

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: P639074

Luminaire Tested: GWS-SA5B-727-U-SL2-W-GRSBK

Issue Date: 1/10/2023

### Test Information

Test Method: LM-79-2019  
Report Number: P639074  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-28)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA5B-727-U-SL2-W-GRSBK  
Description: GALLEON WALL SLIM LUMINAIRE. (5) LIGHTSQUARES WITH 16 LEDS EACH AND TYPE II SPILL LIGHT ELIMINATOR OPTICS W/ FACTORY INSTALLED GLARE SHIELD, BK  
Light Source: (80) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: -

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 8719.3 lumens  
Efficiency: N/A  
Efficacy: 75.4 lumens/watt  
Luminous Opening: Rectangular (W 1.5' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G1

Input Watts (W): 115.7  
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



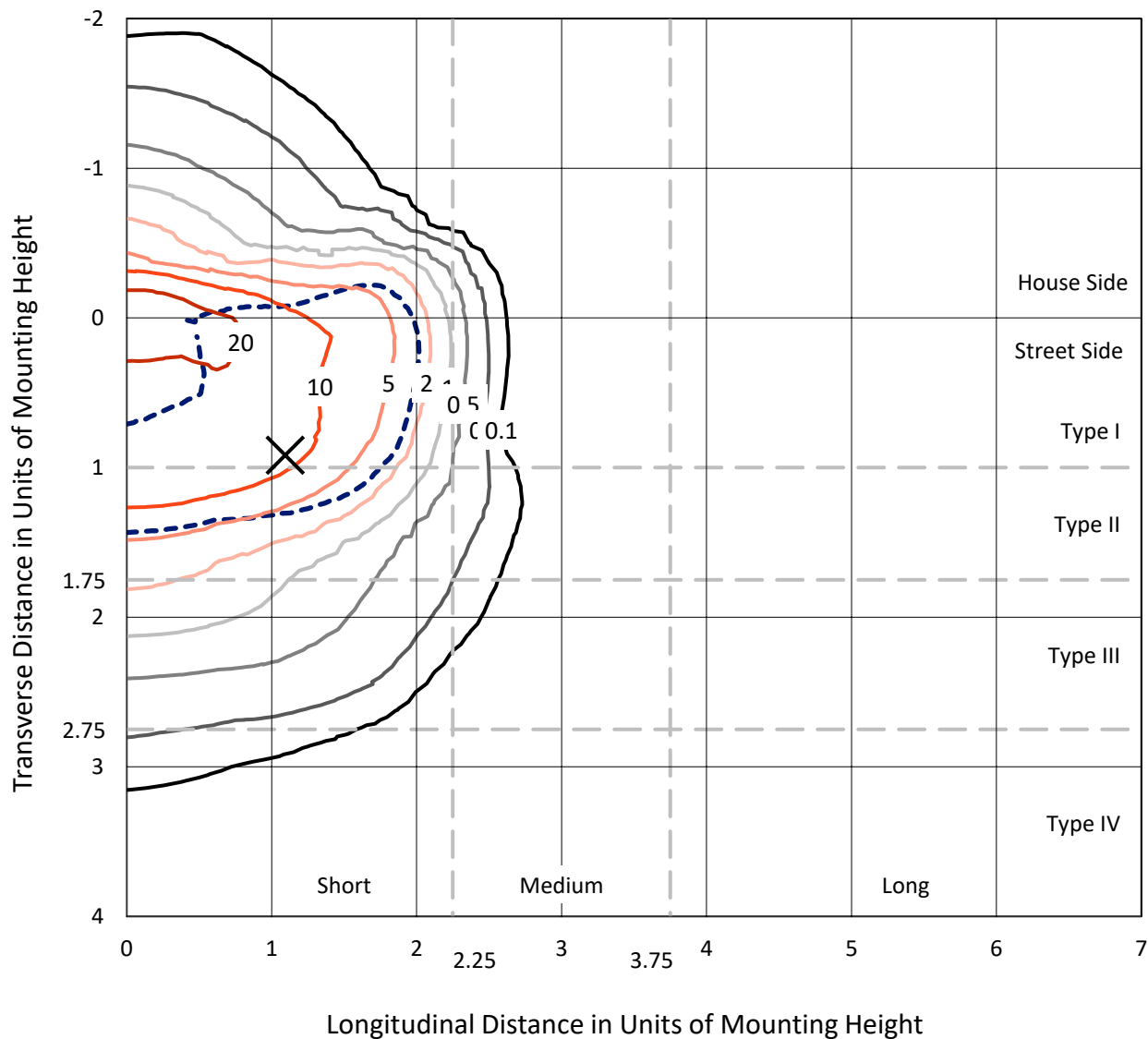
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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

