

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: P638557

Luminaire Tested: GWS-SA4F-722-U-T3R-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P638557  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-18)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA4F-722-U-T3R-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (4) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE III ROADWAY OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (64) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 19619.4 lumens  
Efficiency: N/A  
Efficacy: 87.1 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 1' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B2 - U0 - G4

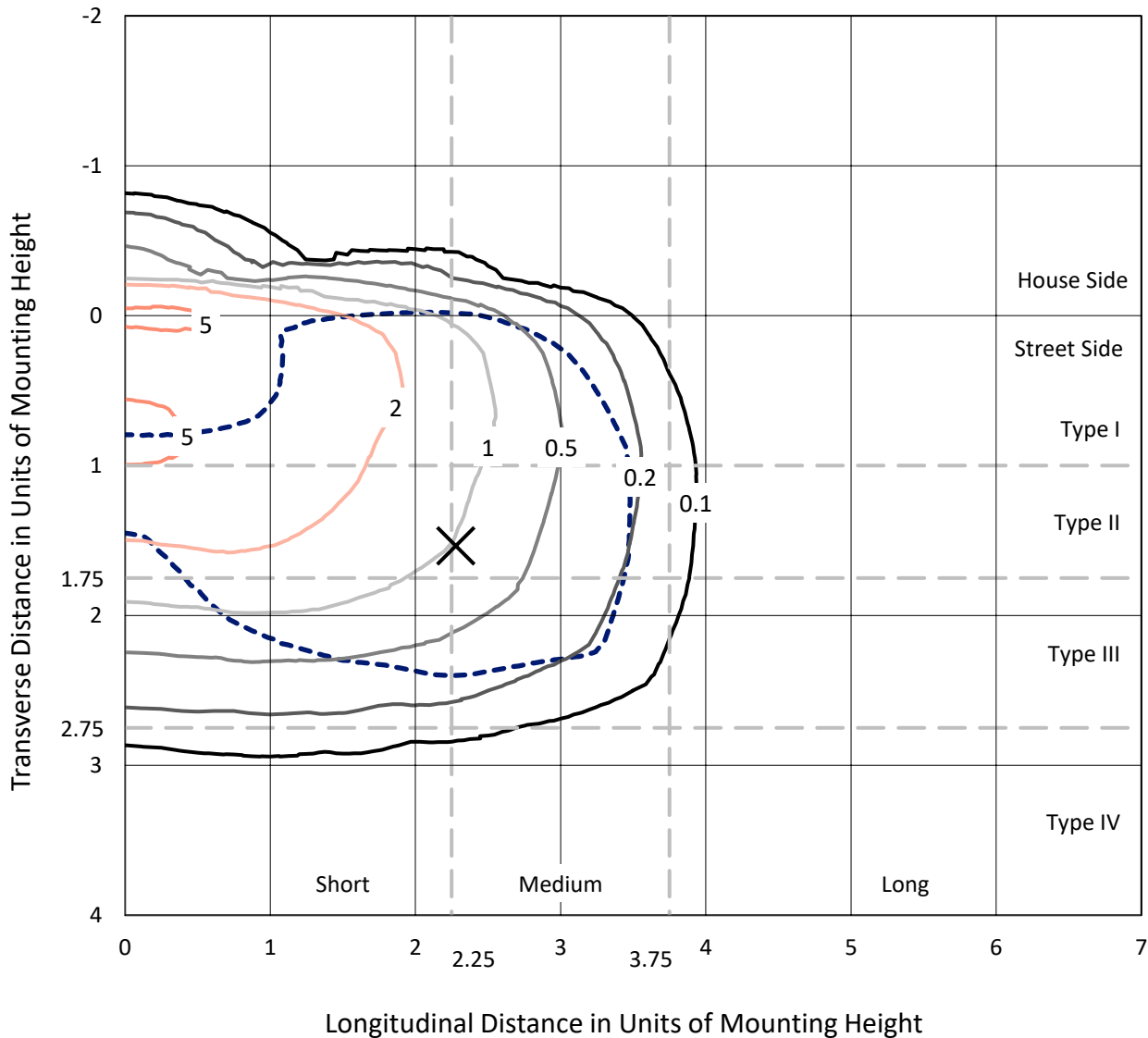
Input Watts (W): 225.3  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



