

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: P633930

Luminaire Tested: GWS-SA2F-760-U-T2R-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P633930  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-11)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA2F-760-U-T2R-W  
Description: GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II ROADWAY OPTICS  
Light Source: (32) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 16689 lumens  
Efficiency: N/A  
Efficacy: 134.0 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G2  
  
Input Watts (W): 124.5  
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

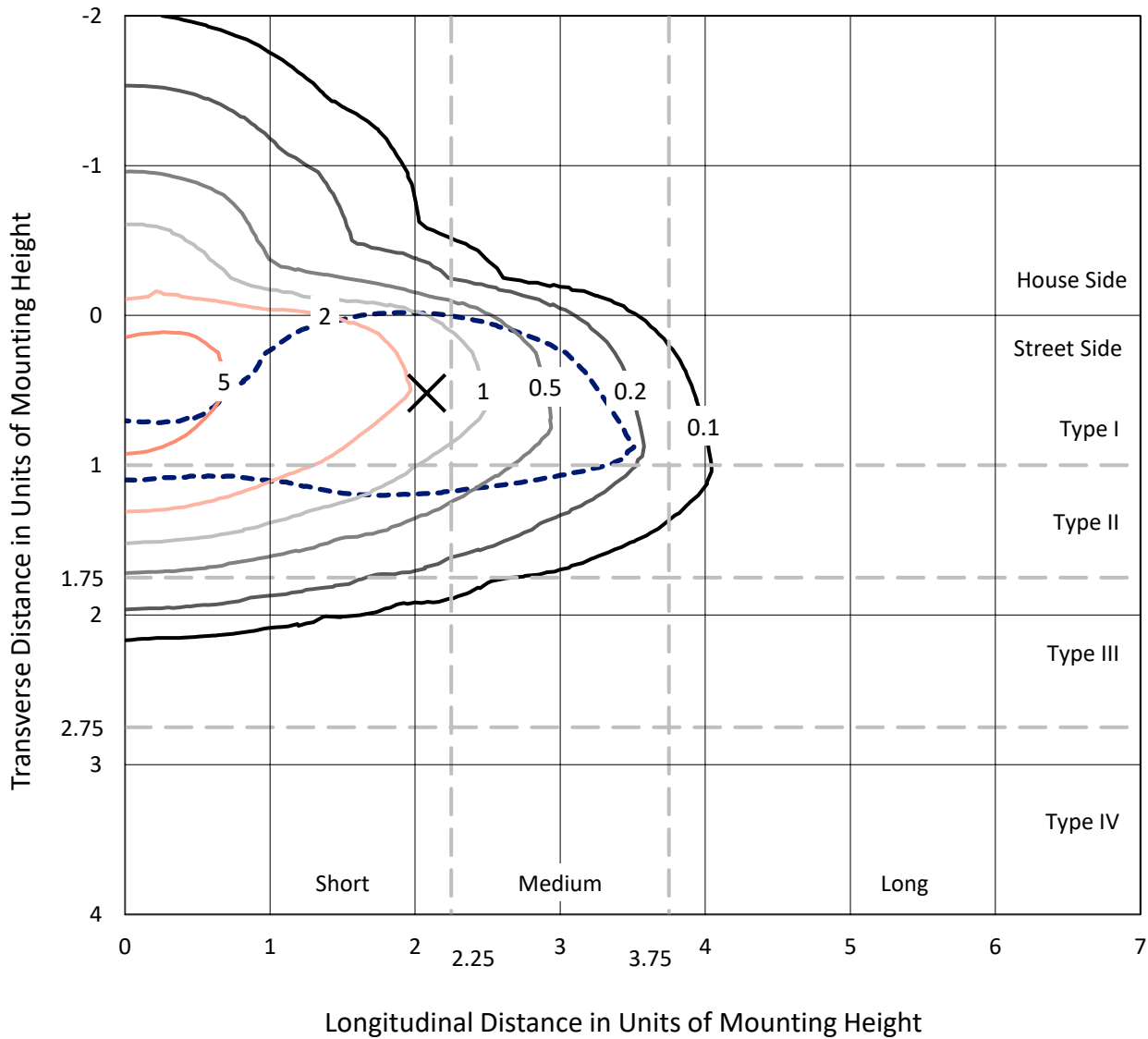


REPORT NUMBER: P633930

CATALOG NUMBER: GWS-SA2F-760-U-T2R-W

### Iso-Footcandle Lines of Horizontal Illumination

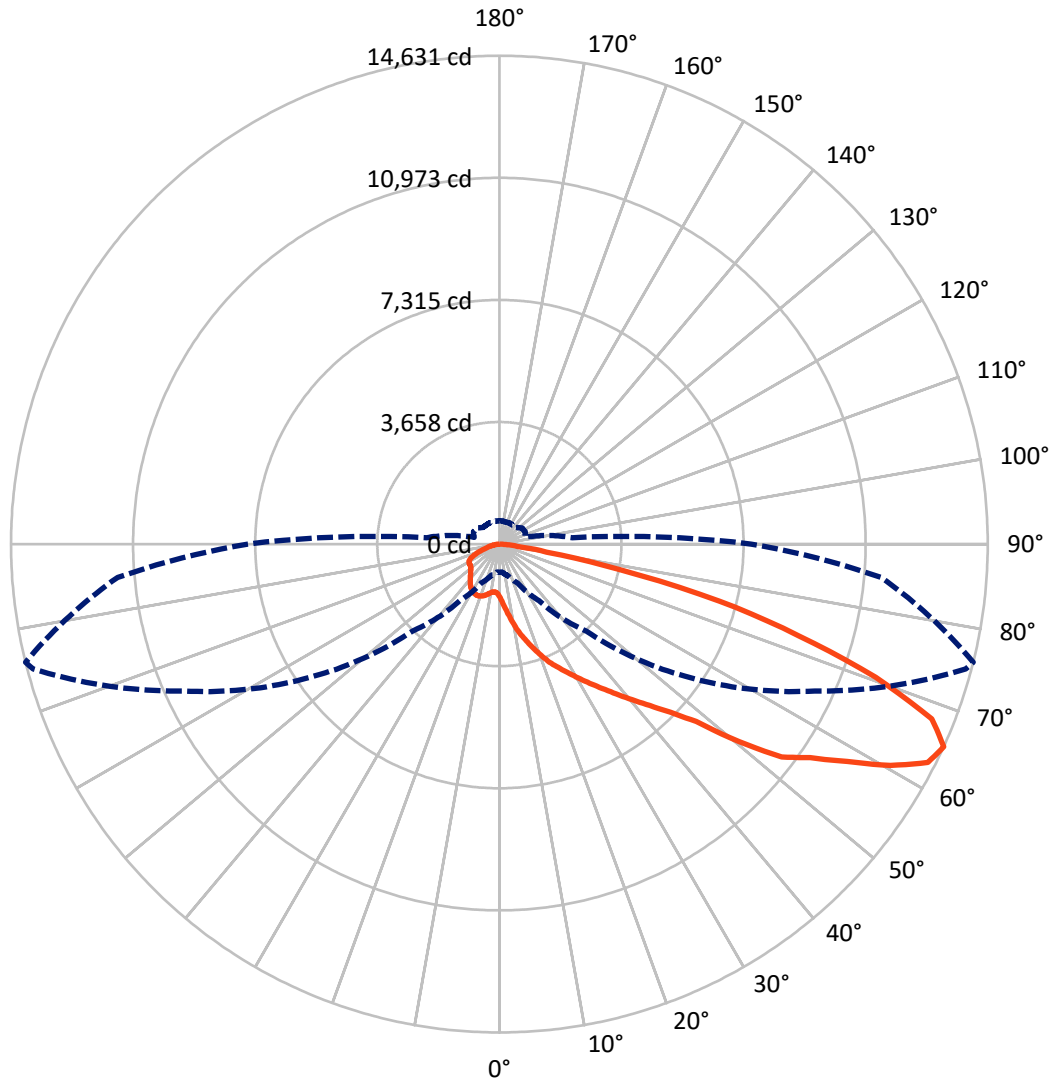
✕ Max cd  
 - - - 1/2 Max cd



Based on 25 foot mounting height. Maximum calculated value = 6.6 fc  
 Type II - Short - N/A

