

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: P637570

Luminaire Tested: GWS-SA4D-722-U-T4FT-W

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P637570  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-54)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA4D-722-U-T4FT-W  
Description: GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE IV FORWARD THROW OPTICS  
Light Source: (64) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 17423.6 lumens  
Efficiency: N/A  
Efficacy: 107.5 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 162.1  
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



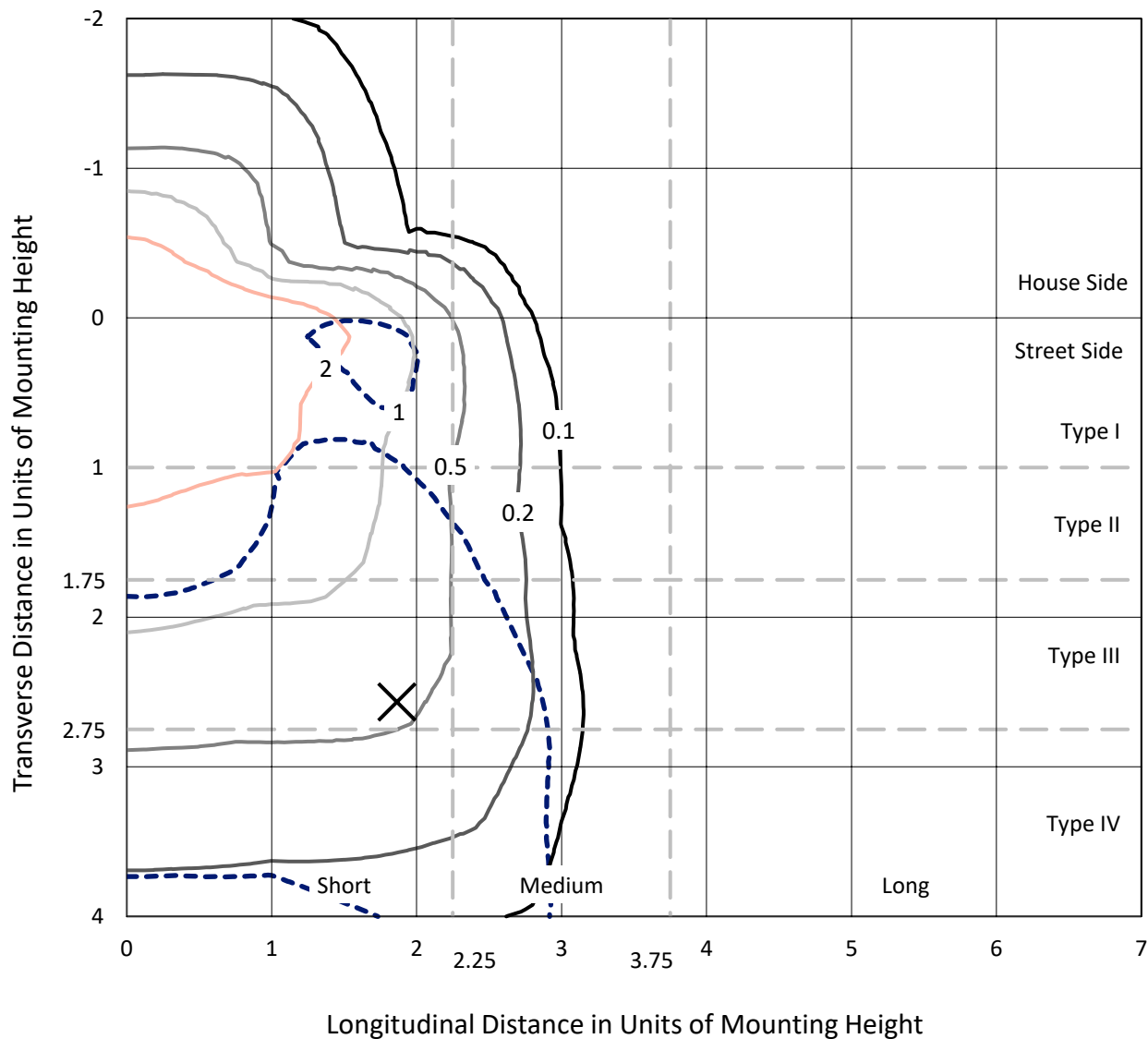
REPORT NUMBER: P637570

CATALOG NUMBER: GWS-SA4D-722-U-T4FT-W

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd

--- 1/2 Max cd

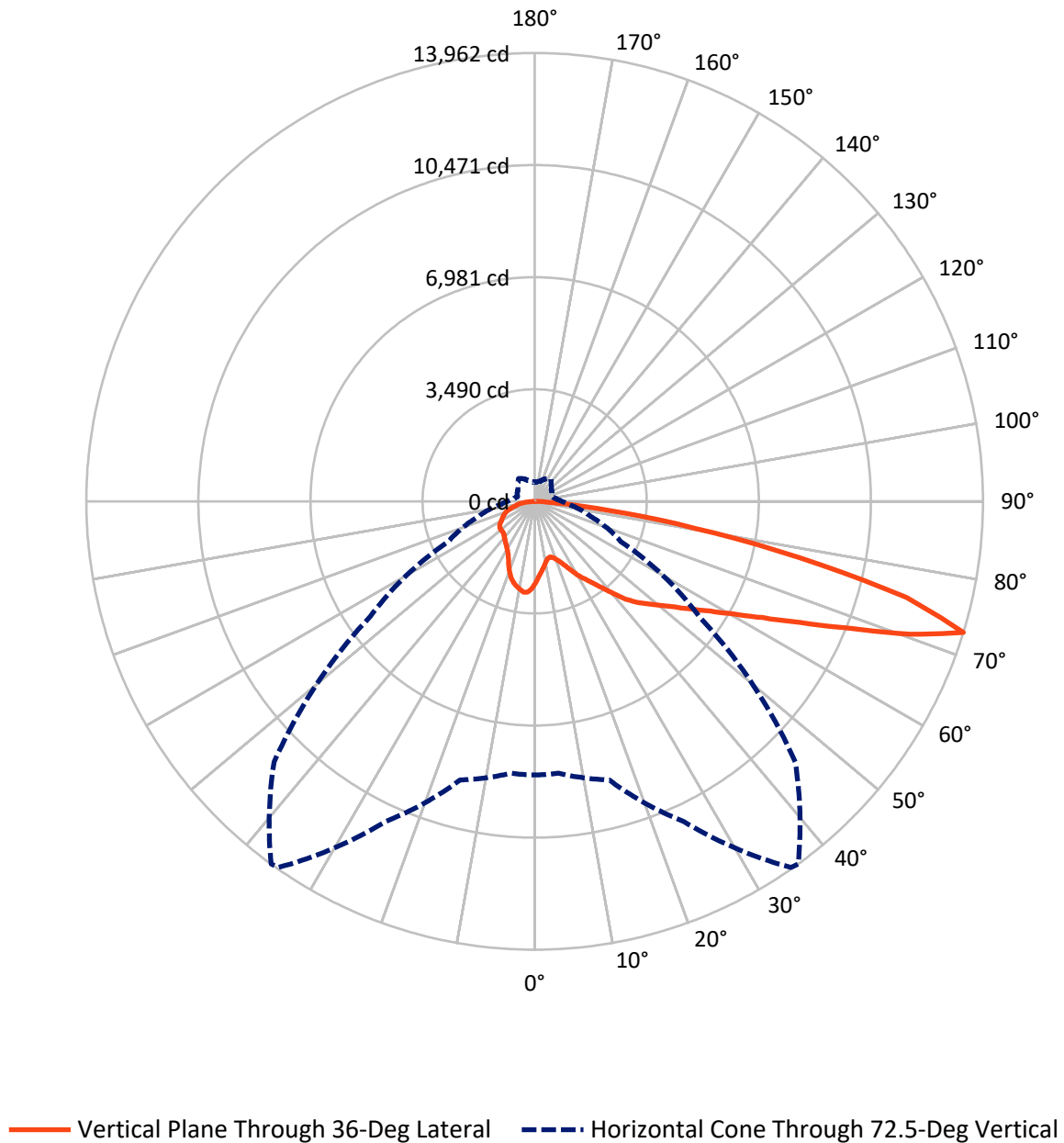


Based on 25 foot mounting height. Maximum calculated value = 4.3 fc  
 Type IV - Short - N/A

REPORT NUMBER: P637570

CATALOG NUMBER: GWS-SA4D-722-U-T4FT-W

