

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: P634459

Luminaire Tested: GWS-SA3B-827-U-SL3-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P634459  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-33)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3B-827-U-SL3-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III SPILL LIGHT ELIMINATOR OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (48) 2700K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

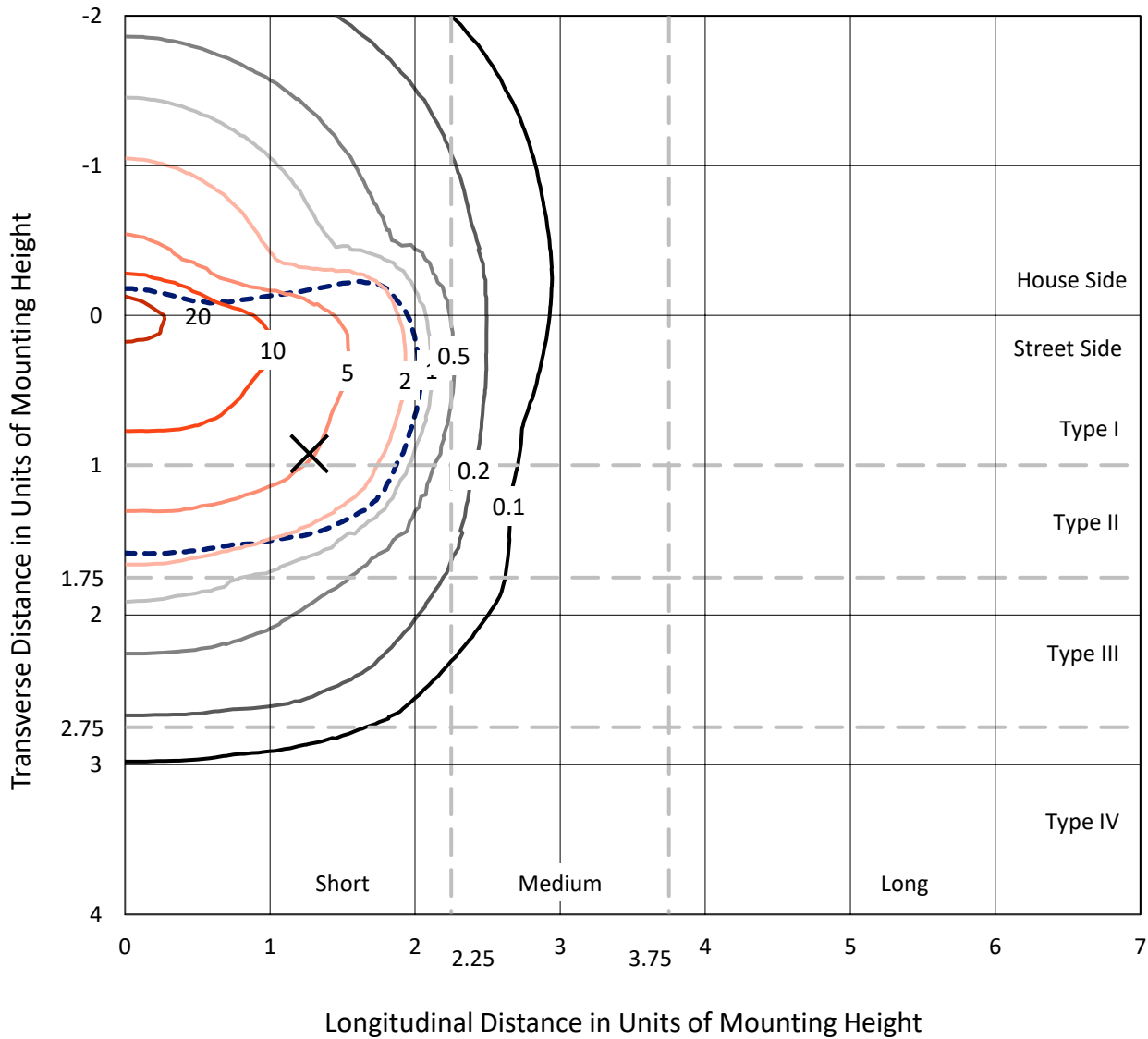
Lumens per Lamp: N/A  
Luminaire Lumens: 6403.4 lumens  
Efficiency: N/A  
Efficacy: 93.8 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G1  
  
Input Watts (W): 68.3  
Input Voltage (V): 120  
Input Current (Ain): 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



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 CATALOG NUMBER: GWS-SA3B-827-U-SL3-W-GRSWH

