

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



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

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P317569

Luminaire Tested: **GLEON-SA5C-827-U-T2R**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P317569  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-8)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GLEON-SA5C-827-U-T2R  
Description: GALLEON AREA AND ROADWAY LUMINAIRE  
(5) 80 CRI, 2700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II  
ROADWAY OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 27074 lumens  
Efficiency: N/A  
Efficacy: 97.0 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 279  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT



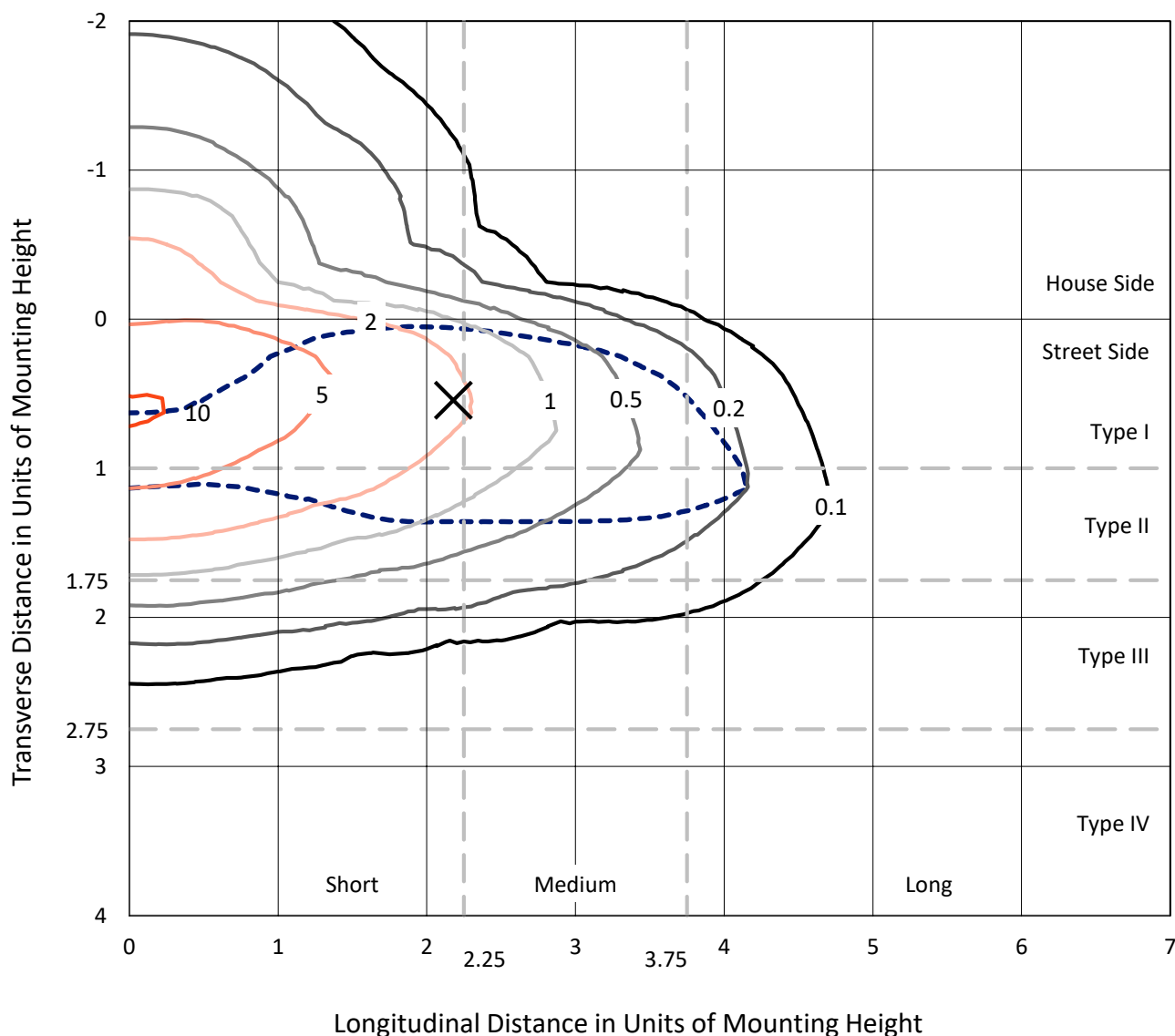
REPORT NUMBER: P317569

CATALOG NUMBER: GLEON-SA5C-827-U-T2R

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

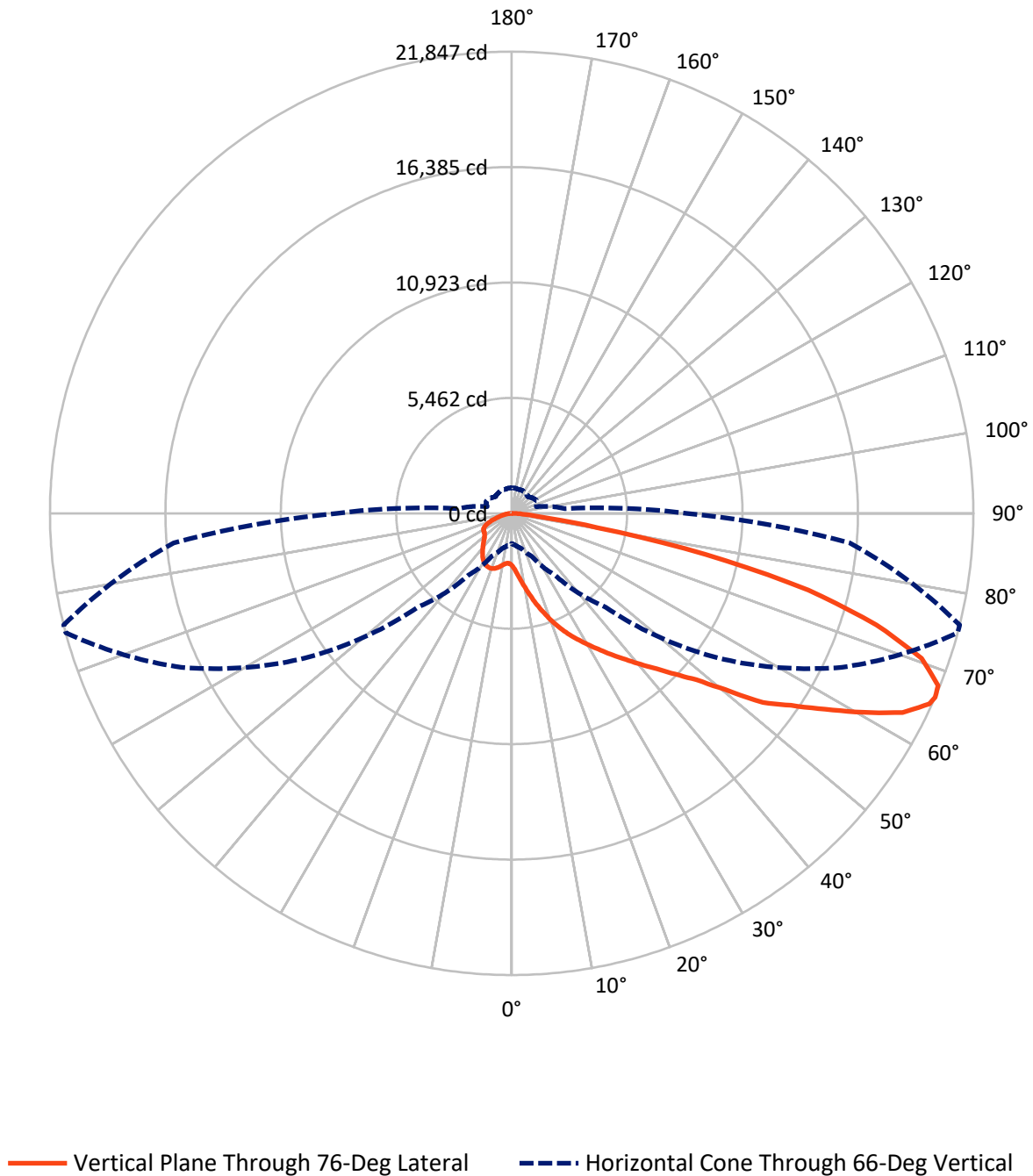


Based on 25 foot mounting height. Maximum calculated value = 10.5 fc

Type II - Short - N/A

REPORT NUMBER: P317569  
CATALOG NUMBER: GLEON-SA5C-827-U-T2R

## Luminous Intensity Polar Plot



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CATALOG NUMBER: GLEON-SA5C-827-U-T2R

**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4555.6   | 0.0    | 4555.6  |
|                    | % Fixture | 16.8     | 0.0    | 16.8    |
| <b>Street Side</b> | Lumens    | 22518.4  | 0.0    | 22518.4 |
|                    | % Fixture | 83.2     | 0.0    | 83.2    |
| <b>Total</b>       | Lumens    | 27074.0  | 0.0    | 27074.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 299.0   | 1.1       |
| 10°-20°   | 1180.7  | 4.4       |
| 20°-30°   | 2294.4  | 8.5       |
| 30°-40°   | 3744.9  | 13.8      |
| 40°-50°   | 5116.4  | 18.9      |
| 50°-60°   | 5959.6  | 22.0      |
| 60°-70°   | 5342.9  | 19.7      |
| 70°-80°   | 2700.1  | 10.0      |
| 80°-90°   | 436.0   | 1.6       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 27074.0 | 100.0     |
| 0°-180°   | 27074.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P317569