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### Luminous Intensity Polar Plot



— Vertical Plane Through 76-Deg Lateral    - - - Horizontal Cone Through 65-Deg Vertical

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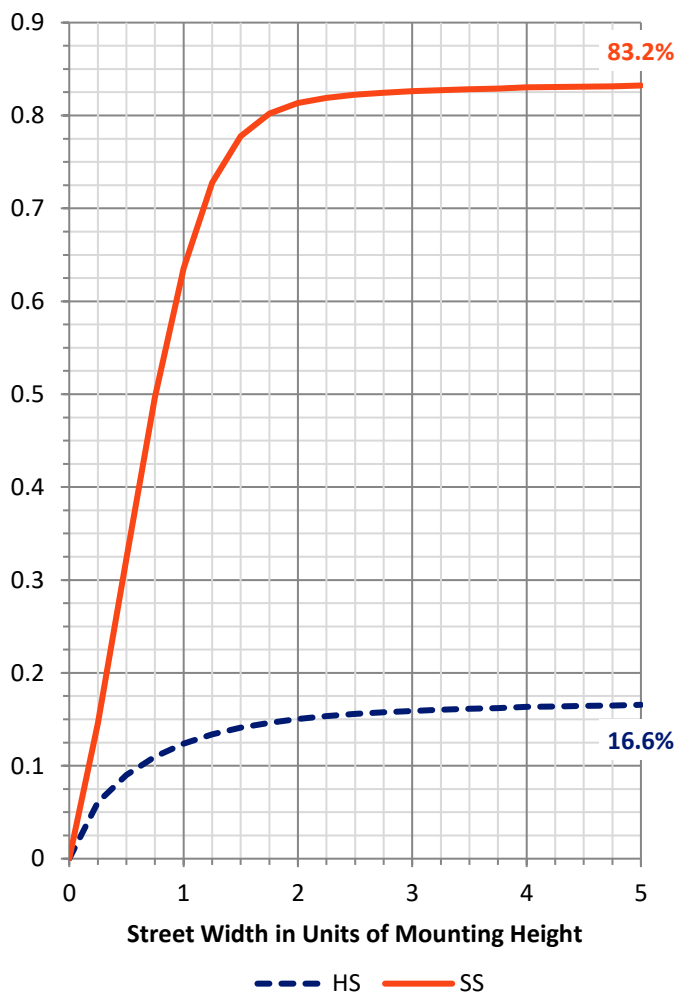
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2789.6   | 0.0    | 2789.6  |
|                    | % Fixture | 16.7     | 0.0    | 16.7    |
| <b>Street Side</b> | Lumens    | 13899.4  | 0.0    | 13899.4 |
|                    | % Fixture | 83.3     | 0.0    | 83.3    |
| <b>Total</b>       | Lumens    | 16689.0  | 0.0    | 16689.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 187.8   | 1.1       |
| 10°-20°   | 715.2   | 4.3       |
| 20°-30°   | 1393.7  | 8.4       |
| 30°-40°   | 2330.9  | 14.0      |
| 40°-50°   | 3337.4  | 20.0      |
| 50°-60°   | 3951.1  | 23.7      |
| 60°-70°   | 3285.3  | 19.7      |
| 70°-80°   | 1344.4  | 8.1       |
| 80°-90°   | 143.1   | 0.9       |
| 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°    | 16689.0 | 100.0     |
| 0°-180°   | 16689.0 | 100.0     |