### Iso-Footcandle Lines of Horizontal Illumination

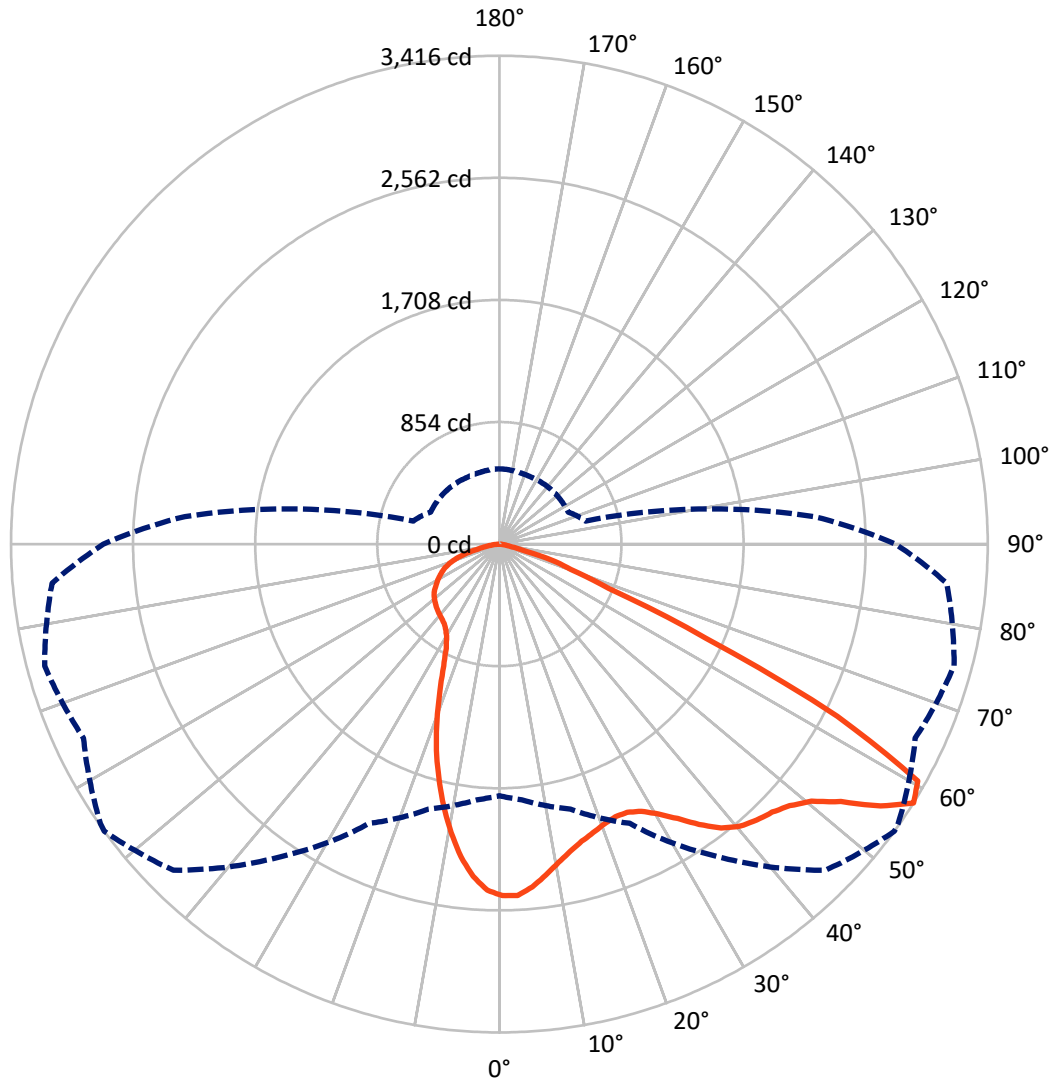
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 24.6 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 54-Deg Lateral    - - - Horizontal Cone Through 57.5-Deg Vertical

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**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1861.5   | 0.0    | 1861.5 |
|                    | % Fixture | 29.1     | 0.0    | 29.1   |
| <b>Street Side</b> | Lumens    | 4541.9   | 0.0    | 4541.9 |
|                    | % Fixture | 70.9     | 0.0    | 70.9   |
| <b>Total</b>       | Lumens    | 6403.4   | 0.0    | 6403.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 216.1  | 3.4       |
| 10°-20°   | 515.6  | 8.1       |
| 20°-30°   | 713.5  | 11.1      |
| 30°-40°   | 991.5  | 15.5      |
| 40°-50°   | 1309.4 | 20.4      |
| 50°-60°   | 1556.1 | 24.3      |
| 60°-70°   | 862.1  | 13.5      |
| 70°-80°   | 214.7  | 3.4       |
| 80°-90°   | 24.4   | 0.4       |
| 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°    | 6403.4 | 100.0     |
| 0°-180°   | 6403.4 | 100.0     |

**Coefficient of Utilization**



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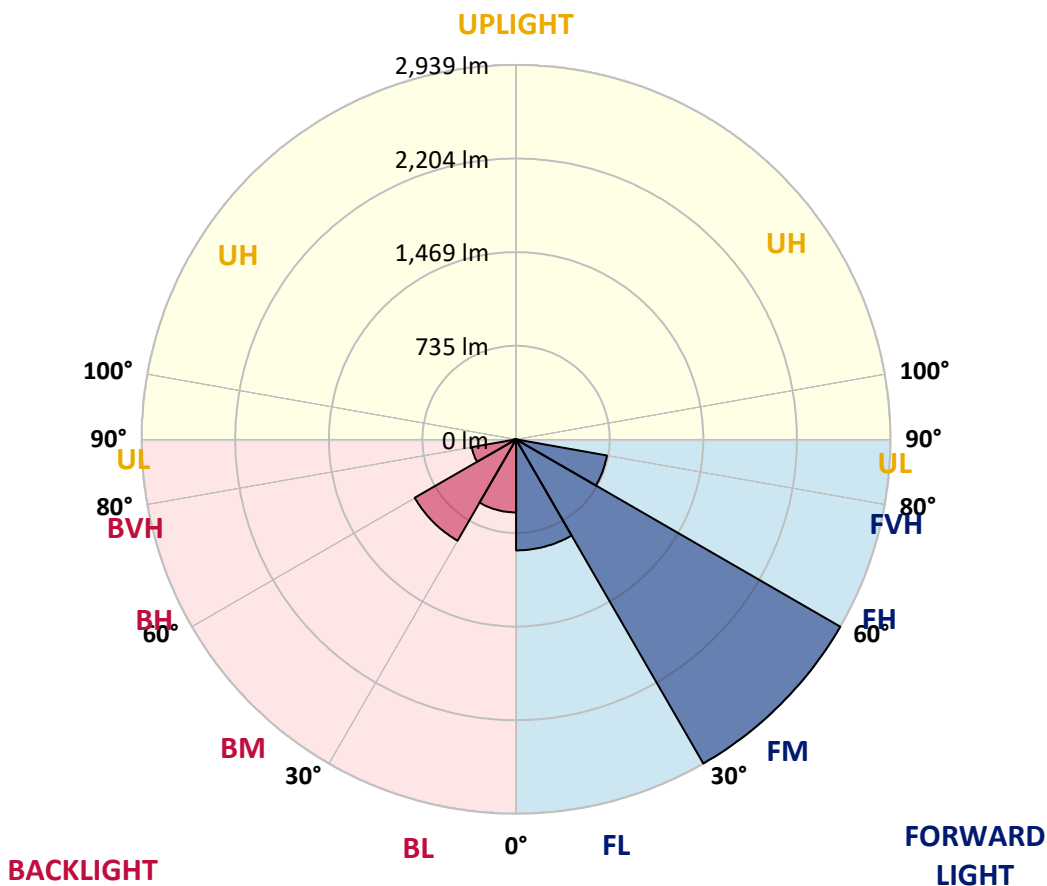
CATALOG NUMBER: GWS-SA3B-827-U-SL3-W-GRSWH