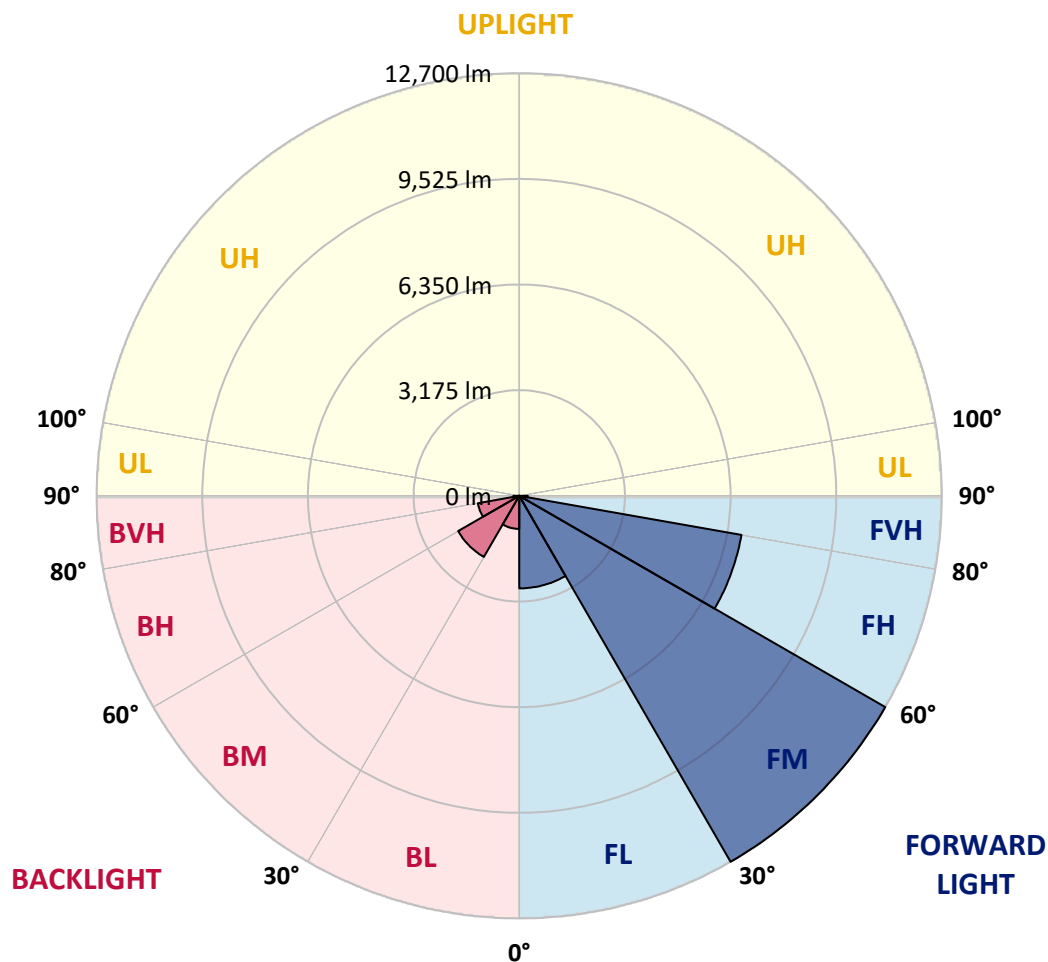
CATALOG NUMBER: GLEON-SA5C-827-U-T2R

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 2780.4  | 10.3      |                         |      |         |
| FM   | (30°-60°)   | 12699.6 | 46.9      |                         |      |         |
| FH   | (60°-80°)   | 6780.9  | 25.0      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 257.5   | 1.0       |                         |      | G3/500  |
| BL   | (0°-30°)    | 993.6   | 3.7       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 2121.4  | 7.8       | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1262.1  | 4.7       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 178.5   | 0.7       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type II Short





