

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: P634644

Luminaire Tested: GWS-SA3C-727-U-T2R-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P634644  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-14)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA3C-727-U-T2R-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (3) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (48) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

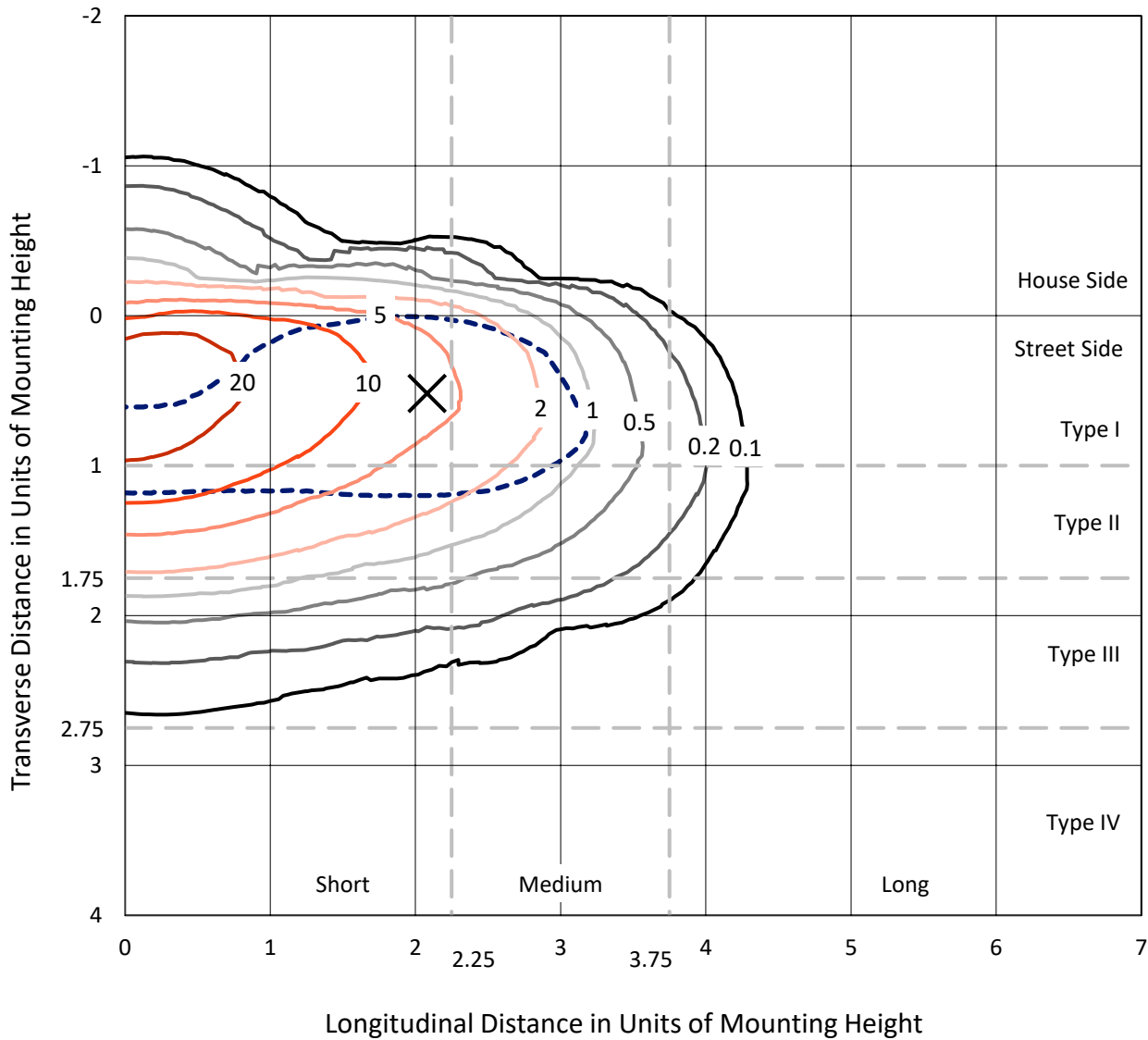
Lumens per Lamp: N/A  
Luminaire Lumens: 9408.4 lumens  
Efficiency: N/A  
Efficacy: 101.2 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G2  
  
Input Watts (W): 93  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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### Iso-Footcandle Lines of Horizontal Illumination

