

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: P631450

Luminaire Tested: GWS-SA1F-760-U-T2-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P631450  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-22)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA1F-760-U-T2-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (1) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (16) 5700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

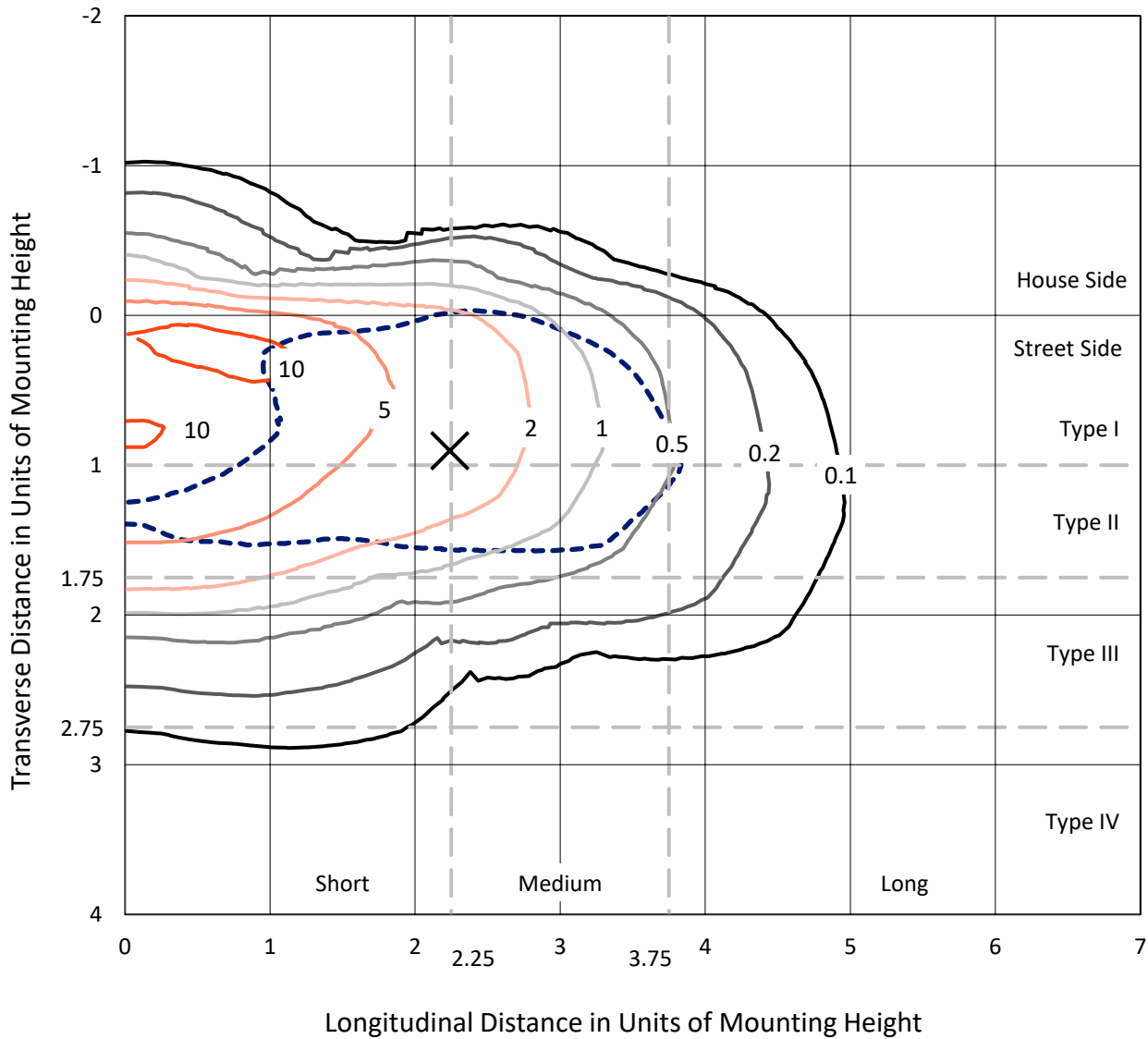
Lumens per Lamp: N/A  
Luminaire Lumens: 6366.9 lumens  
Efficiency: N/A  
Efficacy: 94.7 lumens/watt  
Luminous Opening: Rectangular (W 0.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G2  
  
Input Watts (W): 67.2  
Input Voltage (V): 120  
Input Current (Ain): 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: P631450  
 CATALOG NUMBER: GWS-SA1F-760-U-T2-W-HSS