REPORT NUMBER: P317569

CATALOG NUMBER: GLEON-SA5C-827-U-T2R

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 75°     | 76°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  | 2472.5  |
| 2.5°  | 3282.2  | 3232.6  | 3228.0  | 3155.4  | 3138.8  | 3000.0  | 2898.0  | 2791.4  | 2670.1  | 2646.2  | 2550.6  |
| 5°    | 4216.1  | 4211.5  | 4148.0  | 4029.5  | 3936.6  | 3699.5  | 3465.1  | 3217.0  | 2944.9  | 2900.8  | 2685.7  |
| 7.5°  | 5056.1  | 5048.8  | 5000.1  | 4872.3  | 4738.1  | 4446.8  | 4112.2  | 3731.7  | 3290.5  | 3225.2  | 2868.6  |
| 10°   | 5694.0  | 5691.3  | 5674.7  | 5581.0  | 5467.0  | 5187.6  | 4818.1  | 4298.8  | 3692.2  | 3603.0  | 3097.5  |
| 12.5° | 6186.7  | 6192.2  | 6203.2  | 6170.1  | 6115.9  | 5877.9  | 5499.2  | 4899.9  | 4120.5  | 4032.2  | 3352.1  |
| 15°   | 6520.3  | 6536.9  | 6593.9  | 6640.7  | 6669.2  | 6523.1  | 6156.4  | 5514.8  | 4600.3  | 4494.6  | 3634.3  |
| 17.5° | 6688.5  | 6706.9  | 6805.3  | 6946.8  | 7077.3  | 7062.6  | 6771.3  | 6101.2  | 5060.7  | 4958.7  | 3937.6  |
| 20°   | 6833.8  | 6847.5  | 6957.8  | 7127.9  | 7358.6  | 7460.6  | 7297.0  | 6665.5  | 5565.3  | 5444.0  | 4259.3  |
| 22.5° | 7254.7  | 7272.2  | 7305.3  | 7401.8  | 7605.8  | 7793.3  | 7714.3  | 7199.6  | 6027.7  | 5914.6  | 4564.4  |
| 25°   | 8067.2  | 8088.4  | 8016.7  | 7934.9  | 7973.5  | 8104.0  | 8118.7  | 7686.7  | 6496.4  | 6368.7  | 4892.5  |
| 27.5° | 9046.1  | 9076.4  | 8954.2  | 8743.7  | 8559.9  | 8509.3  | 8491.9  | 8085.6  | 6944.0  | 6796.1  | 5217.0  |
| 30°   | 10004.8 | 10057.1 | 9898.1  | 9625.2  | 9287.8  | 9050.7  | 8875.1  | 8476.2  | 7385.2  | 7243.7  | 5523.1  |
| 32.5° | 10941.4 | 10920.2 | 10689.5 | 10423.0 | 10027.7 | 9730.9  | 9306.2  | 8895.4  | 7881.6  | 7718.9  | 5827.3  |
| 35°   | 11582.9 | 11590.3 | 11376.1 | 11059.9 | 10683.1 | 10455.1 | 9883.4  | 9347.6  | 8388.0  | 8238.2  | 6172.9  |
| 37.5° | 12128.9 | 12094.9 | 11852.2 | 11557.2 | 11232.7 | 11135.3 | 10559.0 | 9845.7  | 8936.7  | 8773.1  | 6540.5  |
| 40°   | 12310.9 | 12271.3 | 12112.3 | 11900.0 | 11639.9 | 11631.6 | 11304.4 | 10410.1 | 9557.1  | 9395.4  | 6955.1  |
| 42.5° | 12200.6 | 12150.0 | 12084.8 | 12026.9 | 11946.9 | 11983.7 | 12004.8 | 11071.9 | 10239.1 | 10058.1 | 7434.9  |
