

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-2019 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for

Cooper Lighting Solutions

Brand: McGRAW-EDISON

Report Number: P633525

Luminaire Tested: GWS-SA2E-830-U-SL3-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P633525  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-34)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA2E-830-U-SL3-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (32) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

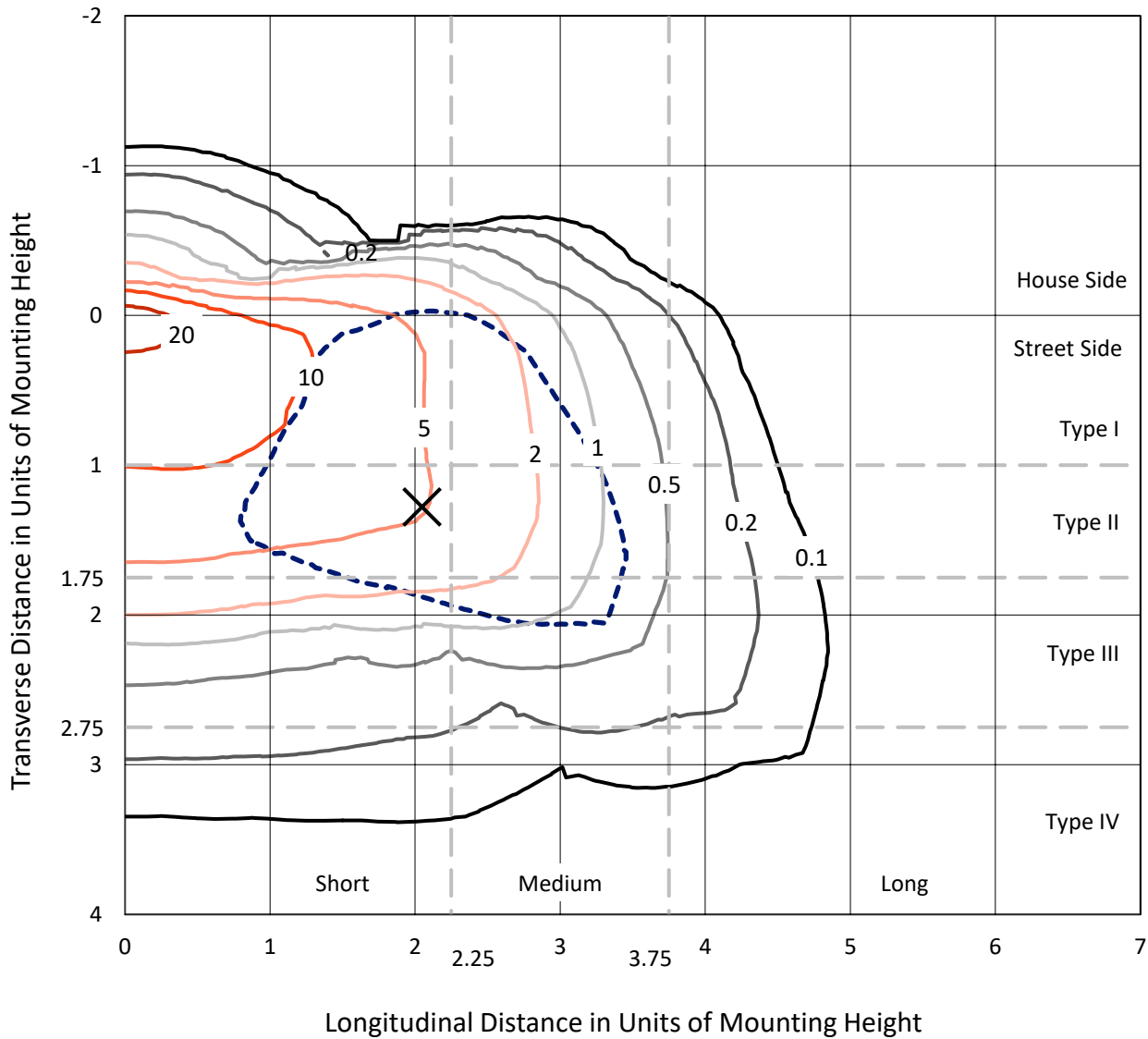
Lumens per Lamp: N/A  
Luminaire Lumens: 9387.8 lumens  
Efficiency: N/A  
Efficacy: 86.8 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Short  
BUG Rating: B1 - U0 - G2  
  
