

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: P632453

Luminaire Tested: GWS-SA2C-760-U-T3R-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P632453  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-15)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA2C-760-U-T3R-W  
Description: GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III ROADWAY OPTICS  
Light Source: (32) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

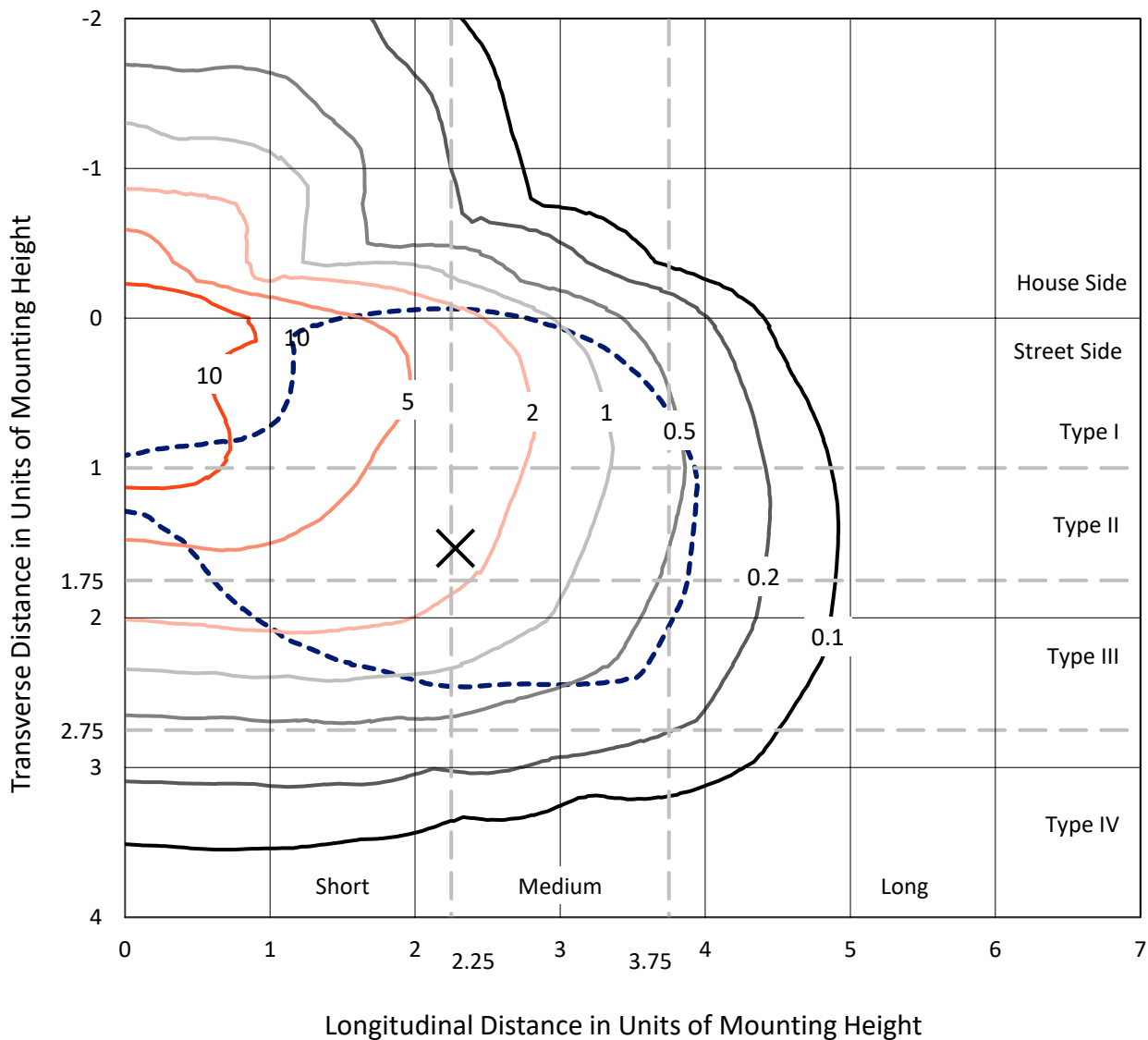
Lumens per Lamp: N/A  
Luminaire Lumens: 9492.6 lumens  
Efficiency: N/A  
Efficacy: 150.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2  
  
Input Watts (W): 63.2  
Input Voltage (V): 120  
Input Current (Ain): 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: P632453  
 CATALOG NUMBER: GWS-SA2C-760-U-T3R-W