**Coefficient of Utilization**



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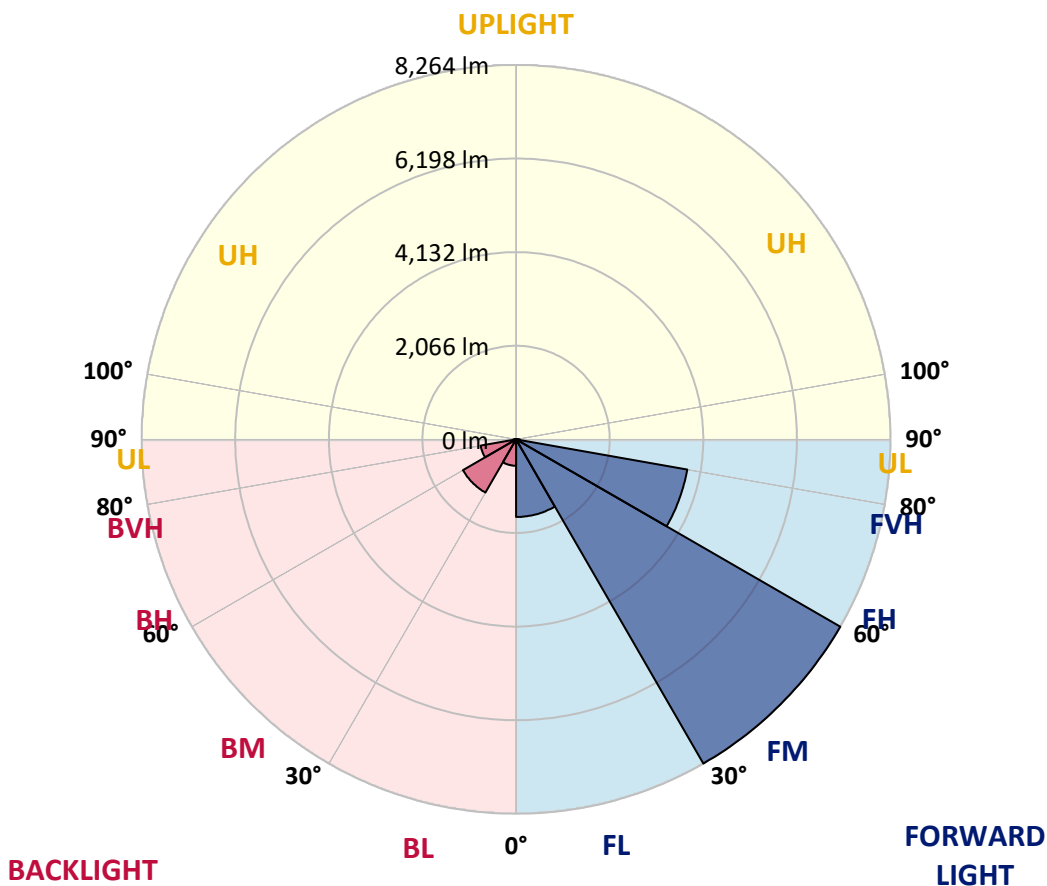
CATALOG NUMBER: GWS-SA2F-760-U-T2R-W