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 871.6  | 13.6      |                         |      |         |
| FM (30°-60°)   | 2938.6 | 45.9      |                         |      |         |
| FH (60°-80°)   | 724.0  | 11.3      |                         |      | G1/1800 |
| FVH (80°-90°)  | 7.6    | 0.1       |                         |      | G0/10   |
| BL (0°-30°)    | 573.6  | 9.0       | B2/1000                 |      |         |
| BM (30°-60°)   | 918.3  | 14.3      | B1/1000                 |      |         |
| BH (60°-80°)   | 352.8  | 5.5       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 16.8   | 0.3       |                         |      | G1/100  |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G1**

Type II Short





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CATALOG NUMBER: GWS-SA3B-827-U-SL3-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 54°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 |
| 2.5°  | 2412.4 | 2417.3 | 2420.6 | 2432.1 | 2442.0 | 2450.7 | 2460.1 | 2460.1 | 2459.5 | 2457.9 | 2454.6 |
| 5°    | 2317.0 | 2322.5 | 2330.1 | 2346.0 | 2367.4 | 2382.8 | 2408.0 | 2410.2 | 2421.1 | 2425.5 | 2423.3 |
| 7.5°  | 2206.3 | 2207.9 | 2217.8 | 2238.6 | 2272.6 | 2300.0 | 2336.2 | 2340.6 | 2366.9 | 2382.2 | 2379.5 |
| 10°   | 2085.1 | 2079.6 | 2097.2 | 2127.9 | 2172.3 | 2218.3 | 2264.9 | 2268.8 | 2311.0 | 2340.0 | 2337.8 |
| 12.5° | 1974.4 | 1975.0 | 1992.5 | 2029.8 | 2085.1 | 2142.1 | 2204.6 | 2213.4 | 2265.5 | 2302.7 | 2298.9 |
| 15°   | 1881.8 | 1884.0 | 1905.3 | 1947.5 | 2010.6 | 2078.5 | 2156.4 | 2164.6 | 2230.4 | 2279.7 | 2268.8 |
| 17.5° | 1807.8 | 1810.0 | 1828.6 | 1876.8 | 1944.3 | 2026.5 | 2121.3 | 2129.5 | 2211.2 | 2269.9 | 2247.4 |
| 20°   | 1756.8 | 1755.7 | 1773.8 | 1819.8 | 1889.4 | 1978.8 | 2090.6 | 2102.7 | 2205.2 | 2273.7 | 2233.1 |
| 22.5° | 1736.0 | 1735.4 | 1748.6 | 1786.4 | 1851.6 | 1942.1 | 2072.0 | 2088.4 | 2211.7 | 2290.7 | 2224.4 |
| 25°   | 1746.4 | 1744.2 | 1755.7 | 1783.6 | 1835.7 | 1927.8 | 2077.5 | 2095.0 | 2239.7 | 2325.8 | 2226.0 |
| 27.5° | 1778.7 | 1776.0 | 1785.8 | 1811.1 | 1850.5 | 1942.6 | 2115.8 | 2136.1 | 2298.9 | 2389.9 | 2247.9 |
| 30°   | 1828.0 | 1826.4 | 1836.3 | 1860.4 | 1894.9 | 1991.9 | 2189.3 | 2212.3 | 2390.4 | 2489.7 | 2295.6 |
| 32.5° | 1885.6 | 1882.9 | 1900.4 | 1928.4 | 1968.4 | 2081.8 | 2287.9 | 2318.1 | 2499.0 | 2617.9 | 2375.6 |
| 35°   | 1950.3 | 1948.1 | 1972.2 | 2012.8 | 2070.3 | 2206.8 | 2407.4 | 2440.3 | 2609.7 | 2763.2 | 2482.0 |
| 37.5° | 2013.3 | 2013.3 | 2059.9 | 2120.2 | 2192.6 | 2342.8 | 2519.8 | 2540.6 | 2686.4 | 2892.0 | 2596.0 |
| 40°   | 2069.2 | 2072.5 | 2142.7 | 2233.1 | 2325.2 | 2465.5 | 2593.8 | 2611.3 | 2720.4 | 2980.8 | 2695.2 |
| 42.5° | 2131.2 | 2133.9 | 2215.6 | 2334.0 | 2443.6 | 2564.7 | 2638.7 | 2647.5 | 2727.0 | 3025.2 | 2765.4 |
| 45°   | 2180.5 | 2184.3 | 2285.7 | 2412.4 | 2546.7 | 2639.3 | 2674.4 | 2682.1 | 2736.3 | 3049.3 | 2816.3 |
| 47.5° | 2206.3 | 2211.7 | 2328.0 | 2475.4 | 2616.3 | 2706.2 | 2733.0 | 2736.3 | 2774.7 | 3091.5 | 2877.7 |
| 50°   | 2201.9 | 2212.8 | 2343.8 | 2506.6 | 2667.8 | 2773.6 | 2827.3 | 2832.8 | 2853.1 | 3153.5 | 2949.5 |
| 52.5° | 2240.8 | 2245.7 | 2377.8 | 2543.9 | 2741.3 | 2898.0 | 2991.2 | 2998.9 | 2989.6 | 3200.0 | 2992.3 |
| 55°   | 2176.1 | 2199.7 | 2335.6 | 2538.4 | 2853.1 | 3090.4 | 3234.0 | 3230.2 | 3113.4 | 3252.1 | 3063.6 |
| 57.5° | 1760.1 | 1794.6 | 1919.0 | 2154.7 | 2668.9 | 3225.3 | 3415.5 | 3406.1 | 3209.4 | 3292.1 | 3140.8 |
| 60°   | 1218.5 | 1224.0 | 1336.4 | 1503.5 | 2059.9 | 2849.2 | 3362.3 | 3382.6 | 3226.9 | 3241.7 | 2997.8 |
| 62.5° | 974.6  | 972.9  | 983.4  | 987.7  | 1310.1 | 2002.9 | 2654.1 | 2728.1 | 2681.0 | 2525.8 | 2124.6 |
| 65°   | 832.1  | 838.1  | 868.8  | 852.9  | 855.1  | 1128.1 | 1585.8 | 1596.2 | 1563.3 | 1507.4 | 1123.7 |
| 67.5° | 651.2  | 661.6  | 715.9  | 777.8  | 758.1  | 726.3  | 822.8  | 817.8  | 644.6  | 498.8  | 412.2  |
| 70°   | 407.8  | 414.4  | 472.5  | 610.6  | 660.0  | 596.4  | 529.0  | 526.8  | 345.3  | 283.9  | 311.3  |
| 72.5° | 237.9  | 239.0  | 255.4  | 340.4  | 438.0  | 407.8  | 389.2  | 374.9  | 222.0  | 226.4  | 248.3  |
| 75°   | 131.0  | 131.0  | 130.5  | 146.9  | 172.7  | 152.9  | 148.0  | 144.2  | 148.5  | 168.3  | 184.7  |
| 77.5° | 27.4   | 28.0   | 29.6   | 38.9   | 50.4   | 61.4   | 77.3   | 77.8   | 97.0   | 112.4  | 125.5  |
| 80°   | 12.6   | 13.2   | 16.4   | 20.8   | 26.9   | 35.6   | 47.1   | 47.7   | 58.7   | 70.7   | 79.5   |
| 82.5° | 6.6    | 7.1    | 8.8    | 11.0   | 14.3   | 18.6   | 26.3   | 26.3   | 35.1   | 41.7   | 47.1   |
| 85°   | 2.2    | 2.2    | 3.3    | 4.4    | 6.0    | 7.7    | 10.4   | 10.4   | 15.3   | 20.3   | 23.6   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.5    | 1.1    | 2.2    | 2.2    | 2.7    | 3.3    | 5.5    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P634459