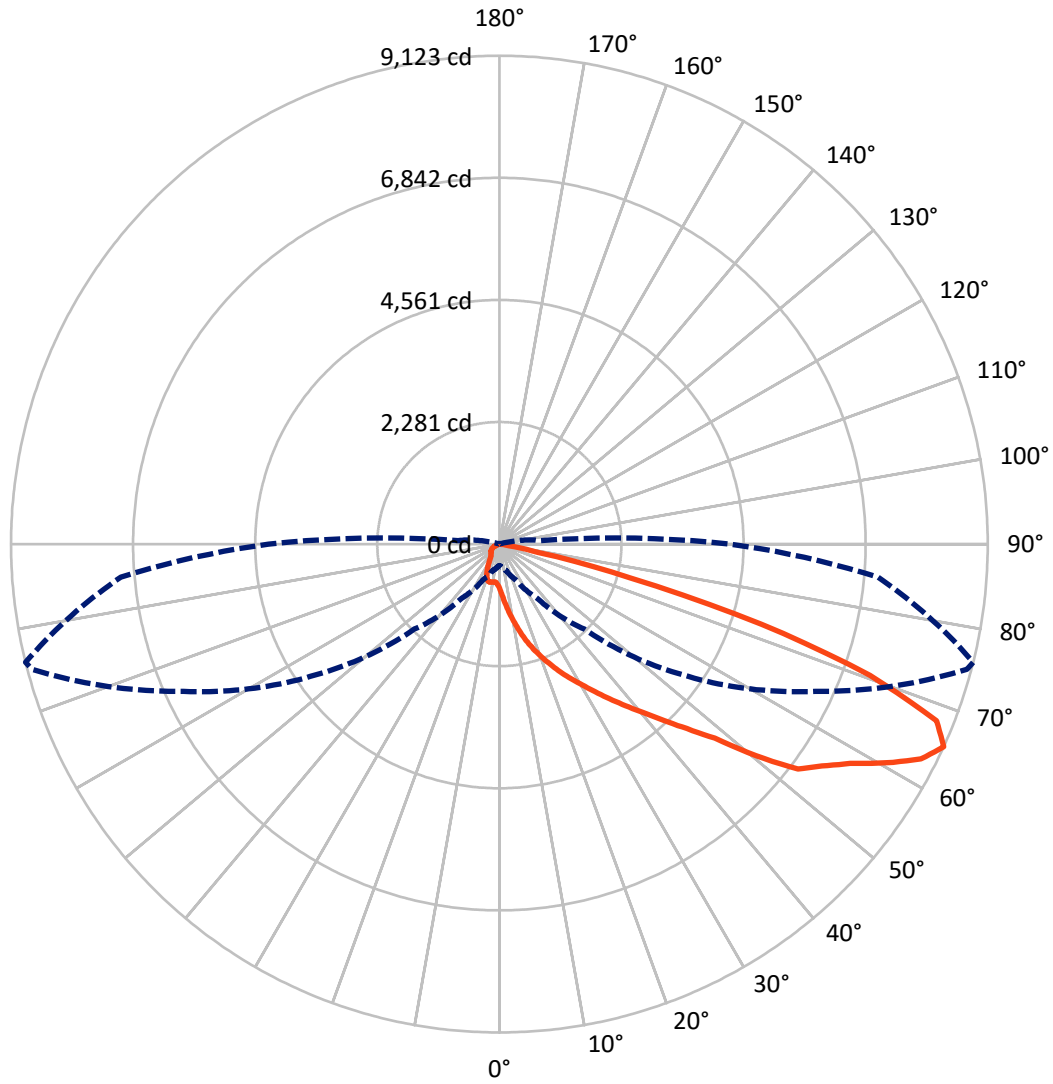
✕ Max cd  
 - - - 1/2 Max cd



Based on 10 foot mounting height. Maximum calculated value = 28.2 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    | 520.2    | 0.0    | 520.2  |
|                    | % Fixture | 5.5      | 0.0    | 5.5    |
| <b>Street Side</b> | Lumens    | 8888.2   | 0.0    | 8888.2 |
|                    | % Fixture | 94.5     | 0.0    | 94.5   |
| <b>Total</b>       | Lumens    | 9408.4   | 0.0    | 9408.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 101.3  | 1.1       |
| 10°-20°   | 384.5  | 4.1       |
| 20°-30°   | 784.5  | 8.3       |
| 30°-40°   | 1395.2 | 14.8      |
| 40°-50°   | 2062.5 | 21.9      |
| 50°-60°   | 2361.4 | 25.1      |
| 60°-70°   | 1801.6 | 19.1      |
| 70°-80°   | 504.7  | 5.4       |
| 80°-90°   | 12.7   | 0.1       |
| 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°    | 9408.4 | 100.0     |
| 0°-180°   | 9408.4 | 100.0     |