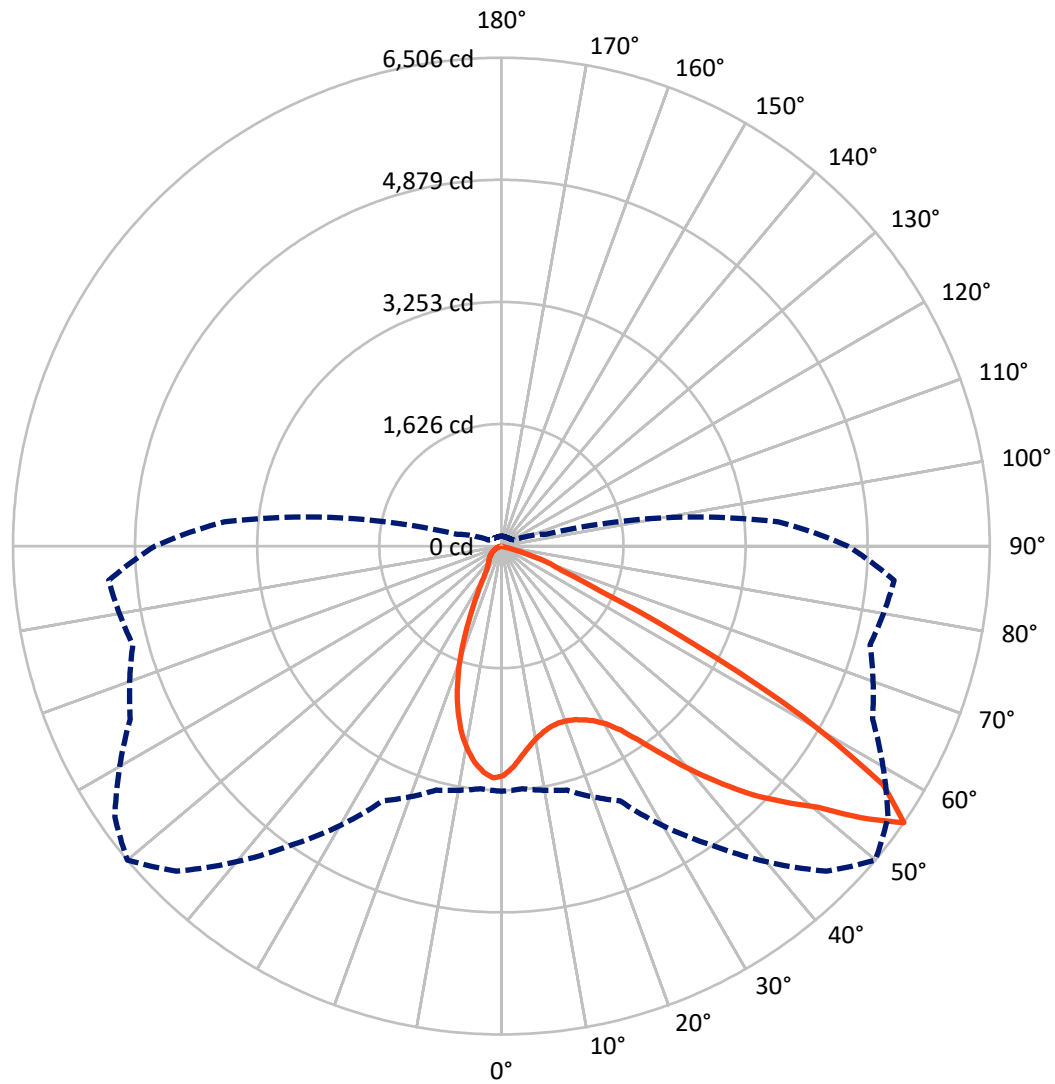


Based on 10 foot mounting height. Maximum calculated value = 30.6 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