### Iso-Footcandle Lines of Horizontal Illumination

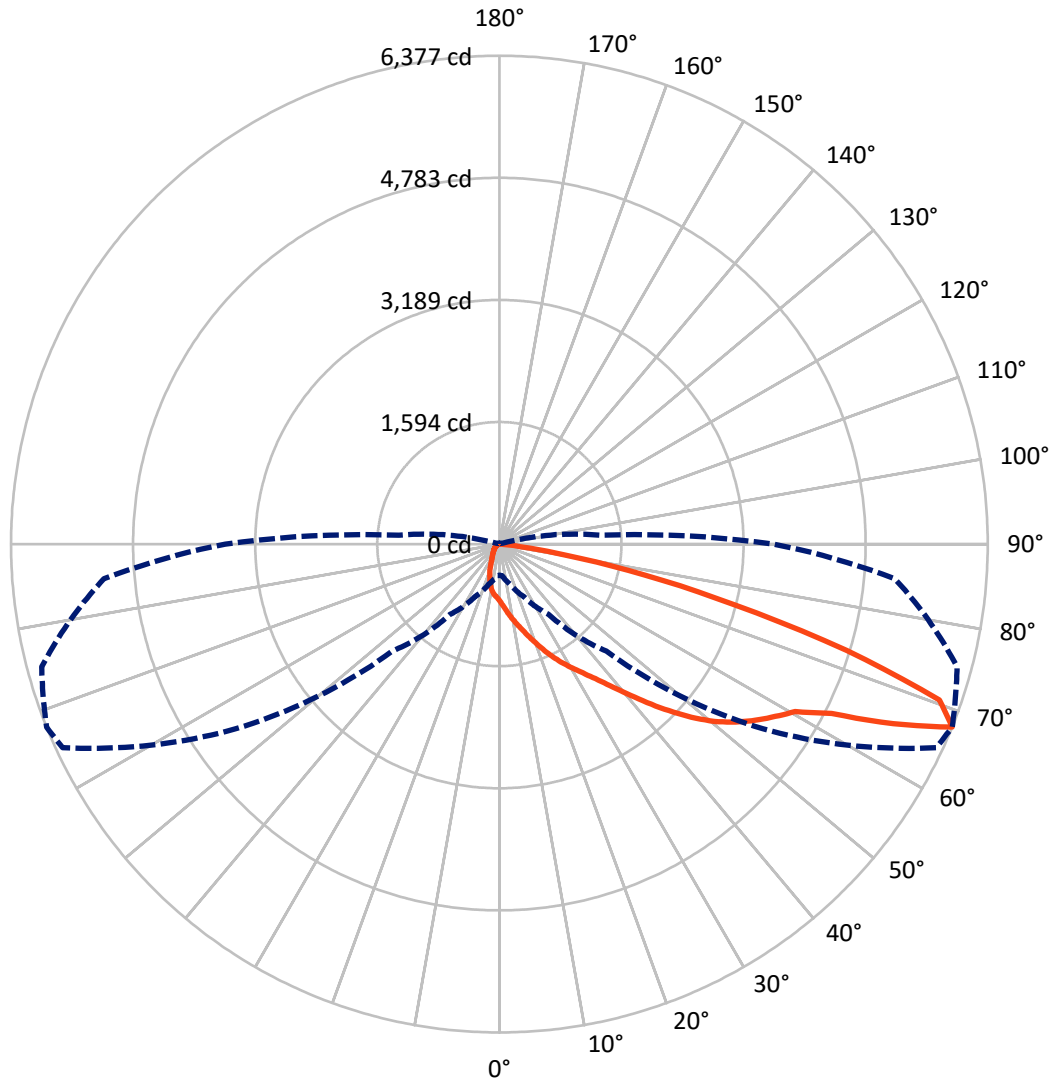
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 11.9 fc  
 Type II - Short - N/A

REPORT NUMBER: P631450  
CATALOG NUMBER: GWS-SA1F-760-U-T2-W-HSS

### Luminous Intensity Polar Plot



— Vertical Plane Through 68-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