**Coefficient of Utilization**



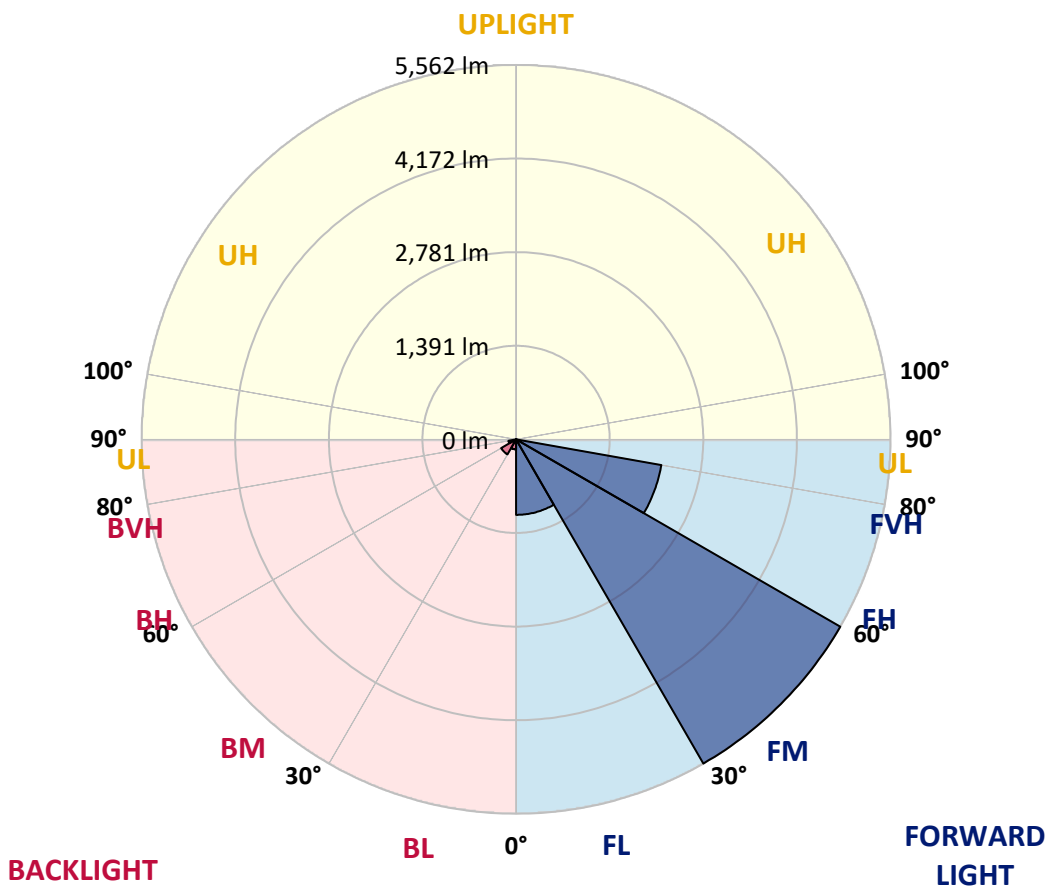
REPORT NUMBER: P634644

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

| Zone           | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|----------------|--------|-----------|-------------------------|------|---------|
|                |        |           | B                       | U    | G       |
| FL (0°-30°)    | 1121.9 | 11.9      |                         |      |         |
| FM (30°-60°)   | 5562.4 | 59.1      |                         |      |         |
| FH (60°-80°)   | 2191.9 | 23.3      |                         |      | G2/5000 |
| FVH (80°-90°)  | 12.0   | 0.1       |                         |      | G1/100  |
| BL (0°-30°)    | 148.5  | 1.6       | B1/500                  |      |         |
| BM (30°-60°)   | 256.7  | 2.7       | B1/1000                 |      |         |
| BH (60°-80°)   | 114.4  | 1.2       | B1/500                  |      | G1/500  |
| BVH (80°-90°)  | 0.7    | 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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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 76°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  | 833.0  |
| 2.5°  | 1283.8 | 1303.0 | 1288.0 | 1262.9 | 1214.4 | 1167.5 | 1107.3 | 1024.5 | 958.4  | 950.1  | 888.2  |
| 5°    | 1733.7 | 1732.0 | 1699.4 | 1666.8 | 1615.8 | 1535.5 | 1414.2 | 1260.4 | 1112.3 | 1099.8 | 960.9  |
| 7.5°  | 2001.3 | 2003.9 | 1985.5 | 1960.4 | 1910.2 | 1827.4 | 1701.1 | 1515.4 | 1298.8 | 1273.7 | 1060.5 |
| 10°   | 2226.3 | 2225.5 | 2212.1 | 2200.4 | 2155.2 | 2100.0 | 1964.5 | 1760.5 | 1499.5 | 1460.2 | 1171.7 |
| 12.5° | 2395.3 | 2401.1 | 2407.8 | 2419.5 | 2400.3 | 2345.9 | 2218.0 | 1995.5 | 1702.8 | 1659.3 | 1298.8 |
| 15°   | 2529.1 | 2530.7 | 2555.8 | 2601.0 | 2616.9 | 2588.4 | 2472.2 | 2223.0 | 1903.5 | 1865.9 | 1445.2 |
| 17.5° | 2569.2 | 2572.6 | 2615.2 | 2698.0 | 2781.6 | 2797.5 | 2709.7 | 2452.1 | 2100.9 | 2060.7 | 1587.4 |
| 20°   | 2653.7 | 2661.2 | 2693.0 | 2765.7 | 2871.1 | 2956.4 | 2922.1 | 2683.8 | 2298.2 | 2245.6 | 1732.9 |
| 22.5° | 2919.6 | 2923.8 | 2912.9 | 2922.1 | 2976.5 | 3075.2 | 3096.1 | 2907.9 | 2500.6 | 2444.6 | 1890.1 |
| 25°   | 3377.1 | 3378.8 | 3302.7 | 3230.8 | 3189.8 | 3208.2 | 3254.2 | 3114.5 | 2701.4 | 2646.2 | 2036.5 |
| 27.5° | 3852.1 | 3858.0 | 3766.8 | 3644.7 | 3498.4 | 3414.7 | 3401.4 | 3303.5 | 2903.7 | 2842.7 | 2181.2 |
| 30°   | 4299.6 | 4299.6 | 4203.4 | 4054.5 | 3858.8 | 3695.8 | 3599.6 | 3494.2 | 3120.4 | 3053.4 | 2329.2 |
| 32.5° | 4701.9 | 4698.5 | 4575.6 | 4414.2 | 4221.0 | 4042.0 | 3839.6 | 3693.2 | 3361.2 | 3286.8 | 2499.8 |
| 35°   | 5033.9 | 5025.5 | 4885.9 | 4731.1 | 4524.6 | 4391.6 | 4165.8 | 3907.3 | 3622.2 | 3547.7 | 2675.4 |
| 37.5° | 5284.8 | 5275.6 | 5147.6 | 4983.7 | 4792.2 | 4706.0 | 4517.0 | 4164.1 | 3897.3 | 3829.6 | 2870.3 |
| 40°   | 5421.1 | 5402.7 | 5314.1 | 5191.9 | 5031.4 | 4956.1 | 4877.5 | 4482.7 | 4221.0 | 4136.5 | 3100.3 |