— Vertical Plane Through 50-Deg Lateral    - - - Horizontal Cone Through 55-Deg Vertical

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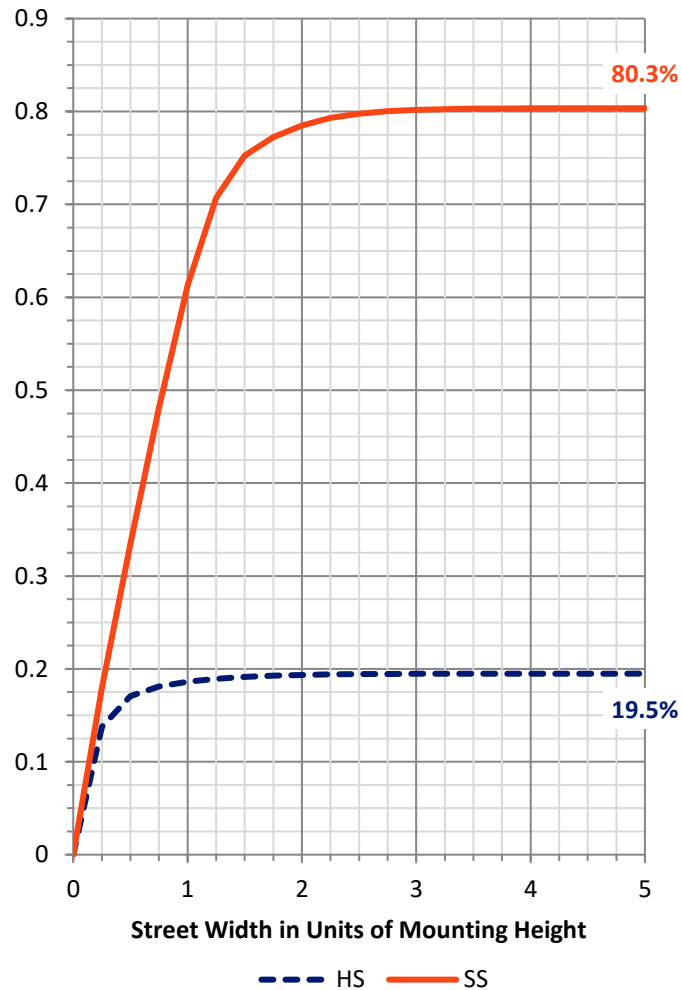
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1718.1   | 0.0    | 1718.1 |
|                    | % Fixture | 19.7     | 0.0    | 19.7   |
| <b>Street Side</b> | Lumens    | 7001.2   | 0.0    | 7001.2 |
|                    | % Fixture | 80.3     | 0.0    | 80.3   |
| <b>Total</b>       | Lumens    | 8719.3   | 0.0    | 8719.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 268.7  | 3.1       |
| 10°-20°   | 661.1  | 7.6       |
| 20°-30°   | 932.6  | 10.7      |
| 30°-40°   | 1380.0 | 15.8      |
| 40°-50°   | 1990.9 | 22.8      |
| 50°-60°   | 2348.4 | 26.9      |
| 60°-70°   | 1047.6 | 12.0      |
| 70°-80°   | 90.1   | 1.0       |
| 80°-90°   | 0.0    | 0.0       |
| 90°-100°  | 0.0    | 0.0       |
| 100°-110° | 0.0    | 0.0       |
| 110°-120° | 0.0    | 0.0       |
| 120°-130° | 0.0    | 0.0       |
| 130°-140° | 0.0    | 0.0       |
| 140°-150° | 0.0    | 0.0       |
| 150°-160° | 0.0    | 0.0       |
| 160°-170° | 0.0    | 0.0       |
| 170°-180° | 0.0    | 0.0       |
| 0°-90°    | 8719.3 | 100.0     |
| 0°-180°   | 8719.3 | 100.0     |