Input Watts (W): 108.2  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P633525  
 CATALOG NUMBER: GWS-SA2E-830-U-SL3-W-HSS

### Iso-Footcandle Lines of Horizontal Illumination

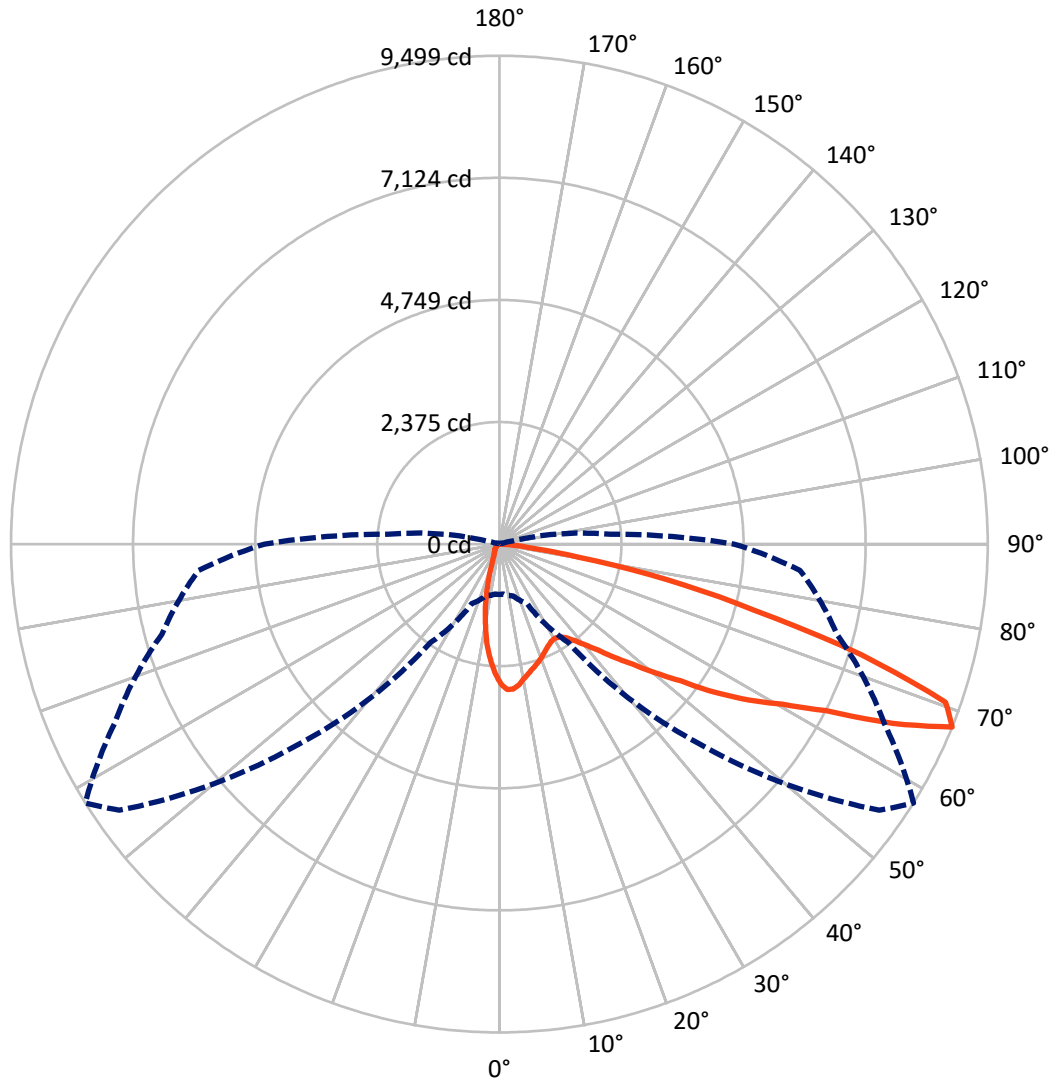
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 27.1 fc  
 Type III - Short - N/A