| 42.5° | 5461.2 | 5439.5 | 5381.0 | 5324.1 | 5227.1 | 5167.7 | 5252.2 | 4842.4 | 4576.4 | 4503.6 | 3362.9 |
| 45°   | 5342.5 | 5329.9 | 5324.9 | 5365.9 | 5383.5 | 5400.2 | 5608.4 | 5240.5 | 4968.6 | 4913.4 | 3693.2 |
| 47.5° | 5056.5 | 5053.1 | 5097.4 | 5268.1 | 5453.7 | 5630.2 | 5995.7 | 5731.4 | 5477.1 | 5417.8 | 4154.9 |
| 50°   | 4527.9 | 4562.2 | 4686.0 | 4985.4 | 5356.7 | 5760.7 | 6357.8 | 6412.2 | 6300.1 | 6213.1 | 4757.1 |
| 52.5° | 3701.6 | 3767.7 | 4045.3 | 4500.3 | 5033.9 | 5723.9 | 6525.1 | 6957.4 | 7072.0 | 6981.7 | 5188.6 |
| 55°   | 2904.6 | 2966.5 | 3214.0 | 3791.1 | 4502.8 | 5443.7 | 6532.6 | 7145.6 | 7395.7 | 7312.0 | 5480.5 |
| 57.5° | 2163.6 | 2220.5 | 2445.4 | 2997.4 | 3780.2 | 4892.5 | 6353.6 | 7250.2 | 7779.6 | 7726.0 | 5941.3 |
| 60°   | 1414.2 | 1470.3 | 1673.5 | 2156.1 | 2932.2 | 4089.7 | 5912.9 | 7228.4 | 8302.3 | 8297.2 | 6507.5 |
| 62.5° | 784.5  | 828.8  | 976.0  | 1352.3 | 2046.5 | 3167.2 | 5220.4 | 7010.1 | 8808.2 | 8840.0 | 6974.2 |
| 65°   | 401.4  | 429.9  | 519.4  | 743.5  | 1238.6 | 2245.6 | 4309.6 | 6510.0 | 9042.4 | 9122.7 | 7097.1 |
| 67.5° | 262.6  | 271.8  | 293.6  | 386.4  | 663.2  | 1412.6 | 3243.3 | 5708.0 | 8712.9 | 8806.6 | 6684.8 |
| 70°   | 213.3  | 220.8  | 233.3  | 257.6  | 342.1  | 750.2  | 2130.1 | 4558.8 | 7280.3 | 7343.8 | 5323.3 |
| 72.5° | 156.4  | 166.4  | 190.7  | 206.6  | 246.7  | 411.5  | 1108.1 | 2992.4 | 4999.6 | 5111.7 | 3345.3 |
| 75°   | 115.4  | 121.3  | 141.3  | 163.1  | 201.6  | 260.1  | 424.0  | 1573.1 | 2581.8 | 2516.5 | 1405.0 |
| 77.5° | 69.4   | 73.6   | 90.3   | 104.5  | 143.8  | 162.2  | 148.0  | 581.3  | 785.3  | 738.5  | 339.6  |
| 80°   | 34.3   | 38.5   | 59.4   | 78.6   | 92.0   | 65.2   | 61.9   | 162.2  | 174.8  | 174.8  | 85.3   |
| 82.5° | 11.7   | 15.1   | 31.8   | 51.9   | 45.2   | 25.1   | 29.3   | 41.8   | 46.8   | 49.3   | 25.1   |
| 85°   | 0.0    | 0.0    | 7.5    | 15.1   | 6.7    | 3.3    | 7.5    | 9.2    | 11.7   | 12.5   | 8.4    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.8    | 2.5    | 3.3    | 3.3    |
| 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-SA3C-727-U-T2R-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°  | 115°  | 125°  | 135°  | 145°  | 155°  | 165°  | 175°  | 180°  |
|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 0°    | 833.0  | 833.0  | 833.0 | 833.0 | 833.0 | 833.0 | 833.0 | 833.0 | 833.0 | 833.0 | 833.0 |
| 2.5°  | 854.7  | 815.4  | 756.0 | 702.5 | 661.5 | 623.1 | 593.8 | 570.4 | 566.2 | 552.8 | 554.5 |
| 5°    | 893.2  | 822.1  | 712.6 | 628.1 | 568.7 | 528.6 | 495.1 | 470.0 | 459.1 | 448.3 | 439.9 |
| 7.5°  | 952.6  | 849.7  | 695.8 | 593.0 | 523.5 | 461.7 | 409.8 | 368.0 | 347.9 | 335.4 | 327.0 |
| 10°   | 1025.3 | 888.2  | 696.7 | 572.1 | 469.2 | 374.7 | 303.6 | 257.6 | 235.8 | 229.2 | 228.3 |
| 12.5° | 1112.3 | 936.7  | 703.4 | 537.8 | 390.6 | 278.5 | 225.0 | 204.1 | 197.4 | 191.5 | 191.5 |
| 15°   | 1204.3 | 991.1  | 703.4 | 475.0 | 297.7 | 217.4 | 194.9 | 181.5 | 173.1 | 169.8 | 168.1 |