### Iso-Footcandle Lines of Horizontal Illumination

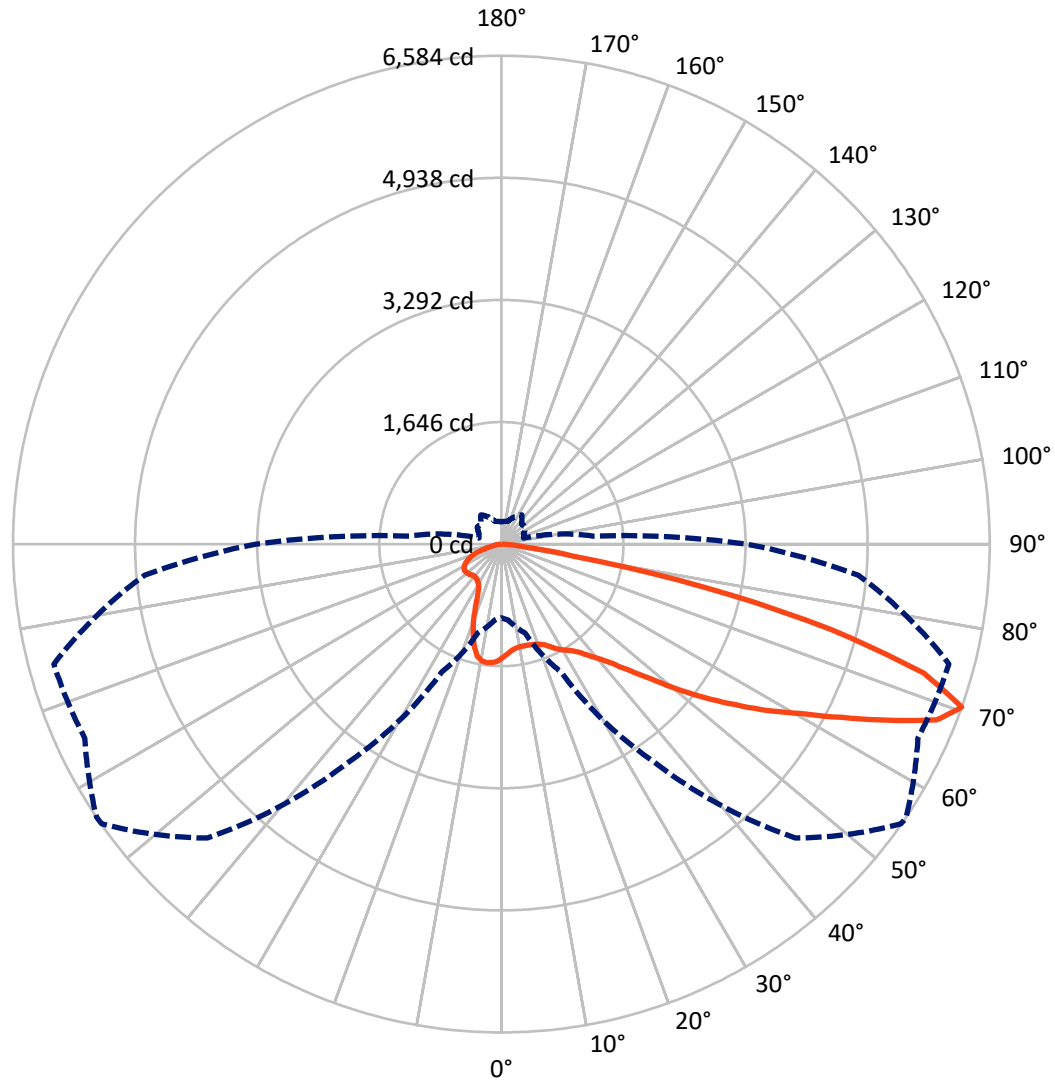
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 15.9 fc  
 Type III - Medium - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 56-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical



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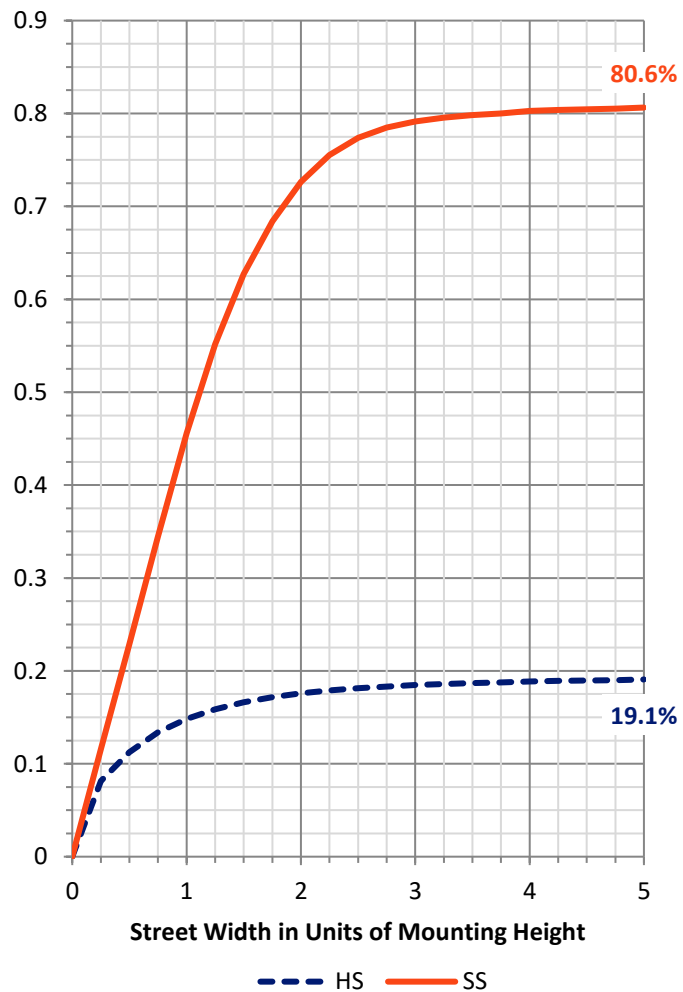
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1825.0   | 0.0    | 1825.0 |
|                    | % Fixture | 19.2     | 0.0    | 19.2   |
| <b>Street Side</b> | Lumens    | 7667.6   | 0.0    | 7667.6 |
|                    | % Fixture | 80.8     | 0.0    | 80.8   |
| <b>Total</b>       | Lumens    | 9492.6   | 0.0    | 9492.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 141.8  | 1.5       |
| 10°-20°   | 384.2  | 4.0       |
| 20°-30°   | 635.2  | 6.7       |
| 30°-40°   | 949.7  | 10.0      |
| 40°-50°   | 1413.2 | 14.9      |
| 50°-60°   | 2009.2 | 21.2      |
| 60°-70°   | 2488.5 | 26.2      |
| 70°-80°   | 1374.1 | 14.5      |
| 80°-90°   | 96.8   | 1.0       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 9492.6 | 100.0     |
| 0°-180°   | 9492.6 | 100.0     |

