

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: P643935

Luminaire Tested: GWS-SA6F-830-U-T2-W-HSS

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P643935  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-22)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA6F-830-U-T2-W-HSS  
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND  
TYPE II OPTICS WITH HOUSE SIDE SHIELD  
Light Source: (96) 3000K CCT, 80 CRI LEDS  
Ballast/Driver: -

**Summary**

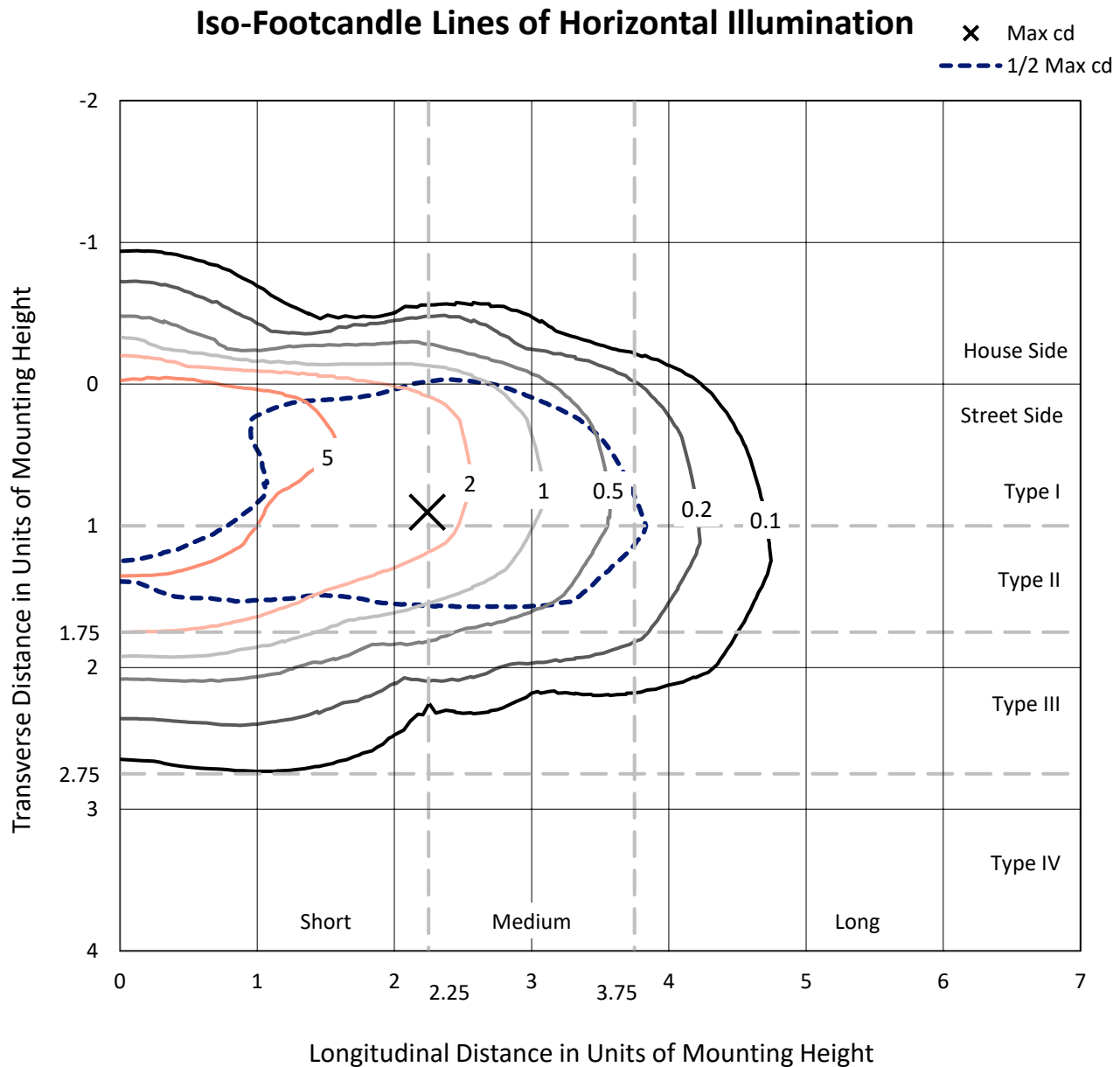
Lumens per Lamp: N/A  
Luminaire Lumens: 29615.4 lumens  
Efficiency: N/A  
Efficacy: 79.5 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B2 - U0 - G4

Input Watts (W): 372.6  
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: P643935

CATALOG NUMBER: GWS-SA6F-830-U-T2-W-HSS

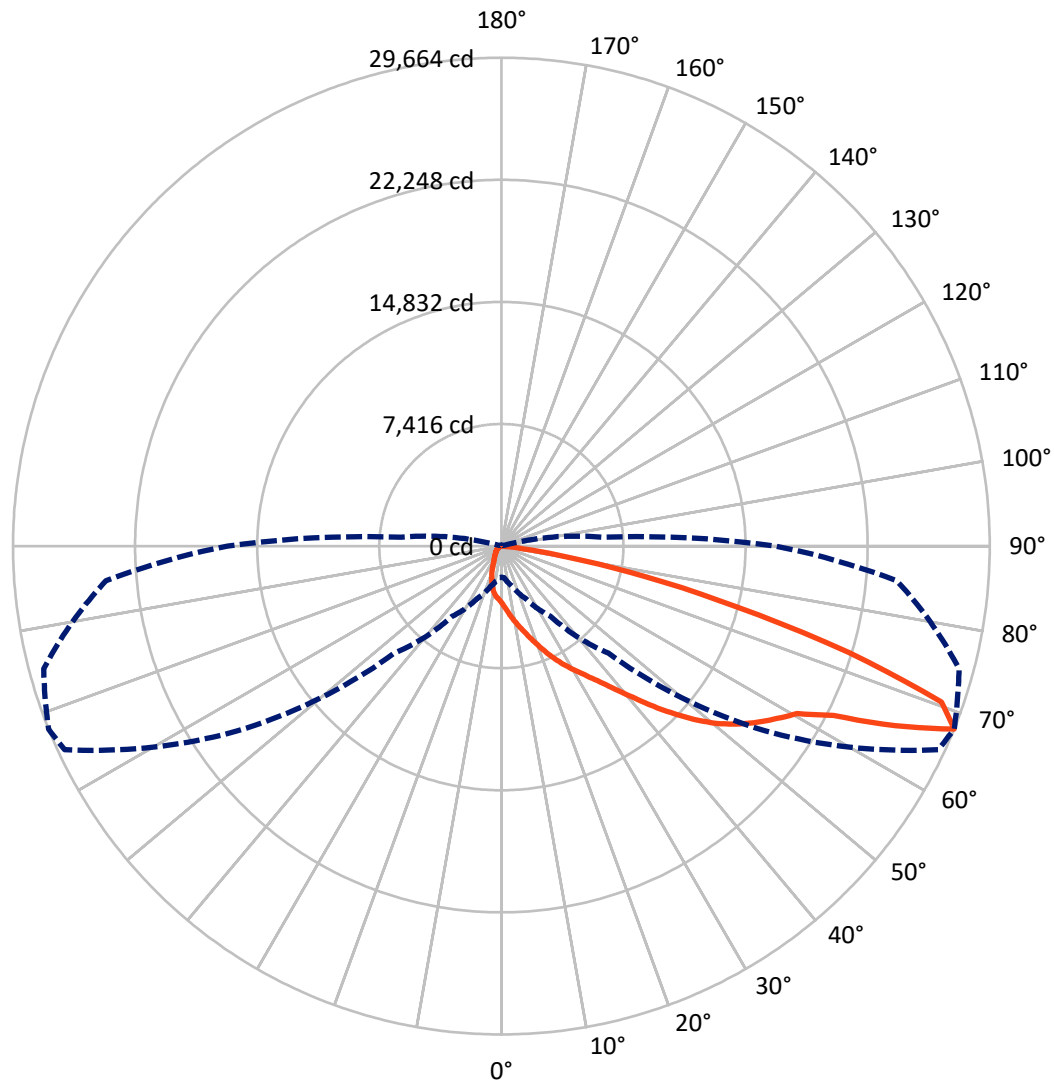


Based on 25 foot mounting height. Maximum calculated value = 8.9 fc  
 Type II - Short - N/A