## Luminous Intensity Polar Plot



REPORT NUMBER: P637570

CATALOG NUMBER: GWS-SA4D-722-U-T4FT-W

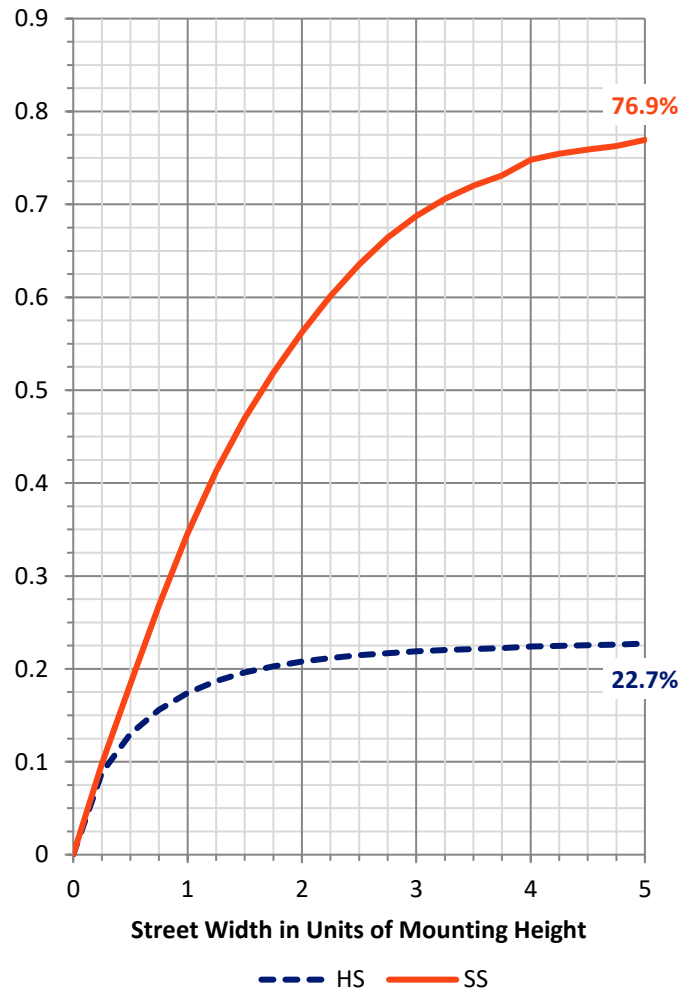
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 4016.9   | 0.0    | 4016.9  |
|                    | % Fixture | 23.1     | 0.0    | 23.1    |
| <b>Street Side</b> | Lumens    | 13406.7  | 0.0    | 13406.7 |
|                    | % Fixture | 76.9     | 0.0    | 76.9    |
| <b>Total</b>       | Lumens    | 17423.6  | 0.0    | 17423.6 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 238.4   | 1.4       |
| 10°-20°   | 672.5   | 3.9       |
| 20°-30°   | 1113.7  | 6.4       |
| 30°-40°   | 1667.9  | 9.6       |
| 40°-50°   | 2433.4  | 14.0      |
| 50°-60°   | 3463.4  | 19.9      |
| 60°-70°   | 4375.8  | 25.1      |
| 70°-80°   | 3118.1  | 17.9      |
| 80°-90°   | 340.4   | 2.0       |
| 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°    | 17423.6 | 100.0     |
| 0°-180°   | 17423.6 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P637570