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1713.1 | 10.3      |                         |      |         |
| FM (30°-60°)   | 8263.8 | 49.5      |                         |      |         |
| FH (60°-80°)   | 3837.2 | 23.0      |                         |      | G2/5000 |
| FVH (80°-90°)  | 85.4   | 0.5       |                         |      | G1/100  |
| BL (0°-30°)    | 583.6  | 3.5       | B2/1000                 |      |         |
| BM (30°-60°)   | 1355.7 | 8.1       | B2/2500                 |      |         |
| BH (60°-80°)   | 792.6  | 4.7       | B2/1000                 |      | G2/1000 |
| BVH (80°-90°)  | 57.8   | 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-G2**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°     | 75°     | 76°     | 85°     |
|-------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| 0°    | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4  | 1580.4  | 1580.4  | 1580.4  |
| 2.5°  | 2215.1 | 2223.3 | 2196.4 | 2187.0 | 2123.6 | 2038.0 | 1966.4 | 1858.5  | 1758.7  | 1743.5  | 1654.3  |
| 5°    | 2813.5 | 2778.3 | 2747.8 | 2727.8 | 2639.8 | 2542.5 | 2391.1 | 2188.1  | 1975.8  | 1950.0  | 1757.5  |
| 7.5°  | 3169.0 | 3163.1 | 3125.6 | 3113.8 | 3045.8 | 2948.4 | 2792.4 | 2540.1  | 2231.5  | 2189.3  | 1897.2  |
| 10°   | 3454.1 | 3450.6 | 3431.8 | 3442.4 | 3380.2 | 3285.1 | 3133.8 | 2873.3  | 2512.0  | 2469.7  | 2053.2  |
| 12.5° | 3702.8 | 3708.7 | 3705.2 | 3743.9 | 3712.2 | 3638.3 | 3481.1 | 3194.8  | 2792.4  | 2746.6  | 2243.3  |
| 15°   | 3884.7 | 3889.4 | 3907.0 | 3991.4 | 4009.0 | 3993.8 | 3834.2 | 3510.4  | 3069.3  | 3003.6  | 2439.2  |
| 17.5° | 3936.3 | 3945.7 | 3987.9 | 4124.0 | 4219.1 | 4282.4 | 4163.9 | 3831.9  | 3341.5  | 3269.9  | 2638.7  |
| 20°   | 4005.5 | 4016.1 | 4058.3 | 4200.3 | 4339.9 | 4484.2 | 4463.1 | 4158.0  | 3616.0  | 3557.3  | 2840.5  |
| 22.5° | 4325.8 | 4317.6 | 4298.8 | 4366.9 | 4466.6 | 4646.1 | 4698.9 | 4471.3  | 3899.9  | 3843.6  | 3063.4  |
| 25°   | 4943.0 | 4927.7 | 4808.0 | 4745.9 | 4713.0 | 4822.1 | 4916.0 | 4756.4  | 4176.8  | 4092.3  | 3271.1  |
| 27.5° | 5623.5 | 5615.2 | 5462.7 | 5314.9 | 5113.1 | 5066.2 | 5121.3 | 5005.1  | 4445.5  | 4359.8  | 3451.7  |
| 30°   | 6267.6 | 6242.9 | 6083.4 | 5898.0 | 5628.1 | 5426.3 | 5345.4 | 5249.2  | 4740.0  | 4650.8  | 3662.9  |
| 32.5° | 6843.6 | 6812.0 | 6624.2 | 6418.9 | 6136.2 | 5898.0 | 5656.3 | 5508.5  | 5073.2  | 4969.9  | 3878.8  |
| 35°   | 7316.5 | 7284.8 | 7092.4 | 6874.2 | 6563.2 | 6387.2 | 6056.4 | 5790.1  | 5412.3  | 5307.8  | 4133.4  |
| 37.5° | 7682.5 | 7653.2 | 7452.6 | 7237.9 | 6966.8 | 6827.2 | 6539.8 | 6106.8  | 5803.0  | 5693.9  | 4403.3  |
| 40°   | 7887.9 | 7866.7 | 7706.0 | 7535.9 | 7308.3 | 7187.4 | 7058.4 | 6506.9  | 6240.6  | 6131.5  | 4721.2  |
| 42.5° | 7950.0 | 7936.0 | 7823.3 | 7735.3 | 7581.6 | 7490.1 | 7564.0 | 6977.4  | 6707.6  | 6612.5  | 5079.1  |
| 45°   | 7794.0 | 7794.0 | 7761.1 | 7805.7 | 7812.8 | 7811.6 | 8070.9 | 7508.9  | 7281.3  | 7176.9  | 5583.6  |