REPORT NUMBER: P638557  
 CATALOG NUMBER: GWS-SA4F-722-U-T3R-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

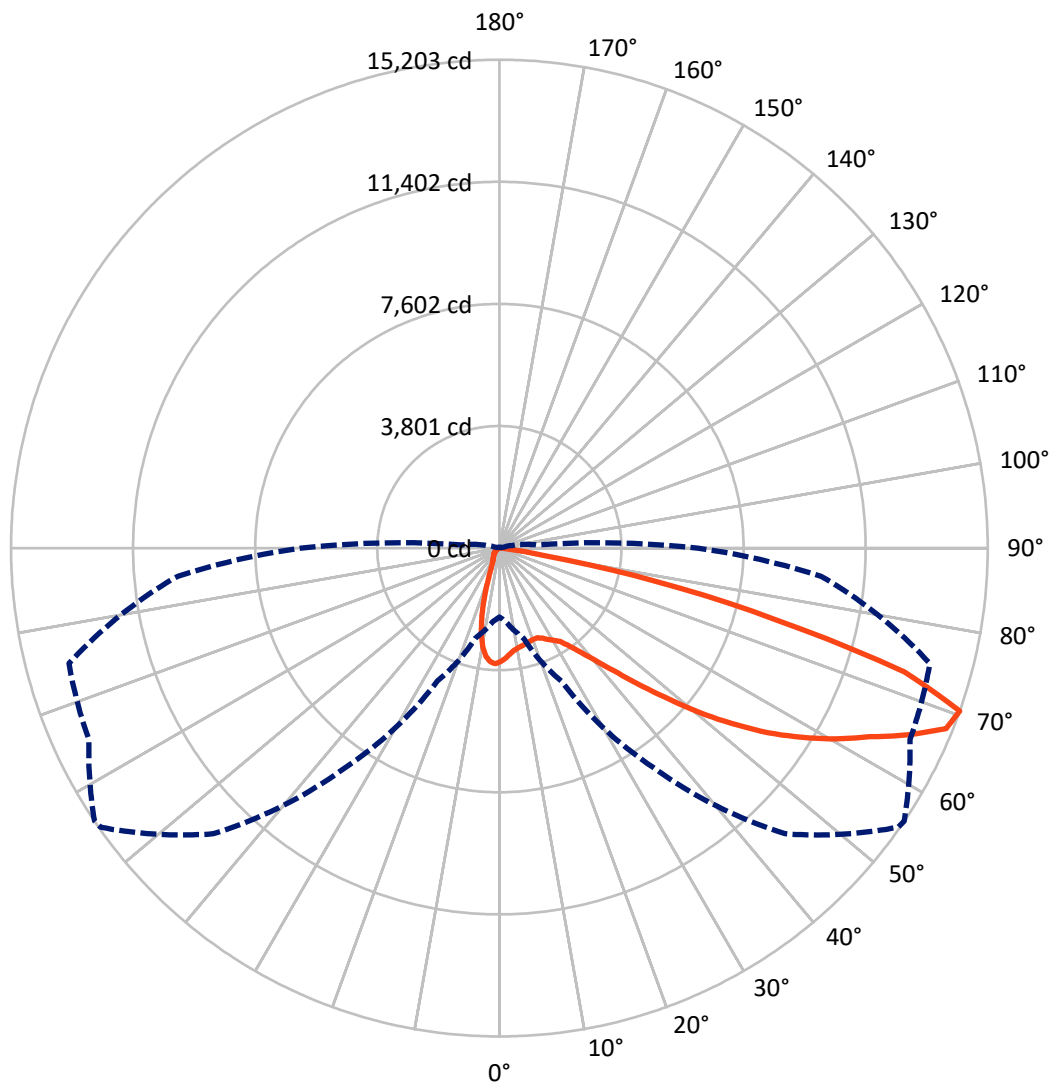


Based on 25 foot mounting height. Maximum calculated value = 6 fc  
 Type III - Medium - N/A

REPORT NUMBER: P638557

CATALOG NUMBER: GWS-SA4F-722-U-T3R-W-HSS

## Luminous Intensity Polar Plot



— Vertical Plane Through 56-Deg Lateral    - - - Horizontal Cone Through 70-Deg Vertical