CATALOG NUMBER: GWS-SA3B-827-U-SL3-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 | 2458.4 |
| 2.5°  | 2447.4 | 2430.5 | 2431.0 | 2434.3 | 2423.9 | 2408.0 | 2397.6 | 2384.4 | 2376.2 | 2374.5 | 2380.6 |
| 5°    | 2412.4 | 2392.6 | 2378.9 | 2364.7 | 2335.1 | 2300.0 | 2272.6 | 2250.1 | 2235.3 | 2229.8 | 2223.3 |
| 7.5°  | 2364.1 | 2338.4 | 2303.8 | 2263.8 | 2210.1 | 2147.6 | 2103.8 | 2062.7 | 2034.1 | 2025.9 | 2022.1 |
| 10°   | 2315.9 | 2278.6 | 2217.2 | 2142.7 | 2053.3 | 1968.9 | 1889.4 | 1828.6 | 1780.4 | 1753.0 | 1761.7 |
| 12.5° | 2266.0 | 2220.0 | 2124.0 | 2009.5 | 1885.1 | 1757.9 | 1653.7 | 1552.9 | 1475.0 | 1436.1 | 1424.6 |
| 15°   | 2222.2 | 2159.7 | 2025.9 | 1870.8 | 1705.3 | 1545.2 | 1394.5 | 1243.2 | 1144.5 | 1090.8 | 1076.0 |
| 17.5° | 2184.9 | 2103.8 | 1922.3 | 1729.4 | 1531.5 | 1303.5 | 1118.2 | 977.9  | 910.5  | 880.9  | 878.7  |
| 20°   | 2148.2 | 2048.9 | 1819.8 | 1577.0 | 1330.9 | 1075.5 | 909.9  | 844.1  | 820.0  | 809.6  | 809.1  |
| 22.5° | 2115.3 | 1991.4 | 1711.8 | 1424.6 | 1131.4 | 903.9  | 812.9  | 784.4  | 777.8  | 777.8  | 776.7  |
| 25°   | 2087.3 | 1933.8 | 1601.1 | 1262.9 | 951.0  | 804.7  | 762.5  | 750.4  | 753.1  | 758.1  | 758.6  |
| 27.5° | 2075.8 | 1888.9 | 1494.2 | 1096.8 | 826.6  | 747.1  | 727.9  | 726.3  | 734.0  | 741.6  | 742.7  |
| 30°   | 2087.9 | 1858.2 | 1384.6 | 937.9  | 752.0  | 712.0  | 703.3  | 706.6  | 715.9  | 723.5  | 723.5  |
| 32.5° | 2125.1 | 1842.8 | 1272.8 | 821.7  | 708.7  | 687.4  | 684.6  | 687.9  | 695.0  | 699.4  | 700.0  |
| 35°   | 2188.2 | 1848.9 | 1157.1 | 743.3  | 680.8  | 669.3  | 668.7  | 670.9  | 673.7  | 676.4  | 677.0  |
| 37.5° | 2267.7 | 1875.7 | 1033.2 | 697.8  | 662.7  | 656.1  | 655.0  | 654.5  | 655.0  | 655.0  | 655.6  |
| 40°   | 2345.5 | 1916.3 | 922.5  | 670.9  | 650.1  | 644.6  | 641.9  | 638.0  | 637.5  | 636.4  | 635.8  |
| 42.5° | 2403.0 | 1947.5 | 834.3  | 651.7  | 638.6  | 632.0  | 628.7  | 622.7  | 622.1  | 621.6  | 621.0  |
| 45°   | 2446.4 | 1973.9 | 760.8  | 633.1  | 626.5  | 620.5  | 613.4  | 607.9  | 609.0  | 610.1  | 610.1  |
| 47.5° | 2495.1 | 1996.9 | 707.1  | 615.6  | 611.7  | 605.7  | 596.9  | 593.1  | 596.9  | 600.8  | 600.8  |
| 50°   | 2554.3 | 2029.2 | 663.3  | 598.0  | 596.4  | 589.3  | 581.6  | 579.9  | 584.3  | 589.8  | 589.8  |
| 52.5° | 2597.6 | 2057.2 | 632.0  | 580.5  | 580.5  | 571.2  | 564.6  | 564.0  | 569.0  | 574.5  | 575.0  |
| 55°   | 2678.8 | 2122.4 | 621.0  | 560.2  | 558.0  | 550.9  | 545.9  | 542.1  | 548.1  | 553.1  | 553.1  |
| 57.5° | 2770.3 | 2209.0 | 623.8  | 531.1  | 528.4  | 526.2  | 522.4  | 518.0  | 519.6  | 525.1  | 525.7  |
| 60°   | 2576.3 | 2041.3 | 593.6  | 502.1  | 500.5  | 499.4  | 494.4  | 486.7  | 488.9  | 493.3  | 493.9  |
| 62.5° | 1799.5 | 1356.6 | 480.2  | 465.9  | 471.4  | 470.9  | 464.3  | 455.5  | 456.1  | 462.1  | 462.1  |
| 65°   | 934.0  | 734.0  | 421.5  | 433.0  | 441.3  | 438.0  | 427.0  | 419.3  | 418.2  | 425.9  | 424.3  |
| 67.5° | 402.9  | 400.7  | 383.7  | 398.5  | 407.3  | 400.1  | 388.6  | 376.0  | 377.1  | 379.9  | 377.7  |
| 70°   | 324.5  | 334.4  | 341.5  | 357.4  | 364.5  | 351.4  | 338.8  | 331.6  | 325.6  | 325.0  | 321.2  |
| 72.5° | 259.3  | 273.0  | 288.9  | 305.3  | 307.5  | 294.4  | 278.5  | 271.9  | 262.6  | 262.0  | 258.2  |
| 75°   | 195.1  | 206.6  | 219.3  | 232.4  | 232.4  | 219.8  | 209.4  | 206.1  | 195.1  | 191.8  | 188.6  |
| 77.5° | 133.2  | 140.3  | 150.2  | 153.5  | 156.8  | 151.8  | 141.4  | 135.9  | 123.3  | 120.0  | 115.7  |
| 80°   | 83.9   | 88.8   | 94.8   | 97.0   | 100.3  | 94.3   | 86.1   | 80.0   | 71.3   | 68.5   | 66.3   |
| 82.5° | 50.4   | 53.7   | 57.6   | 58.7   | 61.4   | 57.0   | 49.3   | 44.9   | 40.0   | 37.8   | 36.2   |
| 85°   | 25.8   | 27.4   | 29.6   | 30.1   | 29.6   | 25.2   | 22.5   | 20.3   | 17.0   | 16.4   | 15.3   |
| 87.5° | 6.6    | 7.7    | 8.2    | 7.7    | 7.1    | 5.5    | 3.8    | 2.7    | 1.1    | 1.1    | 0.5    |
| 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