REPORT NUMBER: P633525  
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### Luminous Intensity Polar Plot



— Vertical Plane Through 58-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 917.1    | 0.0    | 917.1  |
|                    | % Fixture | 9.8      | 0.0    | 9.8    |
| <b>Street Side</b> | Lumens    | 8470.7   | 0.0    | 8470.7 |
|                    | % Fixture | 90.2     | 0.0    | 90.2   |
| <b>Total</b>       | Lumens    | 9387.8   | 0.0    | 9387.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 220.0  | 2.3       |
| 10°-20°   | 458.0  | 4.9       |
| 20°-30°   | 617.7  | 6.6       |
| 30°-40°   | 868.0  | 9.2       |
| 40°-50°   | 1340.6 | 14.3      |
| 50°-60°   | 2143.7 | 22.8      |
| 60°-70°   | 2538.3 | 27.0      |
| 70°-80°   | 1122.9 | 12.0      |
| 80°-90°   | 78.5   | 0.8       |
| 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°    | 9387.8 | 100.0     |
| 0°-180°   | 9387.8 | 100.0     |

**Coefficient of Utilization**



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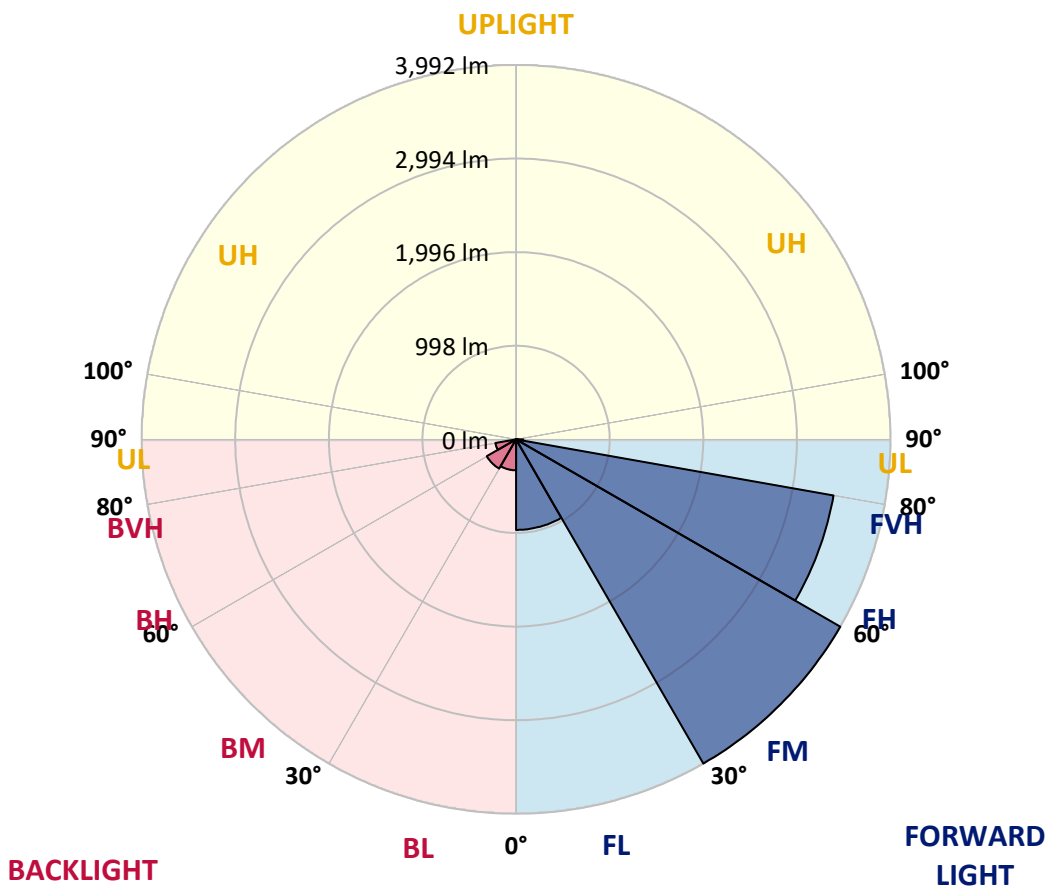
CATALOG NUMBER: GWS-SA2E-830-U-SL3-W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 965.8  | 10.3      |                         |      |         |
| FM (30°-60°)   | 3992.4 | 42.5      |                         |      |         |
| FH (60°-80°)   | 3437.3 | 36.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 75.2   | 0.8       |                         |      | G1/100  |
| BL (0°-30°)    | 330.0  | 3.5       | B1/500                  |      |         |
| BM (30°-60°)   | 359.9  | 3.8       | B1/1000                 |      |         |
| BH (60°-80°)   | 223.9  | 2.4       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 3.3    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Short