REPORT NUMBER: P638557

CATALOG NUMBER: GWS-SA4F-722-U-T3R-W-HSS

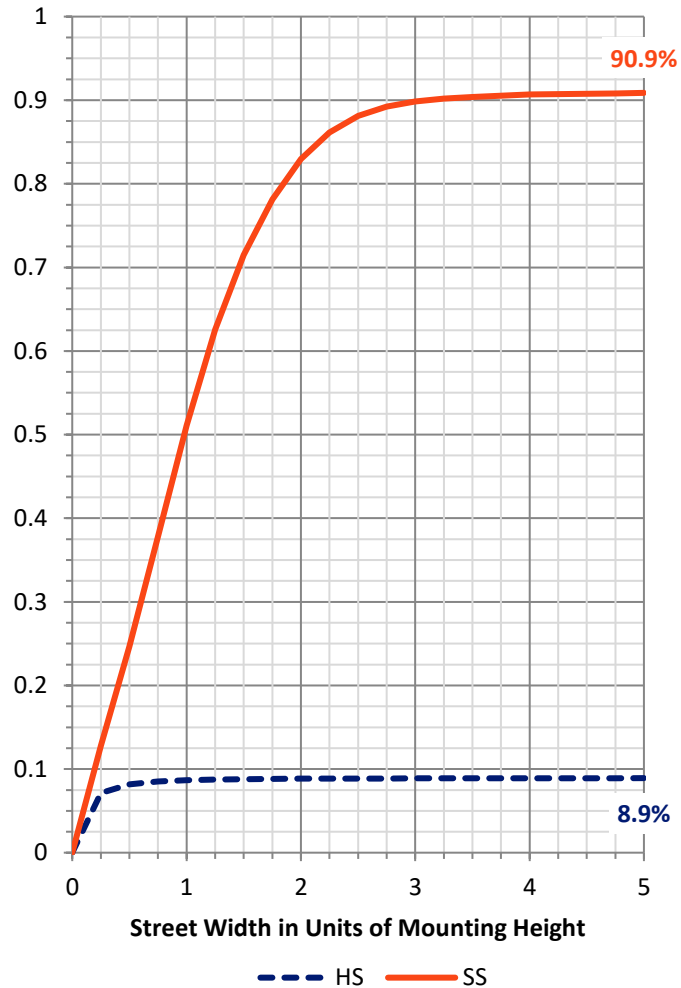
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 1762.2   | 0.0    | 1762.2  |
|                    | % Fixture | 9.0      | 0.0    | 9.0     |
| <b>Street Side</b> | Lumens    | 17857.2  | 0.0    | 17857.2 |
|                    | % Fixture | 91.0     | 0.0    | 91.0    |
| <b>Total</b>       | Lumens    | 19619.4  | 0.0    | 19619.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 303.7   | 1.5       |
| 10°-20°   | 683.1   | 3.5       |
| 20°-30°   | 1082.1  | 5.5       |
| 30°-40°   | 1866.0  | 9.5       |
| 40°-50°   | 3151.1  | 16.1      |
| 50°-60°   | 4630.0  | 23.6      |
| 60°-70°   | 5489.1  | 28.0      |
| 70°-80°   | 2340.8  | 11.9      |
| 80°-90°   | 73.5    | 0.4       |
| 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°    | 19619.4 | 100.0     |
| 0°-180°   | 19619.4 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P638557