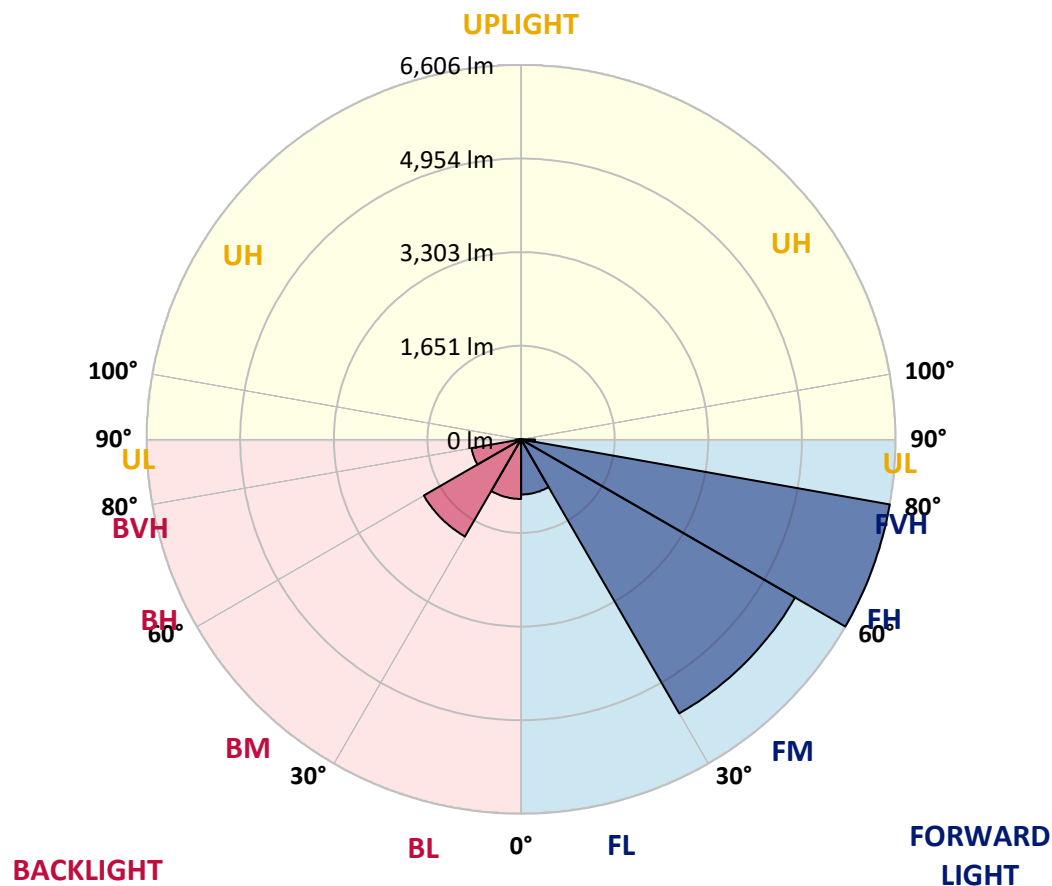
CATALOG NUMBER: GWS-SA4D-722-U-T4FT-W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 972.7  | 5.6       |                         |      |         |
| FM   | (30°-60°)   | 5583.8 | 32.0      |                         |      |         |
| FH   | (60°-80°)   | 6605.9 | 37.9      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 244.3  | 1.4       |                         |      | G3/500  |
| BL   | (0°-30°)    | 1051.9 | 6.0       | B3/2500                 |      |         |
| BM   | (30°-60°)   | 1980.9 | 11.4      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 888.0  | 5.1       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 96.1   | 0.6       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type IV Short





