

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: P633569

Luminaire Tested: GWS-SA2F-722-U-AFL-W-HSS

Issue Date: 1/10/2023

### Test Information

Test Method: LM-79-2019  
Report Number: P633569  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-48)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA2F-722-U-AFL-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (2) LIGHTSQUARES WITH 16 LEDS EACH AND  
AUTOMOTIVE FRONTLINE OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (32) 2200K CCT, 70 CRI LEDS  
Ballast/Driver: -

### Summary

Lumens per Lamp: N/A  
Luminaire Lumens: 10020.8 lumens  
Efficiency: N/A  
Efficacy: 80.5 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B1 - U0 - G1

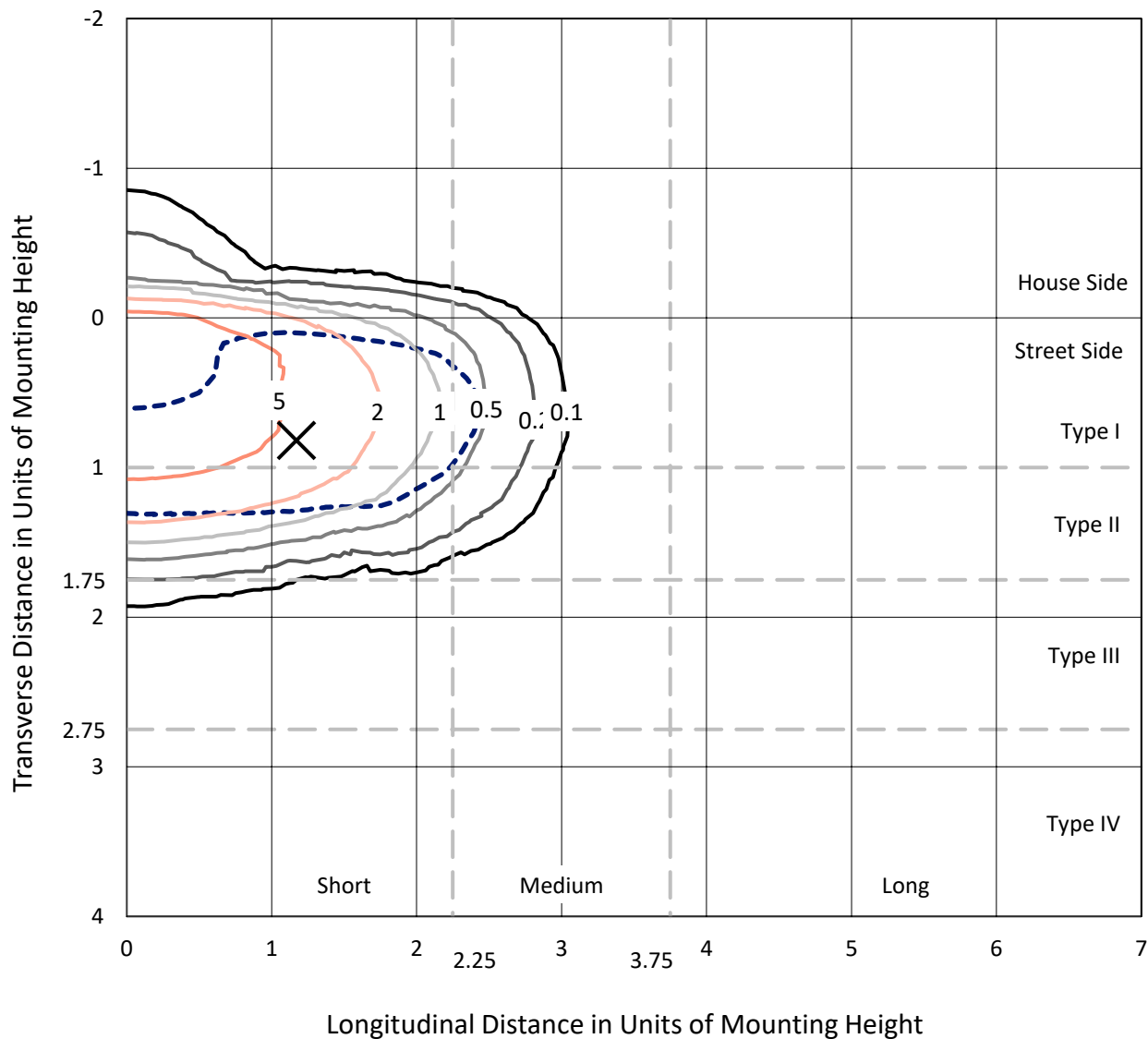
Input Watts (W): 124.5  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 0  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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 CATALOG NUMBER: GWS-SA2F-722-U-AFL-W-HSS