REPORT NUMBER: P633525

CATALOG NUMBER: GWS-SA2E-830-U-SL3-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 |
| 2.5°  | 2848.3 | 2853.3 | 2859.9 | 2868.2 | 2866.6 | 2859.1 | 2850.0 | 2829.2 | 2815.9 | 2774.4 | 2723.7 |
| 5°    | 2756.9 | 2756.1 | 2772.7 | 2788.5 | 2816.7 | 2831.7 | 2852.5 | 2833.3 | 2826.7 | 2776.8 | 2694.6 |
| 7.5°  | 2578.3 | 2587.4 | 2606.5 | 2631.4 | 2672.2 | 2716.2 | 2766.0 | 2760.2 | 2780.2 | 2746.9 | 2644.7 |
| 10°   | 2402.9 | 2398.0 | 2427.9 | 2465.3 | 2527.6 | 2584.1 | 2656.4 | 2655.5 | 2707.9 | 2704.6 | 2588.2 |
| 12.5° | 2249.2 | 2248.4 | 2271.7 | 2314.0 | 2387.2 | 2466.1 | 2564.1 | 2566.6 | 2631.4 | 2658.0 | 2540.0 |
| 15°   | 2119.6 | 2121.3 | 2143.7 | 2187.7 | 2263.4 | 2359.7 | 2473.6 | 2494.3 | 2567.5 | 2621.5 | 2492.7 |
| 17.5° | 2027.4 | 2028.2 | 2041.5 | 2079.7 | 2153.7 | 2256.7 | 2393.8 | 2422.1 | 2515.9 | 2594.0 | 2454.5 |
| 20°   | 1985.0 | 1981.7 | 1984.2 | 2003.3 | 2060.6 | 2154.5 | 2312.4 | 2348.9 | 2468.6 | 2574.9 | 2419.6 |
| 22.5° | 1990.8 | 1985.8 | 1974.2 | 1971.7 | 1997.5 | 2068.9 | 2226.0 | 2270.8 | 2417.1 | 2563.3 | 2388.0 |
| 25°   | 2042.3 | 2031.5 | 2014.9 | 1990.0 | 1980.0 | 2015.7 | 2150.4 | 2196.9 | 2368.9 | 2564.1 | 2363.9 |
| 27.5° | 2121.3 | 2109.6 | 2088.9 | 2055.6 | 2016.6 | 2001.6 | 2098.8 | 2142.9 | 2334.8 | 2583.2 | 2352.3 |
| 30°   | 2221.8 | 2212.7 | 2192.7 | 2152.8 | 2100.5 | 2039.0 | 2088.0 | 2124.6 | 2318.2 | 2622.3 | 2357.2 |
| 32.5° | 2340.6 | 2334.0 | 2317.4 | 2280.8 | 2221.0 | 2127.1 | 2124.6 | 2152.8 | 2331.5 | 2678.8 | 2376.4 |
| 35°   | 2455.3 | 2457.8 | 2458.6 | 2438.7 | 2374.7 | 2260.9 | 2225.1 | 2235.1 | 2386.3 | 2763.6 | 2419.6 |
| 37.5° | 2579.1 | 2573.3 | 2603.2 | 2617.3 | 2555.8 | 2434.5 | 2380.5 | 2381.3 | 2491.0 | 2889.0 | 2501.0 |
| 40°   | 2673.0 | 2674.6 | 2739.5 | 2797.6 | 2771.9 | 2654.7 | 2577.4 | 2576.6 | 2652.2 | 3061.0 | 2632.3 |
| 42.5° | 2761.1 | 2771.9 | 2867.4 | 2967.1 | 3002.8 | 2899.0 | 2843.3 | 2822.5 | 2878.2 | 3293.7 | 2829.2 |
| 45°   | 2855.0 | 2870.7 | 3004.5 | 3146.6 | 3240.5 | 3179.0 | 3135.0 | 3143.3 | 3149.9 | 3564.5 | 3094.2 |
| 47.5° | 2964.6 | 2974.6 | 3139.9 | 3340.2 | 3515.5 | 3499.7 | 3502.2 | 3492.2 | 3488.9 | 3906.0 | 3444.9 |