**Coefficient of Utilization**



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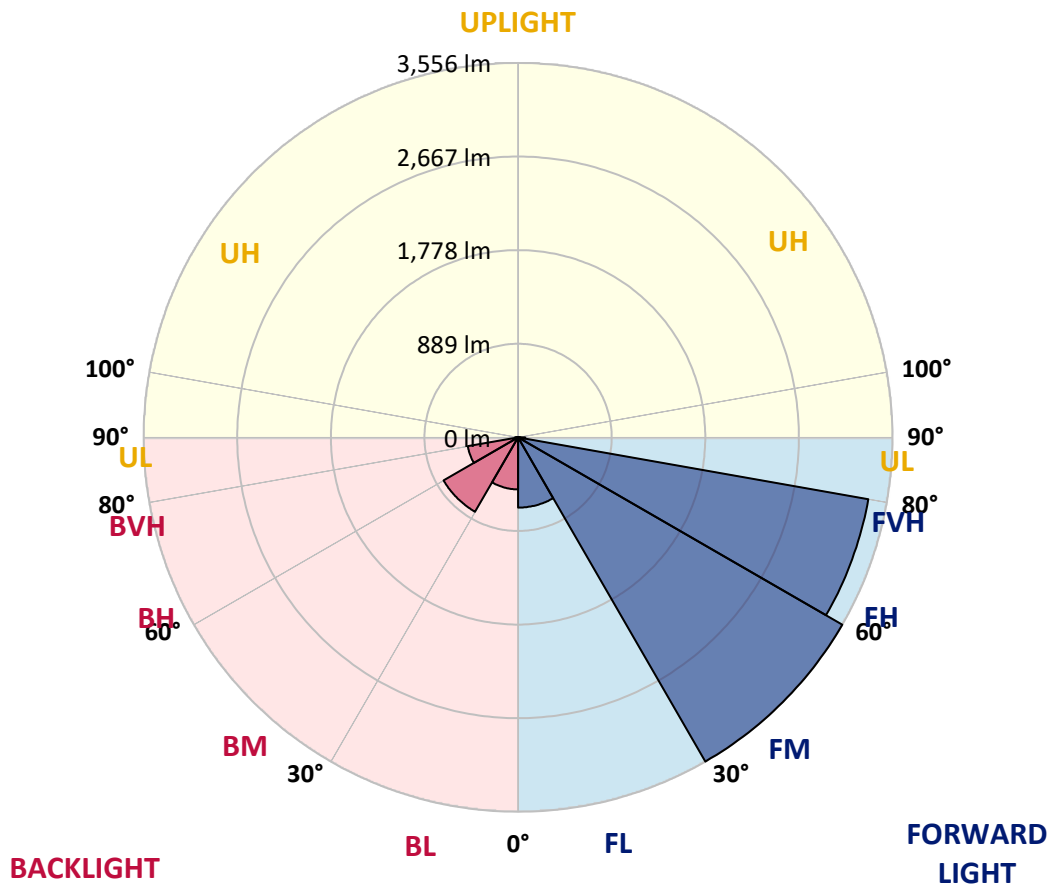
CATALOG NUMBER: GWS-SA2C-760-U-T3R-W

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 667.1  | 7.0       |                         |      |         |
| FM (30°-60°)   | 3555.8 | 37.5      |                         |      |         |
| FH (60°-80°)   | 3377.5 | 35.6      |                         |      | G2/5000 |
| FVH (80°-90°)  | 67.2   | 0.7       |                         |      | G1/100  |
| BL (0°-30°)    | 494.0  | 5.2       | B1/500                  |      |         |
| BM (30°-60°)   | 816.3  | 8.6       | B1/1000                 |      |         |
| BH (60°-80°)   | 485.1  | 5.1       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 29.5   | 0.3       |                         |      | G1/100  |
| 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 Medium