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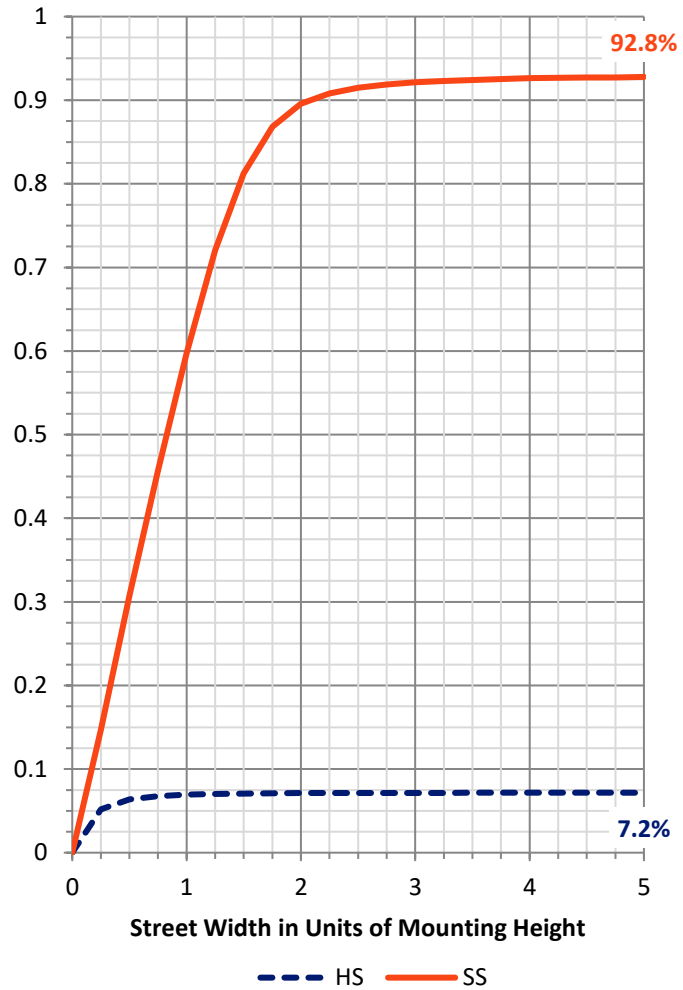
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 459.8    | 0.0    | 459.8  |
|                    | % Fixture | 7.2      | 0.0    | 7.2    |
| <b>Street Side</b> | Lumens    | 5907.1   | 0.0    | 5907.1 |
|                    | % Fixture | 92.8     | 0.0    | 92.8   |
| <b>Total</b>       | Lumens    | 6366.9   | 0.0    | 6366.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 72.3   | 1.1       |
| 10°-20°   | 207.5  | 3.3       |
| 20°-30°   | 356.6  | 5.6       |
| 30°-40°   | 620.0  | 9.7       |
| 40°-50°   | 1081.9 | 17.0      |
| 50°-60°   | 1631.8 | 25.6      |
| 60°-70°   | 1636.3 | 25.7      |
| 70°-80°   | 721.9  | 11.3      |
| 80°-90°   | 38.6   | 0.6       |
| 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°    | 6366.9 | 100.0     |
| 0°-180°   | 6366.9 | 100.0     |

**Coefficient of Utilization**



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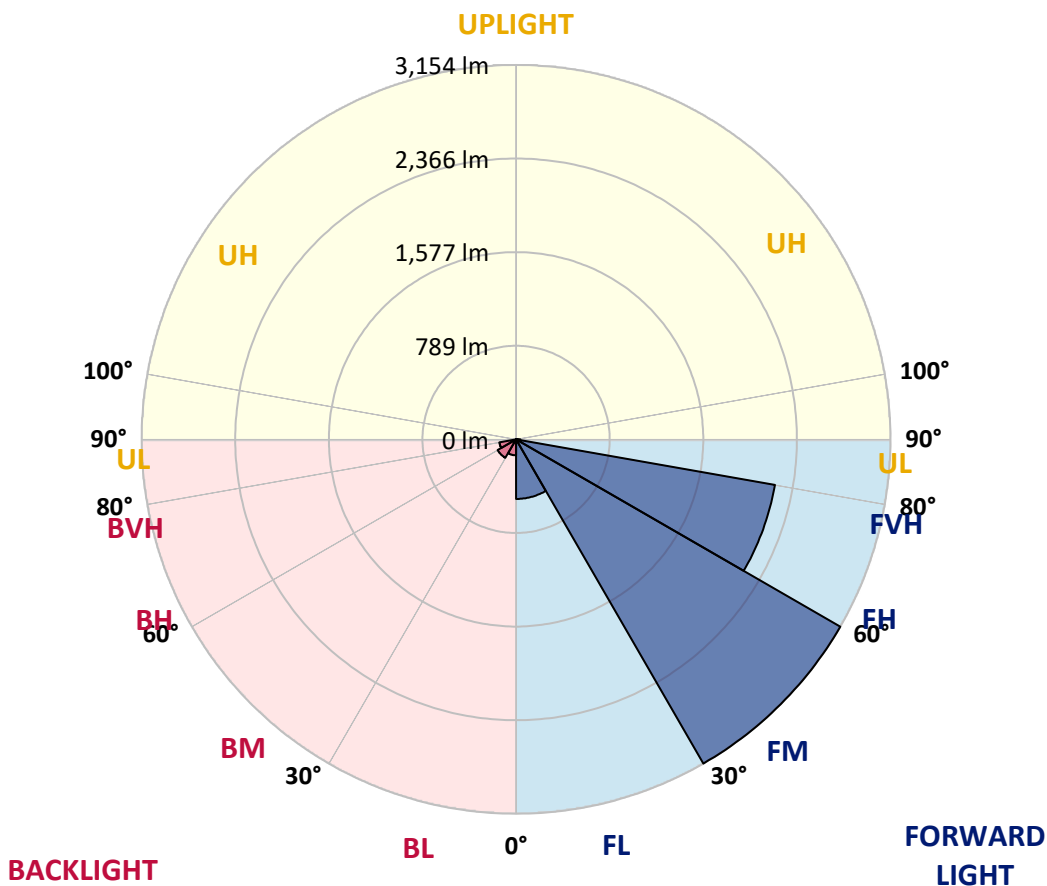
CATALOG NUMBER: GWS-SA1F-760-U-T2-W-HSS

