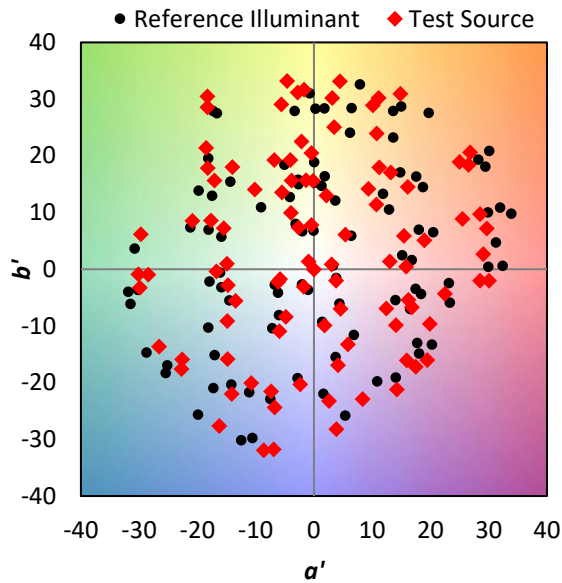
TM-30-18

### Summary

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



### Color Vector Graphics



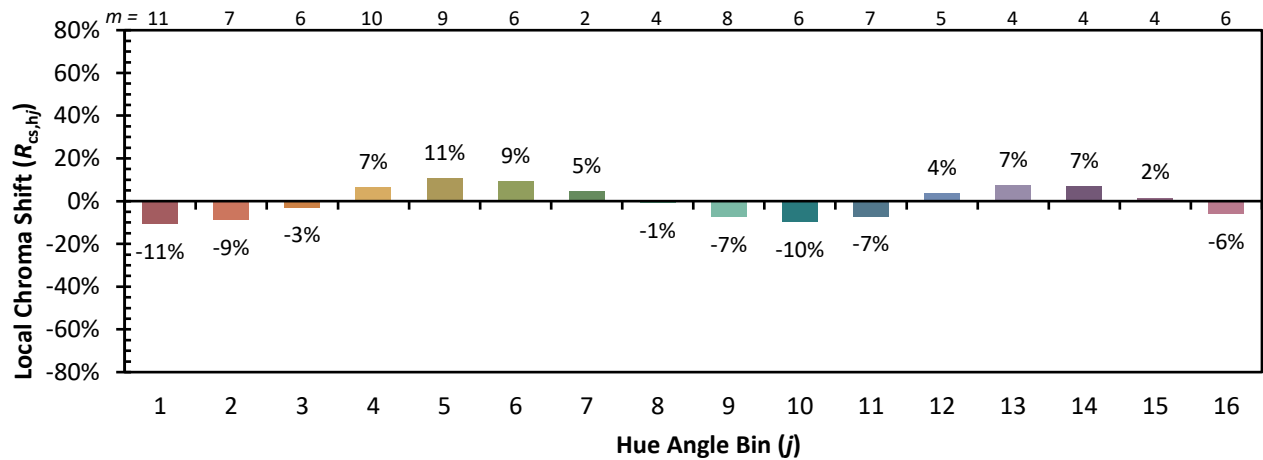


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

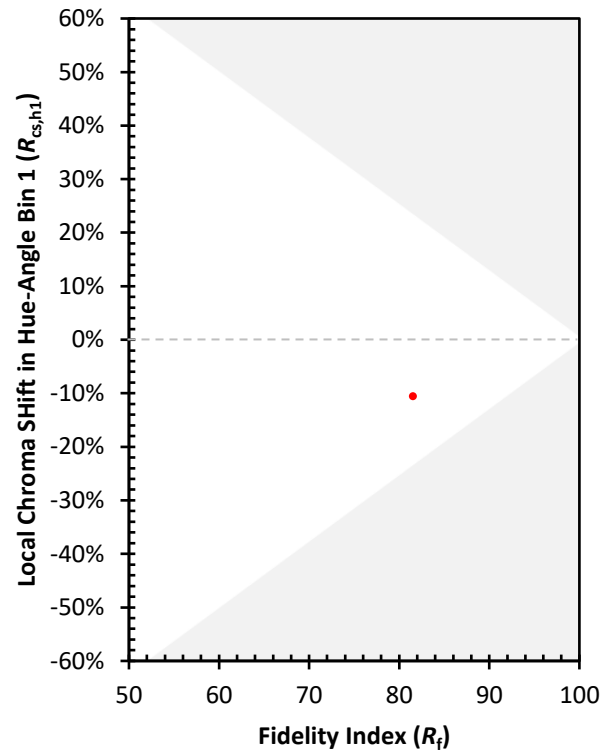
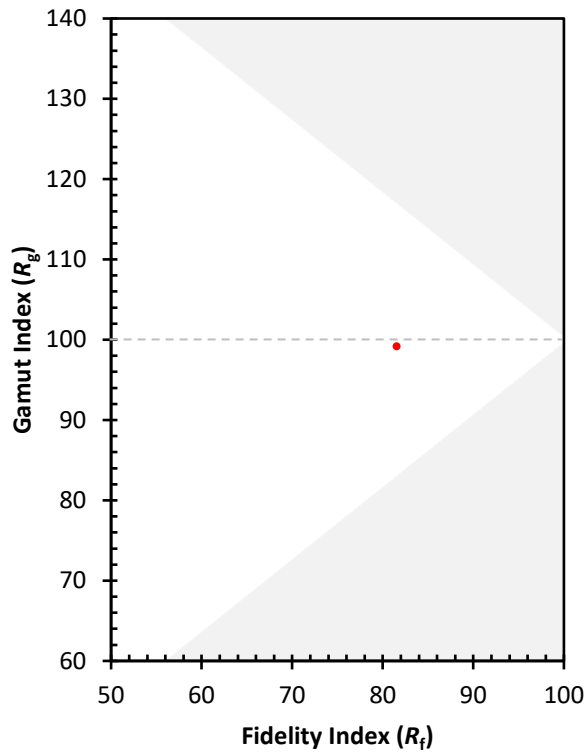
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 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)