| 47.5° | 7395.1 | 7420.9 | 7469.0 | 7688.4 | 7919.5 | 8113.1 | 8663.4 | 8217.5  | 8019.3  | 7933.6  | 6298.1  |
| 50°   | 6665.3 | 6735.7 | 6900.0 | 7328.2 | 7819.8 | 8312.6 | 9224.2 | 9265.3  | 9454.2  | 9302.8  | 7349.3  |
| 52.5° | 5596.5 | 5585.9 | 6004.8 | 6614.9 | 7364.6 | 8320.8 | 9532.8 | 10189.8 | 10697.8 | 10593.4 | 8130.7  |
| 55°   | 4447.8 | 4430.2 | 4820.9 | 5662.2 | 6666.5 | 8006.4 | 9718.1 | 10613.3 | 11387.7 | 11293.8 | 8833.5  |
| 57.5° | 3406.0 | 3383.7 | 3731.0 | 4490.1 | 5680.9 | 7338.8 | 9682.9 | 11117.8 | 12336.9 | 12288.8 | 9788.5  |
| 60°   | 2344.2 | 2317.2 | 2642.2 | 3306.3 | 4514.7 | 6318.0 | 9293.4 | 11377.1 | 13448.0 | 13464.4 | 10810.5 |
| 62.5° | 1407.9 | 1392.7 | 1628.5 | 2143.6 | 3247.6 | 5053.2 | 8381.8 | 11219.9 | 14332.6 | 14406.5 | 11467.5 |
| 65°   | 849.4  | 838.9  | 977.3  | 1278.9 | 2060.3 | 3687.6 | 6976.2 | 10416.2 | 14460.5 | 14630.6 | 11482.7 |
| 67.5° | 618.3  | 619.5  | 659.4  | 779.0  | 1201.4 | 2381.7 | 5235.1 | 8975.5  | 13794.1 | 13970.1 | 10758.8 |
| 70°   | 537.4  | 539.7  | 560.8  | 587.8  | 726.3  | 1363.3 | 3403.6 | 7085.3  | 11824.2 | 11960.3 | 9023.6  |
| 72.5° | 477.5  | 477.5  | 491.6  | 505.7  | 567.9  | 830.7  | 1823.3 | 4952.3  | 9332.1  | 9368.5  | 6887.1  |
| 75°   | 420.0  | 416.5  | 423.5  | 430.6  | 492.8  | 580.8  | 887.0  | 3450.6  | 6892.9  | 6808.5  | 4451.4  |
| 77.5° | 334.4  | 330.9  | 332.0  | 339.1  | 395.4  | 415.3  | 449.4  | 2155.3  | 3884.7  | 3666.5  | 1966.4  |
| 80°   | 238.2  | 235.8  | 248.7  | 266.3  | 292.1  | 254.6  | 281.6  | 1043.0  | 1540.5  | 1433.7  | 762.6   |
| 82.5° | 142.0  | 146.7  | 166.6  | 180.7  | 201.8  | 159.6  | 181.9  | 348.5   | 545.6   | 531.5   | 309.7   |
| 85°   | 19.9   | 21.1   | 59.8   | 69.2   | 86.8   | 62.2   | 96.2   | 157.2   | 218.2   | 233.5   | 109.1   |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 8.2    | 28.2    | 62.2    | 63.4    | 27.0    |
| 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: P633930  
 CATALOG NUMBER: GWS-SA2F-760-U-T2R-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 | 1580.4 |
| 2.5°  | 1608.5 | 1553.4 | 1474.8 | 1409.1 | 1353.9 | 1309.4 | 1271.8 | 1243.7 | 1235.4 | 1223.7 | 1223.7 |
| 5°    | 1667.2 | 1567.5 | 1426.7 | 1327.0 | 1269.5 | 1235.4 | 1212.0 | 1200.2 | 1194.4 | 1187.3 | 1183.8 |
| 7.5°  | 1748.2 | 1608.5 | 1418.5 | 1317.6 | 1273.0 | 1251.9 | 1236.6 | 1229.6 | 1224.9 | 1217.8 | 1217.8 |
| 10°   | 1859.6 | 1669.6 | 1444.3 | 1350.4 | 1315.2 | 1294.1 | 1276.5 | 1264.8 | 1254.2 | 1243.7 | 1241.3 |
| 12.5° | 1980.5 | 1749.3 | 1491.2 | 1395.0 | 1357.5 | 1331.7 | 1307.0 | 1289.4 | 1276.5 | 1263.6 | 1260.1 |
| 15°   | 2114.2 | 1831.5 | 1541.7 | 1438.4 | 1391.5 | 1356.3 | 1327.0 | 1300.0 | 1282.4 | 1263.6 | 1261.3 |
| 17.5° | 2245.6 | 1914.8 | 1583.9 | 1467.8 | 1407.9 | 1364.5 | 1322.3 | 1287.1 | 1264.8 | 1243.7 | 1237.8 |
| 20°   | 2402.8 | 1998.1 | 1613.2 | 1476.0 | 1404.4 | 1346.9 | 1296.5 | 1251.9 | 1227.2 | 1202.6 | 1199.1 |
| 22.5° | 2547.2 | 2075.5 | 1627.3 | 1464.2 | 1377.4 | 1309.4 | 1250.7 | 1202.6 | 1175.6 | 1151.0 | 1146.3 |