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 |
| 2.5°  | 1433.9 | 1425.8 | 1435.2 | 1439.9 | 1451.9 | 1469.3 | 1484.7 | 1485.4 | 1493.4 | 1512.8 | 1531.6 |
| 5°    | 1368.9 | 1364.9 | 1367.6 | 1381.6 | 1394.4 | 1416.4 | 1439.9 | 1441.9 | 1464.6 | 1502.8 | 1540.3 |
| 7.5°  | 1318.7 | 1313.4 | 1323.4 | 1341.5 | 1357.5 | 1382.3 | 1413.1 | 1415.8 | 1447.9 | 1505.5 | 1563.0 |
| 10°   | 1246.4 | 1242.4 | 1261.1 | 1285.2 | 1320.1 | 1360.9 | 1401.7 | 1405.1 | 1447.2 | 1522.9 | 1603.2 |
| 12.5° | 1215.0 | 1215.0 | 1223.0 | 1245.7 | 1283.9 | 1338.1 | 1399.7 | 1405.1 | 1457.9 | 1549.7 | 1654.8 |
| 15°   | 1263.8 | 1267.2 | 1260.5 | 1259.1 | 1274.5 | 1326.1 | 1402.4 | 1410.4 | 1478.0 | 1577.1 | 1705.6 |
| 17.5° | 1362.2 | 1365.6 | 1348.2 | 1320.7 | 1305.3 | 1337.5 | 1412.4 | 1421.1 | 1499.5 | 1607.2 | 1760.5 |
| 20°   | 1500.1 | 1504.1 | 1466.0 | 1423.8 | 1370.9 | 1370.3 | 1431.8 | 1439.9 | 1526.9 | 1640.0 | 1818.8 |
| 22.5° | 1661.4 | 1664.1 | 1615.9 | 1549.0 | 1468.0 | 1431.2 | 1465.3 | 1473.3 | 1562.4 | 1685.5 | 1881.7 |
| 25°   | 1848.2 | 1856.2 | 1798.0 | 1700.9 | 1591.2 | 1514.8 | 1520.9 | 1530.2 | 1626.0 | 1746.5 | 1956.0 |
| 27.5° | 2047.7 | 2057.7 | 1990.8 | 1883.7 | 1732.4 | 1607.2 | 1592.5 | 1600.5 | 1693.6 | 1783.9 | 1995.5 |
| 30°   | 2251.9 | 2259.2 | 2192.3 | 2069.8 | 1884.4 | 1711.7 | 1652.7 | 1657.4 | 1723.0 | 1802.0 | 2035.6 |
| 32.5° | 2478.8 | 2472.8 | 2408.5 | 2267.3 | 2059.7 | 1836.8 | 1709.0 | 1707.6 | 1755.8 | 1838.2 | 2093.2 |
| 35°   | 2691.6 | 2700.4 | 2632.1 | 2476.1 | 2252.5 | 1991.5 | 1793.3 | 1788.0 | 1825.4 | 1897.1 | 2174.2 |
| 37.5° | 2949.4 | 2946.7 | 2865.0 | 2696.3 | 2446.0 | 2139.4 | 1911.8 | 1902.4 | 1915.8 | 1988.8 | 2287.3 |
| 40°   | 3133.5 | 3152.2 | 3099.3 | 2942.0 | 2672.2 | 2321.5 | 2050.4 | 2029.6 | 2033.0 | 2101.9 | 2438.6 |
| 42.5° | 3284.1 | 3301.5 | 3306.8 | 3206.4 | 2931.3 | 2546.4 | 2223.1 | 2202.3 | 2204.3 | 2302.1 | 2624.7 |
| 45°   | 3399.9 | 3423.3 | 3498.9 | 3469.5 | 3223.2 | 2806.1 | 2456.7 | 2435.3 | 2436.6 | 2545.1 | 2849.6 |
| 47.5° | 3447.4 | 3472.8 | 3626.1 | 3696.4 | 3533.1 | 3116.7 | 2747.2 | 2715.7 | 2720.4 | 2840.3 | 3106.7 |
| 50°   | 3432.0 | 3466.1 | 3673.7 | 3871.1 | 3792.8 | 3432.7 | 3094.6 | 3072.5 | 3054.5 | 3228.5 | 3385.8 |
| 52.5° | 3299.5 | 3336.9 | 3669.0 | 3982.2 | 4005.0 | 3731.2 | 3453.4 | 3440.7 | 3436.7 | 3640.9 | 3697.8 |
| 55°   | 2909.2 | 2972.1 | 3507.6 | 4011.7 | 4171.0 | 4012.4 | 3842.3 | 3820.9 | 3841.7 | 4082.7 | 4013.0 |
| 57.5° | 2693.0 | 2739.8 | 3191.7 | 3978.9 | 4306.9 | 4280.1 | 4230.6 | 4232.6 | 4256.0 | 4562.6 | 4395.3 |
| 60°   | 2569.8 | 2624.7 | 3016.3 | 3889.2 | 4437.4 | 4605.5 | 4636.9 | 4636.9 | 4679.1 | 5080.1 | 4783.5 |
| 62.5° | 2406.5 | 2462.0 | 2852.3 | 3716.5 | 4557.9 | 4988.4 | 5147.7 | 5145.7 | 5162.4 | 5635.0 | 5163.1 |
| 65°   | 2075.1 | 2126.7 | 2523.0 | 3444.1 | 4616.8 | 5410.1 | 5728.0 | 5722.0 | 5688.5 | 6129.0 | 5414.1 |
| 67.5° | 1506.8 | 1555.7 | 1932.6 | 2925.9 | 4404.6 | 5750.1 | 6325.8 | 6328.5 | 6128.3 | 6440.3 | 5427.5 |
| 70°   | 993.4  | 1026.9 | 1242.4 | 1900.4 | 3581.9 | 5603.5 | 6576.2 | 6584.2 | 6195.9 | 6246.2 | 4830.4 |
| 72.5° | 619.9  | 643.3  | 775.8  | 1133.3 | 2116.6 | 4435.4 | 5933.5 | 5955.6 | 5574.1 | 5489.1 | 3968.9 |
| 75°   | 411.7  | 427.7  | 516.1  | 660.7  | 979.3  | 2400.5 | 4510.4 | 4581.4 | 4467.6 | 4302.9 | 2765.3 |
| 77.5° | 247.7  | 261.1  | 328.7  | 419.7  | 433.8  | 937.8  | 2632.7 | 2816.2 | 2832.2 | 2246.5 | 1158.1 |
| 80°   | 113.1  | 128.5  | 181.4  | 239.6  | 230.9  | 326.7  | 928.5  | 971.3  | 1146.0 | 713.6  | 365.5  |
| 82.5° | 66.9   | 73.6   | 120.5  | 119.2  | 98.4   | 158.6  | 334.0  | 342.7  | 291.2  | 261.1  | 156.0  |
| 85°   | 26.8   | 31.5   | 50.9   | 44.8   | 36.1   | 51.5   | 125.8  | 131.9  | 126.5  | 113.8  | 57.6   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.7    | 1.3    | 11.4   | 12.0   | 17.4   | 31.5   | 17.4   |
| 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-SA2C-760-U-T3R-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 | 1532.3 |