**Coefficient of Utilization**



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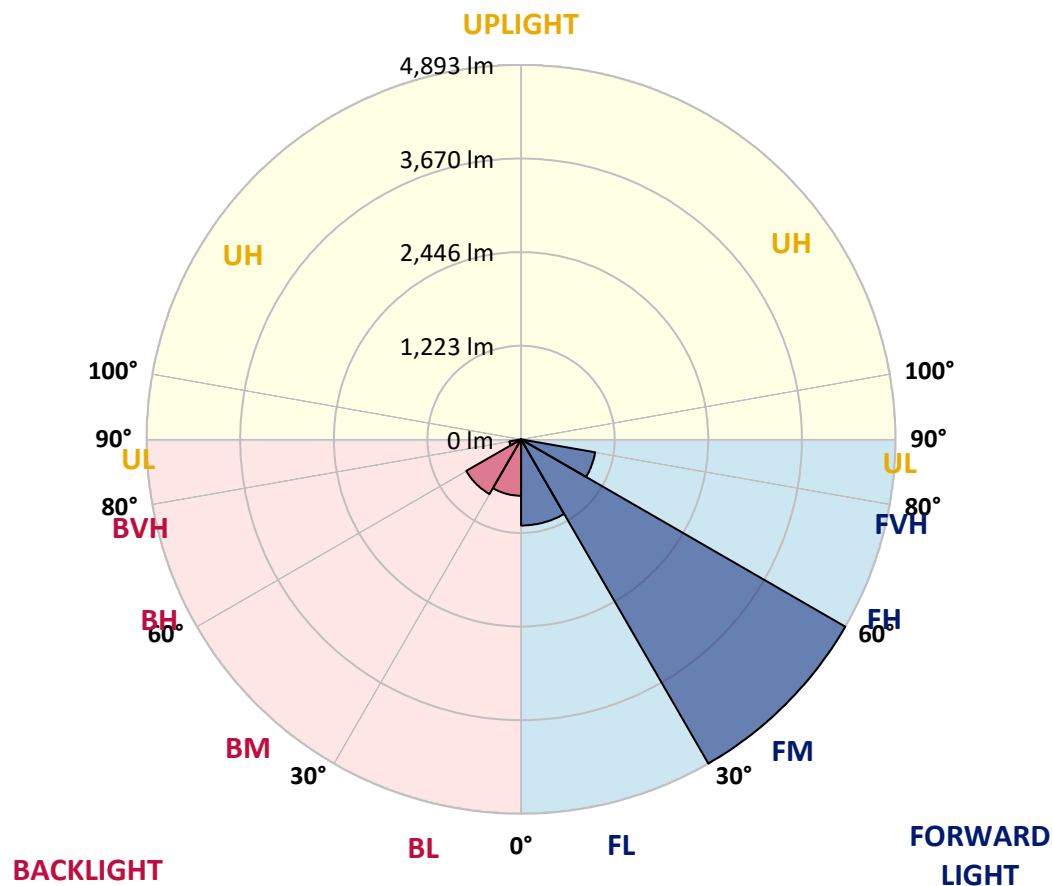
CATALOG NUMBER: GWS-SA5B-727-U-SL2-W-GRSBK

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1125.7 | 12.9      |                         |      |         |
| FM   | (30°-60°)   | 4893.0 | 56.1      |                         |      |         |
| FH   | (60°-80°)   | 982.5  | 11.3      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10   |
| BL   | (0°-30°)    | 736.7  | 8.4       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 826.3  | 9.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 155.1  | 1.8       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 0.0    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G1**