| 45°   | 11793.4 | 11717.1 | 11763.1 | 11889.0 | 12062.7 | 12270.4 | 12637.2 | 11804.4 | 11002.9 | 10851.3 | 7998.3  |
| 47.5° | 11167.5 | 11098.5 | 11241.9 | 11511.2 | 11983.7 | 12509.4 | 13235.5 | 12613.3 | 11914.7 | 11764.0 | 8800.7  |
| 50°   | 10286.9 | 10307.2 | 10512.1 | 11002.0 | 11716.2 | 12619.7 | 13972.7 | 13684.0 | 13240.1 | 13099.5 | 9895.4  |
| 52.5° | 8842.1  | 8845.7  | 9422.9  | 10227.2 | 11241.9 | 12562.7 | 14381.7 | 15052.6 | 15049.9 | 14879.8 | 10937.7 |
| 55°   | 7500.1  | 7581.9  | 8038.7  | 9107.7  | 10473.5 | 12334.8 | 14667.5 | 15718.1 | 16238.3 | 16038.9 | 11909.2 |
| 57.5° | 6189.4  | 6237.2  | 6670.1  | 7743.7  | 9377.0  | 11727.2 | 14960.7 | 16516.8 | 17607.8 | 17481.9 | 13116.9 |
| 60°   | 4698.6  | 4772.1  | 5219.8  | 6211.5  | 7974.4  | 10649.1 | 14988.3 | 17350.5 | 19244.8 | 19118.0 | 14465.3 |
| 62.5° | 3049.7  | 3176.5  | 3595.6  | 4524.9  | 6277.7  | 9098.5  | 14348.6 | 17895.5 | 20796.3 | 20751.3 | 15662.0 |
| 65°   | 1752.8  | 1848.4  | 2139.7  | 2856.7  | 4331.0  | 7151.8  | 12827.4 | 17686.0 | 21751.3 | 21725.5 | 16109.6 |
| 66°   | 1432.0  | 1491.8  | 1715.1  | 2232.6  | 3573.6  | 6280.4  | 11943.2 | 17243.8 | 21845.9 | 21846.9 | 16058.2 |
| 67.5° | 1145.2  | 1171.9  | 1272.1  | 1598.4  | 2637.0  | 4978.0  | 10363.2 | 16268.6 | 21728.3 | 21760.5 | 15726.4 |
| 70°   | 947.6   | 961.4   | 992.7   | 1071.7  | 1439.4  | 3001.9  | 7355.8  | 13734.6 | 20547.2 | 20572.0 | 14431.3 |
| 72.5° | 850.2   | 858.5   | 870.4   | 881.4   | 1015.6  | 1677.4  | 4492.7  | 10987.3 | 18015.0 | 18047.2 | 12457.9 |
| 75°   | 770.2   | 774.8   | 773.0   | 773.9   | 852.0   | 1069.0  | 2321.7  | 8203.3  | 14566.4 | 14502.1 | 9543.4  |
| 77.5° | 676.5   | 681.1   | 671.9   | 673.7   | 753.7   | 821.7   | 1155.3  | 5742.7  | 9830.1  | 9376.1  | 5376.9  |
| 80°   | 571.7   | 575.4   | 571.7   | 578.1   | 656.3   | 620.4   | 671.9   | 3230.8  | 4346.6  | 4111.3  | 1911.8  |
| 82.5° | 432.0   | 447.6   | 458.6   | 484.4   | 540.4   | 441.2   | 449.5   | 1258.3  | 1323.6  | 1260.1  | 586.4   |
| 85°   | 189.3   | 230.7   | 345.6   | 370.4   | 406.3   | 264.7   | 295.0   | 512.9   | 538.6   | 522.1   | 213.2   |
| 87.5° | 49.6    | 54.2    | 171.0   | 215.1   | 225.2   | 119.5   | 153.5   | 233.5   | 246.3   | 233.5   | 70.8    |
| 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: P317569