| 2.5°  | 1543.6 | 1539.6 | 1559.7 | 1575.1 | 1581.8 | 1588.5 | 1582.5 | 1580.4 | 1580.4 | 1567.1 | 1560.4 |
| 5°    | 1560.4 | 1562.4 | 1589.8 | 1602.5 | 1602.5 | 1597.2 | 1581.1 | 1569.7 | 1565.7 | 1548.3 | 1543.6 |
| 7.5°  | 1591.8 | 1600.5 | 1626.0 | 1625.3 | 1606.6 | 1577.1 | 1536.9 | 1506.1 | 1478.0 | 1466.0 | 1458.6 |
| 10°   | 1643.4 | 1654.8 | 1672.2 | 1644.0 | 1591.8 | 1514.2 | 1429.2 | 1362.2 | 1322.1 | 1289.9 | 1289.9 |
| 12.5° | 1702.3 | 1713.0 | 1709.6 | 1644.7 | 1536.9 | 1391.7 | 1269.2 | 1192.2 | 1136.0 | 1106.5 | 1106.5 |
| 15°   | 1761.2 | 1769.9 | 1733.7 | 1613.9 | 1422.5 | 1229.0 | 1095.1 | 1002.8 | 953.9  | 926.4  | 926.4  |
| 17.5° | 1820.8 | 1820.1 | 1743.8 | 1543.0 | 1273.2 | 1048.9 | 917.7  | 846.1  | 829.4  | 824.7  | 824.0  |
| 20°   | 1878.3 | 1862.9 | 1731.1 | 1424.5 | 1099.8 | 867.5  | 784.5  | 789.2  | 814.0  | 824.7  | 826.0  |
| 22.5° | 1943.3 | 1905.1 | 1693.6 | 1273.2 | 903.0  | 741.7  | 747.0  | 785.9  | 822.0  | 838.1  | 840.1  |
| 25°   | 2009.5 | 1941.3 | 1630.7 | 1095.8 | 738.3  | 695.5  | 737.0  | 780.5  | 821.4  | 842.1  | 844.1  |
| 27.5° | 2036.3 | 1941.3 | 1523.5 | 890.3  | 650.7  | 676.1  | 721.6  | 763.8  | 806.6  | 830.7  | 835.4  |
| 30°   | 2058.4 | 1924.5 | 1373.6 | 704.9  | 614.5  | 657.3  | 696.8  | 735.7  | 777.8  | 807.3  | 812.6  |
| 32.5° | 2089.2 | 1909.8 | 1192.2 | 592.4  | 597.8  | 639.3  | 666.7  | 699.5  | 737.7  | 757.1  | 755.1  |
| 35°   | 2125.3 | 1887.0 | 973.3  | 538.9  | 583.7  | 623.9  | 643.3  | 662.7  | 645.3  | 644.6  | 646.6  |
| 37.5° | 2176.9 | 1867.0 | 782.5  | 514.8  | 574.3  | 613.2  | 629.2  | 587.7  | 563.6  | 553.6  | 549.6  |
| 40°   | 2251.2 | 1858.9 | 617.2  | 500.7  | 573.0  | 612.5  | 601.1  | 536.9  | 504.1  | 469.2  | 468.6  |
| 42.5° | 2344.9 | 1852.9 | 510.1  | 494.0  | 577.7  | 627.9  | 562.3  | 503.4  | 435.8  | 420.4  | 419.0  |
| 45°   | 2465.4 | 1843.5 | 456.5  | 492.7  | 589.1  | 639.9  | 558.3  | 457.2  | 411.0  | 404.3  | 404.3  |
| 47.5° | 2610.7 | 1828.8 | 432.4  | 492.7  | 601.8  | 634.6  | 546.2  | 447.2  | 399.6  | 407.0  | 411.7  |
| 50°   | 2777.3 | 1810.1 | 419.7  | 491.3  | 614.5  | 634.6  | 520.8  | 445.1  | 397.0  | 435.1  | 450.5  |
| 52.5° | 2955.4 | 1788.6 | 411.0  | 486.0  | 623.2  | 635.3  | 522.1  | 451.8  | 399.6  | 441.8  | 454.5  |
| 55°   | 3152.2 | 1785.3 | 399.0  | 474.6  | 625.9  | 617.9  | 525.5  | 466.6  | 403.6  | 400.3  | 401.0  |
| 57.5° | 3400.5 | 1825.4 | 390.3  | 457.9  | 615.2  | 582.4  | 532.2  | 477.3  | 399.0  | 399.6  | 404.3  |
| 60°   | 3660.3 | 1901.1 | 397.6  | 441.8  | 593.1  | 548.9  | 536.9  | 471.9  | 376.2  | 365.5  | 366.8  |
| 62.5° | 3881.2 | 1958.7 | 403.6  | 434.4  | 561.0  | 519.5  | 532.2  | 459.9  | 363.5  | 360.8  | 366.8  |
| 65°   | 3973.5 | 1911.1 | 388.9  | 419.0  | 514.1  | 483.3  | 522.1  | 444.5  | 352.8  | 342.7  | 343.4  |
| 67.5° | 3871.1 | 1688.2 | 360.1  | 384.9  | 461.2  | 437.1  | 506.1  | 424.4  | 338.0  | 326.0  | 323.3  |
| 70°   | 3306.8 | 1240.4 | 310.6  | 330.7  | 397.0  | 382.9  | 481.3  | 398.3  | 314.6  | 305.9  | 299.9  |
| 72.5° | 2664.9 | 878.2  | 257.7  | 263.1  | 311.3  | 322.6  | 438.5  | 365.5  | 287.8  | 263.1  | 254.4  |
| 75°   | 1854.9 | 551.6  | 214.9  | 209.5  | 224.9  | 246.3  | 342.1  | 303.2  | 248.3  | 222.2  | 214.2  |
| 77.5° | 797.9  | 283.2  | 168.0  | 165.3  | 149.9  | 170.7  | 262.4  | 253.0  | 208.2  | 178.1  | 173.4  |
| 80°   | 267.1  | 164.0  | 121.2  | 116.5  | 99.7   | 119.8  | 184.8  | 202.2  | 163.3  | 131.9  | 123.8  |
| 82.5° | 133.9  | 95.1   | 77.0   | 69.6   | 66.9   | 75.6   | 109.1  | 125.8  | 113.1  | 91.0   | 77.0   |
| 85°   | 65.6   | 54.2   | 42.2   | 41.5   | 34.8   | 32.8   | 45.5   | 53.6   | 50.9   | 37.5   | 35.5   |
| 87.5° | 24.1   | 21.4   | 13.4   | 10.7   | 6.7    | 4.7    | 2.7    | 2.7    | 2.0    | 2.0    | 2.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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