| 17.5° | 1301.3 | 1042.1 | 686.6 | 388.9 | 228.3 | 191.5 | 173.1 | 160.6 | 153.9 | 148.9 | 147.2 |
| 20°   | 1405.0 | 1090.6 | 644.8 | 297.7 | 195.7 | 171.4 | 153.9 | 141.3 | 134.6 | 129.6 | 129.6 |
| 22.5° | 1510.4 | 1135.7 | 577.1 | 229.2 | 173.1 | 152.2 | 135.5 | 123.8 | 117.1 | 112.1 | 112.1 |
| 25°   | 1608.3 | 1165.8 | 490.1 | 189.0 | 156.4 | 135.5 | 120.4 | 108.7 | 101.2 | 97.9  | 96.2  |
| 27.5° | 1699.4 | 1185.1 | 393.9 | 166.4 | 140.5 | 121.3 | 105.4 | 94.5  | 88.7  | 86.1  | 84.5  |
| 30°   | 1793.9 | 1190.1 | 301.1 | 151.4 | 127.1 | 107.1 | 92.0  | 83.6  | 78.6  | 75.3  | 75.3  |
| 32.5° | 1885.9 | 1184.2 | 230.0 | 138.8 | 115.4 | 94.5  | 82.0  | 74.4  | 70.3  | 67.7  | 66.9  |
| 35°   | 1979.6 | 1157.5 | 186.5 | 128.0 | 103.7 | 82.8  | 72.8  | 66.9  | 64.4  | 61.1  | 61.1  |
| 37.5° | 2081.6 | 1121.5 | 162.2 | 117.1 | 92.0  | 74.4  | 65.2  | 61.1  | 57.7  | 55.2  | 54.4  |
| 40°   | 2208.8 | 1079.7 | 148.9 | 107.9 | 81.1  | 66.9  | 58.5  | 54.4  | 51.9  | 49.3  | 48.5  |
| 42.5° | 2359.3 | 1038.7 | 142.2 | 97.9  | 72.8  | 59.4  | 52.7  | 47.7  | 45.2  | 41.8  | 41.0  |
| 45°   | 2572.6 | 1029.5 | 134.6 | 87.0  | 65.2  | 53.5  | 46.0  | 41.0  | 37.6  | 35.1  | 34.3  |
| 47.5° | 2915.5 | 1055.5 | 122.1 | 75.3  | 57.7  | 46.8  | 39.3  | 35.1  | 30.9  | 28.4  | 26.8  |
| 50°   | 3255.8 | 1048.8 | 109.6 | 65.2  | 51.0  | 40.1  | 33.5  | 29.3  | 25.1  | 22.6  | 21.7  |
| 52.5° | 3441.5 | 1017.0 | 97.9  | 57.7  | 44.3  | 34.3  | 28.4  | 23.4  | 20.9  | 18.4  | 17.6  |
| 55°   | 3609.6 | 1004.4 | 86.1  | 50.2  | 37.6  | 30.1  | 23.4  | 19.2  | 17.6  | 15.1  | 14.2  |
| 57.5° | 3939.1 | 1033.7 | 76.1  | 43.5  | 32.6  | 25.9  | 20.1  | 15.9  | 14.2  | 11.7  | 10.9  |
| 60°   | 4283.7 | 1037.1 | 65.2  | 37.6  | 28.4  | 21.7  | 15.9  | 12.5  | 10.9  | 8.4   | 7.5   |
| 62.5° | 4463.5 | 952.6  | 53.5  | 31.8  | 23.4  | 18.4  | 13.4  | 10.0  | 8.4   | 5.0   | 5.0   |
| 65°   | 4313.0 | 770.3  | 45.2  | 25.9  | 18.4  | 14.2  | 10.0  | 7.5   | 5.0   | 2.5   | 0.8   |
| 67.5° | 3817.0 | 547.8  | 37.6  | 20.9  | 13.4  | 10.0  | 7.5   | 5.0   | 0.8   | 0.0   | 0.0   |
| 70°   | 2795.0 | 312.8  | 29.3  | 15.1  | 10.0  | 6.7   | 5.0   | 2.5   | 0.0   | 0.0   | 0.0   |
| 72.5° | 1717.8 | 167.3  | 21.7  | 10.0  | 7.5   | 5.0   | 4.2   | 1.7   | 0.0   | 0.0   | 0.0   |
| 75°   | 651.5  | 80.3   | 13.4  | 6.7   | 5.9   | 4.2   | 2.5   | 0.8   | 0.0   | 0.0   | 0.0   |
| 77.5° | 176.5  | 39.3   | 7.5   | 5.0   | 4.2   | 2.5   | 1.7   | 0.0   | 0.0   | 0.0   | 0.0   |
| 80°   | 46.0   | 18.4   | 5.0   | 3.3   | 2.5   | 1.7   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 82.5° | 15.9   | 8.4    | 2.5   | 2.5   | 1.7   | 0.8   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 85°   | 6.7    | 3.3    | 1.7   | 1.7   | 0.8   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   | 0.0   |
| 87.5° | 2.5    | 0.8    | 0.8   | 0.8   | 0.8   | 0.0   | 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   |