CATALOG NUMBER: GLEON-SA5C-827-U-T2R

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 | 2472.5 |
| 2.5°  | 2500.0 | 2455.0 | 2374.1 | 2302.4 | 2248.2 | 2211.4 | 2174.7 | 2156.3 | 2145.3 | 2134.2 | 2136.1 |
| 5°    | 2580.0 | 2489.0 | 2350.2 | 2251.9 | 2196.7 | 2161.8 | 2143.4 | 2136.1 | 2131.5 | 2120.4 | 2120.4 |
| 7.5°  | 2700.4 | 2571.7 | 2380.6 | 2279.4 | 2236.2 | 2209.6 | 2198.6 | 2194.9 | 2189.4 | 2176.5 | 2178.3 |
| 10°   | 2852.1 | 2671.9 | 2444.0 | 2345.6 | 2306.1 | 2276.7 | 2261.1 | 2255.6 | 2245.4 | 2230.7 | 2232.6 |
| 12.5° | 3030.4 | 2796.0 | 2527.6 | 2424.7 | 2376.9 | 2337.4 | 2311.6 | 2296.0 | 2278.5 | 2259.2 | 2260.1 |
| 15°   | 3225.2 | 2931.1 | 2617.7 | 2495.4 | 2430.2 | 2375.0 | 2333.7 | 2307.0 | 2279.4 | 2255.6 | 2254.6 |
| 17.5° | 3422.8 | 3061.6 | 2686.6 | 2534.0 | 2445.8 | 2373.2 | 2317.1 | 2275.8 | 2241.8 | 2212.4 | 2209.6 |
| 20°   | 3636.1 | 3179.3 | 2725.2 | 2530.4 | 2416.4 | 2330.0 | 2255.6 | 2204.1 | 2166.4 | 2137.0 | 2132.4 |
| 22.5° | 3853.0 | 3289.6 | 2731.7 | 2492.7 | 2351.1 | 2245.4 | 2167.3 | 2110.3 | 2071.7 | 2041.4 | 2030.4 |
| 25°   | 4051.5 | 3375.1 | 2705.0 | 2420.1 | 2260.1 | 2146.2 | 2069.9 | 2012.0 | 1980.7 | 1944.9 | 1933.9 |
| 27.5° | 4232.6 | 3434.8 | 2651.7 | 2327.2 | 2158.1 | 2046.0 | 1974.3 | 1924.7 | 1890.7 | 1863.1 | 1853.9 |
| 30°   | 4395.3 | 3467.0 | 2564.4 | 2216.9 | 2053.3 | 1951.3 | 1890.7 | 1856.6 | 1827.2 | 1792.3 | 1785.9 |
| 32.5° | 4549.7 | 3467.0 | 2452.2 | 2096.5 | 1949.5 | 1867.7 | 1831.8 | 1810.7 | 1777.6 | 1743.6 | 1734.4 |
| 35°   | 4704.1 | 3445.8 | 2319.9 | 1970.6 | 1853.9 | 1807.9 | 1806.1 | 1781.3 | 1730.7 | 1684.8 | 1672.8 |
| 37.5° | 4866.8 | 3402.6 | 2171.0 | 1853.0 | 1775.8 | 1781.3 | 1796.9 | 1741.8 | 1670.1 | 1604.8 | 1587.3 |
| 40°   | 5050.6 | 3342.9 | 2016.6 | 1750.9 | 1710.5 | 1769.3 | 1772.1 | 1684.8 | 1545.1 | 1485.3 | 1469.7 |
| 42.5° | 5266.6 | 3283.1 | 1873.2 | 1660.9 | 1659.0 | 1733.5 | 1725.2 | 1561.6 | 1478.0 | 1447.6 | 1439.4 |
| 45°   | 5550.6 | 3249.1 | 1737.2 | 1575.4 | 1618.6 | 1675.6 | 1645.2 | 1493.6 | 1458.7 | 1441.2 | 1433.8 |