LM-79-2008: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-9-R4

Test Date: 10/23/2019

Luminaire Tested: SA1C-760-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-9-R4  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry: 4π  
 Issue Date: 10/28/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGRAW-EDISON  
 Catalog Number: **SA1C-760-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

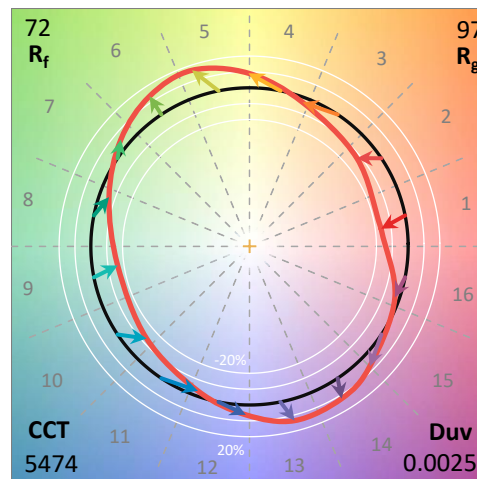
\*\*\*THIS IS A REVISION OF SP1-1908-441-4-R3. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. ROADWAY AND AREA LUMINAIRE. (1) 70 CRI, 5000K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 5474  
 CIE u': 0.2052  
 CIE v': 0.4804  
 Duv: 0.0025  
 CIE x: 0.3330  
 CIE y: 0.3466  
 CIE z: 0.3204  
 Peak Wavelength (nm): 442  
 Dominant Wavelength (nm): 554  
 Purity: 4.1

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.7 |      |       |
| R1:       | 70.6 | R9:  | -27.1 |
| R2:       | 74.6 | R10: | 40.8  |
| R3:       | 78.3 | R11: | 74.6  |
| R4:       | 73.8 | R12: | 50.4  |
| R5:       | 72.4 | R13: | 70.0  |
| R6:       | 67.5 | R14: | 87.8  |
| R7:       | 77.5 |      |       |
| R8:       | 58.9 |      |       |

Rf: 72.1  
 Rg: 97.2



**Test Conditions**

Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

REPORT NUMBER: SP1-1908-441-9-R4

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

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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 5700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



#####

| $\lambda$<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               | 3540                                 | NR                             | 490               | 33363                                | NR                             | 620               | 80193                                | NR                             | 750               | 4663                                 | NR                             | 880               | 4678                                 | NR                             |
| 365               | 2862                                 | NR                             | 495               | 44177                                | NR                             | 625               | 73091                                | NR                             | 755               | 4147                                 | NR                             | 885               | 4128                                 | NR                             |
| 370               | 2865                                 | NR                             | 500               | 57019                                | NR                             | 630               | 66269                                | NR                             | 760               | 4040                                 | NR                             | 890               | 4504                                 | NR                             |
| 375               | 3254                                 | NR                             | 505               | 70030                                | NR                             | 635               | 60012                                | NR                             | 765               | 3474                                 | NR                             | 895               | 4371                                 | NR                             |
| 380               | 3076                                 | NR                             | 510               | 81972                                | NR                             | 640               | 53914                                | NR                             | 770               | 3469                                 | NR                             | 900               | 4082                                 | NR                             |
| 385               | 2904                                 | NR                             | 515               | 92590                                | NR                             | 645               | 48385                                | NR                             | 775               | 3181                                 | NR                             | 905               | 2982                                 | NR                             |
| 390               | 2689                                 | NR                             | 520               | 100305                               | NR                             | 650               | 43219                                | NR                             | 780               | 2969                                 | NR                             | 910               | 4351                                 | NR                             |
| 395               | 2619                                 | NR                             | 525               | 107452                               | NR                             | 655               | 38562                                | NR                             | 785               | 3132                                 | NR                             | 915               | 3365                                 | NR                             |
| 400               | 2679                                 | NR                             | 530               | 111373                               | NR                             | 660               | 34110                                | NR                             | 790               | 2507                                 | NR                             | 920               | 3430                                 | NR                             |
| 405               | 3515                                 | NR                             | 535               | 114505                               | NR                             | 665               | 30085                                | NR                             | 795               | 2968                                 | NR                             | 925               | 4264                                 | NR                             |
| 410               | 6934                                 | NR                             | 540               | 116408                               | NR                             | 670               | 26205                                | NR                             | 800               | 2758                                 | NR                             | 930               | 4095                                 | NR                             |
| 415               | 14943                                | NR                             | 545               | 118700                               | NR                             | 675               | 22906                                | NR                             | 805               | 2872                                 | NR                             | 935               | 5048                                 | NR                             |
| 420               | 31939                                | NR                             | 550               | 119209                               | NR                             | 680               | 20058                                | NR                             | 810               | 3094                                 | NR                             | 940               | 4074                                 | NR                             |
| 425               | 64701                                | NR                             | 555               | 120742                               | NR                             | 685               | 17413                                | NR                             | 815               | 3222                                 | NR                             | 945               | 4949                                 | NR                             |
| 430               | 110939                               | NR                             | 560               | 121594                               | NR                             | 690               | 15447                                | NR                             | 820               | 3238                                 | NR                             | 950               | 4387                                 | NR                             |
| 435               | 164597                               | NR                             | 565               | 121913                               | NR                             | 695               | 13398                                | NR                             | 825               | 3524                                 | NR                             | 955               | 4978                                 | NR                             |
| 440               | 207696                               | NR                             | 570               | 122147                               | NR                             | 700               | 11777                                | NR                             | 830               | 2921                                 | NR                             | 960               | 4706                                 | NR                             |
| 445               | 201830                               | NR                             | 575               | 121605                               | NR                             | 705               | 10412                                | NR                             | 835               | 3595                                 | NR                             | 965               | 5083                                 | NR                             |
| 450               | 145410                               | NR                             | 580               | 120248                               | NR                             | 710               | 9544                                 | NR                             | 840               | 3016                                 | NR                             | 970               | 4522                                 | NR                             |
| 455               | 89594                                | NR                             | 585               | 117717                               | NR                             | 715               | 8940                                 | NR                             | 845               | 4032                                 | NR                             | 975               | 4740                                 | NR                             |
| 460               | 58321                                | NR                             | 590               | 114359                               | NR                             | 720               | 7897                                 | NR                             | 850               | 3579                                 | NR                             | 980               | 6122                                 | NR                             |
| 465               | 39318                                | NR                             | 595               | 109974                               | NR                             | 725               | 7045                                 | NR                             | 855               | 4571                                 | NR                             | 985               | 6450                                 | NR                             |
| 470               | 27693                                | NR                             | 600               | 105269                               | NR                             | 730               | 6483                                 | NR                             | 860               | 4485                                 | NR                             | 990               | 4875                                 | NR                             |
| 475               | 23081                                | NR                             | 605               | 99453                                | NR                             | 735               | 5838                                 | NR                             | 865               | 3978                                 | NR                             | 995               | 4764                                 | NR                             |
| 480               | 23002                                | NR                             | 610               | 92921                                | NR                             | 740               | 5261                                 | NR                             | 870               | 4298                                 | NR                             | 1000              | 3640                                 | NR                             |
| 485               | 26201                                | NR                             | 615               | 86989                                | NR                             | 745               | 4760                                 | NR                             | 875               | 4356                                 | NR                             |                   |                                      |                                |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 13759.3 S/P: 1.85