Signify Classified - Internal  
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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: SP1-1908-441-1-R4

Test Date: 08/20/2019

Luminaire Tested: SA1C-727-U-5WQ

**Test Information**

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-1-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-727-U-5WQ**  
 Description: McGRAW EDISON ROADWAY AND AREA LUMINAIRE

\*\*\*THIS IS A REVISION OF SP1-1908-441-1-R3. TO UPDATE THE CATALOG NUMBER.\*\*\*TESTED IN  
 SITU. (1) 70 CRI, 2700K, 1050MA LIGHTSQUARE WITH 16 LEDS AND TYPE V WIDE OPTICS.

**Spectral Parameters**

CCT (K): 2741  
 CIE u': 0.2605  
 CIE v': 0.5272  
 Duv: 0.0005  
 CIE x: 0.4573  
 CIE y: 0.4113  
 CIE z: 0.1313  
 Peak Wavelength (nm): 602  
 Dominant Wavelength (nm): 583  
 Purity: 61.2

|           |      |      |       |
|-----------|------|------|-------|
| CRI (Ra): | 71.5 |      |       |
| R1:       | 69.2 | R9:  | -16.1 |
| R2:       | 79.4 | R10: | 51.4  |
| R3:       | 87.8 | R11: | 63.1  |
| R4:       | 69.4 | R12: | 42.0  |
| R5:       | 66.4 | R13: | 70.2  |
| R6:       | 69.8 | R14: | 92.4  |
| R7:       | 79.8 |      |       |
| R8:       | 50.1 |      |       |

Rf: 69.9  
 Rg: 98.3



**Test Conditions**

Stabilization Time: 56M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.3./42%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-1-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 2700K 4-step quadrangle

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**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2044                              | 0.0                         | 490            | 7179                              | 1.0                         | 620            | 118034                            | 30.7                        | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 1.9                         | 625            | 111884                            | 24.7                        | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 3.4                         | 630            | 106119                            | 19.2                        | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 6.3                         | 635            | 99706                             | 15.0                        | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 10.4                        | 640            | 92142                             | 11.0                        | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 16.3                        | 645            | 84987                             | 8.2                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 22.9                        | 650            | 78016                             | 5.7                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 29.7                        | 655            | 71541                             | 4.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 36.7                        | 660            | 64863                             | 2.7                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.0                         | 535            | 68520                             | 42.5                        | 665            | 58485                             | 1.9                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.0                         | 540            | 73435                             | 47.8                        | 670            | 51641                             | 1.1                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.0                         | 545            | 78677                             | 52.4                        | 675            | 46030                             | 0.8                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 0.0                         | 550            | 83331                             | 56.6                        | 680            | 40590                             | 0.5                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 0.1                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.3                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 0.3                         | 560            | 94613                             | 64.3                        | 690            | 31631                             | 0.2                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 0.6                         | 565            | 99818                             | 66.4                        | 695            | 27437                             | 0.1                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 0.9                         | 570            | 106526                            | 69.3                        | 700            | 24589                             | 0.1                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 1.1                         | 575            | 111610                            | 69.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 1.0                         | 580            | 117163                            | 69.6                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 0.8                         | 585            | 122201                            | 67.9                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 0.6                         | 590            | 125662                            | 65.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 0.5                         | 595            | 127415                            | 60.4                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 0.4                         | 600            | 129155                            | 55.7                        | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 0.4                         | 605            | 128057                            | 49.6                        | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 0.5                         | 610            | 126031                            | 43.3                        | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 0.7                         | 615            | 123059                            | 37.1                        | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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Scotopic Flux vs. Wavelength