Type II Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 50°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 |
| 2.5°  | 2842.1 | 2844.2 | 2845.3 | 2874.0 | 2884.6 | 2927.2 | 2949.6 | 2961.3 | 2992.2 | 3028.3 | 3058.2 |
| 5°    | 2651.5 | 2648.3 | 2653.7 | 2689.9 | 2713.3 | 2776.1 | 2810.1 | 2833.6 | 2901.7 | 2986.8 | 3058.2 |
| 7.5°  | 2485.5 | 2491.9 | 2498.3 | 2537.6 | 2572.8 | 2640.9 | 2689.9 | 2725.0 | 2819.7 | 2946.4 | 3066.7 |
| 10°   | 2368.4 | 2368.4 | 2378.0 | 2422.7 | 2464.2 | 2548.3 | 2597.2 | 2642.0 | 2754.8 | 2910.2 | 3076.2 |
| 12.5° | 2282.2 | 2283.2 | 2294.9 | 2346.0 | 2393.9 | 2481.2 | 2532.3 | 2576.0 | 2700.5 | 2874.0 | 3078.4 |
| 15°   | 2241.7 | 2238.5 | 2248.1 | 2302.4 | 2355.6 | 2437.6 | 2490.8 | 2533.4 | 2662.2 | 2853.8 | 3089.0 |
| 17.5° | 2231.1 | 2228.9 | 2236.4 | 2289.6 | 2343.9 | 2423.7 | 2475.9 | 2518.5 | 2656.9 | 2860.2 | 3121.0 |
| 20°   | 2261.9 | 2257.7 | 2254.5 | 2300.3 | 2351.4 | 2430.1 | 2484.4 | 2532.3 | 2682.4 | 2895.3 | 3169.9 |
| 22.5° | 2335.4 | 2335.4 | 2327.9 | 2350.3 | 2384.4 | 2455.7 | 2512.1 | 2574.9 | 2749.5 | 2965.5 | 3242.3 |
| 25°   | 2470.6 | 2459.9 | 2446.1 | 2455.7 | 2451.4 | 2496.1 | 2563.2 | 2650.5 | 2876.1 | 3081.6 | 3330.6 |
| 27.5° | 2624.9 | 2634.5 | 2611.1 | 2612.1 | 2574.9 | 2558.9 | 2636.6 | 2768.6 | 3064.5 | 3245.5 | 3461.6 |
| 30°   | 2834.6 | 2827.2 | 2828.2 | 2825.0 | 2738.8 | 2663.2 | 2747.3 | 2923.0 | 3301.9 | 3495.6 | 3631.9 |
| 32.5° | 2998.5 | 3009.2 | 3044.3 | 3064.5 | 2951.7 | 2830.4 | 2919.8 | 3132.7 | 3572.3 | 3780.9 | 3840.5 |
| 35°   | 3172.0 | 3191.2 | 3262.5 | 3328.5 | 3233.8 | 3094.3 | 3190.1 | 3410.5 | 3826.7 | 4063.0 | 4080.0 |
| 37.5° | 3355.1 | 3393.5 | 3478.6 | 3594.6 | 3579.7 | 3456.3 | 3543.5 | 3737.3 | 4026.8 | 4233.3 | 4278.0 |
| 40°   | 3564.8 | 3602.1 | 3741.5 | 3908.6 | 3943.8 | 3916.1 | 3944.8 | 4057.7 | 4158.8 | 4240.7 | 4363.2 |
| 42.5° | 3794.7 | 3845.8 | 4022.5 | 4246.1 | 4378.1 | 4402.5 | 4335.5 | 4323.8 | 4216.3 | 4155.6 | 4345.1 |
| 45°   | 4066.2 | 4125.8 | 4325.9 | 4615.4 | 4825.1 | 4858.1 | 4742.1 | 4592.0 | 4252.5 | 4092.8 | 4290.8 |
| 47.5° | 4370.6 | 4427.0 | 4626.1 | 4974.2 | 5286.0 | 5298.8 | 5096.6 | 4854.9 | 4360.0 | 4165.2 | 4332.3 |
| 50°   | 4472.8 | 4507.9 | 4680.4 | 5089.1 | 5663.9 | 5761.8 | 5469.1 | 5150.8 | 4576.0 | 4378.1 | 4534.5 |
| 52.5° | 4121.5 | 4135.4 | 4285.5 | 4698.5 | 5587.3 | 6216.4 | 6013.1 | 5592.6 | 4960.3 | 4702.7 | 4846.4 |
| 55°   | 3265.7 | 3243.4 | 3364.7 | 3743.7 | 4856.0 | 6123.8 | 6505.9 | 6286.6 | 5455.3 | 5083.8 | 5252.0 |
| 57.5° | 2284.3 | 2257.7 | 2230.0 | 2486.5 | 3623.4 | 5191.3 | 5995.0 | 6383.5 | 5926.8 | 5461.7 | 5689.5 |
| 60°   | 1877.7 | 1852.1 | 1718.0 | 1599.9 | 2190.6 | 3727.7 | 4604.8 | 5336.1 | 5888.5 | 5442.5 | 5675.6 |
| 62.5° | 1622.2 | 1607.3 | 1553.0 | 1392.3 | 1289.0 | 2127.8 | 2883.6 | 3584.0 | 4518.6 | 4273.7 | 4286.5 |
| 65°   | 1274.1 | 1269.9 | 1307.1 | 1324.2 | 1140.0 | 1177.3 | 1471.1 | 1862.8 | 2442.9 | 2303.5 | 2184.2 |
| 67.5° | 870.7  | 861.1  | 931.4  | 1145.3 | 1096.4 | 929.3  | 861.1  | 868.6  | 1057.0 | 646.1  | 513.1  |
| 70°   | 553.5  | 531.2  | 532.2  | 710.0  | 892.0  | 733.4  | 664.2  | 584.4  | 525.8  | 95.8   | 108.6  |
| 72.5° | 354.5  | 340.6  | 292.7  | 320.4  | 413.0  | 357.7  | 360.8  | 310.8  | 207.6  | 51.1   | 59.6   |
| 75°   | 149.0  | 137.3  | 105.4  | 84.1   | 83.0   | 52.2   | 45.8   | 42.6   | 28.7   | 28.7   | 30.9   |
| 77.5° | 1.1    | 0.0    | 0.0    | 1.1    | 2.1    | 1.1    | 1.1    | 2.1    | 4.3    | 6.4    | 7.5    |
| 80°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 1.1    |
| 82.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 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    |