| 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    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5527.6 M/P: 0.74**

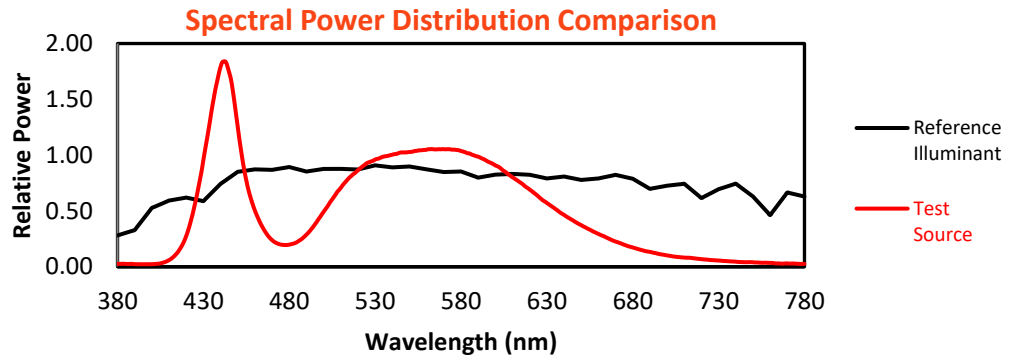
| λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) | λ (nm) | Power (µW/nm) | Lumens (φ/nm) |
|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|--------|---------------|---------------|
| 360    | 3540          | NR            | 490    | 33363         | NR            | 620    | 80193         | NR            | 750    | 4663          | NR            | 880    | 4678          | NR            |
| 365    | 2862          | NR            | 495    | 44177         | NR            | 625    | 73091         | NR            | 755    | 4147          | NR            | 885    | 4128          | NR            |
| 370    | 2865          | NR            | 500    | 57019         | NR            | 630    | 66269         | NR            | 760    | 4040          | NR            | 890    | 4504          | NR            |
| 375    | 3254          | NR            | 505    | 70030         | NR            | 635    | 60012         | NR            | 765    | 3474          | NR            | 895    | 4371          | NR            |
| 380    | 3076          | NR            | 510    | 81972         | NR            | 640    | 53914         | NR            | 770    | 3469          | NR            | 900    | 4082          | NR            |
| 385    | 2904          | NR            | 515    | 92590         | NR            | 645    | 48385         | NR            | 775    | 3181          | NR            | 905    | 2982          | NR            |
| 390    | 2689          | NR            | 520    | 100305        | NR            | 650    | 43219         | NR            | 780    | 2969          | NR            | 910    | 4351          | NR            |
| 395    | 2619          | NR            | 525    | 107452        | NR            | 655    | 38562         | NR            | 785    | 3132          | NR            | 915    | 3365          | NR            |
| 400    | 2679          | NR            | 530    | 111373        | NR            | 660    | 34110         | NR            | 790    | 2507          | NR            | 920    | 3430          | NR            |
| 405    | 3515          | NR            | 535    | 114505        | NR            | 665    | 30085         | NR            | 795    | 2968          | NR            | 925    | 4264          | NR            |
| 410    | 6934          | NR            | 540    | 116408        | NR            | 670    | 26205         | NR            | 800    | 2758          | NR            | 930    | 4095          | NR            |
| 415    | 14943         | NR            | 545    | 118700        | NR            | 675    | 22906         | NR            | 805    | 2872          | NR            | 935    | 5048          | NR            |
| 420    | 31939         | NR            | 550    | 119209        | NR            | 680    | 20058         | NR            | 810    | 3094          | NR            | 940    | 4074          | NR            |
| 425    | 64701         | NR            | 555    | 120742        | NR            | 685    | 17413         | NR            | 815    | 3222          | NR            | 945    | 4949          | NR            |
| 430    | 110939        | NR            | 560    | 121594        | NR            | 690    | 15447         | NR            | 820    | 3238          | NR            | 950    | 4387          | NR            |
| 435    | 164597        | NR            | 565    | 121913        | NR            | 695    | 13398         | NR            | 825    | 3524          | NR            | 955    | 4978          | NR            |
| 440    | 207696        | NR            | 570    | 122147        | NR            | 700    | 11777         | NR            | 830    | 2921          | NR            | 960    | 4706          | NR            |
| 445    | 201830        | NR            | 575    | 121605        | NR            | 705    | 10412         | NR            | 835    | 3595          | NR            | 965    | 5083          | NR            |
| 450    | 145410        | NR            | 580    | 120248        | NR            | 710    | 9544          | NR            | 840    | 3016          | NR            | 970    | 4522          | NR            |
| 455    | 89594         | NR            | 585    | 117717        | NR            | 715    | 8940          | NR            | 845    | 4032          | NR            | 975    | 4740          | NR            |
| 460    | 58321         | NR            | 590    | 114359        | NR            | 720    | 7897          | NR            | 850    | 3579          | NR            | 980    | 6122          | NR            |
| 465    | 39318         | NR            | 595    | 109974        | NR            | 725    | 7045          | NR            | 855    | 4571          | NR            | 985    | 6450          | NR            |
| 470    | 27693         | NR            | 600    | 105269        | NR            | 730    | 6483          | NR            | 860    | 4485          | NR            | 990    | 4875          | NR            |
| 475    | 23081         | NR            | 605    | 99453         | NR            | 735    | 5838          | NR            | 865    | 3978          | NR            | 995    | 4764          | NR            |
| 480    | 23002         | NR            | 610    | 92921         | NR            | 740    | 5261          | NR            | 870    | 4298          | NR            | 1000   | 3640          | NR            |
| 485    | 26201         | NR            | 615    | 86989         | NR            | 745    | 4760          | NR            | 875    | 4356          | NR            |        |               |               |