| 25°   | 2686.8 | 2143.6 | 1621.5 | 1436.1 | 1336.3 | 1257.7 | 1196.7 | 1148.6 | 1122.8 | 1097.0 | 1090.0 |
| 27.5° | 2821.7 | 2189.3 | 1598.0 | 1392.7 | 1284.7 | 1200.2 | 1141.6 | 1098.2 | 1075.9 | 1053.6 | 1044.2 |
| 30°   | 2954.3 | 2231.5 | 1561.6 | 1336.3 | 1219.0 | 1140.4 | 1092.3 | 1061.8 | 1039.5 | 1016.0 | 1009.0 |
| 32.5° | 3088.0 | 2262.1 | 1506.5 | 1270.6 | 1152.1 | 1087.6 | 1058.3 | 1036.0 | 1012.5 | 989.1  | 982.0  |
| 35°   | 3223.0 | 2275.0 | 1439.6 | 1195.6 | 1095.8 | 1053.6 | 1043.0 | 1017.2 | 985.5  | 957.4  | 948.0  |
| 37.5° | 3383.7 | 2286.7 | 1356.3 | 1121.6 | 1046.6 | 1037.2 | 1034.8 | 996.1  | 958.6  | 919.8  | 909.3  |
| 40°   | 3577.3 | 2301.9 | 1270.6 | 1054.8 | 1006.7 | 1031.3 | 1021.9 | 969.1  | 894.0  | 856.5  | 844.8  |
| 42.5° | 3814.3 | 2330.1 | 1181.5 | 993.8  | 977.3  | 1009.0 | 998.4  | 903.4  | 853.0  | 831.8  | 826.0  |
| 45°   | 4162.7 | 2433.3 | 1092.3 | 945.7  | 955.0  | 977.3  | 960.9  | 864.7  | 844.8  | 830.7  | 823.6  |
| 47.5° | 4783.4 | 2591.7 | 1014.9 | 909.3  | 937.4  | 949.2  | 885.8  | 854.1  | 838.9  | 820.1  | 811.9  |
| 50°   | 5428.7 | 2661.0 | 952.7  | 887.0  | 917.5  | 923.4  | 844.8  | 840.1  | 829.5  | 809.6  | 801.3  |
| 52.5° | 5865.1 | 2651.6 | 915.1  | 878.8  | 901.1  | 878.8  | 826.0  | 824.8  | 817.8  | 794.3  | 784.9  |
| 55°   | 6357.9 | 2668.0 | 898.7  | 881.1  | 894.0  | 803.7  | 802.5  | 806.0  | 802.5  | 776.7  | 772.0  |
| 57.5° | 7023.2 | 2718.5 | 890.5  | 889.3  | 889.3  | 767.3  | 780.2  | 784.9  | 777.9  | 766.1  | 762.6  |
| 60°   | 7662.6 | 2722.0 | 875.3  | 898.7  | 885.8  | 745.0  | 754.4  | 759.1  | 750.9  | 748.5  | 747.4  |
| 62.5° | 7903.1 | 2553.0 | 841.2  | 891.7  | 871.7  | 720.4  | 727.4  | 729.8  | 721.6  | 727.4  | 726.3  |
| 65°   | 7545.3 | 2194.0 | 784.9  | 857.7  | 828.3  | 698.1  | 693.4  | 699.3  | 685.2  | 700.4  | 701.6  |
| 67.5° | 6699.3 | 1743.5 | 699.3  | 793.1  | 767.3  | 673.5  | 664.1  | 664.1  | 640.6  | 664.1  | 662.9  |
| 70°   | 5401.7 | 1231.9 | 573.7  | 689.9  | 700.4  | 644.1  | 639.4  | 612.4  | 574.9  | 610.1  | 606.6  |
| 72.5° | 4094.7 | 884.6  | 451.7  | 545.6  | 603.1  | 603.1  | 604.2  | 558.5  | 515.1  | 531.5  | 517.4  |
| 75°   | 2594.1 | 623.0  | 361.4  | 417.7  | 472.8  | 529.1  | 556.1  | 471.7  | 432.9  | 425.9  | 418.9  |
| 77.5° | 1168.6 | 409.5  | 281.6  | 320.3  | 335.6  | 417.7  | 508.0  | 405.9  | 353.2  | 337.9  | 333.2  |
| 80°   | 489.3  | 254.6  | 200.6  | 226.4  | 206.5  | 350.8  | 448.2  | 315.6  | 259.3  | 238.2  | 222.9  |
| 82.5° | 214.7  | 151.4  | 127.9  | 122.0  | 129.1  | 260.5  | 334.4  | 210.0  | 161.9  | 219.4  | 221.7  |
| 85°   | 90.3   | 79.8   | 65.7   | 59.8   | 52.8   | 99.7   | 157.2  | 82.1   | 100.9  | 57.5   | 46.9   |
| 87.5° | 21.1   | 23.5   | 17.6   | 11.7   | 7.0    | 1.2    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 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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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**