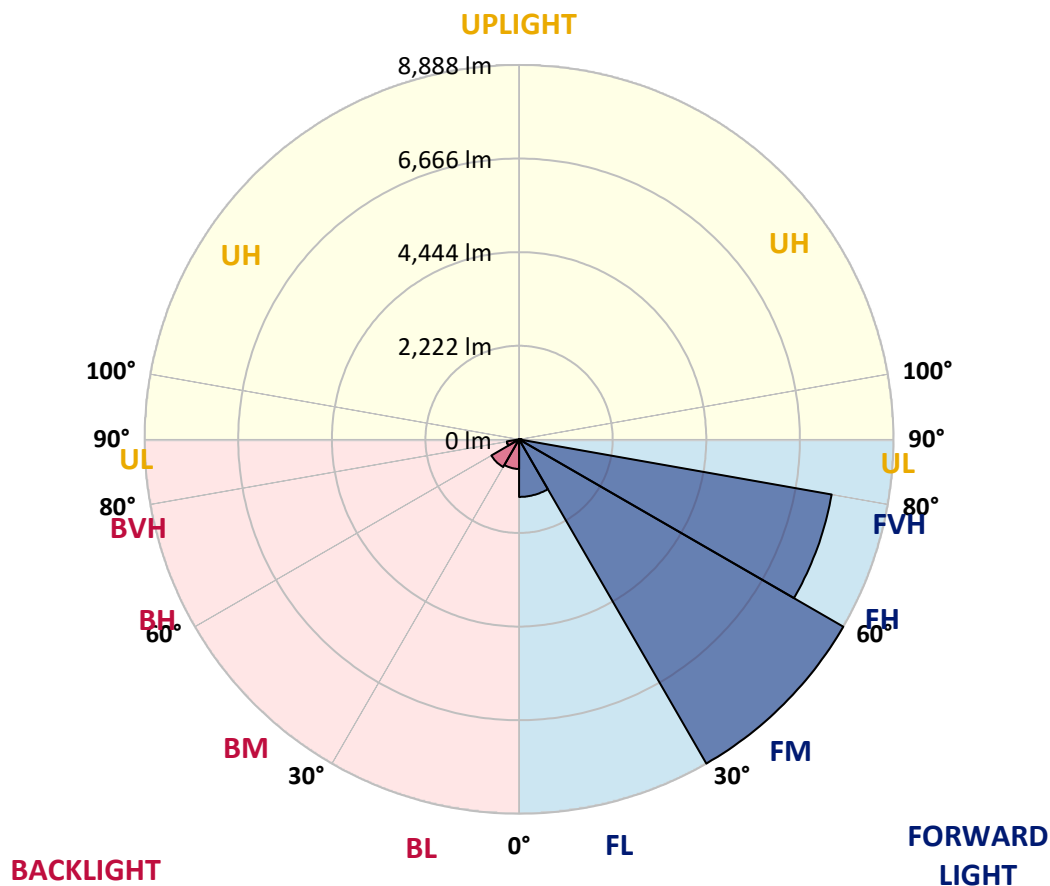
CATALOG NUMBER: GWS-SA4F-722-U-T3R-W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|--------|-----------|-------------------------|------|----------|
|      |             |        |           | B                       | U    | G        |
| FL   | (0°-30°)    | 1367.1 | 7.0       |                         |      |          |
| FM   | (30°-60°)   | 8888.1 | 45.3      |                         |      |          |
| FH   | (60°-80°)   | 7536.0 | 38.4      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 66.0   | 0.3       |                         |      | G1/100   |
| BL   | (0°-30°)    | 701.8  | 3.6       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 759.0  | 3.9       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 293.9  | 1.5       | B1/500                  |      | G1/500   |
| BVH  | (80°-90°)   | 7.5    | 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-G4**