| 50°   | 3097.6 | 3120.8 | 3311.1 | 3550.4 | 3789.7 | 3894.4 | 3929.3 | 3933.5 | 3879.4 | 4278.3 | 3808.0 |
| 52.5° | 3380.1 | 3408.3 | 3571.2 | 3780.6 | 4088.8 | 4309.0 | 4451.1 | 4422.8 | 4339.8 | 4638.9 | 4206.0 |
| 55°   | 3713.3 | 3734.9 | 3891.9 | 4108.8 | 4454.4 | 4763.5 | 5100.9 | 5089.2 | 4885.7 | 5018.6 | 4533.4 |
| 57.5° | 3744.8 | 3768.9 | 4012.4 | 4344.7 | 4923.9 | 5325.2 | 5680.0 | 5717.4 | 5419.1 | 5287.8 | 4825.8 |
| 60°   | 3390.0 | 3439.1 | 3771.4 | 4218.4 | 5103.3 | 6080.5 | 6314.8 | 6322.3 | 5810.4 | 5561.2 | 5183.1 |
| 62.5° | 2717.0 | 2740.3 | 3075.1 | 3658.4 | 4826.7 | 6520.9 | 7284.4 | 7126.6 | 6313.1 | 5984.1 | 5749.0 |
| 65°   | 1424.2 | 1518.9 | 1810.5 | 2456.1 | 3914.3 | 6367.1 | 8451.0 | 8407.8 | 7217.1 | 6589.8 | 6189.3 |
| 67.5° | 977.1  | 976.3  | 1045.3 | 1280.4 | 2334.0 | 5482.2 | 9023.5 | 9498.8 | 8262.4 | 6797.5 | 5870.3 |
| 70°   | 743.6  | 746.1  | 807.6  | 960.5  | 1209.0 | 3649.3 | 8395.3 | 9208.0 | 8456.8 | 6171.9 | 4747.7 |
| 72.5° | 493.6  | 498.5  | 600.7  | 776.1  | 965.5  | 1788.9 | 6524.2 | 7367.5 | 7115.8 | 4957.1 | 3341.9 |
| 75°   | 295.0  | 299.1  | 372.2  | 564.2  | 858.3  | 1001.2 | 4145.3 | 5093.4 | 4898.1 | 3416.6 | 1791.4 |
| 77.5° | 121.3  | 124.6  | 191.1  | 351.5  | 628.2  | 777.7  | 2292.4 | 3332.7 | 2933.9 | 1358.5 | 489.4  |
| 80°   | 50.7   | 52.3   | 92.2   | 245.9  | 452.8  | 487.7  | 1061.9 | 1566.2 | 1202.3 | 292.5  | 149.6  |
| 82.5° | 18.3   | 19.1   | 34.1   | 135.4  | 281.7  | 367.3  | 535.9  | 619.0  | 339.0  | 95.6   | 80.6   |
| 85°   | 0.8    | 0.8    | 8.3    | 45.7   | 107.2  | 103.9  | 306.6  | 296.6  | 112.2  | 39.9   | 48.2   |
| 87.5° | 0.0    | 0.0    | 0.8    | 0.8    | 1.7    | 4.2    | 29.1   | 51.5   | 24.1   | 10.0   | 20.8   |
| 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: GWS-SA2E-830-U-SL3-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 | 2707.9 |
| 2.5°  | 2690.4 | 2646.4 | 2598.2 | 2553.3 | 2481.9 | 2439.5 | 2387.2 | 2363.9 | 2330.7 | 2322.3 | 2327.3 |
| 5°    | 2635.6 | 2560.0 | 2444.5 | 2339.8 | 2204.4 | 2095.5 | 1985.8 | 1939.3 | 1879.5 | 1839.6 | 1823.0 |
| 7.5°  | 2558.3 | 2459.4 | 2279.1 | 2088.9 | 1902.7 | 1704.2 | 1552.9 | 1453.2 | 1362.7 | 1312.8 | 1302.8 |