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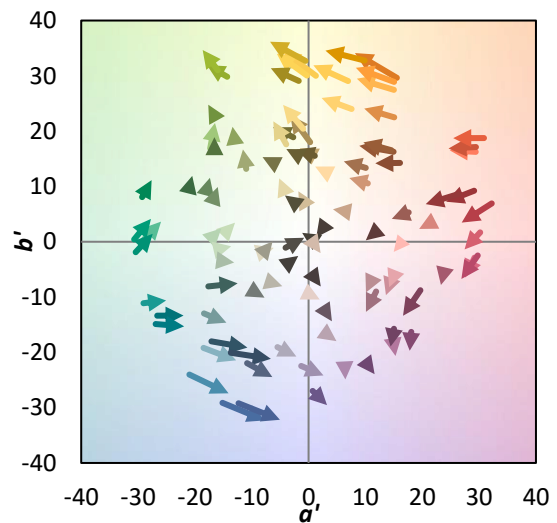
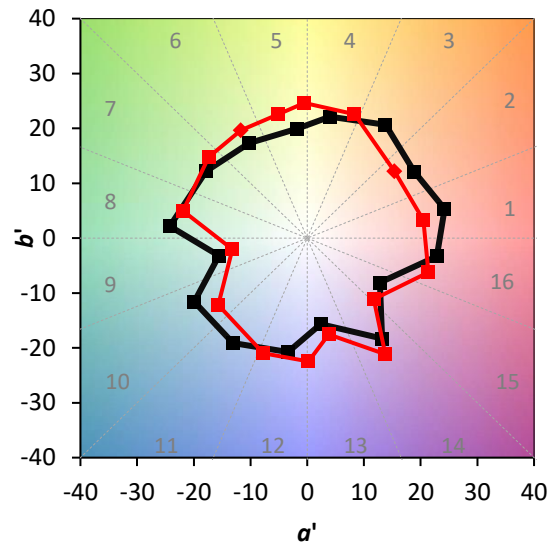
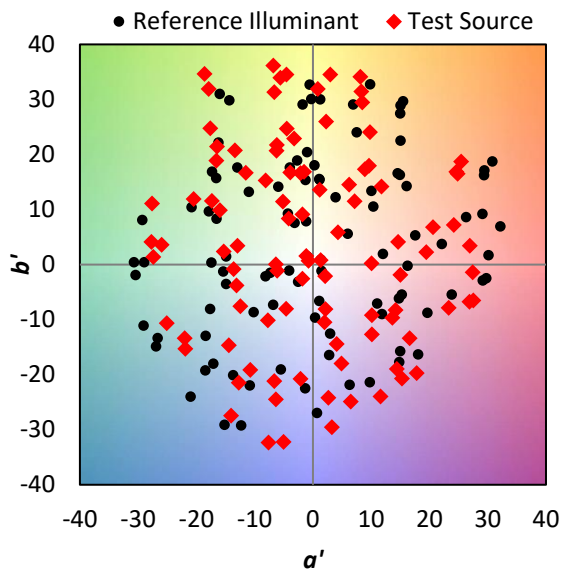
TM-30-18

**Summary**

$R_f = 72.1$   
 $R_g = 97.2$   
 CIE  $R_a = 71.7$   
 $R_g = -27.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 81 | CES79 = 74 |
| CES05 = 46 | CES30 = 59 | CES55 = 80 | CES80 = 70 |
| CES06 = 50 | CES31 = 55 | CES56 = 70 | CES81 = 71 |
| CES07 = 38 | CES32 = 52 | CES57 = 68 | CES82 = 88 |
| CES08 = 38 | CES33 = 63 | CES58 = 70 | CES83 = 82 |
| CES09 = 29 | CES34 = 63 | CES59 = 88 | CES84 = 87 |
| CES10 = 72 | CES35 = 79 | CES60 = 92 | CES85 = 84 |
| CES11 = 55 | CES36 = 90 | CES61 = 88 | CES86 = 76 |
| CES12 = 61 | CES37 = 72 | CES62 = 81 | CES87 = 75 |
| CES13 = 41 | CES38 = 68 | CES63 = 75 | CES88 = 77 |
| CES14 = 74 | CES39 = 91 | CES64 = 72 | CES89 = 76 |
| CES15 = 70 | CES40 = 83 | CES65 = 65 | CES90 = 76 |
| CES16 = 46 | CES41 = 84 | CES66 = 66 | CES91 = 92 |
| CES17 = 48 | CES42 = 70 | CES67 = 64 | CES92 = 70 |
| CES18 = 55 | CES43 = 69 | CES68 = 71 | CES93 = 83 |
| CES19 = 70 | CES44 = 98 | CES69 = 80 | CES94 = 60 |
| CES20 = 64 | CES45 = 79 | CES70 = 58 | CES95 = 73 |
| CES21 = 85 | CES46 = 78 | CES71 = 55 | CES96 = 79 |
| CES22 = 77 | CES47 = 76 | CES72 = 84 | CES97 = 84 |
| CES23 = 91 | CES48 = 68 | CES73 = 47 | CES98 = 73 |
| CES24 = 90 | CES49 = 78 | CES74 = 94 | CES99 = 62 |
| CES25 = 71 | CES50 = 87 | CES75 = 51 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)