Type III Medium



REPORT NUMBER: P638557

CATALOG NUMBER: GWS-SA4F-722-U-T3R-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°     | 35°     | 45°     | 55°     | 56°     | 65°     | 75°     | 85°     |
|-------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3537.6 | 3537.6 | 3537.6 | 3537.6  | 3537.6  | 3537.6  | 3537.6  | 3537.6  | 3537.6  | 3537.6  | 3537.6  |
| 2.5°  | 3293.2 | 3287.8 | 3291.4 | 3318.4  | 3368.7  | 3392.0  | 3431.6  | 3438.8  | 3471.1  | 3512.4  | 3528.6  |
| 5°    | 3079.4 | 3061.5 | 3070.5 | 3108.2  | 3165.7  | 3230.4  | 3304.0  | 3323.8  | 3404.6  | 3496.3  | 3564.5  |
| 7.5°  | 2883.6 | 2863.8 | 2885.4 | 2944.7  | 3025.5  | 3095.6  | 3205.2  | 3217.8  | 3347.1  | 3508.8  | 3632.8  |
| 10°   | 2576.4 | 2581.8 | 2624.9 | 2729.1  | 2853.1  | 2998.6  | 3145.9  | 3163.9  | 3323.8  | 3550.2  | 3742.4  |
| 12.5° | 2341.0 | 2328.4 | 2375.2 | 2493.7  | 2668.0  | 2880.0  | 3101.0  | 3124.3  | 3325.6  | 3613.0  | 3882.5  |
| 15°   | 2231.4 | 2227.8 | 2247.6 | 2333.8  | 2502.7  | 2752.4  | 3059.7  | 3090.2  | 3348.9  | 3670.5  | 4015.5  |
| 17.5° | 2235.0 | 2229.6 | 2227.8 | 2278.1  | 2403.9  | 2657.2  | 3014.8  | 3054.3  | 3368.7  | 3733.4  | 4155.6  |
| 20°   | 2391.3 | 2366.2 | 2321.3 | 2297.9  | 2373.4  | 2596.1  | 2984.2  | 3029.1  | 3397.4  | 3799.9  | 4304.7  |
| 22.5° | 2718.3 | 2727.3 | 2606.9 | 2481.2  | 2445.2  | 2603.3  | 2980.6  | 3032.7  | 3460.3  | 3904.1  | 4488.0  |
| 25°   | 3372.3 | 3357.9 | 3135.1 | 2853.1  | 2657.2  | 2686.0  | 3043.5  | 3106.4  | 3584.3  | 4053.2  | 4660.5  |
| 27.5° | 4191.6 | 4204.1 | 3898.7 | 3449.5  | 3039.9  | 2856.7  | 3158.5  | 3221.4  | 3728.0  | 4146.6  | 4775.5  |
| 30°   | 5084.5 | 5071.9 | 4744.9 | 4247.2  | 3582.5  | 3140.5  | 3273.5  | 3329.2  | 3799.9  | 4196.9  | 4894.0  |
| 32.5° | 5928.9 | 5900.2 | 5576.8 | 5055.7  | 4274.2  | 3587.9  | 3431.6  | 3463.9  | 3895.1  | 4306.5  | 5053.9  |
| 35°   | 6649.3 | 6647.6 | 6365.5 | 5810.3  | 4985.7  | 4148.4  | 3702.9  | 3729.8  | 4073.0  | 4480.8  | 5289.3  |
| 37.5° | 7393.2 | 7368.0 | 7051.8 | 6545.1  | 5716.9  | 4762.9  | 4117.9  | 4107.1  | 4353.2  | 4737.7  | 5578.6  |
| 40°   | 8004.0 | 7987.8 | 7745.3 | 7258.4  | 6476.9  | 5442.0  | 4620.9  | 4588.6  | 4685.6  | 5093.5  | 5981.0  |