Invue

Report Number: SP1-2407-157-9

Test Date: 10/03/2024

Luminaire Tested: EMM2-HTN-SA1A-827-U-5WQ

Data applicable to all product families utilizing light square engine

**Test Information**

Test Method: LM-79-2019  
 Report Number: SP1-2407-157-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/03/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Invue  
 Catalog Number: **EMM2-HTN-SA1A-827-U-5WQ**  
 Description: Epic Modern Light Square 40W 5WQ Optic

**Spectral Parameters**

CCT (K): 2764  
 CIE u': 0.2591  
 CIE v': 0.5290  
 Duv: 0.0020  
 CIE x: 0.4581  
 CIE y: 0.4156  
 CIE z: 0.1263  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 583  
 Purity: 62.2537  
 Rf: 84.7  
 Rg: 94.6

|           |      |      |      |
|-----------|------|------|------|
| CRI (Ra): | 80.9 |      |      |
| R1:       | 78.8 | R9:  | -1.5 |
| R2:       | 89.9 | R10: | 77.9 |
| R3:       | 96.2 | R11: | 78.9 |
| R4:       | 79.1 | R12: | 71.6 |
| R5:       | 79.1 | R13: | 81.2 |
| R6:       | 88.8 | R14: | 98.5 |
| R7:       | 81.3 | R15: | 69.9 |
| R8:       | 54.3 |      |      |



**Test Conditions**

Stabilization Time: 81M  
 Operation Time: 2H 21M  
 Sphere Temperature (°C): 25.2