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 501.9  | 7.9       |                         |      |         |
| FM (30°-60°)   | 3154.1 | 49.5      |                         |      |         |
| FH (60°-80°)   | 2214.7 | 34.8      |                         |      | G2/5000 |
| FVH (80°-90°)  | 36.4   | 0.6       |                         |      | G1/100  |
| BL (0°-30°)    | 134.5  | 2.1       | B1/500                  |      |         |
| BM (30°-60°)   | 179.6  | 2.8       | B0/220                  |      |         |
| BH (60°-80°)   | 143.5  | 2.3       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 2.2    | 0.0       |                         |      | G0/10   |
| UL (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

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

Type II Short





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CATALOG NUMBER: GWS-SA1F-760-U-T2-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 68°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  | 740.9  |
| 2.5°  | 862.8  | 868.3  | 862.8  | 864.0  | 848.2  | 840.9  | 825.0  | 803.1  | 797.6  | 783.6  | 762.3  |
| 5°    | 968.2  | 973.1  | 967.6  | 966.4  | 948.1  | 934.7  | 908.5  | 870.7  | 859.8  | 832.3  | 790.3  |
| 7.5°  | 1025.5 | 1028.5 | 1030.4 | 1033.4 | 1026.7 | 1015.8 | 992.0  | 945.1  | 933.5  | 889.0  | 829.9  |
| 10°   | 1031.6 | 1034.0 | 1043.2 | 1061.5 | 1074.9 | 1081.6 | 1068.2 | 1024.9 | 1006.6 | 963.4  | 878.7  |
| 12.5° | 1014.5 | 1018.2 | 1032.8 | 1063.3 | 1100.4 | 1134.6 | 1143.1 | 1105.3 | 1088.9 | 1033.4 | 935.9  |
| 15°   | 992.0  | 995.0  | 1015.1 | 1056.6 | 1112.6 | 1175.4 | 1210.7 | 1194.3 | 1176.0 | 1118.1 | 999.3  |
| 17.5° | 957.3  | 961.5  | 989.6  | 1045.6 | 1118.1 | 1207.7 | 1283.9 | 1289.3 | 1276.5 | 1213.8 | 1069.4 |
| 20°   | 937.8  | 940.8  | 965.8  | 1023.7 | 1114.5 | 1231.5 | 1352.1 | 1403.9 | 1389.9 | 1324.1 | 1149.8 |
| 22.5° | 954.2  | 956.6  | 973.1  | 1018.2 | 1102.3 | 1244.9 | 1415.5 | 1518.5 | 1510.5 | 1442.3 | 1234.5 |
| 25°   | 1040.7 | 1048.7 | 1038.9 | 1046.8 | 1107.8 | 1252.2 | 1466.7 | 1633.0 | 1634.8 | 1566.0 | 1322.2 |
| 27.5° | 1216.2 | 1205.9 | 1182.7 | 1143.1 | 1150.4 | 1271.7 | 1510.5 | 1740.9 | 1756.7 | 1686.6 | 1400.2 |
| 30°   | 1394.8 | 1388.7 | 1374.6 | 1313.1 | 1261.9 | 1314.9 | 1547.7 | 1851.1 | 1876.1 | 1805.4 | 1469.7 |
| 32.5° | 1595.2 | 1601.3 | 1576.3 | 1502.6 | 1415.5 | 1402.7 | 1586.1 | 1955.9 | 2002.9 | 1940.1 | 1551.4 |