| 42.5° | 8456.8 | 8458.6 | 8383.1 | 8086.7  | 7281.8  | 6227.1  | 5253.4  | 5203.1  | 5201.3  | 5630.7  | 6512.8  |
| 45°   | 8799.9 | 8823.3 | 8936.5 | 8891.5  | 8232.2  | 7141.6  | 6063.6  | 6011.5  | 5923.5  | 6327.8  | 7121.9  |
| 47.5° | 8959.8 | 8990.4 | 9331.7 | 9511.4  | 9064.0  | 8048.9  | 7028.4  | 6918.8  | 6746.4  | 7254.8  | 7802.8  |
| 50°   | 8943.7 | 8997.6 | 9473.7 | 10019.8 | 9818.6  | 8968.8  | 8079.5  | 8027.4  | 7745.3  | 8235.8  | 8476.5  |
| 52.5° | 8577.1 | 8692.1 | 9482.6 | 10328.9 | 10398.9 | 9816.8  | 9166.4  | 9069.4  | 8932.9  | 9259.9  | 9108.9  |
| 55°   | 7581.8 | 7721.9 | 9103.6 | 10427.7 | 10851.7 | 10557.0 | 10230.0 | 10151.0 | 9924.6  | 10226.4 | 9660.5  |
| 57.5° | 7041.0 | 7161.4 | 8305.8 | 10379.2 | 11236.2 | 11241.5 | 11176.9 | 11112.2 | 10925.3 | 11182.3 | 10307.3 |
| 60°   | 6715.8 | 6836.2 | 7880.0 | 10201.3 | 11584.7 | 11963.8 | 12066.2 | 12059.0 | 11789.5 | 12269.2 | 11065.5 |
| 62.5° | 6239.7 | 6405.0 | 7436.3 | 9739.6  | 11832.6 | 12675.3 | 12984.3 | 12935.8 | 12635.7 | 13401.1 | 11816.5 |
| 65°   | 5278.5 | 5422.2 | 6527.2 | 8977.8  | 11687.1 | 13264.6 | 13979.6 | 14004.8 | 13658.0 | 14466.5 | 12409.4 |
| 67.5° | 3701.1 | 3807.1 | 4904.8 | 7378.8  | 10699.0 | 13458.6 | 14998.3 | 14996.5 | 14405.4 | 15012.7 | 12147.1 |
| 70°   | 2145.2 | 2290.7 | 2898.0 | 4561.7  | 8323.8  | 12576.4 | 15151.0 | 15203.1 | 14101.8 | 13871.8 | 10052.2 |
| 72.5° | 830.0  | 950.4  | 1642.1 | 2423.7  | 4340.7  | 9633.6  | 13032.8 | 13185.5 | 11802.1 | 10700.8 | 6996.1  |
| 75°   | 247.9  | 276.7  | 772.6  | 1290.0  | 1742.7  | 4653.3  | 8823.3  | 8866.4  | 8095.6  | 6674.5  | 3586.1  |
| 77.5° | 185.1  | 204.8  | 337.8  | 652.2   | 610.9   | 1410.4  | 4565.3  | 4985.7  | 4297.6  | 2384.1  | 988.1   |
| 80°   | 125.8  | 149.1  | 240.7  | 318.0   | 226.4   | 375.5   | 1282.8  | 1408.6  | 1311.5  | 535.4   | 247.9   |
| 82.5° | 55.7   | 71.9   | 170.7  | 159.9   | 82.6    | 107.8   | 395.3   | 420.4   | 271.3   | 161.7   | 86.2    |
| 85°   | 5.4    | 7.2    | 64.7   | 70.1    | 30.5    | 25.2    | 82.6    | 82.6    | 59.3    | 55.7    | 35.9    |
| 87.5° | 0.0    | 0.0    | 1.8    | 3.6     | 3.6     | 5.4     | 7.2     | 9.0     | 10.8    | 14.4    | 18.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