REPORT NUMBER: P643935

CATALOG NUMBER: GWS-SA6F-830-U-T2-W-HSS

## Luminous Intensity Polar Plot



— Vertical Plane Through 68-Deg Lateral    - - - Horizontal Cone Through 67.5-Deg Vertical

REPORT NUMBER: P643935

CATALOG NUMBER: GWS-SA6F-830-U-T2-W-HSS

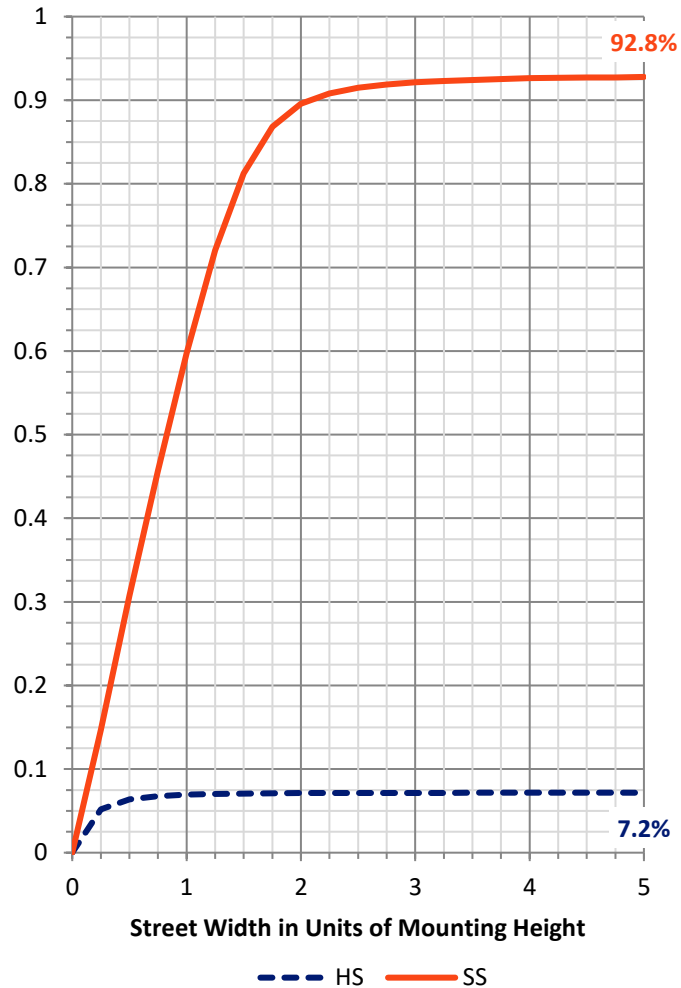
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2138.6   | 0.0    | 2138.6  |
|                    | % Fixture | 7.2      | 0.0    | 7.2     |
| <b>Street Side</b> | Lumens    | 27476.8  | 0.0    | 27476.8 |
|                    | % Fixture | 92.8     | 0.0    | 92.8    |
| <b>Total</b>       | Lumens    | 29615.4  | 0.0    | 29615.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 336.1   | 1.1       |
| 10°-20°   | 965.3   | 3.3       |
| 20°-30°   | 1658.8  | 5.6       |
| 30°-40°   | 2884.1  | 9.7       |
| 40°-50°   | 5032.4  | 17.0      |
| 50°-60°   | 7590.2  | 25.6      |
| 60°-70°   | 7611.0  | 25.7      |
| 70°-80°   | 3358.0  | 11.3      |
| 80°-90°   | 179.4   | 0.6       |
| 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°    | 29615.4 | 100.0     |
| 0°-180°   | 29615.4 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P643935

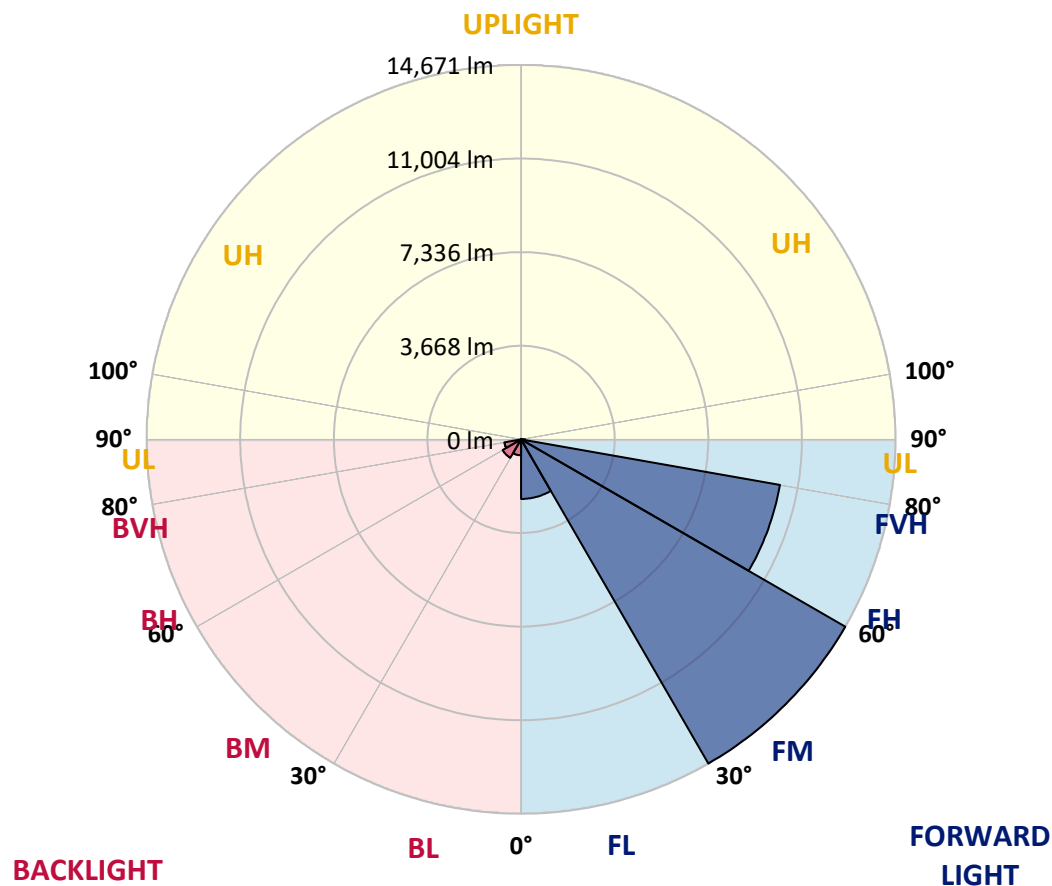
CATALOG NUMBER: GWS-SA6F-830-U-T2-W-HSS

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |          |
|------|-------------|---------|-----------|-------------------------|------|----------|
|      |             |         |           | B                       | U    | G        |
| FL   | (0°-30°)    | 2334.6  | 7.9       |                         |      |          |
| FM   | (30°-60°)   | 14671.4 | 49.5      |                         |      |          |
| FH   | (60°-80°)   | 10301.6 | 34.8      |                         |      | G4/12000 |
| FVH  | (80°-90°)   | 169.2   | 0.6       |                         |      | G2/225   |
| BL   | (0°-30°)    | 625.7   | 2.1       | B2/1000                 |      |          |
| BM   | (30°-60°)   | 835.4   | 2.8       | B1/1000                 |      |          |
| BH   | (60°-80°)   | 667.4   | 2.3       | B2/1000                 |      | G2/1000  |
| BVH  | (80°-90°)   | 10.1    | 0.0       |                         |      | G1/100   |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |          |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |          |