| 10°   | 2480.2 | 2351.4 | 2093.0 | 1820.5 | 1532.2 | 1294.5 | 1090.1 | 938.9  | 815.9  | 760.3  | 717.1  |
| 12.5° | 2399.6 | 2239.3 | 1903.6 | 1548.0 | 1213.1 | 889.1  | 636.5  | 489.4  | 401.3  | 366.4  | 372.2  |
| 15°   | 2325.7 | 2131.2 | 1715.8 | 1275.4 | 854.2  | 536.8  | 351.5  | 296.6  | 275.9  | 269.2  | 268.4  |
| 17.5° | 2255.0 | 2029.0 | 1528.8 | 1010.4 | 563.3  | 329.0  | 269.2  | 255.9  | 250.1  | 246.8  | 246.8  |
| 20°   | 2191.1 | 1931.0 | 1346.0 | 761.1  | 363.9  | 260.9  | 243.5  | 236.8  | 231.8  | 229.3  | 229.3  |
| 22.5° | 2131.2 | 1836.3 | 1167.4 | 538.4  | 268.4  | 234.3  | 223.5  | 216.9  | 211.0  | 207.7  | 207.7  |
| 25°   | 2077.2 | 1750.7 | 997.1  | 370.6  | 231.0  | 214.4  | 202.7  | 195.3  | 185.3  | 179.5  | 179.5  |
| 27.5° | 2038.2 | 1674.3 | 833.4  | 270.0  | 208.6  | 192.8  | 179.5  | 169.5  | 158.7  | 152.1  | 150.4  |
| 30°   | 2014.9 | 1609.4 | 668.0  | 221.8  | 187.8  | 172.0  | 157.0  | 144.6  | 132.1  | 125.5  | 124.6  |
| 32.5° | 2001.6 | 1549.6 | 516.8  | 193.6  | 170.3  | 152.1  | 135.4  | 122.1  | 109.7  | 102.2  | 101.4  |
| 35°   | 2006.6 | 1503.1 | 387.2  | 174.5  | 153.7  | 134.6  | 116.3  | 103.0  | 92.2   | 85.6   | 83.9   |
| 37.5° | 2049.8 | 1482.3 | 290.8  | 159.5  | 139.6  | 119.6  | 100.5  | 88.1   | 78.1   | 73.1   | 72.3   |
| 40°   | 2133.7 | 1486.5 | 228.5  | 147.9  | 128.0  | 104.7  | 86.4   | 74.8   | 67.3   | 63.1   | 62.3   |
| 42.5° | 2264.2 | 1521.4 | 188.6  | 137.9  | 115.5  | 91.4   | 74.8   | 65.6   | 58.2   | 54.0   | 53.2   |
| 45°   | 2458.6 | 1593.7 | 164.5  | 126.3  | 102.2  | 78.9   | 64.8   | 56.5   | 49.9   | 44.9   | 44.0   |
| 47.5° | 2740.3 | 1719.1 | 148.7  | 115.5  | 90.6   | 68.1   | 55.7   | 47.4   | 41.5   | 37.4   | 36.6   |
| 50°   | 3040.2 | 1869.5 | 135.4  | 104.7  | 80.6   | 59.0   | 47.4   | 39.1   | 34.1   | 29.9   | 29.1   |
| 52.5° | 3360.1 | 2031.5 | 125.5  | 94.7   | 71.5   | 50.7   | 39.9   | 32.4   | 27.4   | 23.3   | 22.4   |
| 55°   | 3667.6 | 2194.4 | 113.8  | 88.1   | 60.7   | 43.2   | 33.2   | 26.6   | 21.6   | 18.3   | 18.3   |
| 57.5° | 3966.7 | 2344.0 | 101.4  | 77.3   | 49.9   | 36.6   | 27.4   | 21.6   | 17.4   | 15.0   | 14.1   |