REPORT NUMBER: SP1-2407-157-9

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

REPORT NUMBER: SP1-2407-157-9

**CIE 1931 Chromaticity Diagram**



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

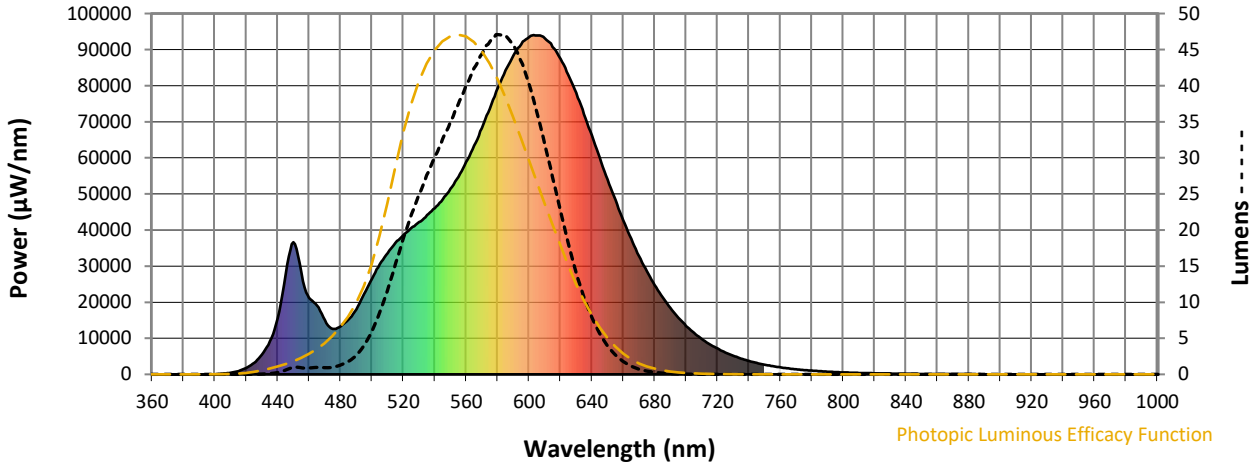


CCT = 2764K  
 CIE x = 0.4581  
 CIE y = 0.4156  
 Duv = 0.0020

Point lies inside the ANSI 2700K 4-step quadrangle

REPORT NUMBER: SP1-2407-157-9

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 4337.9**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 2.6                            | 620               | 87426                                | 22.8                           | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 3.9                            | 625               | 83013                                | 18.2                           | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 5.8                            | 630               | 78077                                | 14.1                           | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 8.5                            | 635               | 72080                                | 10.7                           | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 11.5                           | 640               | 66249                                | 7.9                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 15.2                           | 645               | 59973                                | 5.7                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 18.7                           | 650               | 53972                                | 3.9                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 21.9                           | 655               | 48369                                | 2.7                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 24.9                           | 660               | 42641                                | 1.8                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 27.6                           | 665               | 37602                                | 1.1                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.0                            | 540               | 46032                                | 30.0                           | 670               | 32798                                | 0.7                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.0                            | 545               | 48553                                | 32.5                           | 675               | 28558                                | 0.5                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 0.0                            | 550               | 51408                                | 34.9                           | 680               | 24782                                | 0.3                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 0.0                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.2                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 0.0                            | 560               | 58847                                | 40.0                           | 690               | 18413                                | 0.1                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 0.1                            | 565               | 63386                                | 42.4                           | 695               | 15721                                | 0.1                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 0.2                            | 570               | 68196                                | 44.3                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 0.6                            | 575               | 73613                                | 46.0                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 0.9                            | 580               | 79207                                | 47.1                           | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 0.9                            | 585               | 84248                                | 47.0                           | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 0.9                            | 590               | 88397                                | 45.7                           | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 1.0                            | 595               | 91428                                | 43.4                           | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 0.9                            | 600               | 93452                                | 40.3                           | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 1.0                            | 605               | 93959                                | 36.4                           | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 1.3                            | 610               | 93079                                | 32.0                           | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 1.8                            | 615               | 90707                                | 27.3                           | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Scotopic Flux vs. Wavelength**



**Scotopic Lumens: 5286.7**

**S/P: 1.22**

| $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>( $\mu\text{W}/\text{nm}$ ) | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | 0.0                            | 490               | 18018                                | 75.9                           | 620               | 87426                                | 0.4                            | 750               | 2680                                 | 0.0                            | 880               | 58                                   | 0.0                            |
| 365               | 0                                    | 0.0                            | 495               | 22295                                | 93.2                           | 625               | 83013                                | 0.2                            | 755               | 2287                                 | 0.0                            | 885               | 46                                   | 0.0                            |
| 370               | 0                                    | 0.0                            | 500               | 26478                                | 107.8                          | 630               | 78077                                | 0.1                            | 760               | 1944                                 | 0.0                            | 890               | 45                                   | 0.0                            |
| 375               | 0                                    | 0.0                            | 505               | 30524                                | 118.7                          | 635               | 72080                                | 0.1                            | 765               | 1653                                 | 0.0                            | 895               | 41                                   | 0.0                            |
| 380               | 0                                    | 0.0                            | 510               | 33611                                | 122.2                          | 640               | 66249                                | 0.1                            | 770               | 1413                                 | 0.0                            | 900               | 38                                   | 0.0                            |
| 385               | 0                                    | 0.0                            | 515               | 36490                                | 120.8                          | 645               | 59973                                | 0.0                            | 775               | 1198                                 | 0.0                            | 905               | 33                                   | 0.0                            |
| 390               | 0                                    | 0.0                            | 520               | 38610                                | 113.9                          | 650               | 53972                                | 0.0                            | 780               | 1025                                 | 0.0                            | 910               | 30                                   | 0.0                            |
| 395               | 0                                    | 0.0                            | 525               | 40511                                | 104.1                          | 655               | 48369                                | 0.0                            | 785               | 874                                  | 0.0                            | 915               | 23                                   | 0.0                            |
| 400               | 48                                   | 0.0                            | 530               | 42223                                | 92.4                           | 660               | 42641                                | 0.0                            | 790               | 747                                  | 0.0                            | 920               | 24                                   | 0.0                            |
| 405               | 201                                  | 0.0                            | 535               | 44137                                | 80.5                           | 665               | 37602                                | 0.0                            | 795               | 639                                  | 0.0                            | 925               | 22                                   | 0.0                            |
| 410               | 457                                  | 0.1                            | 540               | 46032                                | 68.2                           | 670               | 32798                                | 0.0                            | 800               | 547                                  | 0.0                            | 930               | 22                                   | 0.0                            |
| 415               | 925                                  | 0.3                            | 545               | 48553                                | 57.1                           | 675               | 28558                                | 0.0                            | 805               | 473                                  | 0.0                            | 935               | 17                                   | 0.0                            |
| 420               | 1816                                 | 1.1                            | 550               | 51408                                | 46.7                           | 680               | 24782                                | 0.0                            | 810               | 401                                  | 0.0                            | 940               | 13                                   | 0.0                            |
| 425               | 3217                                 | 2.5                            | 555               | 54711                                | 37.4                           | 685               | 21386                                | 0.0                            | 815               | 351                                  | 0.0                            | 945               | 6                                    | 0.0                            |
| 430               | 5520                                 | 5.9                            | 560               | 58847                                | 29.4                           | 690               | 18413                                | 0.0                            | 820               | 307                                  | 0.0                            | 950               | 10                                   | 0.0                            |
| 435               | 9225                                 | 12.5                           | 565               | 63386                                | 22.5                           | 695               | 15721                                | 0.0                            | 825               | 261                                  | 0.0                            | 955               | 11                                   | 0.0                            |
| 440               | 15522                                | 26.3                           | 570               | 68196                                | 16.9                           | 700               | 13432                                | 0.0                            | 830               | 228                                  | 0.0                            | 960               | 8                                    | 0.0                            |
| 445               | 27642                                | 55.2                           | 575               | 73613                                | 12.4                           | 705               | 11513                                | 0.0                            | 835               | 193                                  | 0.0                            | 965               | 12                                   | 0.0                            |
| 450               | 36602                                | 85.4                           | 580               | 79207                                | 9.0                            | 710               | 9780                                 | 0.0                            | 840               | 174                                  | 0.0                            | 970               | 3                                    | 0.0                            |
| 455               | 28292                                | 75.1                           | 585               | 84248                                | 6.3                            | 715               | 8356                                 | 0.0                            | 845               | 151                                  | 0.0                            | 975               | 8                                    | 0.0                            |
| 460               | 21166                                | 63.2                           | 590               | 88397                                | 4.4                            | 720               | 7161                                 | 0.0                            | 850               | 123                                  | 0.0                            | 980               | 2                                    | 0.0                            |
| 465               | 19092                                | 63.2                           | 595               | 91428                                | 3.0                            | 725               | 6067                                 | 0.0                            | 855               | 106                                  | 0.0                            | 985               | 13                                   | 0.0                            |
| 470               | 14951                                | 54.2                           | 600               | 93452                                | 2.0                            | 730               | 5164                                 | 0.0                            | 860               | 95                                   | 0.0                            | 990               | 16                                   | 0.0                            |
| 475               | 12606                                | 48.8                           | 605               | 93959                                | 1.3                            | 735               | 4393                                 | 0.0                            | 865               | 82                                   | 0.0                            | 995               | 20                                   | 0.0                            |
| 480               | 13323                                | 54.2                           | 610               | 93079                                | 0.9                            | 740               | 3694                                 | 0.0                            | 870               | 77                                   | 0.0                            | 1000              | 0                                    | 0.0                            |
| 485               | 15164                                | 63.3                           | 615               | 90707                                | 0.5                            | 745               | 3157                                 | 0.0                            | 875               | 65                                   | 0.0                            |                   |                                      |                                |