Scotopic Lumens: 6474.3

S/P: 1.04

| 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    | 2044          | 0.0           | 490    | 7179          | 6.0           | 620    | 118034        | 0.1           | 750    | 8362          | 0.0           | 880    | 3128          | 0.0           |
| 365    | 2016          | 0.0           | 495    | 10476         | 8.6           | 625    | 111884        | 0.1           | 755    | 7635          | 0.0           | 885    | 3110          | 0.0           |
| 370    | 2020          | 0.0           | 500    | 15549         | 12.5          | 630    | 106119        | 0.0           | 760    | 6582          | 0.0           | 890    | 2632          | 0.0           |
| 375    | 2137          | 0.0           | 505    | 22477         | 17.3          | 635    | 99706         | 0.0           | 765    | 5777          | 0.0           | 895    | 2709          | 0.0           |
| 380    | 2046          | 0.0           | 510    | 30417         | 21.8          | 640    | 92142         | 0.0           | 770    | 5474          | 0.0           | 900    | 2016          | 0.0           |
| 385    | 1925          | 0.0           | 515    | 39274         | 25.7          | 645    | 84987         | 0.0           | 775    | 4977          | 0.0           | 905    | 1748          | 0.0           |
| 390    | 1893          | 0.0           | 520    | 47282         | 27.5          | 650    | 78016         | 0.0           | 780    | 4723          | 0.0           | 910    | 2046          | 0.0           |
| 395    | 1695          | 0.0           | 525    | 55413         | 28.1          | 655    | 71541         | 0.0           | 785    | 4219          | 0.0           | 915    | 1844          | 0.0           |
| 400    | 1633          | 0.0           | 530    | 62377         | 27.0          | 660    | 64863         | 0.0           | 790    | 3969          | 0.0           | 920    | 2734          | 0.0           |
| 405    | 2065          | 0.0           | 535    | 68520         | 24.7          | 665    | 58485         | 0.0           | 795    | 4122          | 0.0           | 925    | 2307          | 0.0           |
| 410    | 3449          | 0.1           | 540    | 73435         | 21.5          | 670    | 51641         | 0.0           | 800    | 2864          | 0.0           | 930    | 2039          | 0.0           |
| 415    | 7117          | 0.5           | 545    | 78677         | 18.3          | 675    | 46030         | 0.0           | 805    | 3151          | 0.0           | 935    | 1784          | 0.0           |
| 420    | 13992         | 1.6           | 550    | 83331         | 15.0          | 680    | 40590         | 0.0           | 810    | 3022          | 0.0           | 940    | 2464          | 0.0           |
| 425    | 25176         | 3.9           | 555    | 89120         | 12.0          | 685    | 35691         | 0.0           | 815    | 3471          | 0.0           | 945    | 2794          | 0.0           |
| 430    | 38151         | 8.1           | 560    | 94613         | 9.3           | 690    | 31631         | 0.0           | 820    | 2749          | 0.0           | 950    | 3090          | 0.0           |
| 435    | 49673         | 13.3          | 565    | 99818         | 7.0           | 695    | 27437         | 0.0           | 825    | 2729          | 0.0           | 955    | 1866          | 0.0           |
| 440    | 57273         | 19.1          | 570    | 106526        | 5.2           | 700    | 24589         | 0.0           | 830    | 2282          | 0.0           | 960    | 3110          | 0.0           |
| 445    | 54802         | 21.6          | 575    | 111610        | 3.7           | 705    | 21832         | 0.0           | 835    | 3140          | 0.0           | 965    | 3880          | 0.0           |
| 450    | 39184         | 18.1          | 580    | 117163        | 2.6           | 710    | 19500         | 0.0           | 840    | 2365          | 0.0           | 970    | 3243          | 0.0           |
| 455    | 22506         | 11.8          | 585    | 122201        | 1.8           | 715    | 17870         | 0.0           | 845    | 3024          | 0.0           | 975    | 2014          | 0.0           |
| 460    | 13692         | 8.1           | 590    | 125662        | 1.2           | 720    | 15924         | 0.0           | 850    | 2510          | 0.0           | 980    | 1688          | 0.0           |
| 465    | 9446          | 6.2           | 595    | 127415        | 0.8           | 725    | 14268         | 0.0           | 855    | 2739          | 0.0           | 985    | 2827          | 0.0           |
| 470    | 6698          | 4.8           | 600    | 129155        | 0.5           | 730    | 12438         | 0.0           | 860    | 3515          | 0.0           | 990    | 4172          | 0.0           |
| 475    | 5328          | 4.1           | 605    | 128057        | 0.4           | 735    | 11255         | 0.0           | 865    | 3600          | 0.0           | 995    | 3177          | 0.0           |
| 480    | 5081          | 4.1           | 610    | 126031        | 0.2           | 740    | 9951          | 0.0           | 870    | 3609          | 0.0           | 1000   | 3241          | 0.0           |
| 485    | 5579          | 4.6           | 615    | 123059        | 0.1           | 745    | 8870          | 0.0           | 875    | 3208          | 0.0           |        |               |               |

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Melanopic Flux vs. Wavelength