| 47.5° | 5998.3 | 3266.6 | 1612.2 | 1507.4 | 1578.2 | 1617.7 | 1496.3 | 1466.0 | 1441.2 | 1420.1 | 1412.7 |
| 50°   | 6558.9 | 3256.5 | 1511.1 | 1460.5 | 1532.2 | 1557.0 | 1429.3 | 1430.2 | 1417.3 | 1393.4 | 1382.4 |
| 52.5° | 6980.8 | 3177.4 | 1445.8 | 1433.8 | 1491.8 | 1449.5 | 1387.0 | 1395.2 | 1388.8 | 1353.9 | 1341.9 |
| 55°   | 7388.0 | 3109.4 | 1412.7 | 1423.7 | 1462.3 | 1315.3 | 1337.3 | 1357.6 | 1351.1 | 1317.1 | 1311.6 |
| 57.5° | 7894.4 | 3096.6 | 1392.5 | 1426.5 | 1437.5 | 1248.2 | 1289.5 | 1316.2 | 1311.6 | 1296.9 | 1294.1 |
| 60°   | 8514.8 | 3100.2 | 1374.1 | 1431.1 | 1409.9 | 1198.5 | 1244.5 | 1278.5 | 1281.3 | 1278.5 | 1276.7 |
| 62.5° | 8855.8 | 3000.0 | 1328.1 | 1418.2 | 1361.2 | 1155.3 | 1197.6 | 1247.3 | 1248.2 | 1253.7 | 1252.8 |
| 65°   | 8566.3 | 2700.4 | 1242.7 | 1373.2 | 1279.4 | 1119.5 | 1157.2 | 1211.4 | 1197.6 | 1222.4 | 1222.4 |
| 66°   | 8285.1 | 2527.6 | 1200.4 | 1343.8 | 1244.5 | 1105.7 | 1144.3 | 1193.0 | 1175.6 | 1209.6 | 1209.6 |
| 67.5° | 7710.6 | 2236.2 | 1124.1 | 1281.3 | 1194.9 | 1086.4 | 1129.6 | 1162.7 | 1138.8 | 1189.4 | 1185.7 |
| 70°   | 6661.0 | 1729.8 | 970.6  | 1139.7 | 1113.1 | 1057.9 | 1109.4 | 1102.0 | 1067.1 | 1144.3 | 1129.6 |
| 72.5° | 5615.9 | 1314.4 | 779.4  | 954.1  | 989.0  | 1022.1 | 1080.9 | 1024.8 | 980.7  | 1034.9 | 1002.8 |
| 75°   | 4357.6 | 988.1  | 615.8  | 741.7  | 835.5  | 966.0  | 1046.9 | 935.7  | 872.3  | 866.7  | 849.3  |
| 77.5° | 2355.7 | 678.3  | 488.1  | 566.2  | 663.6  | 896.2  | 1023.9 | 840.1  | 744.5  | 722.4  | 708.7  |
| 80°   | 932.9  | 441.2  | 354.8  | 429.2  | 464.2  | 795.0  | 968.8  | 728.9  | 614.0  | 591.9  | 570.8  |
| 82.5° | 385.1  | 261.0  | 228.9  | 287.7  | 302.4  | 680.2  | 869.5  | 597.4  | 474.3  | 656.3  | 696.7  |
| 85°   | 165.4  | 143.4  | 136.0  | 148.9  | 171.0  | 477.0  | 692.1  | 455.9  | 512.0  | 456.8  | 363.1  |
| 87.5° | 49.6   | 60.7   | 57.9   | 57.0   | 62.5   | 114.0  | 368.6  | 253.7  | 375.9  | 142.5  | 106.6  |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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