REPORT NUMBER: SP1-2407-157-9

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 9797**

**M/P: 2.26**

| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 0             | 0.0           | 490    | 18018         | 27.7          | 620    | 87426         | 1.1           | 750    | 2680          | 0.0           | 880    | 58            | 0.0           |
| 365    | 0             | 0.0           | 495    | 22295         | 36.0          | 625    | 83013         | 0.7           | 755    | 2287          | 0.0           | 885    | 46            | 0.0           |
| 370    | 0             | 0.0           | 500    | 26478         | 44.2          | 630    | 78077         | 0.4           | 760    | 1944          | 0.0           | 890    | 45            | 0.0           |
| 375    | 0             | 0.0           | 505    | 30524         | 51.8          | 635    | 72080         | 0.3           | 765    | 1653          | 0.0           | 895    | 41            | 0.0           |
| 380    | 0             | 0.0           | 510    | 33611         | 57.0          | 640    | 66249         | 0.2           | 770    | 1413          | 0.0           | 900    | 38            | 0.0           |
| 385    | 0             | 0.0           | 515    | 36490         | 60.5          | 645    | 59973         | 0.1           | 775    | 1198          | 0.0           | 905    | 33            | 0.0           |
| 390    | 0             | 0.0           | 520    | 38610         | 61.4          | 650    | 53972         | 0.1           | 780    | 1025          | 0.0           | 910    | 30            | 0.0           |
| 395    | 0             | 0.0           | 525    | 40511         | 60.6          | 655    | 48369         | 0.0           | 785    | 874           | 0.0           | 915    | 23            | 0.0           |
| 400    | 48            | 0.0           | 530    | 42223         | 58.2          | 660    | 42641         | 0.0           | 790    | 747           | 0.0           | 920    | 24            | 0.0           |
| 405    | 201           | 0.0           | 535    | 44137         | 55.0          | 665    | 37602         | 0.0           | 795    | 639           | 0.0           | 925    | 22            | 0.0           |
| 410    | 457           | 0.0           | 540    | 46032         | 50.9          | 670    | 32798         | 0.0           | 800    | 547           | 0.0           | 930    | 22            | 0.0           |
| 415    | 925           | 0.1           | 545    | 48553         | 46.6          | 675    | 28558         | 0.0           | 805    | 473           | 0.0           | 935    | 17            | 0.0           |
| 420    | 1816          | 0.3           | 550    | 51408         | 42.0          | 680    | 24782         | 0.0           | 810    | 401           | 0.0           | 940    | 13            | 0.0           |
| 425    | 3217          | 0.8           | 555    | 54711         | 37.4          | 685    | 21386         | 0.0           | 815    | 351           | 0.0           | 945    | 6             | 0.0           |
| 430    | 5520          | 1.9           | 560    | 58847         | 32.9          | 690    | 18413         | 0.0           | 820    | 307           | 0.0           | 950    | 10            | 0.0           |
| 435    | 9225          | 4.1           | 565    | 63386         | 28.4          | 695    | 15721         | 0.0           | 825    | 261           | 0.0           | 955    | 11            | 0.0           |
| 440    | 15522         | 8.7           | 570    | 68196         | 24.1          | 700    | 13432         | 0.0           | 830    | 228           | 0.0           | 960    | 8             | 0.0           |
| 445    | 27642         | 18.5          | 575    | 73613         | 20.0          | 705    | 11513         | 0.0           | 835    | 193           | 0.0           | 965    | 12            | 0.0           |
| 450    | 36602         | 28.3          | 580    | 79207         | 16.3          | 710    | 9780          | 0.0           | 840    | 174           | 0.0           | 970    | 3             | 0.0           |
| 455    | 28292         | 24.7          | 585    | 84248         | 12.9          | 715    | 8356          | 0.0           | 845    | 151           | 0.0           | 975    | 8             | 0.0           |
| 460    | 21166         | 20.4          | 590    | 88397         | 9.8           | 720    | 7161          | 0.0           | 850    | 123           | 0.0           | 980    | 2             | 0.0           |
| 465    | 19092         | 20.1          | 595    | 91428         | 7.3           | 725    | 6067          | 0.0           | 855    | 106           | 0.0           | 985    | 13            | 0.0           |
| 470    | 14951         | 17.2          | 600    | 93452         | 5.3           | 730    | 5164          | 0.0           | 860    | 95            | 0.0           | 990    | 16            | 0.0           |
| 475    | 12606         | 15.7          | 605    | 93959         | 3.7           | 735    | 4393          | 0.0           | 865    | 82            | 0.0           | 995    | 20            | 0.0           |
| 480    | 13323         | 18.0          | 610    | 93079         | 2.5           | 740    | 3694          | 0.0           | 870    | 77            | 0.0           | 1000   | 0             | 0.0           |
| 485    | 15164         | 21.9          | 615    | 90707         | 1.7           | 745    | 3157          | 0.0           | 875    | 65            | 0.0           |        |               |               |