## Iso-Footcandle Lines of Horizontal Illumination

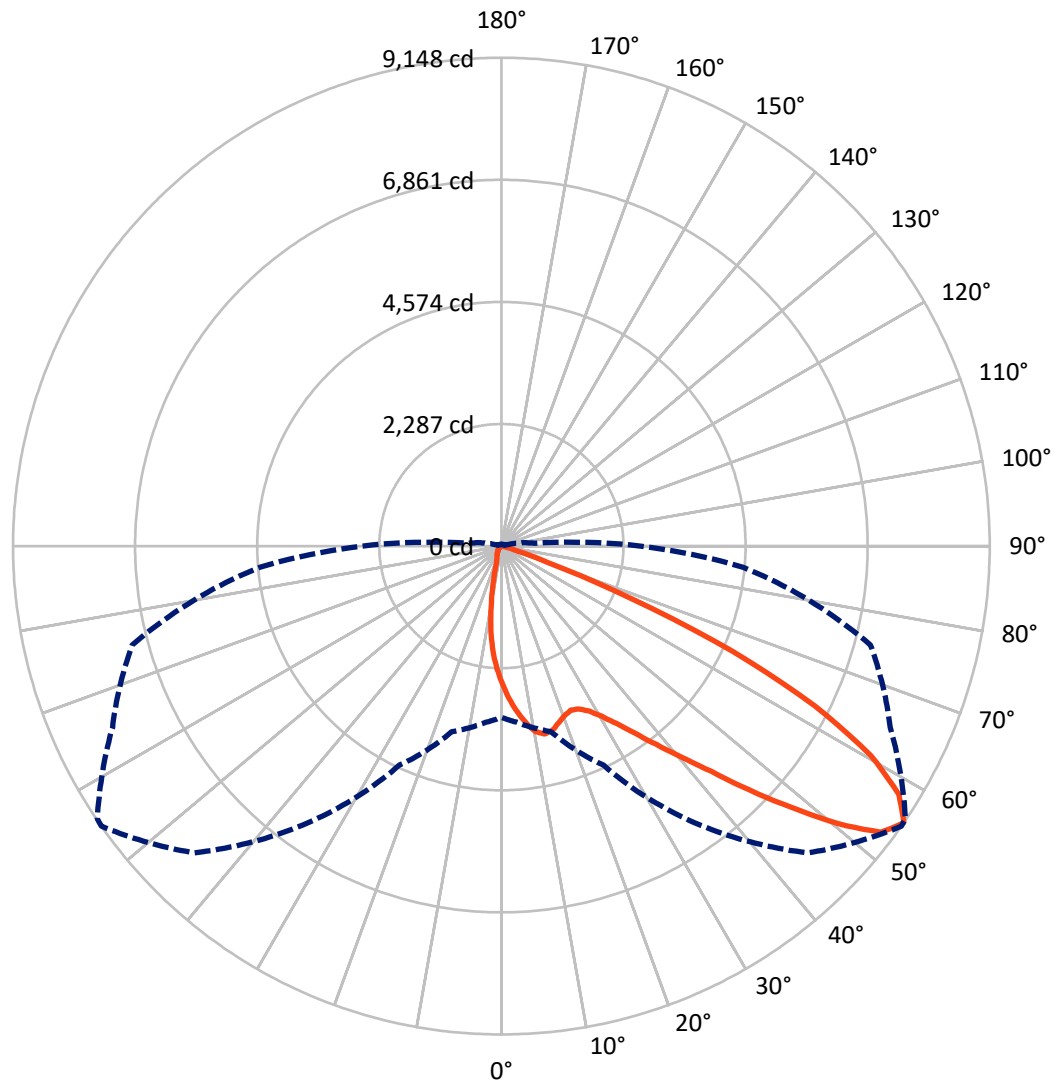
✕ Max cd  
 - - - 1/2 Max cd



Based on 20 foot mounting height. Maximum calculated value = 8.5 fc  
 Type II - Short - N/A

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## Luminous Intensity Polar Plot