REPORT NUMBER: P637570

CATALOG NUMBER: GWS-SA4D-722-U-T4FT-W

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 36°     | 45°     | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|---------|---------|---------|---------|--------|--------|--------|--------|
| 0°    | 2550.0 | 2550.0 | 2550.0 | 2550.0  | 2550.0  | 2550.0  | 2550.0  | 2550.0 | 2550.0 | 2550.0 | 2550.0 |
| 2.5°  | 2326.3 | 2322.4 | 2314.7 | 2338.0  | 2361.2  | 2358.6  | 2391.0  | 2422.0 | 2455.6 | 2490.5 | 2537.1 |
| 5°    | 2140.1 | 2137.5 | 2131.1 | 2166.0  | 2200.9  | 2199.6  | 2252.6  | 2303.0 | 2371.6 | 2446.6 | 2539.7 |
| 7.5°  | 1953.9 | 1947.4 | 1956.5 | 2000.4  | 2049.6  | 2054.8  | 2127.2  | 2209.9 | 2309.5 | 2422.0 | 2553.9 |
| 10°   | 1789.7 | 1788.4 | 1792.3 | 1841.4  | 1915.1  | 1920.3  | 2013.4  | 2128.5 | 2260.4 | 2410.4 | 2586.2 |
| 12.5° | 1747.0 | 1744.4 | 1734.1 | 1758.6  | 1814.2  | 1822.0  | 1924.2  | 2065.1 | 2226.7 | 2416.8 | 2630.2 |
| 15°   | 1816.8 | 1810.4 | 1774.2 | 1762.5  | 1789.7  | 1796.1  | 1882.8  | 2027.6 | 2207.3 | 2428.5 | 2685.8 |
| 17.5° | 1937.1 | 1933.2 | 1864.7 | 1816.8  | 1834.9  | 1840.1  | 1904.8  | 2021.1 | 2202.2 | 2451.7 | 2754.3 |
| 20°   | 2112.9 | 2096.1 | 1988.8 | 1916.4  | 1916.4  | 1924.2  | 1962.9  | 2049.6 | 2208.6 | 2480.2 | 2831.9 |
| 22.5° | 2345.7 | 2312.1 | 2160.8 | 2062.5  | 2036.7  | 2047.0  | 2063.8  | 2120.7 | 2235.8 | 2528.0 | 2928.9 |
| 25°   | 2606.9 | 2575.9 | 2396.1 | 2257.8  | 2221.6  | 2225.5  | 2211.2  | 2221.6 | 2295.3 | 2594.0 | 3049.2 |
| 27.5° | 2884.9 | 2864.2 | 2672.9 | 2497.0  | 2440.1  | 2440.1  | 2389.7  | 2365.1 | 2378.0 | 2669.0 | 3183.6 |
| 30°   | 3133.2 | 3104.8 | 2943.1 | 2750.5  | 2675.5  | 2675.5  | 2579.8  | 2526.7 | 2495.7 | 2760.8 | 3363.4 |
| 32.5° | 3263.8 | 3247.0 | 3139.7 | 2992.3  | 2900.5  | 2886.2  | 2803.5  | 2741.4 | 2669.0 | 2896.6 | 3606.5 |
| 35°   | 3434.5 | 3430.6 | 3366.0 | 3250.9  | 3134.5  | 3113.8  | 3056.9  | 3007.8 | 2882.4 | 3066.0 | 3929.8 |
| 37.5° | 3649.2 | 3642.7 | 3632.4 | 3563.8  | 3424.2  | 3420.3  | 3369.9  | 3310.4 | 3147.4 | 3310.4 | 4321.6 |
| 40°   | 3889.7 | 3878.1 | 3865.1 | 3863.8  | 3779.8  | 3765.5  | 3761.7  | 3694.4 | 3466.8 | 3605.2 | 4730.2 |