| 35°   | 1834.7 | 1836.5 | 1787.2 | 1705.5 | 1606.8 | 1547.7 | 1654.9 | 2071.7 | 2158.2 | 2111.9 | 1660.4 |
| 37.5° | 2068.1 | 2079.0 | 2052.2 | 1923.7 | 1835.9 | 1728.1 | 1768.9 | 2220.4 | 2342.3 | 2324.0 | 1797.5 |
| 40°   | 2274.6 | 2291.7 | 2283.2 | 2158.9 | 2043.7 | 1952.9 | 1945.6 | 2394.7 | 2564.7 | 2585.4 | 1978.5 |
| 42.5° | 2439.1 | 2450.1 | 2456.8 | 2368.5 | 2266.7 | 2215.5 | 2163.7 | 2597.0 | 2827.3 | 2912.0 | 2200.3 |
| 45°   | 2612.8 | 2616.5 | 2630.5 | 2570.8 | 2481.8 | 2486.1 | 2421.5 | 2842.5 | 3103.9 | 3273.9 | 2455.0 |
| 47.5° | 2834.0 | 2846.2 | 2839.5 | 2776.7 | 2696.3 | 2744.4 | 2687.8 | 3095.4 | 3376.9 | 3660.2 | 2715.8 |
| 50°   | 3103.3 | 3116.1 | 3110.0 | 3036.9 | 2947.3 | 2967.4 | 2932.1 | 3341.0 | 3640.1 | 4024.6 | 2932.7 |
| 52.5° | 3242.2 | 3252.6 | 3328.2 | 3361.1 | 3314.1 | 3186.2 | 3140.5 | 3610.9 | 3862.5 | 4324.4 | 3132.0 |
| 55°   | 3175.2 | 3182.5 | 3347.0 | 3486.0 | 3657.8 | 3529.8 | 3350.1 | 3819.3 | 4058.7 | 4558.4 | 3280.0 |
| 57.5° | 2897.4 | 2937.0 | 3160.6 | 3395.8 | 3757.1 | 3869.2 | 3690.1 | 4046.0 | 4247.6 | 4721.1 | 3425.7 |
| 60°   | 2327.6 | 2325.8 | 2646.3 | 3068.6 | 3563.4 | 3962.5 | 4170.3 | 4352.4 | 4437.1 | 4846.0 | 3620.6 |
| 62.5° | 1286.3 | 1297.9 | 1724.4 | 2280.7 | 3024.7 | 3721.2 | 4530.4 | 4882.0 | 4869.2 | 5064.1 | 3925.9 |
| 65°   | 640.4  | 663.6  | 895.1  | 1306.4 | 2012.6 | 3075.3 | 4592.5 | 5689.9 | 5653.4 | 5577.8 | 4556.6 |
| 67.5° | 406.4  | 415.6  | 543.5  | 759.2  | 1118.7 | 1976.7 | 4205.6 | 6292.6 | 6377.2 | 6187.1 | 5182.4 |
| 70°   | 263.2  | 278.5  | 377.8  | 519.1  | 675.1  | 1018.8 | 3080.8 | 5902.0 | 6096.3 | 6120.1 | 4792.4 |
| 72.5° | 143.2  | 154.2  | 241.3  | 370.5  | 487.5  | 509.4  | 1730.5 | 4429.2 | 4741.8 | 5191.5 | 3749.2 |
| 75°   | 81.7   | 89.6   | 132.2  | 251.7  | 357.7  | 310.1  | 767.1  | 2965.0 | 3164.3 | 3710.2 | 2686.5 |
| 77.5° | 49.4   | 56.1   | 74.3   | 122.5  | 224.2  | 207.2  | 290.0  | 1804.8 | 1931.6 | 2213.7 | 1410.0 |
| 80°   | 22.5   | 26.8   | 46.9   | 67.6   | 122.5  | 98.1   | 110.9  | 841.5  | 868.9  | 908.5  | 466.7  |
| 82.5° | 10.4   | 12.2   | 21.3   | 40.2   | 69.5   | 56.7   | 42.7   | 194.4  | 273.6  | 259.0  | 118.8  |
| 85°   | 1.2    | 1.2    | 7.9    | 16.5   | 19.5   | 14.6   | 17.7   | 43.9   | 55.4   | 78.0   | 34.1   |
| 87.5° | 0.0    | 0.0    | 0.6    | 0.6    | 1.2    | 1.8    | 3.7    | 5.5    | 7.9    | 12.8   | 8.5    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