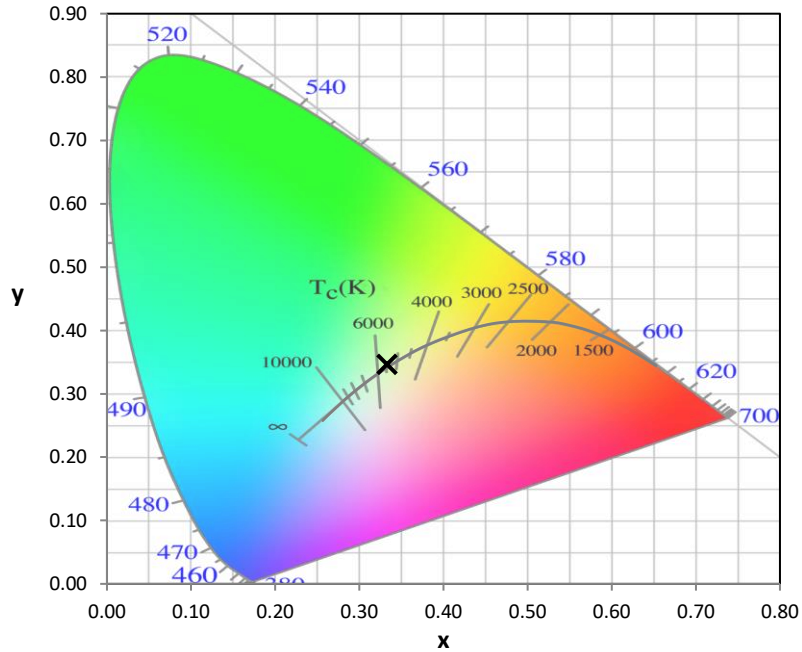
Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.6/31%  
 Sphere Temperature (°C): 25.9

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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**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)