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CATALOG NUMBER: GWS-SA5B-727-U-SL2-W-GRSBK

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 | 3059.2 |
| 2.5°  | 3076.2 | 3050.7 | 3079.4 | 3090.1 | 3089.0 | 3090.1 | 3059.2 | 3037.9 | 3036.9 | 3010.3 | 2997.5 |
| 5°    | 3088.0 | 3067.7 | 3089.0 | 3075.2 | 3042.2 | 3000.7 | 2945.3 | 2897.4 | 2876.1 | 2845.3 | 2830.4 |
| 7.5°  | 3110.3 | 3089.0 | 3085.8 | 3030.5 | 2948.5 | 2861.2 | 2763.3 | 2676.0 | 2629.2 | 2572.8 | 2576.0 |
| 10°   | 3126.3 | 3101.8 | 3060.3 | 2947.4 | 2811.2 | 2671.8 | 2525.9 | 2396.1 | 2314.1 | 2238.5 | 2225.8 |
| 12.5° | 3132.7 | 3096.5 | 2999.6 | 2829.3 | 2637.7 | 2455.7 | 2241.7 | 2056.5 | 1928.8 | 1829.8 | 1815.9 |
| 15°   | 3144.4 | 3085.8 | 2921.9 | 2686.7 | 2423.7 | 2166.1 | 1893.6 | 1640.3 | 1471.1 | 1357.2 | 1366.7 |
| 17.5° | 3162.5 | 3074.1 | 2834.6 | 2527.0 | 2193.8 | 1829.8 | 1461.5 | 1170.9 | 1015.5 | 949.5  | 950.5  |
| 20°   | 3188.0 | 3060.3 | 2738.8 | 2351.4 | 1918.1 | 1449.8 | 1021.9 | 802.6  | 758.9  | 756.8  | 753.6  |
| 22.5° | 3222.1 | 3046.4 | 2636.6 | 2158.7 | 1591.3 | 1015.5 | 680.2  | 612.1  | 630.2  | 665.3  | 671.7  |
| 25°   | 3262.5 | 3029.4 | 2522.7 | 1941.5 | 1234.8 | 666.3  | 509.9  | 499.2  | 542.9  | 589.7  | 600.3  |
| 27.5° | 3325.3 | 3020.9 | 2392.9 | 1694.6 | 866.5  | 477.9  | 417.3  | 423.6  | 463.0  | 502.4  | 512.0  |
| 30°   | 3431.8 | 3036.9 | 2251.3 | 1417.8 | 556.7  | 381.1  | 361.9  | 371.5  | 392.8  | 413.0  | 421.5  |
| 32.5° | 3576.5 | 3083.7 | 2114.0 | 1115.5 | 397.0  | 331.0  | 326.8  | 332.1  | 340.6  | 352.3  | 355.5  |
| 35°   | 3745.8 | 3164.6 | 1972.4 | 798.3  | 327.8  | 302.3  | 298.0  | 298.0  | 302.3  | 304.4  | 305.5  |
| 37.5° | 3885.2 | 3249.8 | 1839.4 | 531.2  | 293.8  | 279.9  | 273.6  | 270.4  | 269.3  | 271.4  | 272.5  |
| 40°   | 3945.9 | 3284.9 | 1694.6 | 386.4  | 269.3  | 259.7  | 250.1  | 240.6  | 240.6  | 248.0  | 249.1  |
| 42.5° | 3903.3 | 3245.5 | 1527.5 | 319.3  | 252.3  | 238.4  | 223.5  | 215.0  | 219.3  | 226.7  | 228.9  |
| 45°   | 3812.8 | 3148.6 | 1343.3 | 282.1  | 235.2  | 217.1  | 200.1  | 194.8  | 199.1  | 208.6  | 210.8  |
| 47.5° | 3797.9 | 3084.8 | 1123.0 | 257.6  | 217.1  | 199.1  | 181.0  | 175.6  | 181.0  | 188.4  | 190.5  |
| 50°   | 3945.9 | 3140.1 | 878.2  | 236.3  | 200.1  | 179.9  | 165.0  | 159.7  | 162.9  | 167.1  | 169.2  |