REPORT NUMBER: P638557

CATALOG NUMBER: GWS-SA4F-722-U-T3R-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 | 3537.6 |
| 2.5°  | 3569.9 | 3548.4 | 3575.3 | 3596.9 | 3602.3 | 3562.7 | 3539.4 | 3505.2 | 3498.0 | 3499.8 | 3490.9 |
| 5°    | 3618.4 | 3607.6 | 3627.4 | 3604.1 | 3543.0 | 3428.0 | 3329.2 | 3219.6 | 3160.3 | 3126.1 | 3122.6 |
| 7.5°  | 3708.3 | 3702.9 | 3681.3 | 3575.3 | 3384.9 | 3129.7 | 2883.6 | 2642.9 | 2493.7 | 2439.8 | 2430.8 |
| 10°   | 3841.2 | 3830.4 | 3742.4 | 3490.9 | 3084.8 | 2594.3 | 2181.1 | 1836.2 | 1626.0 | 1564.9 | 1489.4 |
| 12.5° | 3993.9 | 3972.4 | 3780.1 | 3309.4 | 2632.1 | 1952.9 | 1437.3 | 1051.0 | 869.6  | 815.7  | 815.7  |
| 15°   | 4141.2 | 4094.5 | 3758.6 | 3009.4 | 2075.1 | 1270.2 | 803.1  | 607.3  | 551.6  | 537.2  | 537.2  |
| 17.5° | 4292.2 | 4202.3 | 3674.1 | 2599.7 | 1433.7 | 751.0  | 535.4  | 497.7  | 490.5  | 492.3  | 494.1  |
| 20°   | 4434.1 | 4294.0 | 3525.0 | 2107.5 | 914.5  | 524.6  | 479.7  | 470.7  | 467.1  | 470.7  | 468.9  |
| 22.5° | 4588.6 | 4378.4 | 3298.6 | 1570.3 | 594.7  | 472.5  | 456.3  | 449.2  | 445.6  | 451.0  | 451.0  |
| 25°   | 4741.3 | 4439.5 | 2998.6 | 1056.4 | 472.5  | 440.2  | 431.2  | 424.0  | 420.4  | 422.2  | 422.2  |
| 27.5° | 4820.4 | 4416.1 | 2605.1 | 673.7  | 424.0  | 407.8  | 398.9  | 389.9  | 384.5  | 382.7  | 384.5  |
| 30°   | 4874.3 | 4344.3 | 2123.6 | 479.7  | 384.5  | 364.7  | 355.7  | 348.5  | 334.2  | 325.2  | 328.8  |
| 32.5° | 4958.7 | 4272.4 | 1600.8 | 402.4  | 352.1  | 321.6  | 307.2  | 289.3  | 269.5  | 260.5  | 260.5  |
| 35°   | 5059.3 | 4173.6 | 1122.9 | 362.9  | 318.0  | 285.7  | 258.7  | 228.2  | 204.8  | 197.6  | 197.6  |
| 37.5° | 5192.3 | 4080.2 | 747.4  | 336.0  | 289.3  | 255.1  | 217.4  | 181.5  | 156.3  | 152.7  | 150.9  |
| 40°   | 5391.7 | 4001.1 | 526.4  | 316.2  | 264.1  | 222.8  | 177.9  | 140.1  | 122.2  | 116.8  | 116.8  |
| 42.5° | 5650.4 | 3920.3 | 416.8  | 296.4  | 242.5  | 192.2  | 141.9  | 111.4  | 97.0   | 93.4   | 91.6   |
| 45°   | 5970.2 | 3825.0 | 362.9  | 278.5  | 221.0  | 159.9  | 113.2  | 93.4   | 82.6   | 79.1   | 79.1   |
| 47.5° | 6317.0 | 3695.7 | 337.8  | 255.1  | 195.8  | 129.4  | 95.2   | 80.8   | 75.5   | 73.7   | 71.9   |
| 50°   | 6658.3 | 3521.4 | 316.2  | 233.6  | 167.1  | 106.0  | 82.6   | 73.7   | 70.1   | 68.3   | 68.3   |
| 52.5° | 6956.6 | 3318.4 | 289.3  | 208.4  | 136.5  | 91.6   | 73.7   | 68.3   | 64.7   | 61.1   | 59.3   |
| 55°   | 7211.7 | 3097.4 | 255.1  | 179.7  | 111.4  | 80.8   | 68.3   | 62.9   | 59.3   | 55.7   | 53.9   |
| 57.5° | 7540.5 | 2971.6 | 204.8  | 145.5  | 91.6   | 71.9   | 62.9   | 57.5   | 53.9   | 48.5   | 48.5   |
| 60°   | 7905.2 | 2880.0 | 152.7  | 115.0  | 79.1   | 66.5   | 57.5   | 52.1   | 48.5   | 43.1   | 43.1   |
| 62.5° | 8198.0 | 2743.5 | 120.4  | 93.4   | 68.3   | 59.3   | 52.1   | 46.7   | 43.1   | 37.7   | 37.7   |
| 65°   | 8309.4 | 2461.4 | 98.8   | 73.7   | 55.7   | 52.1   | 46.7   | 43.1   | 37.7   | 32.3   | 32.3   |
| 67.5° | 7806.4 | 1897.2 | 82.6   | 59.3   | 46.7   | 44.9   | 41.3   | 39.5   | 32.3   | 28.7   | 26.9   |
| 70°   | 6182.2 | 1157.0 | 68.3   | 48.5   | 39.5   | 37.7   | 37.7   | 34.1   | 28.7   | 26.9   | 25.2   |
| 72.5° | 4236.5 | 596.5  | 55.7   | 39.5   | 34.1   | 34.1   | 32.3   | 30.5   | 26.9   | 25.2   | 25.2   |
| 75°   | 2200.9 | 199.4  | 43.1   | 30.5   | 26.9   | 28.7   | 28.7   | 26.9   | 25.2   | 25.2   | 23.4   |
| 77.5° | 630.6  | 89.8   | 32.3   | 23.4   | 21.6   | 21.6   | 23.4   | 23.4   | 23.4   | 21.6   | 21.6   |
| 80°   | 163.5  | 52.1   | 23.4   | 18.0   | 18.0   | 18.0   | 18.0   | 19.8   | 21.6   | 19.8   | 19.8   |
| 82.5° | 66.5   | 28.7   | 16.2   | 14.4   | 14.4   | 14.4   | 14.4   | 16.2   | 18.0   | 18.0   | 18.0   |
| 85°   | 41.3   | 14.4   | 12.6   | 12.6   | 12.6   | 10.8   | 10.8   | 12.6   | 12.6   | 14.4   | 14.4   |
| 87.5° | 25.2   | 10.8   | 10.8   | 10.8   | 10.8   | 9.0    | 9.0    | 9.0    | 9.0    | 9.0    | 9.0    |
| 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.