REPORT NUMBER: P631450

CATALOG NUMBER: GWS-SA1F-760-U-T2-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 740.9  | 740.9  | 740.9 | 740.9 | 740.9 | 740.9 | 740.9 | 740.9 | 740.9 | 740.9 | 740.9 |
| 2.5°  | 752.5  | 735.5  | 720.2 | 697.7 | 682.4 | 665.4 | 653.8 | 639.8 | 634.3 | 630.0 | 624.0 |
| 5°    | 769.6  | 742.2  | 705.0 | 663.6 | 629.4 | 597.1 | 567.3 | 547.8 | 530.7 | 528.3 | 519.8 |
| 7.5°  | 797.6  | 756.8  | 694.0 | 626.4 | 568.5 | 514.9 | 472.8 | 438.7 | 421.7 | 416.2 | 406.4 |
| 10°   | 834.8  | 778.7  | 677.6 | 574.0 | 490.5 | 426.5 | 379.0 | 340.6 | 313.8 | 304.1 | 296.7 |
| 12.5° | 876.2  | 798.8  | 651.4 | 509.4 | 414.3 | 341.2 | 280.9 | 240.1 | 223.0 | 216.9 | 211.4 |
| 15°   | 923.7  | 817.7  | 609.9 | 444.8 | 340.0 | 251.0 | 208.4 | 190.7 | 183.4 | 181.6 | 179.8 |
| 17.5° | 969.4  | 829.9  | 560.6 | 377.8 | 261.4 | 195.0 | 174.9 | 168.2 | 166.3 | 164.5 | 163.3 |
| 20°   | 1021.2 | 838.4  | 502.7 | 314.4 | 202.9 | 165.1 | 155.4 | 150.5 | 146.8 | 143.2 | 142.6 |
| 22.5° | 1074.2 | 838.4  | 439.9 | 252.3 | 170.0 | 148.1 | 137.1 | 128.0 | 121.3 | 117.6 | 116.4 |
| 25°   | 1124.8 | 826.9  | 377.8 | 201.7 | 149.9 | 131.6 | 117.6 | 107.2 | 98.1  | 93.8  | 92.6  |
| 27.5° | 1160.8 | 797.0  | 323.6 | 170.6 | 135.9 | 117.0 | 99.9  | 88.4  | 81.0  | 76.8  | 76.2  |
| 30°   | 1183.3 | 752.5  | 273.6 | 152.3 | 123.7 | 101.8 | 84.7  | 74.9  | 69.5  | 66.4  | 65.2  |
| 32.5° | 1200.4 | 697.7  | 229.1 | 139.5 | 112.1 | 88.4  | 73.7  | 65.8  | 60.9  | 58.5  | 57.9  |
| 35°   | 1234.5 | 645.9  | 196.2 | 128.0 | 99.9  | 77.4  | 64.6  | 58.5  | 54.8  | 51.8  | 51.2  |
| 37.5° | 1282.0 | 602.6  | 170.0 | 117.6 | 88.4  | 68.9  | 58.5  | 53.0  | 50.0  | 46.9  | 46.3  |
| 40°   | 1352.1 | 575.2  | 150.5 | 107.2 | 78.0  | 62.2  | 53.6  | 48.7  | 44.5  | 41.4  | 40.8  |
| 42.5° | 1460.0 | 562.4  | 137.7 | 96.9  | 68.9  | 56.1  | 49.4  | 43.3  | 39.0  | 36.0  | 35.3  |
| 45°   | 1588.5 | 569.1  | 126.7 | 86.5  | 62.8  | 51.8  | 43.9  | 37.8  | 33.5  | 30.5  | 29.9  |
| 47.5° | 1726.2 | 592.9  | 117.6 | 76.8  | 56.7  | 47.5  | 39.0  | 32.3  | 28.6  | 25.6  | 25.0  |
| 50°   | 1870.0 | 631.9  | 109.7 | 67.6  | 51.8  | 42.7  | 33.5  | 28.0  | 24.4  | 21.9  | 21.3  |
| 52.5° | 1994.9 | 684.9  | 101.8 | 60.9  | 47.5  | 37.8  | 29.2  | 24.4  | 20.7  | 18.3  | 17.7  |
| 55°   | 2114.4 | 734.9  | 95.7  | 54.8  | 42.7  | 32.9  | 25.6  | 20.7  | 17.7  | 15.2  | 14.6  |
| 57.5° | 2244.2 | 787.9  | 88.4  | 49.4  | 38.4  | 29.2  | 22.5  | 17.7  | 15.2  | 12.8  | 12.2  |
| 60°   | 2433.1 | 866.5  | 77.4  | 45.1  | 33.5  | 25.6  | 19.5  | 15.8  | 13.4  | 10.4  | 9.7   |
| 62.5° | 2705.4 | 1009.7 | 65.2  | 39.0  | 28.6  | 21.9  | 16.5  | 13.4  | 11.0  | 8.5   | 7.3   |
| 65°   | 3214.8 | 1253.4 | 53.6  | 32.3  | 23.2  | 18.3  | 14.0  | 11.0  | 8.5   | 6.1   | 5.5   |
| 67.5° | 3581.6 | 1316.8 | 43.3  | 26.2  | 18.9  | 14.0  | 11.6  | 8.5   | 6.1   | 4.3   | 3.7   |
| 70°   | 3131.3 | 945.7  | 33.5  | 21.3  | 15.8  | 11.0  | 9.1   | 6.7   | 4.3   | 3.0   | 2.4   |
| 72.5° | 2359.3 | 617.9  | 25.0  | 16.5  | 12.2  | 9.1   | 6.7   | 5.5   | 3.7   | 2.4   | 1.8   |
| 75°   | 1662.9 | 357.1  | 18.3  | 12.2  | 8.5   | 6.7   | 5.5   | 4.3   | 3.0   | 1.8   | 1.8   |
| 77.5° | 852.5  | 147.5  | 12.8  | 8.5   | 6.1   | 4.3   | 3.7   | 2.4   | 2.4   | 1.8   | 1.2   |
| 80°   | 259.0  | 48.7   | 7.3   | 5.5   | 4.3   | 3.0   | 1.8   | 1.8   | 1.8   | 1.2   | 0.6   |
| 82.5° | 59.1   | 15.8   | 4.3   | 4.3   | 3.0   | 2.4   | 1.8   | 0.6   | 0.6   | 0.0   | 0.0   |
| 85°   | 15.2   | 4.9    | 3.7   | 3.0   | 3.0   | 2.4   | 1.2   | 0.6   | 0.0   | 0.0   | 0.0   |
| 87.5° | 5.5    | 3.0    | 3.0   | 3.0   | 2.4   | 1.8   | 1.2   | 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   |