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

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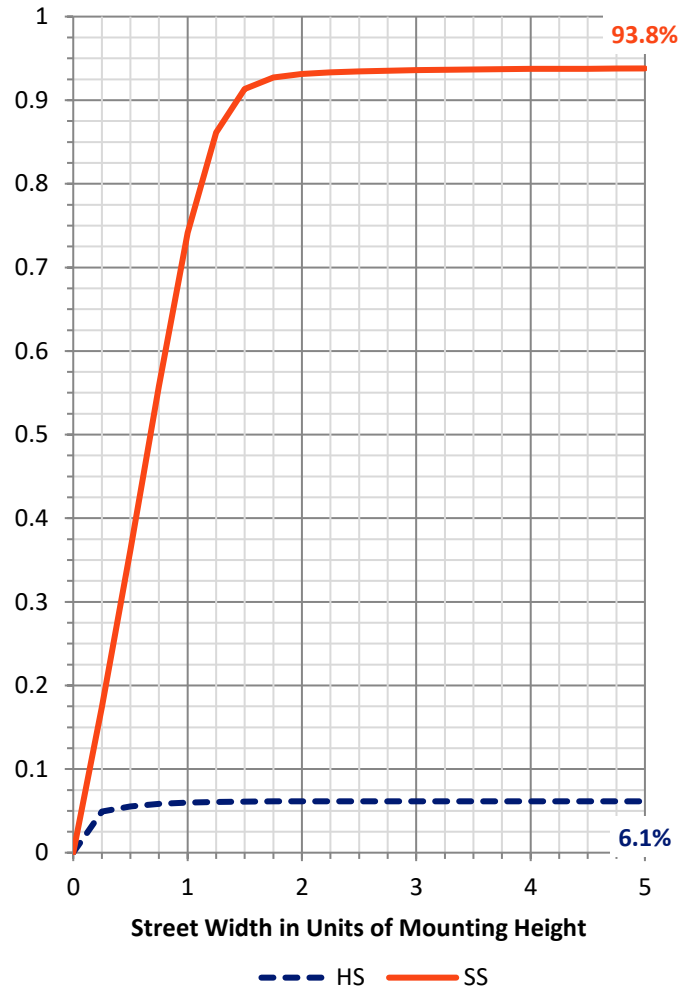
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 618.3    | 0.0    | 618.3   |
|                    | % Fixture | 6.2      | 0.0    | 6.2     |
| <b>Street Side</b> | Lumens    | 9402.5   | 0.0    | 9402.5  |
|                    | % Fixture | 93.8     | 0.0    | 93.8    |
| <b>Total</b>       | Lumens    | 10020.8  | 0.0    | 10020.8 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 228.8   | 2.3       |
| 10°-20°   | 551.6   | 5.5       |
| 20°-30°   | 918.6   | 9.2       |
| 30°-40°   | 1565.3  | 15.6      |
| 40°-50°   | 2555.2  | 25.5      |
| 50°-60°   | 2675.1  | 26.7      |
| 60°-70°   | 1349.3  | 13.5      |
| 70°-80°   | 170.4   | 1.7       |
| 80°-90°   | 6.5     | 0.1       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 10020.8 | 100.0     |
| 0°-180°   | 10020.8 | 100.0     |

**Coefficient of Utilization**



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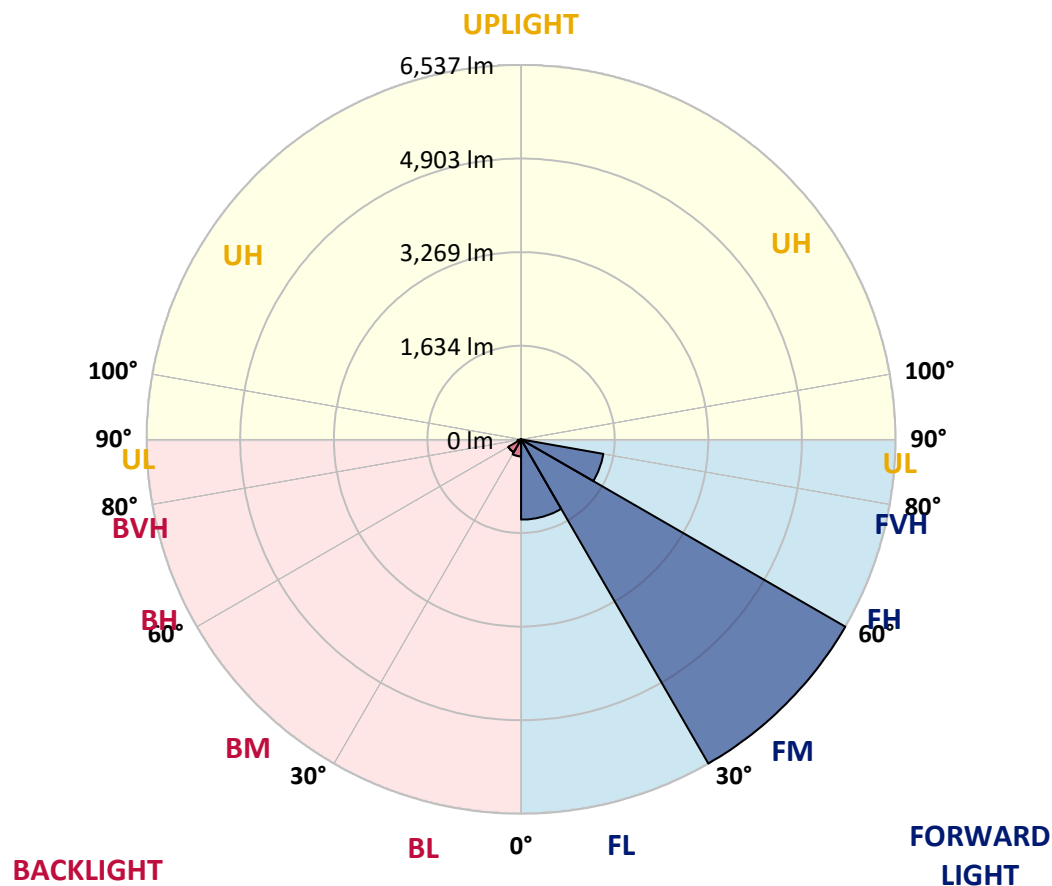
CATALOG NUMBER: GWS-SA2F-722-U-AFL-W-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1401.8 | 14.0      |                         |      |         |
| FM   | (30°-60°)   | 6537.1 | 65.2      |                         |      |         |
| FH   | (60°-80°)   | 1457.7 | 14.5      |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 5.9    | 0.1       |                         |      | G0/10   |
| BL   | (0°-30°)    | 297.2  | 3.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 258.5  | 2.6       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 62.0   | 0.6       | B0/110                  |      | G0/110  |
| BVH  | (80°-90°)   | 0.6    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G1**