| 42.5° | 4220.7 | 4180.6 | 4059.1 | 4113.4  | 4175.5  | 4162.5  | 4211.7  | 4110.8 | 3865.1 | 3955.6 | 5116.9 |
| 45°   | 4628.1 | 4529.8 | 4289.3 | 4304.8  | 4461.2  | 4487.1  | 4657.8  | 4633.2 | 4303.5 | 4360.4 | 5524.2 |
| 47.5° | 4872.5 | 4787.1 | 4563.4 | 4550.5  | 4745.7  | 4778.1  | 5149.2  | 5195.7 | 4775.5 | 4847.9 | 6027.2 |
| 50°   | 5072.9 | 5013.4 | 4829.8 | 4847.9  | 5054.8  | 5087.1  | 5636.7  | 5736.3 | 5220.3 | 5347.0 | 6611.7 |
| 52.5° | 5314.7 | 5229.4 | 5087.1 | 5172.5  | 5425.9  | 5464.7  | 6178.5  | 6285.8 | 5621.2 | 5895.3 | 7216.9 |
| 55°   | 5450.5 | 5415.6 | 5418.1 | 5548.8  | 5866.9  | 5919.9  | 6746.2  | 6728.1 | 5988.4 | 6364.7 | 7672.0 |
| 57.5° | 5763.4 | 5750.5 | 5869.4 | 5918.6  | 6381.5  | 6450.1  | 7313.9  | 7158.7 | 6322.0 | 6728.1 | 7890.6 |
| 60°   | 6315.6 | 6283.2 | 6386.7 | 6461.7  | 7017.7  | 7114.7  | 7947.5  | 7580.2 | 6548.3 | 6998.3 | 7816.9 |
| 62.5° | 7091.4 | 7051.4 | 7055.2 | 7174.2  | 7869.9  | 7972.1  | 8652.2  | 7932.0 | 6618.2 | 7039.7 | 7350.1 |
| 65°   | 8056.1 | 7997.9 | 7932.0 | 8093.6  | 9001.4  | 9086.7  | 9419.0  | 8188.0 | 6451.3 | 6641.4 | 6375.1 |
| 67.5° | 9073.8 | 9025.9 | 8948.4 | 9287.1  | 10466.5 | 10518.2 | 10279.0 | 8166.0 | 5922.5 | 5575.9 | 4471.6 |
| 70°   | 9133.3 | 9144.9 | 9512.2 | 10738.0 | 12379.0 | 12391.9 | 11092.3 | 7723.8 | 4796.2 | 3614.3 | 2228.0 |
| 72.5° | 8520.3 | 8500.9 | 8979.4 | 11003.1 | 13917.8 | 13961.8 | 11476.4 | 6257.4 | 2963.8 | 1802.6 | 1044.8 |
| 75°   | 6920.7 | 6954.4 | 7457.4 | 9627.2  | 11929.0 | 11967.8 | 9355.7  | 3689.3 | 1408.2 | 881.9  | 668.5  |
| 77.5° | 2979.3 | 3166.8 | 4158.7 | 6782.4  | 8543.6  | 8423.3  | 4822.0  | 1494.8 | 751.3  | 628.5  | 512.1  |
| 80°   | 859.9  | 933.6  | 1481.9 | 3225.0  | 5119.4  | 5028.9  | 1908.6  | 559.9  | 523.7  | 472.0  | 367.2  |
| 82.5° | 278.0  | 307.8  | 543.1  | 1284.1  | 2294.0  | 2291.4  | 724.1   | 331.0  | 342.7  | 320.7  | 236.6  |
| 85°   | 77.6   | 89.2   | 166.8  | 389.2   | 709.9   | 695.7   | 209.5   | 156.5  | 182.3  | 184.9  | 117.7  |
| 87.5° | 0.0    | 0.0    | 1.3    | 2.6     | 2.6     | 2.6     | 5.2     | 23.3   | 53.0   | 67.2   | 47.8   |
| 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: P637570