Signify Classified - Internal  
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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   | CRI (Ra): | 71.7 | R9:  | -27.1 |
| CIE u':                   | 0.2052 | R1:       | 70.6 | R10: | 40.8  |
| CIE v':                   | 0.4804 | R2:       | 74.6 | R11: | 74.6  |
| Duv:                      | 0.0025 | R3:       | 78.3 | R12: | 50.4  |
| CIE x:                    | 0.3330 | R4:       | 73.8 | R13: | 70.0  |
| CIE y:                    | 0.3466 | R5:       | 72.4 | R14: | 87.8  |
| CIE z:                    | 0.3204 | R6:       | 67.5 |      |       |
| Peak Wavelength (nm):     | 442    | R7:       | 77.5 |      |       |
| Dominant Wavelength (nm): | 554    | R8:       | 58.9 |      |       |
| Purity:                   | 4.1    |           |      |      |       |
| 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



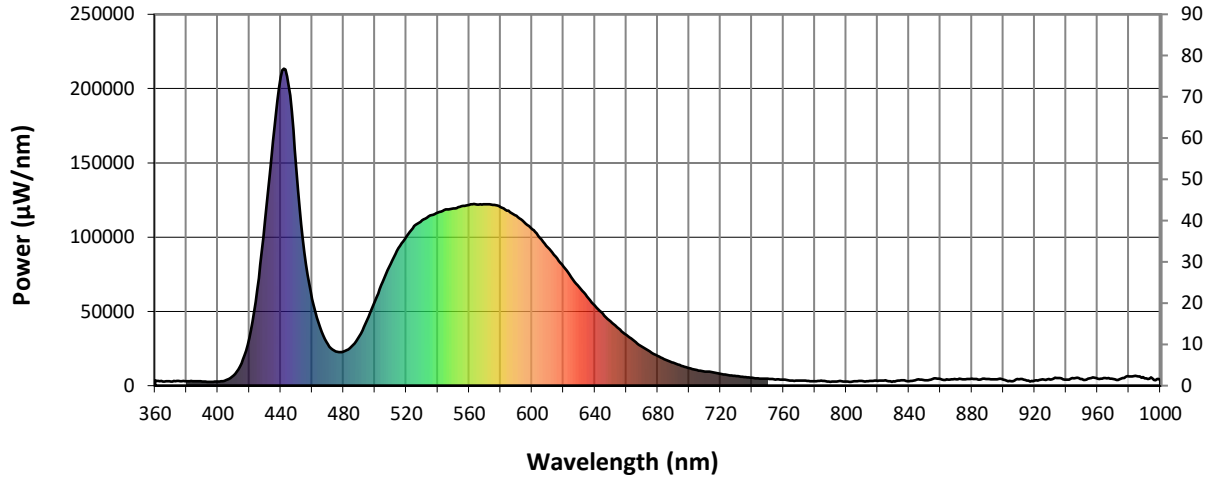
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