**BUG Rating: B2-U0-G4**

Type II Short



REPORT NUMBER: P643935

CATALOG NUMBER: GWS-SA6F-830-U-T2-W-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 55°     | 65°     | 68°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  | 3446.5  |
| 2.5°  | 4013.3  | 4038.8  | 4013.3  | 4019.0  | 3945.3  | 3911.3  | 3837.6  | 3735.6  | 3710.1  | 3644.9  | 3545.7  |
| 5°    | 4503.7  | 4526.3  | 4500.8  | 4495.2  | 4410.1  | 4347.8  | 4225.9  | 4050.2  | 3999.2  | 3871.6  | 3676.1  |
| 7.5°  | 4770.1  | 4784.3  | 4792.8  | 4806.9  | 4775.8  | 4724.7  | 4614.2  | 4396.0  | 4342.1  | 4135.2  | 3860.3  |
| 10°   | 4798.4  | 4809.8  | 4852.3  | 4937.3  | 4999.7  | 5030.8  | 4968.5  | 4767.3  | 4682.2  | 4481.0  | 4087.0  |
| 12.5° | 4719.1  | 4736.1  | 4804.1  | 4945.8  | 5118.7  | 5277.4  | 5317.1  | 5141.4  | 5064.9  | 4806.9  | 4353.4  |
| 15°   | 4614.2  | 4628.4  | 4721.9  | 4914.6  | 5175.4  | 5467.3  | 5631.7  | 5555.2  | 5470.2  | 5200.9  | 4648.2  |
| 17.5° | 4452.6  | 4472.5  | 4602.9  | 4863.6  | 5200.9  | 5617.5  | 5971.8  | 5997.3  | 5937.8  | 5645.9  | 4974.2  |
| 20°   | 4362.0  | 4376.1  | 4492.3  | 4761.6  | 5183.9  | 5728.1  | 6289.3  | 6530.2  | 6465.0  | 6158.9  | 5348.3  |
| 22.5° | 4438.5  | 4449.8  | 4526.3  | 4736.1  | 5127.2  | 5790.4  | 6584.0  | 7063.0  | 7026.2  | 6708.7  | 5742.2  |
| 25°   | 4840.9  | 4877.8  | 4832.4  | 4869.3  | 5152.7  | 5824.4  | 6822.1  | 7595.9  | 7604.4  | 7284.1  | 6150.4  |
| 27.5° | 5657.2  | 5609.0  | 5501.3  | 5317.1  | 5351.1  | 5915.1  | 7026.2  | 8097.5  | 8171.2  | 7845.3  | 6513.2  |
| 30°   | 6487.7  | 6459.3  | 6394.1  | 6107.9  | 5869.8  | 6116.4  | 7199.1  | 8610.5  | 8726.7  | 8398.0  | 6836.3  |
| 32.5° | 7420.1  | 7448.5  | 7332.3  | 6989.3  | 6584.0  | 6524.5  | 7377.6  | 9098.0  | 9316.3  | 9024.3  | 7216.1  |
| 35°   | 8534.0  | 8542.5  | 8312.9  | 7933.1  | 7474.0  | 7199.1  | 7697.9  | 9636.5  | 10039.0 | 9823.6  | 7723.4  |
| 37.5° | 9619.5  | 9670.5  | 9545.8  | 8947.8  | 8539.7  | 8038.0  | 8227.9  | 10328.1 | 10895.0 | 10809.9 | 8361.1  |
| 40°   | 10580.4 | 10659.7 | 10620.0 | 10041.8 | 9506.2  | 9083.9  | 9049.8  | 11138.7 | 11929.5 | 12025.8 | 9202.9  |
| 42.5° | 11345.6 | 11396.6 | 11427.8 | 11016.8 | 10543.5 | 10305.4 | 10064.5 | 12079.7 | 13151.0 | 13545.0 | 10234.6 |
| 45°   | 12153.4 | 12170.4 | 12235.6 | 11957.8 | 11544.0 | 11563.8 | 11263.4 | 13221.9 | 14437.8 | 15228.6 | 11419.3 |
| 47.5° | 13182.2 | 13238.9 | 13207.7 | 12915.8 | 12541.7 | 12765.6 | 12502.0 | 14398.1 | 15707.6 | 17025.5 | 12632.4 |
| 50°   | 14435.0 | 14494.5 | 14466.1 | 14126.0 | 13709.4 | 13802.9 | 13638.5 | 15540.3 | 16932.0 | 18720.4 | 13641.4 |
| 52.5° | 15081.2 | 15129.4 | 15480.8 | 15633.9 | 15415.6 | 14820.4 | 14607.9 | 16795.9 | 17966.5 | 20114.9 | 14568.2 |
| 55°   | 14769.4 | 14803.4 | 15568.7 | 16214.9 | 17014.2 | 16419.0 | 15582.8 | 17765.2 | 18879.1 | 21203.2 | 15256.9 |
| 57.5° | 13477.0 | 13661.2 | 14701.4 | 15795.4 | 17476.1 | 17997.7 | 17164.4 | 18819.6 | 19757.7 | 21960.0 | 15934.3 |
| 60°   | 10826.9 | 10818.4 | 12309.3 | 14273.4 | 16574.8 | 18431.3 | 19397.8 | 20245.2 | 20639.2 | 22541.0 | 16841.3 |
| 62.5° | 5983.2  | 6037.0  | 8021.0  | 10608.7 | 14069.3 | 17308.9 | 21072.8 | 22708.2 | 22648.7 | 23555.7 | 18261.2 |
| 65°   | 2978.8  | 3086.5  | 4163.6  | 6076.7  | 9361.6  | 14304.6 | 21361.9 | 26466.5 | 26296.4 | 25945.0 | 21194.7 |
| 67.5° | 1890.5  | 1933.0  | 2528.2  | 3531.5  | 5203.7  | 9194.4  | 19562.2 | 29269.6 | 29663.5 | 28779.2 | 24105.5 |
| 70°   | 1224.4  | 1295.3  | 1757.3  | 2414.8  | 3140.4  | 4738.9  | 14330.1 | 27452.8 | 28356.9 | 28467.5 | 22291.6 |
| 72.5° | 666.1   | 717.1   | 1122.4  | 1723.2  | 2267.4  | 2369.5  | 8049.3  | 20602.4 | 22056.3 | 24148.0 | 17439.3 |
| 75°   | 379.8   | 416.6   | 615.0   | 1170.6  | 1663.7  | 1442.6  | 3568.4  | 13791.6 | 14718.4 | 17257.9 | 12496.3 |
| 77.5° | 229.6   | 260.8   | 345.8   | 569.7   | 1043.0  | 963.7   | 1349.1  | 8395.1  | 8984.7  | 10296.9 | 6558.5  |
| 80°   | 104.9   | 124.7   | 218.2   | 314.6   | 569.7   | 456.3   | 515.8   | 3914.1  | 4041.7  | 4225.9  | 2171.1  |
| 82.5° | 48.2    | 56.7    | 99.2    | 187.1   | 323.1   | 263.6   | 198.4   | 904.1   | 1272.6  | 1204.6  | 552.7   |
| 85°   | 5.7     | 5.7     | 36.8    | 76.5    | 90.7    | 68.0    | 82.2    | 204.1   | 257.9   | 362.8   | 158.7   |
| 87.5° | 0.0     | 0.0     | 2.8     | 2.8     | 5.7     | 8.5     | 17.0    | 25.5    | 36.8    | 59.5    | 39.7    |
| 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: P643935