| 52.5° | 4216.3 | 3345.6 | 708.9  | 216.1  | 179.9  | 160.7  | 151.2  | 144.8  | 144.8  | 149.0  | 150.1  |
| 55°   | 4615.4 | 3704.3 | 612.1  | 192.7  | 156.5  | 145.8  | 137.3  | 130.9  | 130.9  | 133.1  | 134.1  |
| 57.5° | 5075.3 | 4138.6 | 634.4  | 161.8  | 137.3  | 132.0  | 124.5  | 119.2  | 121.3  | 121.3  | 121.3  |
| 60°   | 5011.4 | 4106.6 | 679.1  | 136.2  | 121.3  | 119.2  | 112.8  | 110.7  | 116.0  | 111.8  | 109.6  |
| 62.5° | 3691.5 | 2836.7 | 355.5  | 111.8  | 104.3  | 102.2  | 97.9   | 102.2  | 109.6  | 97.9   | 93.7   |
| 65°   | 1792.5 | 1373.1 | 142.6  | 91.5   | 88.3   | 86.2   | 84.1   | 90.5   | 94.7   | 76.6   | 72.4   |
| 67.5° | 421.5  | 342.8  | 92.6   | 77.7   | 73.4   | 69.2   | 71.3   | 72.4   | 69.2   | 52.2   | 50.0   |
| 70°   | 109.6  | 107.5  | 72.4   | 64.9   | 58.5   | 54.3   | 54.3   | 53.2   | 45.8   | 33.0   | 30.9   |
| 72.5° | 59.6   | 58.5   | 52.2   | 49.0   | 40.4   | 36.2   | 37.3   | 33.0   | 25.5   | 19.2   | 18.1   |
| 75°   | 29.8   | 31.9   | 29.8   | 27.7   | 22.4   | 20.2   | 20.2   | 18.1   | 12.8   | 7.5    | 7.5    |
| 77.5° | 6.4    | 7.5    | 7.5    | 6.4    | 5.3    | 4.3    | 4.3    | 5.3    | 2.1    | 0.0    | 0.0    |
| 80°   | 1.1    | 1.1    | 1.1    | 1.1    | 1.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 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  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-1-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:  $4\pi$   
 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   | CRI (Ra): | 71.5 |      |       |
| CIE u':                   | 0.2605 | R1:       | 69.2 | R9:  | -16.1 |
| CIE v':                   | 0.5272 | R2:       | 79.4 | R10: | 51.4  |
| Duv:                      | 0.0005 | R3:       | 87.8 | R11: | 63.1  |
| CIE x:                    | 0.4573 | R4:       | 69.4 | R12: | 42.0  |
| CIE y:                    | 0.4113 | R5:       | 66.4 | R13: | 70.2  |
| CIE z:                    | 0.1313 | R6:       | 69.8 | R14: | 92.4  |
| Peak Wavelength (nm):     | 602    | R7:       | 79.8 |      |       |
| Dominant Wavelength (nm): | 583    | R8:       | 50.1 |      |       |
| Purity:                   | 61.2   |           |      |      |       |
| 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