**Summary**

$R_f = 84.7$   
 $R_g = 94.6$   
 CIE  $R_a = 80.9$   
 $R_g = -1.5$



**Color Vector Graphics**



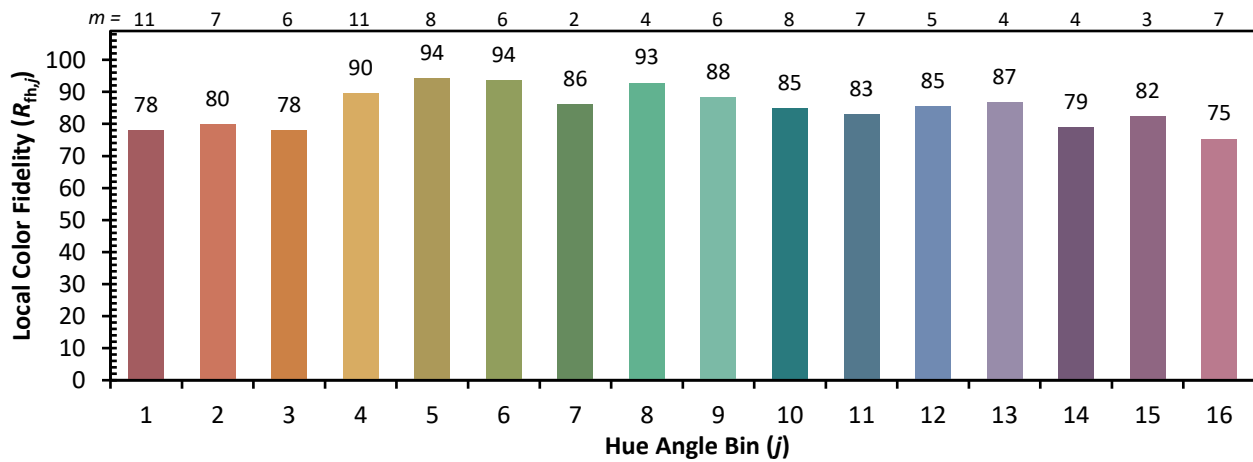


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 84 | CES51 = 95 | CES76 = 81 |
| CES02 = 63 | CES27 = 95 | CES52 = 94 | CES77 = 84 |
| CES03 = 31 | CES28 = 94 | CES53 = 89 | CES78 = 81 |
| CES04 = 71 | CES29 = 87 | CES54 = 91 | CES79 = 89 |
| CES05 = 50 | CES30 = 94 | CES55 = 90 | CES80 = 89 |
| CES06 = 52 | CES31 = 89 | CES56 = 86 | CES81 = 69 |
| CES07 = 43 | CES32 = 82 | CES57 = 85 | CES82 = 96 |
| CES08 = 41 | CES33 = 91 | CES58 = 86 | CES83 = 93 |
| CES09 = 29 | CES34 = 92 | CES59 = 91 | CES84 = 92 |
| CES10 = 77 | CES35 = 96 | CES60 = 94 | CES85 = 76 |
| CES11 = 60 | CES36 = 90 | CES61 = 89 | CES86 = 65 |
| CES12 = 66 | CES37 = 96 | CES62 = 94 | CES87 = 84 |
| CES13 = 44 | CES38 = 98 | CES63 = 87 | CES88 = 86 |
| CES14 = 74 | CES39 = 98 | CES64 = 82 | CES89 = 73 |
| CES15 = 72 | CES40 = 95 | CES65 = 78 | CES90 = 88 |
| CES16 = 48 | CES41 = 96 | CES66 = 81 | CES91 = 82 |
| CES17 = 50 | CES42 = 97 | CES67 = 80 | CES92 = 64 |
| CES18 = 57 | CES43 = 91 | CES68 = 83 | CES93 = 78 |
| CES19 = 73 | CES44 = 99 | CES69 = 88 | CES94 = 59 |
| CES20 = 67 | CES45 = 93 | CES70 = 80 | CES95 = 74 |
| CES21 = 87 | CES46 = 89 | CES71 = 79 | CES96 = 83 |
| CES22 = 79 | CES47 = 92 | CES72 = 92 | CES97 = 88 |
| CES23 = 92 | CES48 = 83 | CES73 = 75 | CES98 = 83 |
| CES24 = 91 | CES49 = 90 | CES74 = 91 | CES99 = 74 |
| CES25 = 72 | CES50 = 94 | CES75 = 81 |            |



Color Rendition by Hue-Angle Bin



Measure Comparisons



(END OF REPORT)