CATALOG NUMBER: GWS-SA6F-830-U-T2-W-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3446.5  | 3446.5 | 3446.5 | 3446.5 | 3446.5 | 3446.5 | 3446.5 | 3446.5 | 3446.5 | 3446.5 | 3446.5 |
| 2.5°  | 3500.3  | 3421.0 | 3350.1 | 3245.2 | 3174.4 | 3095.0 | 3041.2 | 2976.0 | 2950.5 | 2930.6 | 2902.3 |
| 5°    | 3579.7  | 3452.1 | 3279.3 | 3086.5 | 2927.8 | 2777.6 | 2638.7 | 2548.0 | 2468.7 | 2457.3 | 2417.6 |
| 7.5°  | 3710.1  | 3520.2 | 3228.2 | 2913.6 | 2644.4 | 2395.0 | 2199.4 | 2040.7 | 1961.3 | 1935.8 | 1890.5 |
| 10°   | 3883.0  | 3622.2 | 3151.7 | 2669.9 | 2281.6 | 1984.0 | 1762.9 | 1584.4 | 1459.7 | 1414.3 | 1380.3 |
| 12.5° | 4075.7  | 3715.7 | 3029.8 | 2369.5 | 1927.3 | 1587.2 | 1306.6 | 1116.7 | 1037.3 | 1009.0 | 983.5  |
| 15°   | 4296.8  | 3803.6 | 2837.1 | 2069.0 | 1581.5 | 1167.7 | 969.3  | 887.1  | 853.1  | 844.6  | 836.1  |
| 17.5° | 4509.3  | 3860.3 | 2607.5 | 1757.3 | 1215.9 | 907.0  | 813.4  | 782.3  | 773.8  | 765.3  | 759.6  |
| 20°   | 4750.2  | 3900.0 | 2338.3 | 1462.5 | 943.8  | 768.1  | 722.7  | 700.1  | 683.1  | 666.1  | 663.2  |
| 22.5° | 4996.8  | 3900.0 | 2046.3 | 1173.4 | 790.8  | 688.7  | 637.7  | 595.2  | 564.0  | 547.0  | 541.3  |
| 25°   | 5232.1  | 3846.1 | 1757.3 | 938.1  | 697.2  | 612.2  | 547.0  | 498.8  | 456.3  | 436.5  | 430.8  |
| 27.5° | 5399.3  | 3707.2 | 1505.0 | 793.6  | 632.0  | 544.2  | 464.8  | 411.0  | 377.0  | 357.1  | 354.3  |
| 30°   | 5504.2  | 3500.3 | 1272.6 | 708.6  | 575.4  | 473.3  | 394.0  | 348.6  | 323.1  | 308.9  | 303.3  |
| 32.5° | 5583.5  | 3245.2 | 1065.7 | 649.0  | 521.5  | 411.0  | 342.9  | 306.1  | 283.4  | 272.1  | 269.3  |
| 35°   | 5742.2  | 3004.3 | 912.6  | 595.2  | 464.8  | 360.0  | 300.4  | 272.1  | 255.1  | 240.9  | 238.1  |
| 37.5° | 5963.3  | 2803.1 | 790.8  | 547.0  | 411.0  | 320.3  | 272.1  | 246.6  | 232.4  | 218.2  | 215.4  |
| 40°   | 6289.3  | 2675.6 | 700.1  | 498.8  | 362.8  | 289.1  | 249.4  | 226.7  | 206.9  | 192.7  | 189.9  |
| 42.5° | 6790.9  | 2616.0 | 640.5  | 450.6  | 320.3  | 260.8  | 229.6  | 201.2  | 181.4  | 167.2  | 164.4  |
| 45°   | 7389.0  | 2647.2 | 589.5  | 402.5  | 291.9  | 240.9  | 204.1  | 175.7  | 155.9  | 141.7  | 138.9  |
| 47.5° | 8029.5  | 2757.8 | 547.0  | 357.1  | 263.6  | 221.1  | 181.4  | 150.2  | 133.2  | 119.0  | 116.2  |
| 50°   | 8698.4  | 2939.1 | 510.2  | 314.6  | 240.9  | 198.4  | 155.9  | 130.4  | 113.4  | 102.0  | 99.2   |
| 52.5° | 9279.4  | 3185.7 | 473.3  | 283.4  | 221.1  | 175.7  | 136.0  | 113.4  | 96.4   | 85.0   | 82.2   |
| 55°   | 9834.9  | 3418.1 | 445.0  | 255.1  | 198.4  | 153.1  | 119.0  | 96.4   | 82.2   | 70.9   | 68.0   |
| 57.5° | 10438.6 | 3664.7 | 411.0  | 229.6  | 178.6  | 136.0  | 104.9  | 82.2   | 70.9   | 59.5   | 56.7   |
| 60°   | 11317.3 | 4030.3 | 360.0  | 209.7  | 155.9  | 119.0  | 90.7   | 73.7   | 62.4   | 48.2   | 45.3   |
| 62.5° | 12584.2 | 4696.4 | 303.3  | 181.4  | 133.2  | 102.0  | 76.5   | 62.4   | 51.0   | 39.7   | 34.0   |
| 65°   | 14953.6 | 5830.1 | 249.4  | 150.2  | 107.7  | 85.0   | 65.2   | 51.0   | 39.7   | 28.3   | 25.5   |
| 67.5° | 16659.9 | 6124.9 | 201.2  | 121.9  | 87.9   | 65.2   | 53.9   | 39.7   | 28.3   | 19.8   | 17.0   |
| 70°   | 14565.3 | 4398.8 | 155.9  | 99.2   | 73.7   | 51.0   | 42.5   | 31.2   | 19.8   | 14.2   | 11.3   |
| 72.5° | 10974.3 | 2874.0 | 116.2  | 76.5   | 56.7   | 42.5   | 31.2   | 25.5   | 17.0   | 11.3   | 8.5    |
| 75°   | 7734.7  | 1660.9 | 85.0   | 56.7   | 39.7   | 31.2   | 25.5   | 19.8   | 14.2   | 8.5    | 8.5    |
| 77.5° | 3965.2  | 685.9  | 59.5   | 39.7   | 28.3   | 19.8   | 17.0   | 11.3   | 11.3   | 8.5    | 5.7    |
| 80°   | 1204.6  | 226.7  | 34.0   | 25.5   | 19.8   | 14.2   | 8.5    | 8.5    | 8.5    | 5.7    | 2.8    |
| 82.5° | 274.9   | 73.7   | 19.8   | 19.8   | 14.2   | 11.3   | 8.5    | 2.8    | 2.8    | 0.0    | 0.0    |
| 85°   | 70.9    | 22.7   | 17.0   | 14.2   | 14.2   | 11.3   | 5.7    | 2.8    | 0.0    | 0.0    | 0.0    |
| 87.5° | 25.5    | 14.2   | 14.2   | 14.2   | 11.3   | 8.5    | 5.7    | 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-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

MCGRAW EDISON

Report Number: SP1-2408-195-9

Test Date: 08/07/2024

Luminaire Tested: GALN-SB1A-830-U-5WQ

Data in this report applies to families of products including GALN-SB1A-830-U-5WQ.