Type II Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 56°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 |
| 2.5°  | 3018.0 | 3003.4 | 3025.7 | 3000.0 | 2956.3 | 2919.5 | 2871.5 | 2854.3 | 2777.3 | 2704.4 | 2634.2 |
| 5°    | 3384.6 | 3388.9 | 3382.0 | 3346.1 | 3284.4 | 3215.9 | 3119.1 | 3097.6 | 2963.1 | 2824.4 | 2674.5 |
| 7.5°  | 3475.4 | 3472.8 | 3487.4 | 3501.1 | 3490.8 | 3456.6 | 3351.2 | 3329.8 | 3162.7 | 2954.6 | 2736.1 |
| 10°   | 3195.3 | 3197.0 | 3227.0 | 3319.5 | 3434.3 | 3553.4 | 3537.1 | 3525.1 | 3361.5 | 3101.9 | 2804.7 |
| 12.5° | 2799.5 | 2814.9 | 2846.6 | 2978.6 | 3173.0 | 3443.7 | 3611.6 | 3623.6 | 3543.9 | 3263.8 | 2885.2 |
| 15°   | 2628.2 | 2631.6 | 2657.3 | 2737.0 | 2881.8 | 3215.9 | 3579.9 | 3613.3 | 3696.4 | 3426.6 | 2972.6 |
| 17.5° | 2623.9 | 2628.2 | 2639.3 | 2674.5 | 2768.7 | 3036.8 | 3478.0 | 3536.2 | 3811.2 | 3601.3 | 3077.1 |
| 20°   | 2785.0 | 2782.4 | 2774.7 | 2755.8 | 2797.0 | 2977.7 | 3383.8 | 3448.0 | 3873.8 | 3771.8 | 3182.4 |
| 22.5° | 3077.1 | 3073.7 | 3039.4 | 2961.4 | 2928.0 | 3031.7 | 3337.5 | 3395.7 | 3911.5 | 3923.4 | 3269.0 |
| 25°   | 3413.7 | 3437.7 | 3373.5 | 3255.3 | 3173.0 | 3169.6 | 3378.6 | 3419.7 | 3944.0 | 4057.9 | 3328.1 |
| 27.5° | 3783.0 | 3790.7 | 3735.8 | 3603.1 | 3484.0 | 3390.6 | 3497.7 | 3528.5 | 3980.0 | 4177.9 | 3361.5 |
| 30°   | 4188.1 | 4185.6 | 4123.0 | 3968.8 | 3824.1 | 3689.6 | 3698.1 | 3710.1 | 4063.9 | 4314.9 | 3398.3 |
| 32.5° | 4694.4 | 4705.6 | 4594.2 | 4384.3 | 4210.4 | 4024.5 | 3960.3 | 3962.0 | 4215.6 | 4491.4 | 3454.0 |
| 35°   | 5382.3 | 5354.9 | 5207.6 | 4908.6 | 4612.2 | 4411.7 | 4302.1 | 4292.7 | 4449.4 | 4728.7 | 3550.8 |
| 37.5° | 6037.6 | 6040.2 | 5886.0 | 5557.1 | 5182.7 | 4866.6 | 4711.6 | 4685.9 | 4778.4 | 5057.6 | 3711.9 |
| 40°   | 6492.5 | 6501.1 | 6436.8 | 6264.7 | 5868.0 | 5420.9 | 5193.0 | 5166.4 | 5205.0 | 5474.0 | 3922.6 |
| 42.5° | 6733.2 | 6757.2 | 6775.2 | 6815.5 | 6514.8 | 6113.0 | 5762.7 | 5760.1 | 5719.8 | 5948.6 | 4166.7 |