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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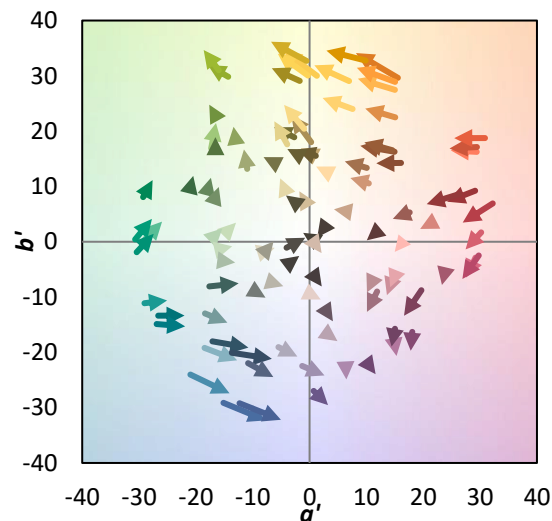
TM-30-18

**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 ( $R_{f,i}$ )**

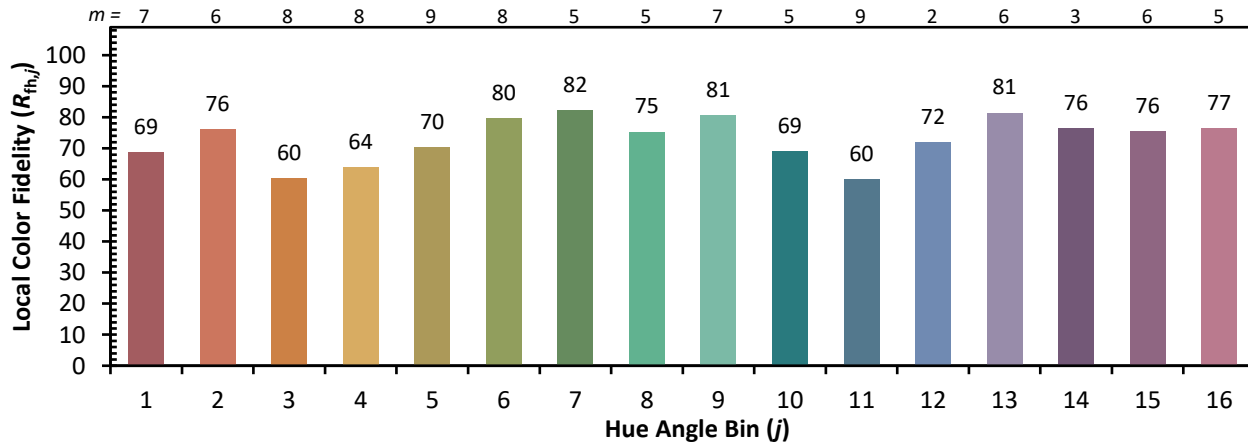
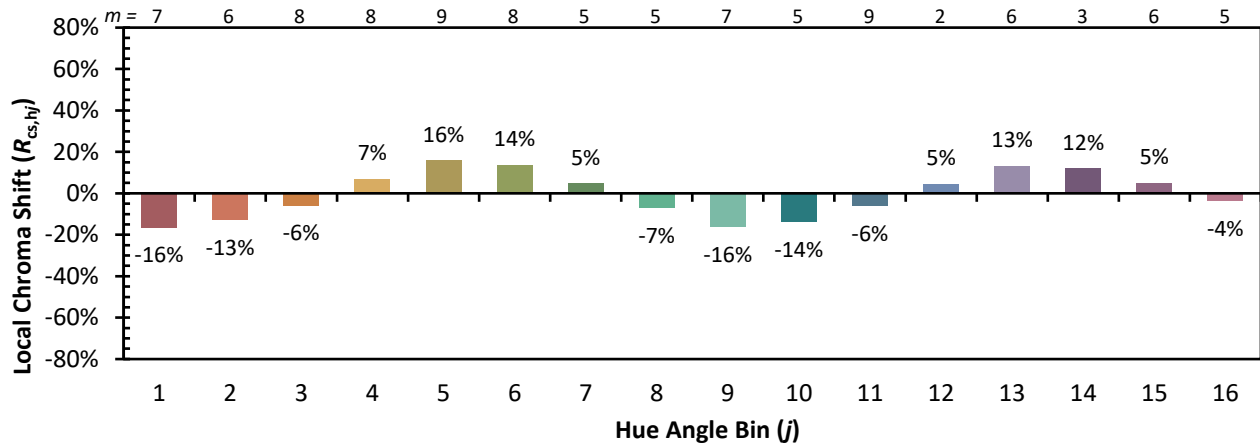
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 88 | CES76 = 43 |
| CES02 = 59 | CES27 = 79 | CES52 = 90 | CES77 = 64 |
| CES03 = 30 | CES28 = 77 | CES53 = 77 | CES78 = 46 |
| CES04 = 69 | CES29 = 50 | CES54 = 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)