| 60°   | 4324.0 | 2550.8 | 87.2   | 65.6   | 41.5   | 30.7   | 22.4   | 17.4   | 14.1   | 11.6   | 11.6   |
| 62.5° | 4854.9 | 2766.0 | 74.8   | 54.8   | 34.9   | 25.8   | 18.3   | 14.1   | 11.6   | 10.0   | 9.1    |
| 65°   | 5028.6 | 2649.7 | 63.1   | 44.9   | 28.3   | 20.8   | 15.0   | 12.5   | 10.0   | 9.1    | 8.3    |
| 67.5° | 4564.9 | 2172.0 | 52.3   | 36.6   | 23.3   | 17.4   | 13.3   | 10.8   | 9.1    | 8.3    | 7.5    |
| 70°   | 3562.0 | 1541.3 | 40.7   | 27.4   | 19.1   | 14.1   | 11.6   | 10.0   | 8.3    | 7.5    | 7.5    |
| 72.5° | 2422.9 | 911.5  | 32.4   | 20.8   | 15.8   | 12.5   | 10.0   | 9.1    | 8.3    | 7.5    | 6.6    |
| 75°   | 1193.2 | 324.0  | 24.9   | 15.8   | 12.5   | 10.8   | 9.1    | 8.3    | 7.5    | 6.6    | 6.6    |
| 77.5° | 321.6  | 89.7   | 19.1   | 12.5   | 10.0   | 8.3    | 8.3    | 8.3    | 7.5    | 5.8    | 5.8    |
| 80°   | 108.8  | 37.4   | 14.1   | 9.1    | 8.3    | 6.6    | 5.8    | 7.5    | 6.6    | 5.8    | 5.0    |
| 82.5° | 59.8   | 18.3   | 10.0   | 7.5    | 5.8    | 5.0    | 5.0    | 5.0    | 5.0    | 4.2    | 4.2    |
| 85°   | 38.2   | 10.0   | 6.6    | 5.8    | 5.8    | 4.2    | 3.3    | 3.3    | 2.5    | 2.5    | 2.5    |
| 87.5° | 17.4   | 5.8    | 5.8    | 5.0    | 5.0    | 4.2    | 2.5    | 1.7    | 0.8    | 0.8    | 0.8    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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: 4π  
 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  
 Rf: 81.5  
 Rg: 99.2

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



**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>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /nm) | $\lambda$<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>( $\phi$ /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**

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

REPORT NUMBER: SP1-2408-195-9

Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.32

| 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            |        |                          |               |

**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)