| 45°   | 6742.7 | 6778.6 | 6888.3 | 7163.3 | 7197.5 | 6902.9 | 6521.7 | 6464.3 | 6309.2 | 6456.5 | 4385.2 |
| 47.5° | 6370.0 | 6453.1 | 6686.1 | 7231.0 | 7590.8 | 7688.4 | 7310.6 | 7275.5 | 6840.3 | 6858.3 | 4548.8 |
| 50°   | 5501.4 | 5587.9 | 6017.1 | 6884.0 | 7690.1 | 8312.0 | 8176.7 | 8103.9 | 7284.1 | 7123.9 | 4627.6 |
| 52.5° | 4610.5 | 4689.3 | 4980.5 | 6058.2 | 7278.1 | 8508.2 | 8906.6 | 8820.0 | 7682.4 | 7216.4 | 4595.1 |
| 55°   | 3208.1 | 3313.5 | 3597.9 | 4528.2 | 6328.9 | 8126.2 | 9148.1 | 9130.1 | 8037.9 | 7158.1 | 4544.5 |
| 57.5° | 1572.8 | 1677.3 | 1960.9 | 2791.8 | 4688.4 | 7094.8 | 8778.9 | 8874.0 | 8250.4 | 7095.6 | 4503.4 |
| 60°   | 657.0  | 699.9  | 797.5  | 1225.0 | 2623.1 | 5361.8 | 7945.4 | 8077.3 | 8120.2 | 7010.8 | 4499.1 |
| 62.5° | 381.2  | 388.1  | 398.3  | 508.0  | 1020.3 | 3073.7 | 6591.0 | 6778.6 | 7435.7 | 6898.6 | 4431.4 |
| 65°   | 287.8  | 290.4  | 286.1  | 311.8  | 421.5  | 1165.9 | 4762.1 | 5017.4 | 6206.4 | 6460.0 | 4164.2 |
| 67.5° | 236.4  | 236.4  | 225.3  | 230.4  | 264.7  | 436.9  | 2629.1 | 2985.4 | 4592.5 | 5309.5 | 3438.6 |
| 70°   | 188.5  | 192.7  | 187.6  | 180.8  | 189.3  | 241.6  | 935.5  | 1159.9 | 2674.5 | 3135.3 | 2005.4 |
| 72.5° | 143.1  | 143.1  | 151.6  | 146.5  | 140.5  | 151.6  | 326.4  | 366.6  | 1073.4 | 1307.2 | 723.9  |
| 75°   | 110.5  | 113.9  | 119.9  | 114.8  | 106.2  | 89.9   | 156.8  | 166.2  | 323.8  | 304.1  | 161.9  |
| 77.5° | 56.5   | 57.4   | 76.2   | 84.0   | 78.8   | 54.8   | 68.5   | 75.4   | 105.4  | 94.2   | 60.0   |
| 80°   | 34.3   | 36.0   | 42.8   | 66.0   | 52.3   | 29.1   | 28.3   | 30.0   | 49.7   | 42.8   | 24.8   |
| 82.5° | 14.6   | 15.4   | 24.0   | 24.0   | 21.4   | 11.1   | 11.1   | 11.1   | 24.0   | 22.3   | 10.3   |
| 85°   | 0.0    | 0.0    | 4.3    | 3.4    | 3.4    | 4.3    | 4.3    | 4.3    | 6.0    | 8.6    | 5.1    |
| 87.5° | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.9    | 2.6    | 2.6    |
| 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: P633569