CATALOG NUMBER: GWS-SA4D-722-U-T4FT-W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 | 2550.0 |
| 2.5°  | 2565.5 | 2561.7 | 2614.7 | 2656.1 | 2694.9 | 2720.7 | 2728.5 | 2733.6 | 2744.0 | 2749.2 | 2744.0 |
| 5°    | 2583.6 | 2603.0 | 2691.0 | 2755.6 | 2807.4 | 2838.4 | 2839.7 | 2837.1 | 2844.9 | 2838.4 | 2834.5 |
| 7.5°  | 2622.4 | 2659.9 | 2771.1 | 2839.7 | 2873.3 | 2874.6 | 2843.6 | 2807.4 | 2789.2 | 2773.7 | 2768.6 |
| 10°   | 2674.2 | 2729.8 | 2851.3 | 2896.6 | 2886.2 | 2838.4 | 2769.9 | 2713.0 | 2680.6 | 2657.4 | 2652.2 |
| 12.5° | 2745.3 | 2807.4 | 2922.4 | 2921.1 | 2856.5 | 2771.1 | 2691.0 | 2622.4 | 2575.9 | 2548.7 | 2539.7 |
| 15°   | 2812.5 | 2891.4 | 2974.2 | 2913.4 | 2811.2 | 2707.8 | 2604.3 | 2512.5 | 2450.5 | 2407.8 | 2400.0 |
| 17.5° | 2895.3 | 2979.3 | 3011.7 | 2888.8 | 2754.3 | 2621.1 | 2482.8 | 2362.5 | 2278.5 | 2228.0 | 2224.2 |
| 20°   | 2991.0 | 3066.0 | 3029.8 | 2846.1 | 2680.6 | 2506.1 | 2318.6 | 2184.1 | 2093.6 | 2044.4 | 2048.3 |
| 22.5° | 3102.2 | 3156.5 | 3034.9 | 2788.0 | 2578.5 | 2343.1 | 2133.6 | 2004.3 | 1943.6 | 1917.7 | 1919.0 |
| 25°   | 3221.1 | 3256.1 | 3025.9 | 2709.1 | 2422.0 | 2144.0 | 1943.6 | 1884.1 | 1878.9 | 1872.4 | 1875.0 |
| 27.5° | 3362.1 | 3354.3 | 2998.7 | 2597.9 | 2211.2 | 1912.5 | 1810.4 | 1825.9 | 1846.6 | 1844.0 | 1846.6 |
| 30°   | 3550.9 | 3477.2 | 2963.8 | 2444.0 | 1960.4 | 1718.5 | 1731.5 | 1775.4 | 1802.6 | 1805.2 | 1812.9 |
| 32.5° | 3766.8 | 3613.0 | 2908.2 | 2234.5 | 1721.1 | 1609.9 | 1657.8 | 1710.8 | 1743.1 | 1749.6 | 1759.9 |
| 35°   | 4024.2 | 3768.1 | 2809.9 | 1973.3 | 1549.2 | 1545.3 | 1589.2 | 1625.4 | 1660.4 | 1662.9 | 1662.9 |
| 37.5° | 4320.3 | 3923.3 | 2653.5 | 1684.9 | 1443.1 | 1489.7 | 1531.0 | 1538.8 | 1547.9 | 1540.1 | 1544.0 |
| 40°   | 4591.8 | 4073.3 | 2431.1 | 1422.4 | 1356.5 | 1440.5 | 1475.4 | 1449.6 | 1421.1 | 1401.7 | 1405.6 |
| 42.5° | 4819.4 | 4175.5 | 2136.2 | 1238.8 | 1268.5 | 1396.6 | 1423.7 | 1370.7 | 1315.1 | 1278.9 | 1284.1 |
| 45°   | 5075.5 | 4269.9 | 1789.7 | 1114.7 | 1193.5 | 1365.5 | 1383.6 | 1315.1 | 1244.0 | 1189.7 | 1181.9 |
| 47.5° | 5428.5 | 4462.5 | 1481.9 | 1028.0 | 1140.5 | 1348.7 | 1378.5 | 1285.4 | 1192.3 | 1110.8 | 1101.7 |
| 50°   | 5864.3 | 4735.4 | 1224.6 | 971.1  | 1116.0 | 1339.7 | 1377.2 | 1253.0 | 1141.8 | 1046.1 | 1039.7 |
| 52.5° | 6340.1 | 5001.8 | 1034.5 | 927.2  | 1091.4 | 1312.5 | 1370.7 | 1216.8 | 1088.8 | 985.4  | 977.6  |
| 55°   | 6657.0 | 5106.5 | 906.5  | 885.8  | 1051.3 | 1269.8 | 1344.8 | 1181.9 | 1008.6 | 914.2  | 902.6  |
| 57.5° | 6750.1 | 4972.0 | 817.2  | 848.3  | 999.6  | 1210.4 | 1295.7 | 1108.2 | 959.5  | 884.5  | 875.4  |
| 60°   | 6589.7 | 4633.2 | 761.6  | 817.2  | 942.7  | 1134.1 | 1210.4 | 1065.5 | 920.7  | 853.5  | 847.0  |
| 62.5° | 6137.1 | 4110.8 | 719.0  | 784.9  | 884.5  | 1053.9 | 1156.0 | 1013.8 | 878.0  | 825.0  | 816.0  |
| 65°   | 5226.8 | 3371.1 | 684.1  | 751.3  | 828.9  | 977.6  | 1096.6 | 962.1  | 831.5  | 791.4  | 781.0  |
| 67.5° | 3655.6 | 2367.7 | 646.6  | 711.2  | 773.3  | 903.9  | 1034.5 | 914.2  | 783.6  | 753.9  | 743.5  |
| 70°   | 1787.1 | 1255.6 | 601.3  | 664.7  | 713.8  | 828.9  | 972.4  | 856.0  | 720.3  | 703.5  | 689.2  |
| 72.5° | 850.9  | 702.2  | 548.3  | 601.3  | 632.3  | 729.3  | 869.0  | 772.0  | 645.3  | 609.1  | 584.5  |
| 75°   | 570.3  | 499.1  | 478.5  | 526.3  | 534.1  | 611.6  | 744.8  | 666.0  | 569.0  | 527.6  | 506.9  |
| 77.5° | 431.9  | 381.5  | 402.2  | 444.8  | 429.3  | 503.0  | 612.9  | 593.5  | 513.4  | 475.9  | 465.5  |
| 80°   | 303.9  | 278.0  | 319.4  | 345.3  | 333.6  | 428.0  | 552.2  | 508.2  | 422.8  | 381.5  | 373.7  |
| 82.5° | 191.4  | 186.2  | 235.3  | 239.2  | 243.1  | 338.8  | 453.9  | 399.6  | 328.5  | 270.3  | 250.9  |
| 85°   | 95.7   | 106.0  | 140.9  | 140.9  | 139.7  | 174.6  | 258.6  | 225.0  | 177.2  | 140.9  | 137.1  |
| 87.5° | 32.3   | 45.3   | 60.8   | 49.1   | 37.5   | 29.7   | 33.6   | 41.4   | 44.0   | 42.7   | 42.7   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