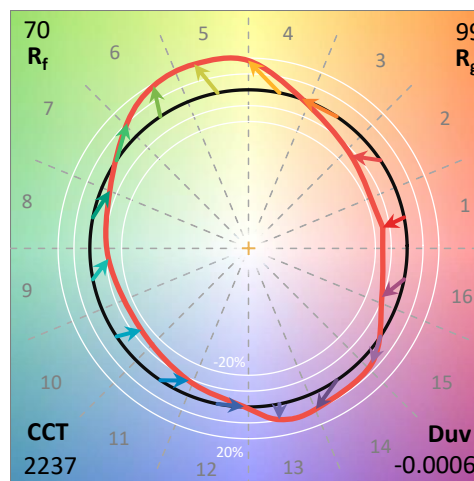
### Test Information

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**

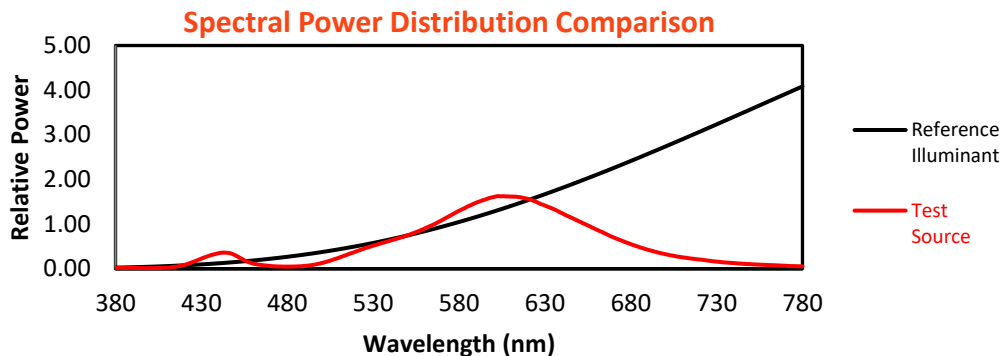
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 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 ( $R_{f,i}$ )**

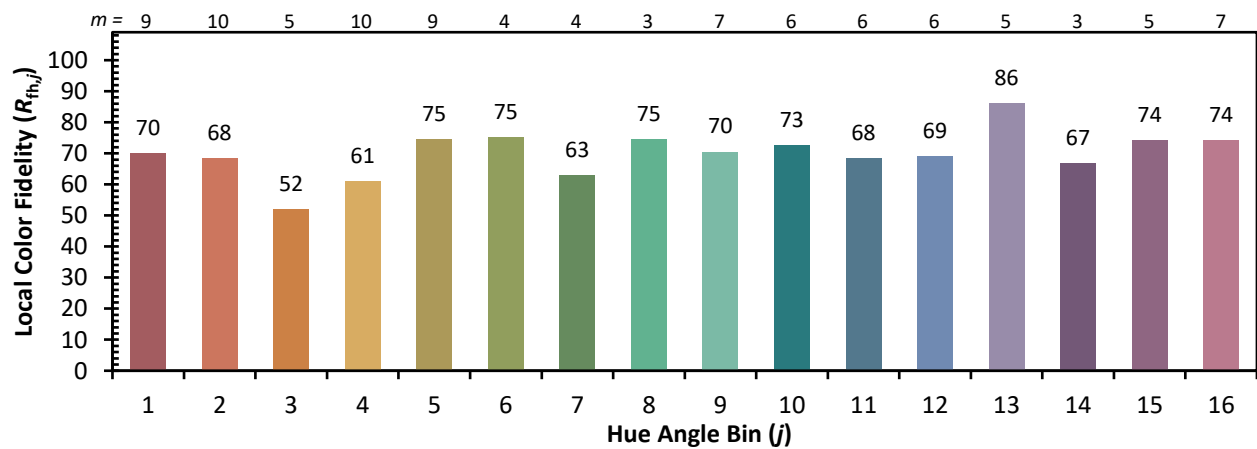
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54 = 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)