CATALOG NUMBER: GWS-SA2F-722-U-AFL-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 | 2588.8 |
| 2.5°  | 2588.8 | 2534.0 | 2460.3 | 2393.5 | 2303.5 | 2253.0 | 2182.7 | 2125.3 | 2076.5 | 2061.1 | 2054.2 |
| 5°    | 2589.6 | 2495.4 | 2337.8 | 2180.2 | 1986.6 | 1834.1 | 1677.3 | 1553.1 | 1451.2 | 1418.6 | 1410.0 |
| 7.5°  | 2606.8 | 2468.0 | 2212.7 | 1926.6 | 1602.8 | 1335.5 | 1096.5 | 882.3  | 783.0  | 749.6  | 742.7  |
| 10°   | 2629.9 | 2444.9 | 2067.9 | 1622.5 | 1157.3 | 813.8  | 576.5  | 439.5  | 374.4  | 338.4  | 343.5  |
| 12.5° | 2659.9 | 2426.0 | 1907.8 | 1293.5 | 765.8  | 447.2  | 317.0  | 265.6  | 251.9  | 245.0  | 241.6  |
| 15°   | 2700.2 | 2403.8 | 1709.0 | 967.2  | 469.4  | 287.8  | 244.1  | 230.4  | 225.3  | 221.9  | 221.0  |
| 17.5° | 2741.3 | 2378.1 | 1506.8 | 680.2  | 311.8  | 239.0  | 219.3  | 212.4  | 209.0  | 206.5  | 205.6  |
| 20°   | 2785.0 | 2334.4 | 1269.6 | 468.6  | 245.9  | 215.0  | 202.2  | 194.5  | 190.2  | 185.9  | 185.0  |
| 22.5° | 2803.8 | 2264.1 | 1042.5 | 328.1  | 218.4  | 197.9  | 181.6  | 172.2  | 167.0  | 163.6  | 163.6  |
| 25°   | 2785.8 | 2150.2 | 807.8  | 249.3  | 198.7  | 179.0  | 162.8  | 152.5  | 148.2  | 144.8  | 144.8  |
| 27.5° | 2737.8 | 2003.7 | 589.4  | 206.5  | 177.3  | 159.3  | 143.9  | 134.5  | 131.1  | 129.4  | 129.4  |
| 30°   | 2684.7 | 1818.7 | 415.5  | 177.3  | 153.3  | 138.8  | 125.9  | 119.9  | 119.1  | 117.4  | 117.4  |
| 32.5° | 2639.3 | 1645.6 | 286.1  | 155.9  | 135.4  | 120.8  | 112.2  | 109.7  | 110.5  | 108.8  | 109.7  |
| 35°   | 2614.5 | 1476.0 | 212.4  | 138.8  | 120.8  | 107.1  | 102.8  | 102.8  | 102.8  | 101.9  | 101.9  |
| 37.5° | 2624.8 | 1309.0 | 173.0  | 126.8  | 107.9  | 97.7   | 93.4   | 95.1   | 96.8   | 96.8   | 96.8   |
| 40°   | 2676.2 | 1160.8 | 153.3  | 115.6  | 96.8   | 89.1   | 85.7   | 88.2   | 90.8   | 92.5   | 92.5   |
| 42.5° | 2741.3 | 1040.8 | 138.8  | 106.2  | 89.1   | 80.5   | 78.8   | 81.4   | 84.0   | 85.7   | 85.7   |
| 45°   | 2782.4 | 920.0  | 124.2  | 94.2   | 81.4   | 71.1   | 71.1   | 74.5   | 73.7   | 74.5   | 74.5   |
| 47.5° | 2801.2 | 824.1  | 109.7  | 81.4   | 69.4   | 61.7   | 62.5   | 64.2   | 62.5   | 64.2   | 64.2   |
| 50°   | 2755.0 | 727.3  | 96.8   | 67.7   | 57.4   | 54.0   | 55.7   | 54.8   | 54.8   | 58.3   | 58.3   |
| 52.5° | 2670.2 | 655.3  | 85.7   | 57.4   | 48.8   | 48.0   | 49.7   | 46.3   | 47.1   | 47.1   | 46.3   |
| 55°   | 2607.6 | 614.2  | 76.2   | 49.7   | 42.0   | 42.8   | 42.0   | 36.0   | 32.6   | 29.1   | 28.3   |
| 57.5° | 2576.8 | 597.9  | 69.4   | 44.5   | 37.7   | 37.7   | 34.3   | 24.8   | 18.8   | 14.6   | 12.8   |
| 60°   | 2569.9 | 578.2  | 62.5   | 38.5   | 33.4   | 31.7   | 24.8   | 14.6   | 9.4    | 6.9    | 6.0    |
| 62.5° | 2504.8 | 530.3  | 56.5   | 30.8   | 29.1   | 25.7   | 15.4   | 8.6    | 5.1    | 3.4    | 2.6    |
| 65°   | 2291.5 | 436.0  | 50.5   | 24.0   | 22.3   | 18.8   | 9.4    | 5.1    | 2.6    | 0.9    | 0.0    |
| 67.5° | 1822.9 | 309.2  | 44.5   | 18.0   | 15.4   | 12.0   | 6.0    | 3.4    | 0.9    | 0.0    | 0.0    |
| 70°   | 1051.1 | 167.0  | 36.8   | 12.8   | 10.3   | 7.7    | 4.3    | 1.7    | 0.0    | 0.0    | 0.0    |
| 72.5° | 351.2  | 78.0   | 28.3   | 8.6    | 7.7    | 6.0    | 2.6    | 0.9    | 0.0    | 0.0    | 0.0    |
| 75°   | 77.1   | 46.3   | 18.8   | 6.0    | 5.1    | 4.3    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    |
| 77.5° | 29.1   | 32.6   | 9.4    | 4.3    | 3.4    | 2.6    | 0.9    | 0.0    | 0.0    | 0.0    | 0.0    |
| 80°   | 11.1   | 21.4   | 4.3    | 2.6    | 2.6    | 0.9    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 82.5° | 6.0    | 8.6    | 2.6    | 1.7    | 1.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 3.4    | 4.3    | 1.7    | 0.9    | 0.9    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 1.7    | 0.9    | 0.9    | 0.9    | 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    |