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

Report Prepared for

Cooper Lighting Solutions

McGRAW-EDISON

Report Number: SP1-1908-441-10-R4

Test Date: 10/25/2019

Luminaire Tested: SA1C-722-U-5WQ

Data in this report applies to families of products SA1C-722-U-5WQ.

### Test Information

Test Method: LM-79-2008 Report  
 Number: SP1-1908-441-10-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-722-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):                  | 2237    | CRI (Ra): | 72.0 |      |       |
| CIE u':                   | 0.2876  | R1:       | 68.9 | R9:  | -17.4 |
| CIE v':                   | 0.5346  | R2:       | 83.0 | R10: | 61.3  |
| Duv:                      | -0.0006 | R3:       | 95.2 | R11: | 59.8  |
| CIE x:                    | 0.5005  | R4:       | 66.2 | R12: | 50.5  |
| CIE y:                    | 0.4134  | R5:       | 65.9 | R13: | 71.1  |
| CIE z:                    | 0.0860  | R6:       | 76.3 | R14: | 96.9  |
| Peak Wavelength (nm):     | 603     | R7:       | 76.7 |      |       |
| Dominant Wavelength (nm): | 587     | R8:       | 43.8 |      |       |
| Purity:                   | 74.5    |           |      |      |       |
| Rf:                       | 69.8    |           |      |      |       |
| Rg:                       | 99.2    |           |      |      |       |



### Test Conditions

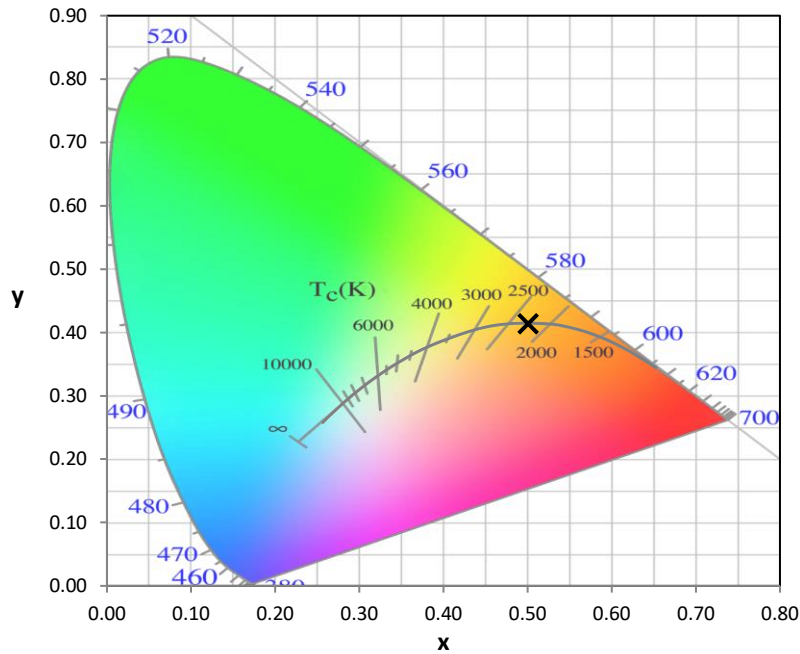
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

REPORT NUMBER: SP1-1908-441-10-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            |

REPORT NUMBER: SP1-1908-441-10-R4

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 2200K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-10-R4

**Photopic Flux vs. Wavelength**



#####

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

Scotopic Flux vs. Wavelength



Scotopic Lumens: 4696.9

S/P: 0.85

| 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       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 1470.8 M/P: 0.27**