Melanopic Lumens: 2145.7 M/P: 0.35

| $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) | $\lambda$ (nm) | Power ( $\mu\text{W}/\text{nm}$ ) | Lumens ( $\phi/\text{nm}$ ) |
|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|----------------|-----------------------------------|-----------------------------|
| 360            | 2044                              | 0.0                         | 490            | 7179                              | 11.1                        | 620            | 118034                            | 1.5                         | 750            | 8362                              | 0.0                         | 880            | 3128                              | 0.0                         |
| 365            | 2016                              | 0.0                         | 495            | 10476                             | 16.9                        | 625            | 111884                            | 0.9                         | 755            | 7635                              | 0.0                         | 885            | 3110                              | 0.0                         |
| 370            | 2020                              | 0.0                         | 500            | 15549                             | 26.0                        | 630            | 106119                            | 0.6                         | 760            | 6582                              | 0.0                         | 890            | 2632                              | 0.0                         |
| 375            | 2137                              | 0.0                         | 505            | 22477                             | 38.2                        | 635            | 99706                             | 0.4                         | 765            | 5777                              | 0.0                         | 895            | 2709                              | 0.0                         |
| 380            | 2046                              | 0.0                         | 510            | 30417                             | 51.6                        | 640            | 92142                             | 0.2                         | 770            | 5474                              | 0.0                         | 900            | 2016                              | 0.0                         |
| 385            | 1925                              | 0.0                         | 515            | 39274                             | 65.1                        | 645            | 84987                             | 0.1                         | 775            | 4977                              | 0.0                         | 905            | 1748                              | 0.0                         |
| 390            | 1893                              | 0.0                         | 520            | 47282                             | 75.2                        | 650            | 78016                             | 0.1                         | 780            | 4723                              | 0.0                         | 910            | 2046                              | 0.0                         |
| 395            | 1695                              | 0.0                         | 525            | 55413                             | 82.9                        | 655            | 71541                             | 0.1                         | 785            | 4219                              | 0.0                         | 915            | 1844                              | 0.0                         |
| 400            | 1633                              | 0.0                         | 530            | 62377                             | 86.0                        | 660            | 64863                             | 0.0                         | 790            | 3969                              | 0.0                         | 920            | 2734                              | 0.0                         |
| 405            | 2065                              | 0.1                         | 535            | 68520                             | 85.4                        | 665            | 58485                             | 0.0                         | 795            | 4122                              | 0.0                         | 925            | 2307                              | 0.0                         |
| 410            | 3449                              | 0.2                         | 540            | 73435                             | 81.1                        | 670            | 51641                             | 0.0                         | 800            | 2864                              | 0.0                         | 930            | 2039                              | 0.0                         |
| 415            | 7117                              | 0.7                         | 545            | 78677                             | 75.4                        | 675            | 46030                             | 0.0                         | 805            | 3151                              | 0.0                         | 935            | 1784                              | 0.0                         |
| 420            | 13992                             | 2.3                         | 550            | 83331                             | 68.1                        | 680            | 40590                             | 0.0                         | 810            | 3022                              | 0.0                         | 940            | 2464                              | 0.0                         |
| 425            | 25176                             | 6.2                         | 555            | 89120                             | 60.9                        | 685            | 35691                             | 0.0                         | 815            | 3471                              | 0.0                         | 945            | 2794                              | 0.0                         |
| 430            | 38151                             | 13.0                        | 560            | 94613                             | 52.9                        | 690            | 31631                             | 0.0                         | 820            | 2749                              | 0.0                         | 950            | 3090                              | 0.0                         |
| 435            | 49673                             | 22.2                        | 565            | 99818                             | 44.8                        | 695            | 27437                             | 0.0                         | 825            | 2729                              | 0.0                         | 955            | 1866                              | 0.0                         |
| 440            | 57273                             | 32.0                        | 570            | 106526                            | 37.6                        | 700            | 24589                             | 0.0                         | 830            | 2282                              | 0.0                         | 960            | 3110                              | 0.0                         |
| 445            | 54802                             | 36.7                        | 575            | 111610                            | 30.4                        | 705            | 21832                             | 0.0                         | 835            | 3140                              | 0.0                         | 965            | 3880                              | 0.0                         |
| 450            | 39184                             | 30.4                        | 580            | 117163                            | 24.1                        | 710            | 19500                             | 0.0                         | 840            | 2365                              | 0.0                         | 970            | 3243                              | 0.0                         |
| 455            | 22506                             | 19.7                        | 585            | 122201                            | 18.7                        | 715            | 17870                             | 0.0                         | 845            | 3024                              | 0.0                         | 975            | 2014                              | 0.0                         |
| 460            | 13692                             | 13.2                        | 590            | 125662                            | 14.0                        | 720            | 15924                             | 0.0                         | 850            | 2510                              | 0.0                         | 980            | 1688                              | 0.0                         |
| 465            | 9446                              | 10.0                        | 595            | 127415                            | 10.2                        | 725            | 14268                             | 0.0                         | 855            | 2739                              | 0.0                         | 985            | 2827                              | 0.0                         |
| 470            | 6698                              | 7.7                         | 600            | 129155                            | 7.3                         | 730            | 12438                             | 0.0                         | 860            | 3515                              | 0.0                         | 990            | 4172                              | 0.0                         |
| 475            | 5328                              | 6.7                         | 605            | 128057                            | 5.0                         | 735            | 11255                             | 0.0                         | 865            | 3600                              | 0.0                         | 995            | 3177                              | 0.0                         |
| 480            | 5081                              | 6.9                         | 610            | 126031                            | 3.4                         | 740            | 9951                              | 0.0                         | 870            | 3609                              | 0.0                         | 1000           | 3241                              | 0.0                         |
| 485            | 5579                              | 8.1                         | 615            | 123059                            | 2.3                         | 745            | 8870                              | 0.0                         | 875            | 3208                              | 0.0                         |                |                                   |                             |

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**Summary**

$R_f = 69.9$   
 $R_g = 98.3$   
 $CIE R_a = 71.5$   
 $R_9 = -16.1$



**Color Vector Graphics**





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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 77 | CES79 = 81 |
| CES05 = 50 | CES30 = 46 | CES55 = 74 | CES80 = 80 |
| CES06 = 52 | CES31 = 50 | CES56 = 63 | CES81 = 73 |
| CES07 = 42 | CES32 = 49 | CES57 = 60 | CES82 = 91 |
| CES08 = 41 | CES33 = 53 | CES58 = 63 | CES83 = 84 |
| CES09 = 29 | CES34 = 66 | CES59 = 85 | CES84 = 90 |
| CES10 = 77 | CES35 = 82 | CES60 = 89 | CES85 = 87 |
| CES11 = 60 | CES36 = 78 | CES61 = 85 | CES86 = 65 |
| CES12 = 66 | CES37 = 75 | CES62 = 69 | CES87 = 78 |
| CES13 = 43 | CES38 = 53 | CES63 = 68 | CES88 = 73 |
| CES14 = 74 | CES39 = 91 | CES64 = 68 | CES89 = 68 |
| CES15 = 71 | CES40 = 85 | CES65 = 65 | CES90 = 68 |
| CES16 = 48 | CES41 = 76 | CES66 = 62 | CES91 = 91 |
| CES17 = 50 | CES42 = 76 | CES67 = 60 | CES92 = 71 |
| CES18 = 57 | CES43 = 65 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 57 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 78 |
| CES21 = 88 | CES46 = 70 | CES71 = 57 | CES96 = 80 |
| CES22 = 80 | CES47 = 63 | CES72 = 86 | CES97 = 79 |
| CES23 = 92 | CES48 = 51 | CES73 = 52 | CES98 = 71 |
| CES24 = 91 | CES49 = 68 | CES74 = 90 | CES99 = 64 |
| CES25 = 73 | CES50 = 77 | CES75 = 58 |            |



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Color Rendition by Hue-Angle Bin



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Measure Comparisons



(END OF REPORT)