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

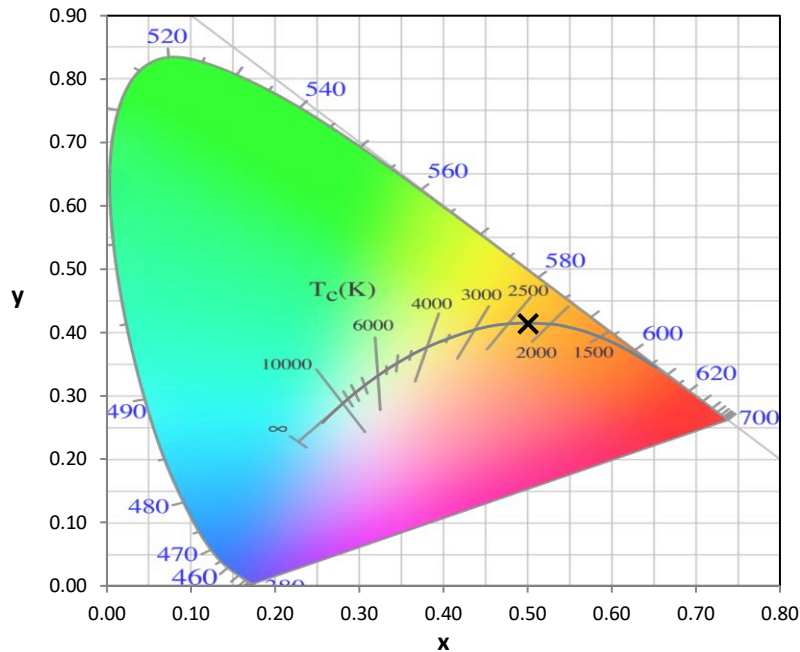
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.7/41%  
 Sphere Temperature (°C): 25.6

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

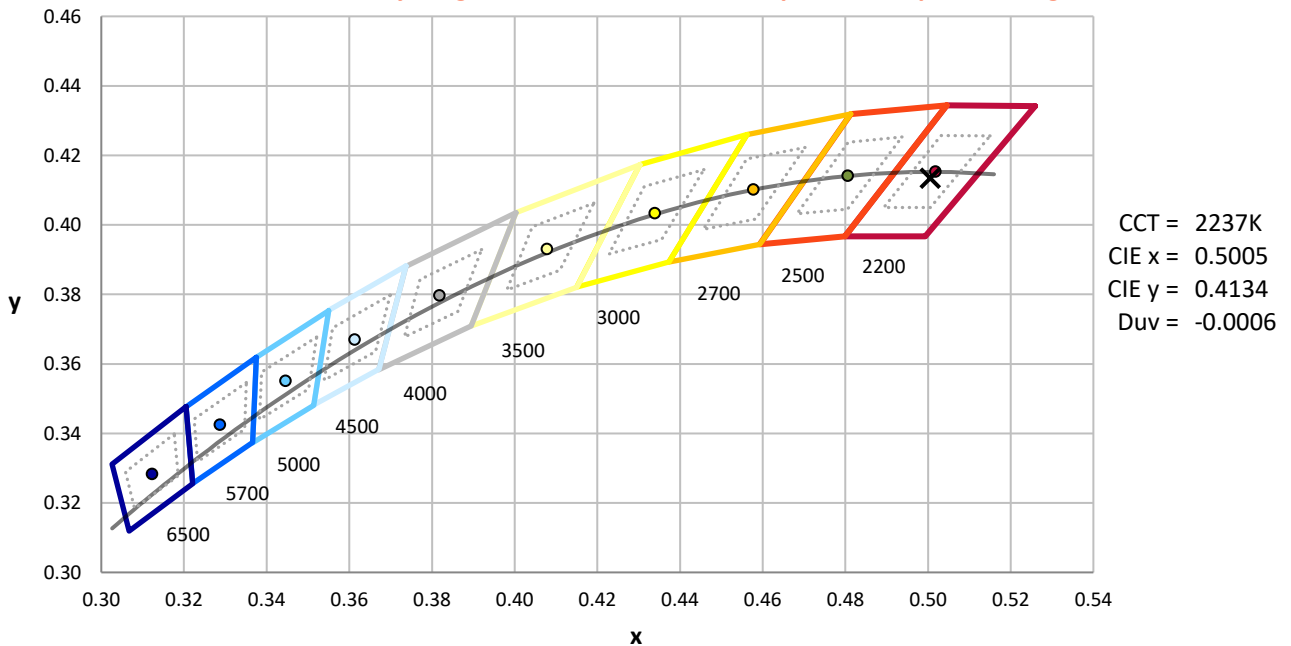
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| 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            |