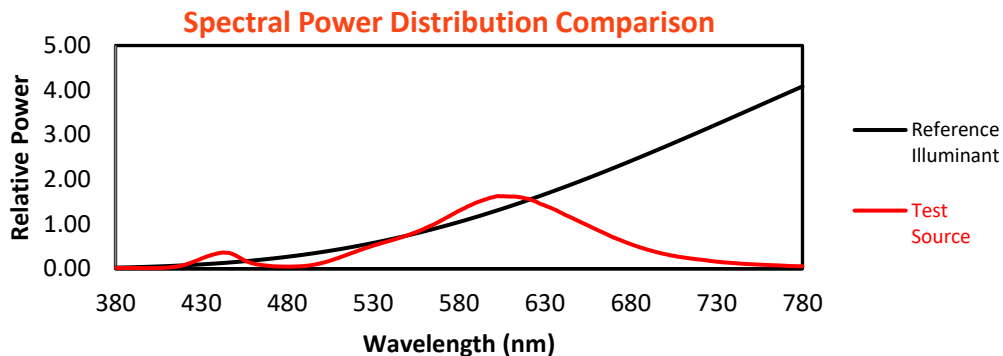
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1768             | NR               | 490       | 5206             | NR               | 620       | 130919           | NR               | 750       | 8553             | NR               | 880       | 2713             | NR               |
| 365       | 1569             | NR               | 495       | 7286             | NR               | 625       | 125335           | NR               | 755       | 7696             | NR               | 885       | 2316             | NR               |
| 370       | 1594             | NR               | 500       | 10654            | NR               | 630       | 118388           | NR               | 760       | 6978             | NR               | 890       | 2539             | NR               |
| 375       | 1744             | NR               | 505       | 15189            | NR               | 635       | 111855           | NR               | 765       | 6377             | NR               | 895       | 1933             | NR               |
| 380       | 1659             | NR               | 510       | 20541            | NR               | 640       | 104062           | NR               | 770       | 5600             | NR               | 900       | 2216             | NR               |
| 385       | 1504             | NR               | 515       | 26492            | NR               | 645       | 96365            | NR               | 775       | 5000             | NR               | 905       | 2067             | NR               |
| 390       | 1541             | NR               | 520       | 32294            | NR               | 650       | 88651            | NR               | 780       | 4709             | NR               | 910       | 1959             | NR               |
| 395       | 1355             | NR               | 525       | 38123            | NR               | 655       | 81152            | NR               | 785       | 4305             | NR               | 915       | 1874             | NR               |
| 400       | 1243             | NR               | 530       | 43232            | NR               | 660       | 73523            | NR               | 790       | 4040             | NR               | 920       | 1484             | NR               |
| 405       | 1417             | NR               | 535       | 48012            | NR               | 665       | 66123            | NR               | 795       | 3642             | NR               | 925       | 1914             | NR               |
| 410       | 2147             | NR               | 540       | 52623            | NR               | 670       | 58677            | NR               | 800       | 3594             | NR               | 930       | 1948             | NR               |
| 415       | 3837             | NR               | 545       | 57516            | NR               | 675       | 52349            | NR               | 805       | 3190             | NR               | 935       | 2079             | NR               |
| 420       | 7159             | NR               | 550       | 62613            | NR               | 680       | 46159            | NR               | 810       | 3241             | NR               | 940       | 2263             | NR               |
| 425       | 12599            | NR               | 555       | 68554            | NR               | 685       | 40525            | NR               | 815       | 2732             | NR               | 945       | 1688             | NR               |
| 430       | 19019            | NR               | 560       | 75325            | NR               | 690       | 35615            | NR               | 820       | 2612             | NR               | 950       | 1560             | NR               |
| 435       | 24875            | NR               | 565       | 82533            | NR               | 695       | 31158            | NR               | 825       | 2966             | NR               | 955       | 2826             | NR               |
| 440       | 29103            | NR               | 570       | 90909            | NR               | 700       | 27409            | NR               | 830       | 2574             | NR               | 960       | 1477             | NR               |
| 445       | 29901            | NR               | 575       | 99621            | NR               | 705       | 24204            | NR               | 835       | 2633             | NR               | 965       | 1568             | NR               |
| 450       | 24862            | NR               | 580       | 108484           | NR               | 710       | 21558            | NR               | 840       | 2526             | NR               | 970       | 2030             | NR               |
| 455       | 15942            | NR               | 585       | 116679           | NR               | 715       | 19222            | NR               | 845       | 2631             | NR               | 975       | 1986             | NR               |
| 460       | 9916             | NR               | 590       | 123752           | NR               | 720       | 17310            | NR               | 850       | 2079             | NR               | 980       | 2540             | NR               |
| 465       | 7051             | NR               | 595       | 129324           | NR               | 725       | 15280            | NR               | 855       | 2309             | NR               | 985       | 1139             | NR               |
| 470       | 5227             | NR               | 600       | 134082           | NR               | 730       | 13282            | NR               | 860       | 2528             | NR               | 990       | 2018             | NR               |
| 475       | 4257             | NR               | 605       | 135698           | NR               | 735       | 11753            | NR               | 865       | 2121             | NR               | 995       | 3445             | NR               |
| 480       | 4052             | NR               | 610       | 135144           | NR               | 740       | 10654            | NR               | 870       | 2751             | NR               | 1000      | 3704             | NR               |
| 485       | 4298             | NR               | 615       | 134180           | NR               | 745       | 9451             | NR               | 875       | 2317             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

### Summary

$R_f = 69.8$   
 $R_g = 99.2$   
 CIE  $R_a = 72.0$   
 $R_g = -17.4$



### Color Vector Graphics





REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

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

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 78 | CES79 = 84 |
| CES05 = 52 | CES30 = 48 | CES55 = 75 | CES80 = 84 |
| CES06 = 52 | CES31 = 51 | CES56 = 65 | CES81 = 63 |
| CES07 = 44 | CES32 = 51 | CES57 = 62 | CES82 = 92 |
| CES08 = 42 | CES33 = 53 | CES58 = 66 | CES83 = 83 |
| CES09 = 29 | CES34 = 70 | CES59 = 84 | CES84 = 92 |
| CES10 = 78 | CES35 = 85 | CES60 = 90 | CES85 = 81 |
| CES11 = 61 | CES36 = 78 | CES61 = 84 | CES86 = 56 |
| CES12 = 68 | CES37 = 80 | CES62 = 70 | CES87 = 78 |
| CES13 = 45 | CES38 = 53 | CES63 = 68 | CES88 = 72 |
| CES14 = 75 | CES39 = 90 | CES64 = 69 | CES89 = 62 |
| CES15 = 72 | CES40 = 84 | CES65 = 67 | CES90 = 67 |
| CES16 = 49 | CES41 = 75 | CES66 = 64 | CES91 = 90 |
| CES17 = 51 | CES42 = 79 | CES67 = 63 | CES92 = 67 |
| CES18 = 57 | CES43 = 64 | CES68 = 69 | CES93 = 79 |
| CES19 = 74 | CES44 = 98 | CES69 = 80 | CES94 = 52 |
| CES20 = 68 | CES45 = 73 | CES70 = 63 | CES95 = 76 |
| CES21 = 89 | CES46 = 67 | CES71 = 63 | CES96 = 78 |
| CES22 = 81 | CES47 = 60 | CES72 = 87 | CES97 = 77 |
| CES23 = 92 | CES48 = 48 | CES73 = 56 | CES98 = 71 |
| CES24 = 92 | CES49 = 64 | CES74 = 87 | CES99 = 65 |
| CES25 = 74 | CES50 = 74 | CES75 = 66 |            |



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-10-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)