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2408-195-9  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 08/07/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: MCGRAW EDISON  
 Catalog Number: **GALN-SB1A-830-U-5WQ**  
 Description: GALLEON AREA AND ROADWAY LUMINAIRE. (1) 80 CRI, 3000K, 350MA HIGH DENSITY LIGHTSQUARE WITH 26 LEDS AND TYPE V WIDE OPTICS

### Spectral Parameters

CCT (K): 3050  
 CIE  $u'$ : 0.2476  
 CIE  $v'$ : 0.5251  
 Duv: 0.0034  
 CIE x: 0.4383  
 CIE y: 0.4131  
 CIE z: 0.1487  
 Peak Wavelength (nm): 603  
 Dominant Wavelength (nm): 581  
 Purity: 55.55201  
 R<sub>f</sub>: 81.5  
 R<sub>g</sub>: 99.2

CRI (Ra): 81.0  
 R1: 79.6  
 R2: 85.6  
 R3: 92.0  
 R4: 82.6  
 R5: 78.9  
 R6: 81.7  
 R7: 85.2  
 R8: 62.0  
 R9: 7.1  
 R10: 67.0  
 R11: 82.7  
 R12: 63.2  
 R13: 80.3  
 R14: 95.0  
 R15: 71.7



### Test Conditions

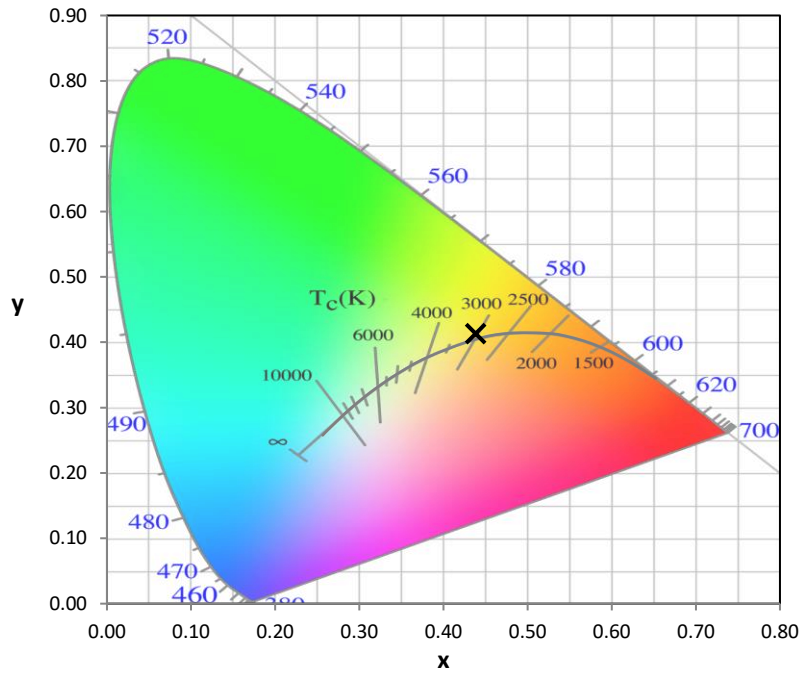
Stabilization Time: 20M  
 Operation Time: 1H 20M  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2408-195-9

| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

REPORT NUMBER: SP1-2408-195-9

**CIE 1931 Chromaticity Diagram**



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



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2408-195-9

### Photopic Flux vs. Wavelength

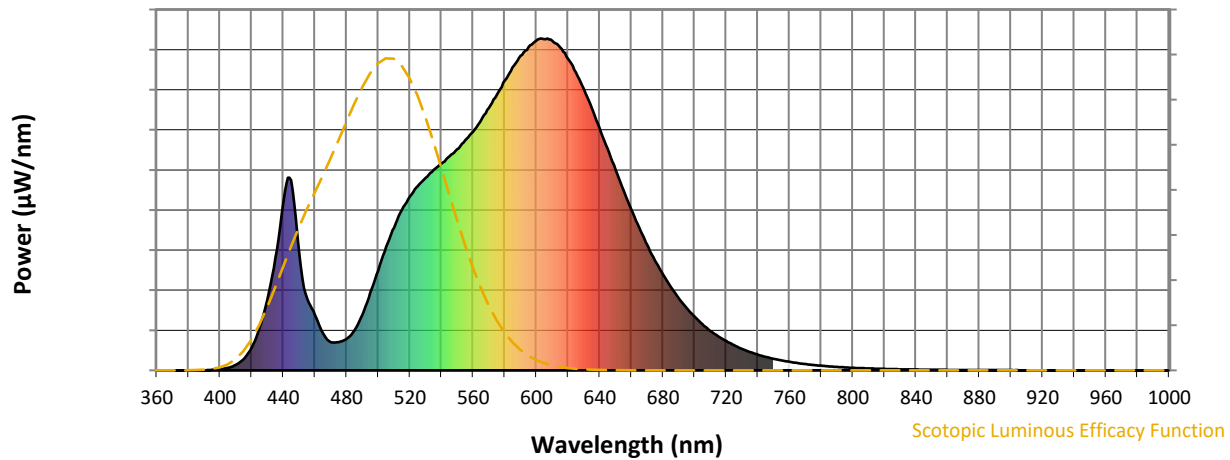


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|-------------------|-------------------------------|--------------------------------|
| 360               | 0                             | NR                             | 490               | 168                           | NR                             | 620               | 940                           | NR                             | 750               | 35                            | NR                             | 880               | 1                             | NR                             |
| 365               | 0                             | NR                             | 495               | 233                           | NR                             | 625               | 897                           | NR                             | 755               | 30                            | NR                             | 885               | 1                             | NR                             |
| 370               | 0                             | NR                             | 500               | 300                           | NR                             | 630               | 847                           | NR                             | 760               | 26                            | NR                             | 890               | 1                             | NR                             |
| 375               | 0                             | NR                             | 505               | 372                           | NR                             | 635               | 790                           | NR                             | 765               | 22                            | NR                             | 895               | 1                             | NR                             |
| 380               | 0                             | NR                             | 510               | 430                           | NR                             | 640               | 730                           | NR                             | 770               | 19                            | NR                             | 900               | 1                             | NR                             |
| 385               | 0                             | NR                             | 515               | 483                           | NR                             | 645               | 668                           | NR                             | 775               | 16                            | NR                             | 905               | 1                             | NR                             |
| 390               | 0                             | NR                             | 520               | 524                           | NR                             | 650               | 605                           | NR                             | 780               | 14                            | NR                             | 910               | 0                             | NR                             |
| 395               | 2                             | NR                             | 525               | 555                           | NR                             | 655               | 545                           | NR                             | 785               | 12                            | NR                             | 915               | 0                             | NR                             |
| 400               | 4                             | NR                             | 530               | 581                           | NR                             | 660               | 485                           | NR                             | 790               | 10                            | NR                             | 920               | 0                             | NR                             |
| 405               | 7                             | NR                             | 535               | 604                           | NR                             | 665               | 430                           | NR                             | 795               | 9                             | NR                             | 925               | 0                             | NR                             |
| 410               | 17                            | NR                             | 540               | 623                           | NR                             | 670               | 378                           | NR                             | 800               | 8                             | NR                             | 930               | 0                             | NR                             |
| 415               | 34                            | NR                             | 545               | 645                           | NR                             | 675               | 331                           | NR                             | 805               | 7                             | NR                             | 935               | 0                             | NR                             |
| 420               | 68                            | NR                             | 550               | 667                           | NR                             | 680               | 290                           | NR                             | 810               | 6                             | NR                             | 940               | 0                             | NR                             |
| 425               | 128                           | NR                             | 555               | 693                           | NR                             | 685               | 251                           | NR                             | 815               | 5                             | NR                             | 945               | 0                             | NR                             |
| 430               | 214                           | NR                             | 560               | 719                           | NR                             | 690               | 218                           | NR                             | 820               | 4                             | NR                             | 950               | 0                             | NR                             |
| 435               | 339                           | NR                             | 565               | 754                           | NR                             | 695               | 188                           | NR                             | 825               | 4                             | NR                             | 955               | 0                             | NR                             |
| 440               | 507                           | NR                             | 570               | 791                           | NR                             | 700               | 162                           | NR                             | 830               | 3                             | NR                             | 960               | 0                             | NR                             |
| 445               | 573                           | NR                             | 575               | 830                           | NR                             | 705               | 139                           | NR                             | 835               | 3                             | NR                             | 965               | 0                             | NR                             |
| 450               | 356                           | NR                             | 580               | 873                           | NR                             | 710               | 119                           | NR                             | 840               | 3                             | NR                             | 970               | 0                             | NR                             |
| 455               | 217                           | NR                             | 585               | 913                           | NR                             | 715               | 102                           | NR                             | 845               | 2                             | NR                             | 975               | 0                             | NR                             |
| 460               | 168                           | NR                             | 590               | 948                           | NR                             | 720               | 88                            | NR                             | 850               | 2                             | NR                             | 980               | 0                             | NR                             |
| 465               | 113                           | NR                             | 595               | 974                           | NR                             | 725               | 76                            | NR                             | 855               | 2                             | NR                             | 985               | 0                             | NR                             |
| 470               | 85                            | NR                             | 600               | 994                           | NR                             | 730               | 65                            | NR                             | 860               | 1                             | NR                             | 990               | 0                             | NR                             |
| 475               | 85                            | NR                             | 605               | 998                           | NR                             | 735               | 55                            | NR                             | 865               | 1                             | NR                             | 995               | 0                             | NR                             |
| 480               | 94                            | NR                             | 610               | 994                           | NR                             | 740               | 47                            | NR                             | 870               | 1                             | NR                             | 1000              | 0                             | NR                             |
| 485               | 120                           | NR                             | 615               | 973                           | NR                             | 745               | 41                            | NR                             | 875               | 1                             | NR                             |                   |                               |                                |

REPORT NUMBER: SP1-2408-195-9

### Scotopic Flux vs. Wavelength



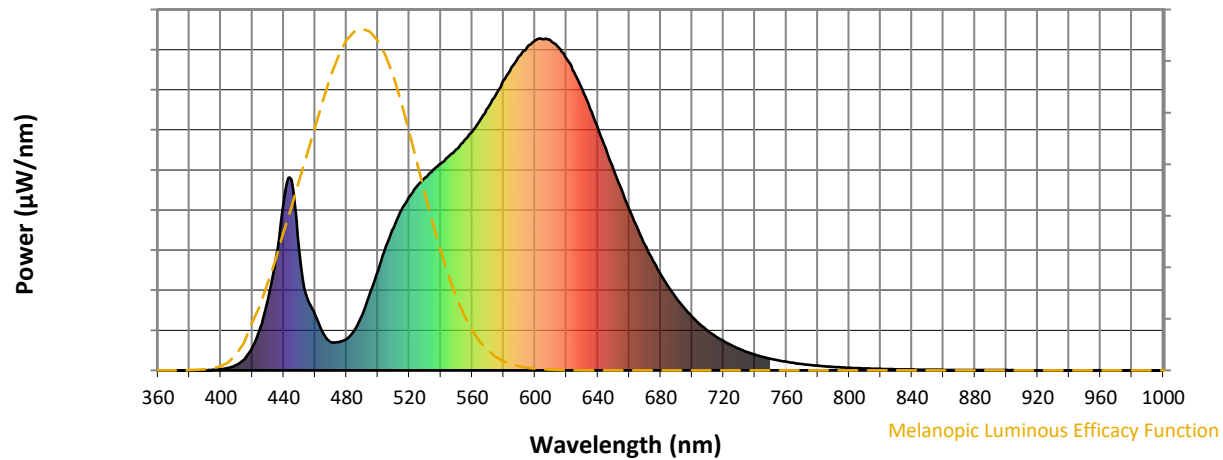
Scotopic Lumens: NR

S/P: 1.27

| λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) | λ (nm) | Power W <sup>^</sup> /nm | Lumens (Φ/nm) |
|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|--------|--------------------------|---------------|
| 360    | 0                        | NR            | 490    | 168                      | NR            | 620    | 940                      | NR            | 750    | 35                       | NR            | 880    | 1                        | NR            |
| 365    | 0                        | NR            | 495    | 233                      | NR            | 625    | 897                      | NR            | 755    | 30                       | NR            | 885    | 1                        | NR            |
| 370    | 0                        | NR            | 500    | 300                      | NR            | 630    | 847                      | NR            | 760    | 26                       | NR            | 890    | 1                        | NR            |
| 375    | 0                        | NR            | 505    | 372                      | NR            | 635    | 790                      | NR            | 765    | 22                       | NR            | 895    | 1                        | NR            |
| 380    | 0                        | NR            | 510    | 430                      | NR            | 640    | 730                      | NR            | 770    | 19                       | NR            | 900    | 1                        | NR            |
| 385    | 0                        | NR            | 515    | 483                      | NR            | 645    | 668                      | NR            | 775    | 16                       | NR            | 905    | 1                        | NR            |
| 390    | 0                        | NR            | 520    | 524                      | NR            | 650    | 605                      | NR            | 780    | 14                       | NR            | 910    | 0                        | NR            |
| 395    | 2                        | NR            | 525    | 555                      | NR            | 655    | 545                      | NR            | 785    | 12                       | NR            | 915    | 0                        | NR            |
| 400    | 4                        | NR            | 530    | 581                      | NR            | 660    | 485                      | NR            | 790    | 10                       | NR            | 920    | 0                        | NR            |
| 405    | 7                        | NR            | 535    | 604                      | NR            | 665    | 430                      | NR            | 795    | 9                        | NR            | 925    | 0                        | NR            |
| 410    | 17                       | NR            | 540    | 623                      | NR            | 670    | 378                      | NR            | 800    | 8                        | NR            | 930    | 0                        | NR            |
| 415    | 34                       | NR            | 545    | 645                      | NR            | 675    | 331                      | NR            | 805    | 7                        | NR            | 935    | 0                        | NR            |
| 420    | 68                       | NR            | 550    | 667                      | NR            | 680    | 290                      | NR            | 810    | 6                        | NR            | 940    | 0                        | NR            |
| 425    | 128                      | NR            | 555    | 693                      | NR            | 685    | 251                      | NR            | 815    | 5                        | NR            | 945    | 0                        | NR            |
| 430    | 214                      | NR            | 560    | 719                      | NR            | 690    | 218                      | NR            | 820    | 4                        | NR            | 950    | 0                        | NR            |
| 435    | 339                      | NR            | 565    | 754                      | NR            | 695    | 188                      | NR            | 825    | 4                        | NR            | 955    | 0                        | NR            |
| 440    | 507                      | NR            | 570    | 791                      | NR            | 700    | 162                      | NR            | 830    | 3                        | NR            | 960    | 0                        | NR            |
| 445    | 573                      | NR            | 575    | 830                      | NR            | 705    | 139                      | NR            | 835    | 3                        | NR            | 965    | 0                        | NR            |
| 450    | 356                      | NR            | 580    | 873                      | NR            | 710    | 119                      | NR            | 840    | 3                        | NR            | 970    | 0                        | NR            |
| 455    | 217                      | NR            | 585    | 913                      | NR            | 715    | 102                      | NR            | 845    | 2                        | NR            | 975    | 0                        | NR            |
| 460    | 168                      | NR            | 590    | 948                      | NR            | 720    | 88                       | NR            | 850    | 2                        | NR            | 980    | 0                        | NR            |
| 465    | 113                      | NR            | 595    | 974                      | NR            | 725    | 76                       | NR            | 855    | 2                        | NR            | 985    | 0                        | NR            |
| 470    | 85                       | NR            | 600    | 994                      | NR            | 730    | 65                       | NR            | 860    | 1                        | NR            | 990    | 0                        | NR            |
| 475    | 85                       | NR            | 605    | 998                      | NR            | 735    | 55                       | NR            | 865    | 1                        | NR            | 995    | 0                        | NR            |
| 480    | 94                       | NR            | 610    | 994                      | NR            | 740    | 47                       | NR            | 870    | 1                        | NR            | 1000   | 0                        | NR            |
| 485    | 120                      | NR            | 615    | 973                      | NR            | 745    | 41                       | NR            | 875    | 1                        | NR            |        |                          |               |