Report Prepared for

Cooper Lighting Solutions

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:  $4\pi$   
 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  
 R2: 89.9  
 R3: 96.2  
 R4: 79.1  
 R5: 79.1  
 R6: 88.8  
 R7: 81.3  
 R8: 54.3  
 R9: -1.5  
 R10: 77.9  
 R11: 78.9  
 R12: 71.6  
 R13: 81.2  
 R14: 98.5  
 R15: 69.9



### 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**

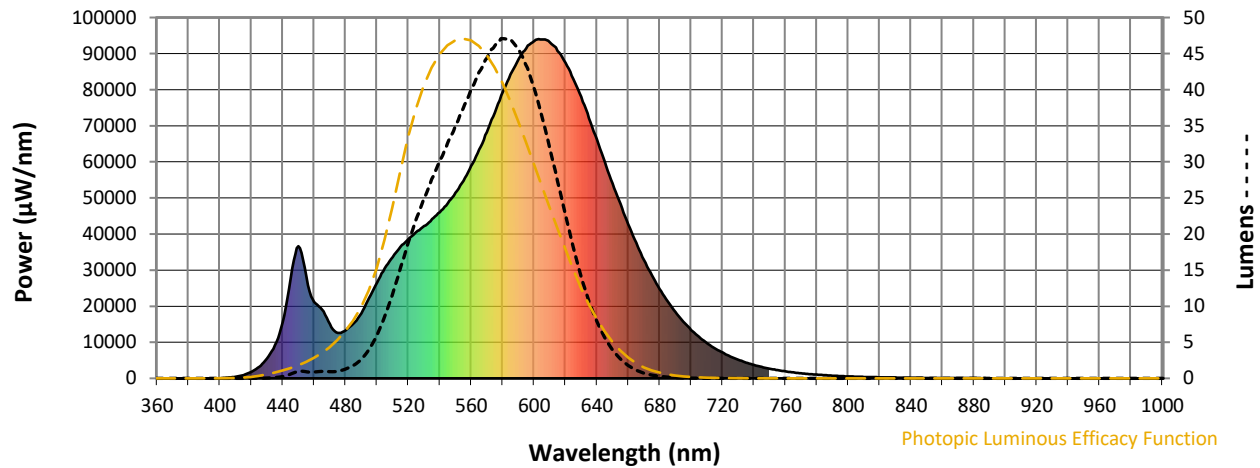


**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



REPORT NUMBER: SP1-2407-157-9

### Photopic Flux vs. Wavelength



**Photopic Lumens: 4337.9**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/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

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/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<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(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              |           |                  |                  |

REPORT NUMBER: SP1-2407-157-9

TM-30-18

### 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)