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| 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

REPORT NUMBER: SP1-1908-441-1-R4

**Photopic Flux vs. Wavelength**



**Photopic Lumens: 6211.7**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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**

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 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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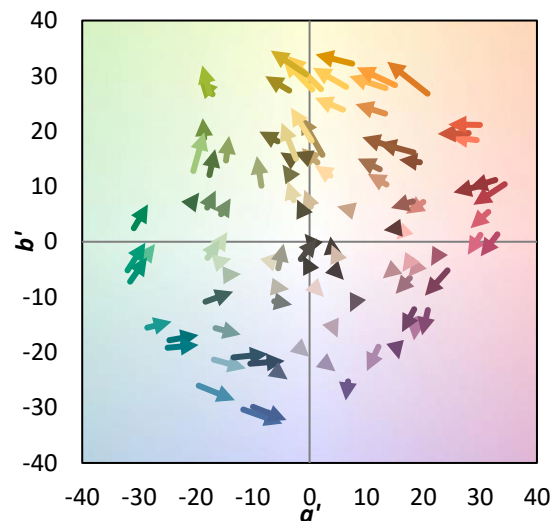
**TM-30-18**

### Summary

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



### Color Vector Graphics



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

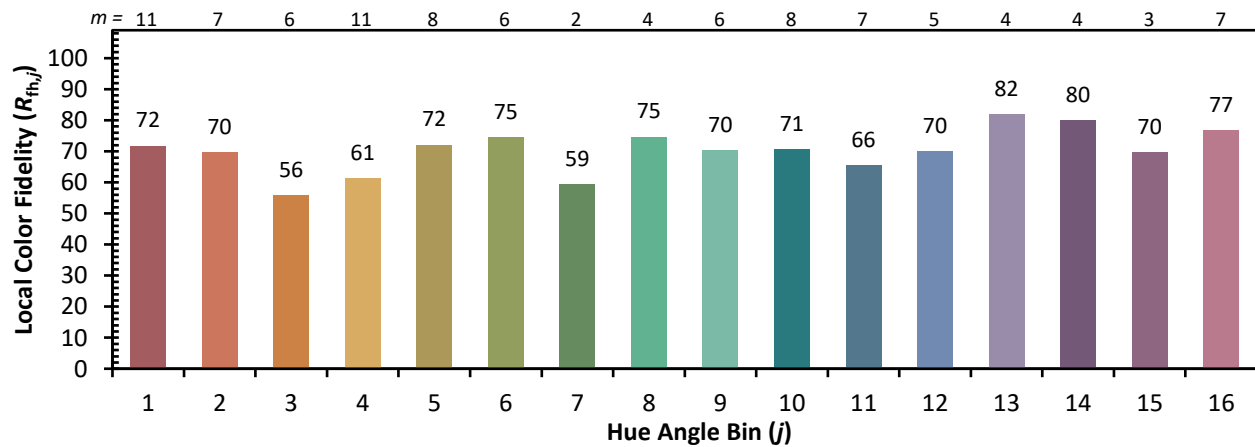
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|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 54 | CES51 = 77 | CES76 = 48 |
| CES02 = 63 | CES27 = 74 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 66 | CES78 = 56 |
| CES04 = 71 | CES29 = 44 | CES54 = 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)