REPORT NUMBER: SP1-2408-195-9

### Melanopic Flux vs. Wavelength


**Melanopic Lumens: NR**
**M/P: 2.32**

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 168                                  | NR                             | 620               | 940                                  | NR                             | 750               | 35                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 233                                  | NR                             | 625               | 897                                  | NR                             | 755               | 30                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 300                                  | NR                             | 630               | 847                                  | NR                             | 760               | 26                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 372                                  | NR                             | 635               | 790                                  | NR                             | 765               | 22                                   | NR                             | 895               | 1                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 430                                  | NR                             | 640               | 730                                  | NR                             | 770               | 19                                   | NR                             | 900               | 1                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 483                                  | NR                             | 645               | 668                                  | NR                             | 775               | 16                                   | NR                             | 905               | 1                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 524                                  | NR                             | 650               | 605                                  | NR                             | 780               | 14                                   | NR                             | 910               | 0                                    | NR                             |
| 395               | 2                                    | NR                             | 525               | 555                                  | NR                             | 655               | 545                                  | NR                             | 785               | 12                                   | NR                             | 915               | 0                                    | NR                             |
| 400               | 4                                    | NR                             | 530               | 581                                  | NR                             | 660               | 485                                  | NR                             | 790               | 10                                   | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 604                                  | NR                             | 665               | 430                                  | NR                             | 795               | 9                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 17                                   | NR                             | 540               | 623                                  | NR                             | 670               | 378                                  | NR                             | 800               | 8                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 34                                   | NR                             | 545               | 645                                  | NR                             | 675               | 331                                  | NR                             | 805               | 7                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 68                                   | NR                             | 550               | 667                                  | NR                             | 680               | 290                                  | NR                             | 810               | 6                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 128                                  | NR                             | 555               | 693                                  | NR                             | 685               | 251                                  | NR                             | 815               | 5                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 214                                  | NR                             | 560               | 719                                  | NR                             | 690               | 218                                  | NR                             | 820               | 4                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 339                                  | NR                             | 565               | 754                                  | NR                             | 695               | 188                                  | NR                             | 825               | 4                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 507                                  | NR                             | 570               | 791                                  | NR                             | 700               | 162                                  | NR                             | 830               | 3                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 573                                  | NR                             | 575               | 830                                  | NR                             | 705               | 139                                  | NR                             | 835               | 3                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 356                                  | NR                             | 580               | 873                                  | NR                             | 710               | 119                                  | NR                             | 840               | 3                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 217                                  | NR                             | 585               | 913                                  | NR                             | 715               | 102                                  | NR                             | 845               | 2                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 168                                  | NR                             | 590               | 948                                  | NR                             | 720               | 88                                   | NR                             | 850               | 2                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 113                                  | NR                             | 595               | 974                                  | NR                             | 725               | 76                                   | NR                             | 855               | 2                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 85                                   | NR                             | 600               | 994                                  | NR                             | 730               | 65                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 85                                   | NR                             | 605               | 998                                  | NR                             | 735               | 55                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 94                                   | NR                             | 610               | 994                                  | NR                             | 740               | 47                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 120                                  | NR                             | 615               | 973                                  | NR                             | 745               | 41                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