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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 2200K 4-step quadrangle

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**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               |           |                  |                  |

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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               |           |                  |                  |

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**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               |           |                  |                  |

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### Summary

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



### Color Vector Graphics





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

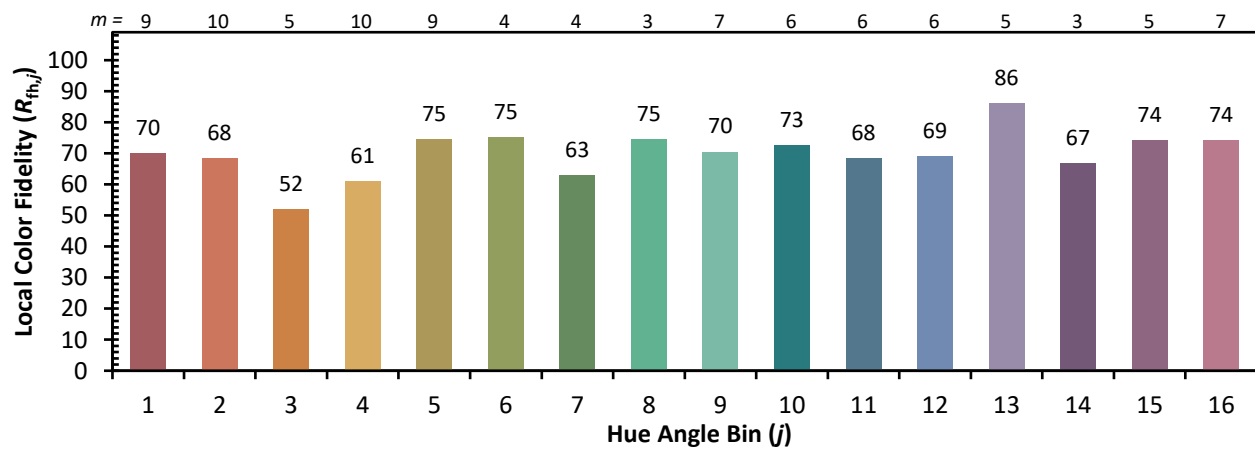
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 87 | CES26 = 56 | CES51 = 74 | CES76 = 56 |
| CES02 = 65 | CES27 = 76 | CES52 = 76 | CES77 = 81 |
| CES03 = 32 | CES28 = 83 | CES53 = 65 | CES78 = 63 |
| CES04 = 72 | CES29 = 46 | CES54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



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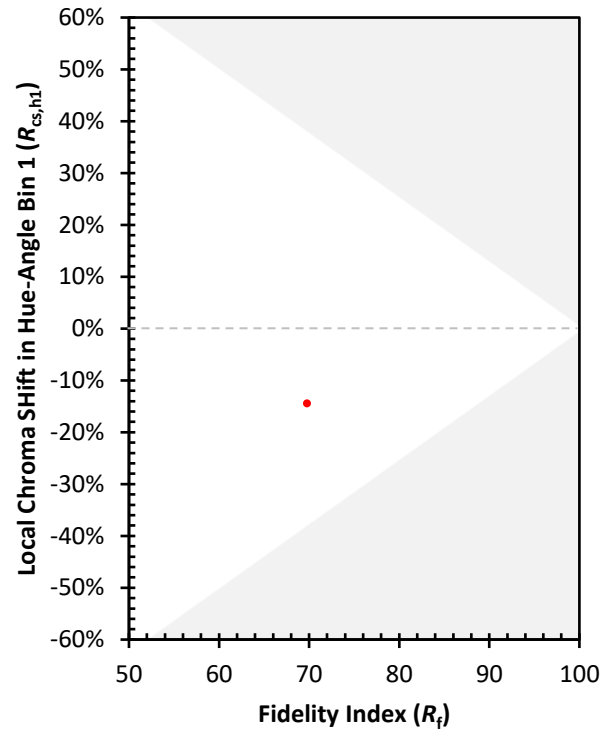
Color Rendition by Hue-Angle Bin



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**Measure Comparisons**



(END OF REPORT)