REPORT NUMBER: SP1-2408-195-9

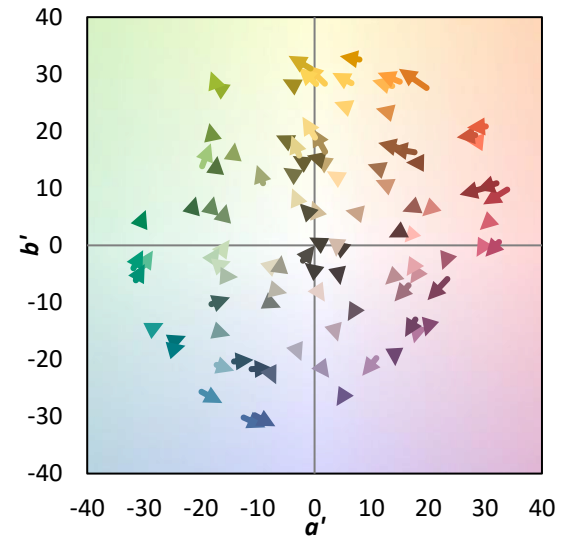
TM-30-18

### Summary

$R_f = 81.5$   
 $R_g = 99.2$   
 $CIE R_a = 81.0$   
 $R_9 = 7.1$



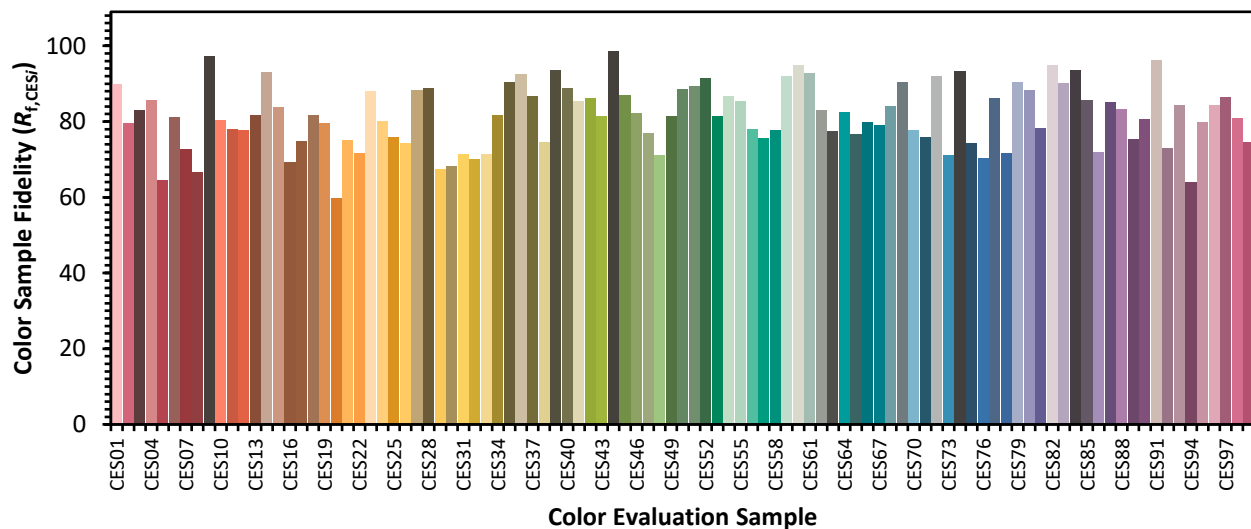
### Color Vector Graphics



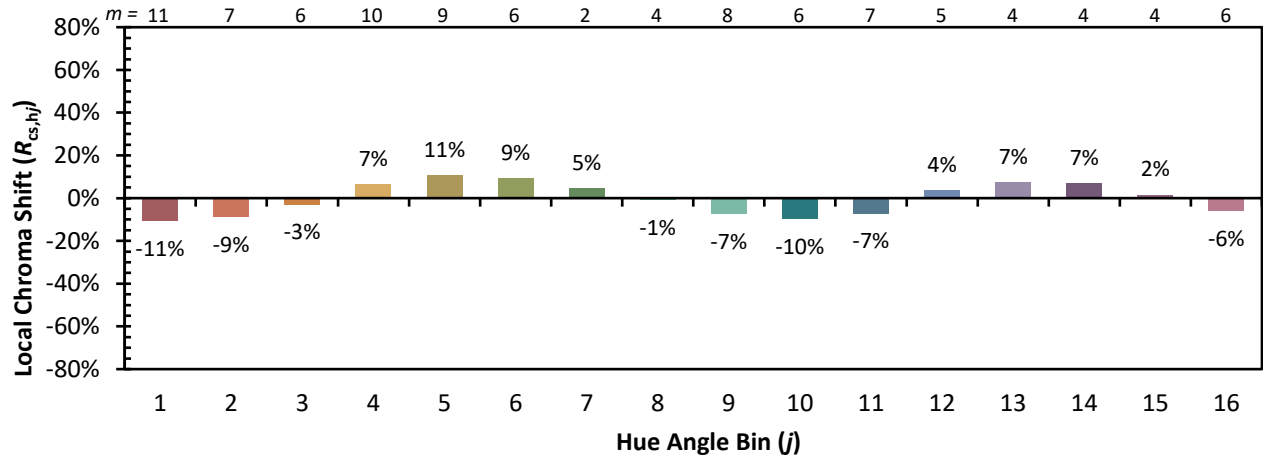


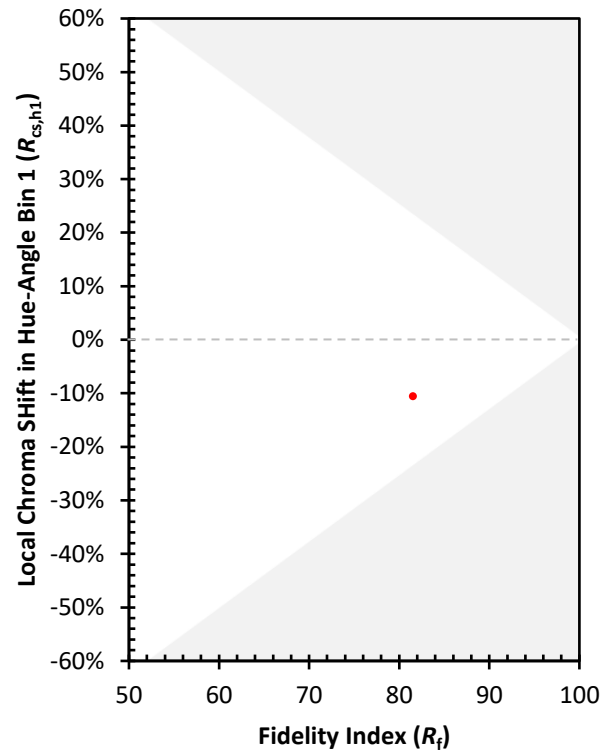
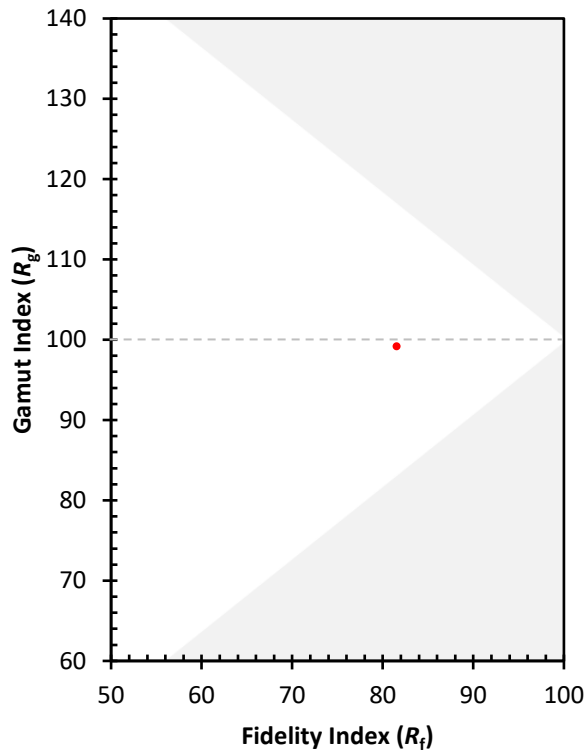
**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 74 | CES51 = 89 | CES76 = 70 |
| CES02 = 63 | CES27 = 88 | CES52 = 92 | CES77 = 86 |
| CES03 = 31 | CES28 = 89 | CES53 = 81 | CES78 = 72 |
| CES04 = 70 | CES29 = 67 | CES54 = 87 | CES79 = 90 |
| CES05 = 50 | CES30 = 68 | CES55 = 85 | CES80 = 88 |
| CES06 = 51 | CES31 = 71 | CES56 = 78 | CES81 = 78 |
| CES07 = 42 | CES32 = 70 | CES57 = 76 | CES82 = 95 |
| CES08 = 41 | CES33 = 71 | CES58 = 78 | CES83 = 90 |
| CES09 = 29 | CES34 = 82 | CES59 = 92 | CES84 = 94 |
| CES10 = 76 | CES35 = 90 | CES60 = 95 | CES85 = 86 |
| CES11 = 59 | CES36 = 93 | CES61 = 93 | CES86 = 72 |
| CES12 = 65 | CES37 = 87 | CES62 = 83 | CES87 = 85 |
| CES13 = 43 | CES38 = 75 | CES63 = 77 | CES88 = 83 |
| CES14 = 74 | CES39 = 94 | CES64 = 83 | CES89 = 75 |
| CES15 = 71 | CES40 = 89 | CES65 = 77 | CES90 = 81 |
| CES16 = 47 | CES41 = 85 | CES66 = 80 | CES91 = 96 |
| CES17 = 50 | CES42 = 86 | CES67 = 79 | CES92 = 73 |
| CES18 = 56 | CES43 = 81 | CES68 = 84 | CES93 = 84 |
| CES19 = 72 | CES44 = 99 | CES69 = 91 | CES94 = 64 |
| CES20 = 66 | CES45 = 87 | CES70 = 78 | CES95 = 80 |
| CES21 = 87 | CES46 = 82 | CES71 = 76 | CES96 = 84 |
| CES22 = 79 | CES47 = 77 | CES72 = 92 | CES97 = 87 |
| CES23 = 92 | CES48 = 71 | CES73 = 71 | CES98 = 81 |
| CES24 = 91 | CES49 = 81 | CES74 = 93 | CES99 = 74 |
| CES25 = 72 | CES50 = 89 | CES75 = 74 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**


(END OF REPORT)