

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: P643248

Luminaire Tested: GWS-SA6E-750-U-AFL-W-GRSWH

Issue Date: 1/10/2023

**Test Information**

Test Method: LM-79-2019  
Report Number: P643248  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-2209-782-47)  
Test Lab: COOPER LIGHTING SOLUTIONS  
Issue Date: 1/10/2023  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: McGRAW-EDISON  
Catalog Number: GWS-SA6E-750-U-AFL-W-GRSWH  
Description: GALLEON WALL SLIM LUMINAIRE. (6) LIGHTSQUARES WITH 16 LEDS EACH AND  
AUTOMOTIVE FRONTLINE OPTICS W/ FACTORY INSTALLED GLARE SHIELD, WH  
Light Source: (96) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: -

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 41541 lumens  
Efficiency: N/A  
Efficacy: 128.3 lumens/watt  
Luminous Opening: Rectangular (W 2' x L: 1' x H: 0')  
IES Classification: Type II - Short  
BUG Rating: B4 - U0 - G3

Input Watts (W): 323.8  
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



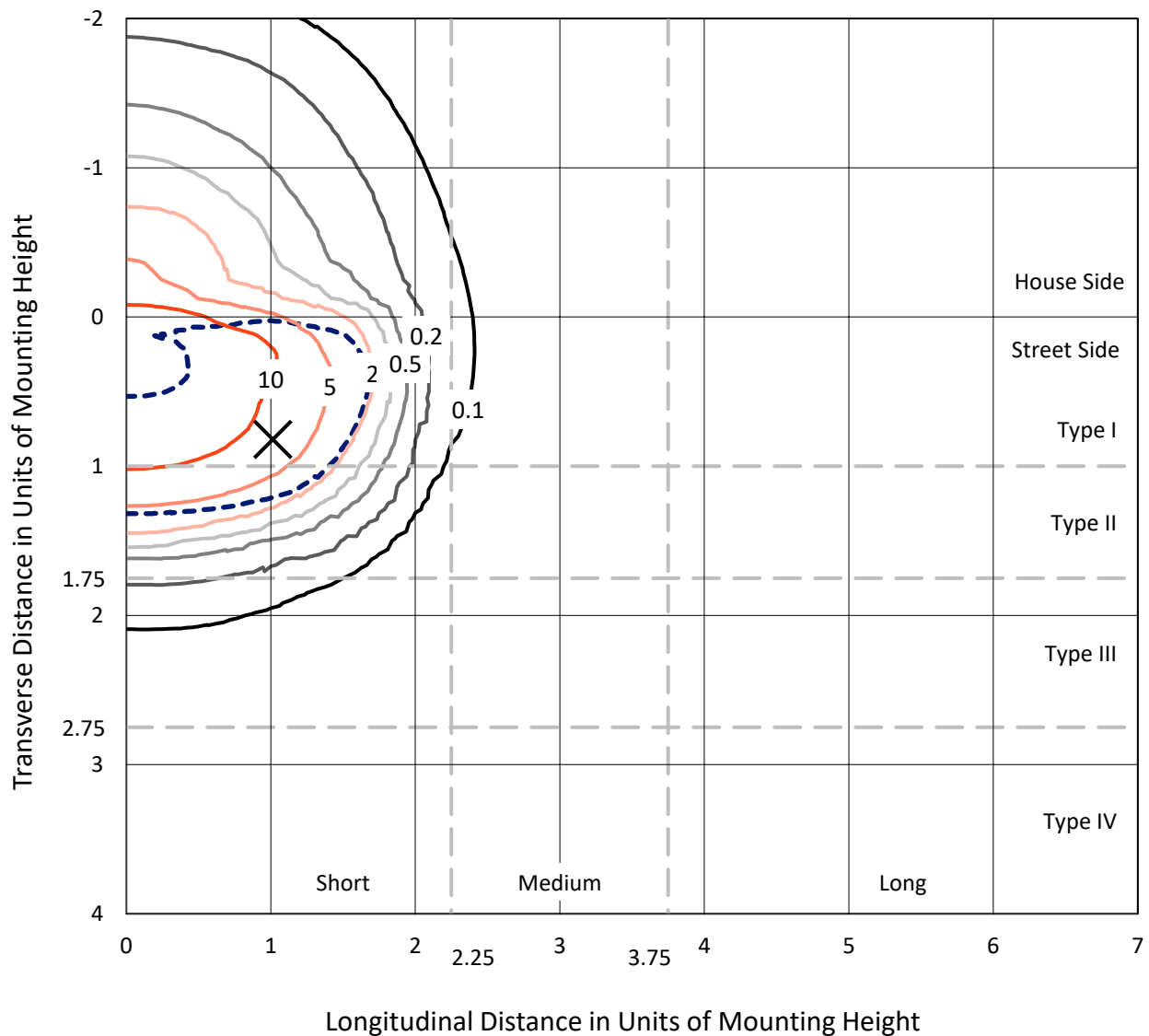
REPORT NUMBER: P643248

CATALOG NUMBER: GWS-SA6E-750-U-AFL-W-GRSWH

## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

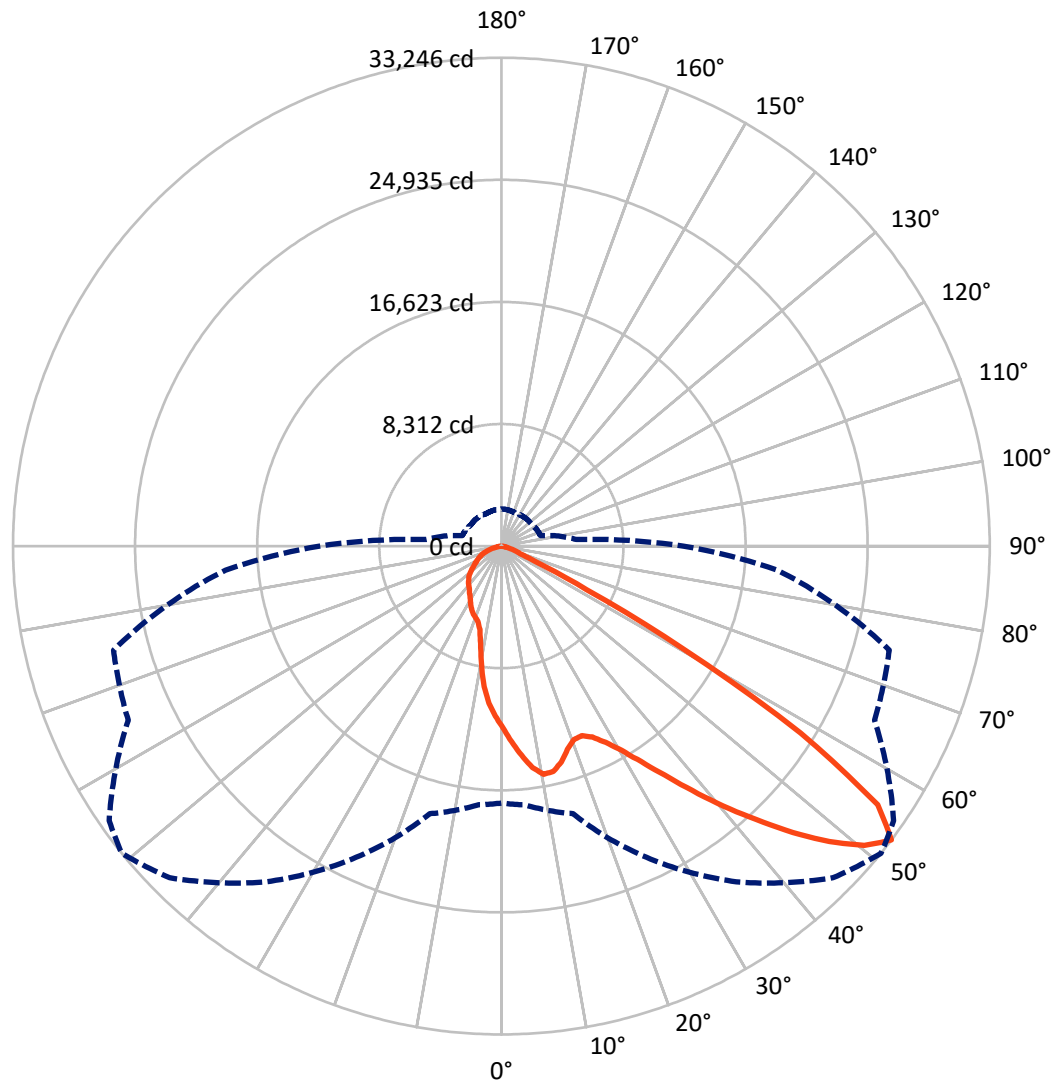


Based on 30 foot mounting height. Maximum calculated value = 16.8 fc  
Type II - Short - N/A

REPORT NUMBER: P643248

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## Luminous Intensity Polar Plot



— Vertical Plane Through 51-Deg Lateral    - - - Horizontal Cone Through 52.5-Deg Vertical

REPORT NUMBER: P643248

CATALOG NUMBER: GWS-SA6E-750-U-AFL-W-GRSWH

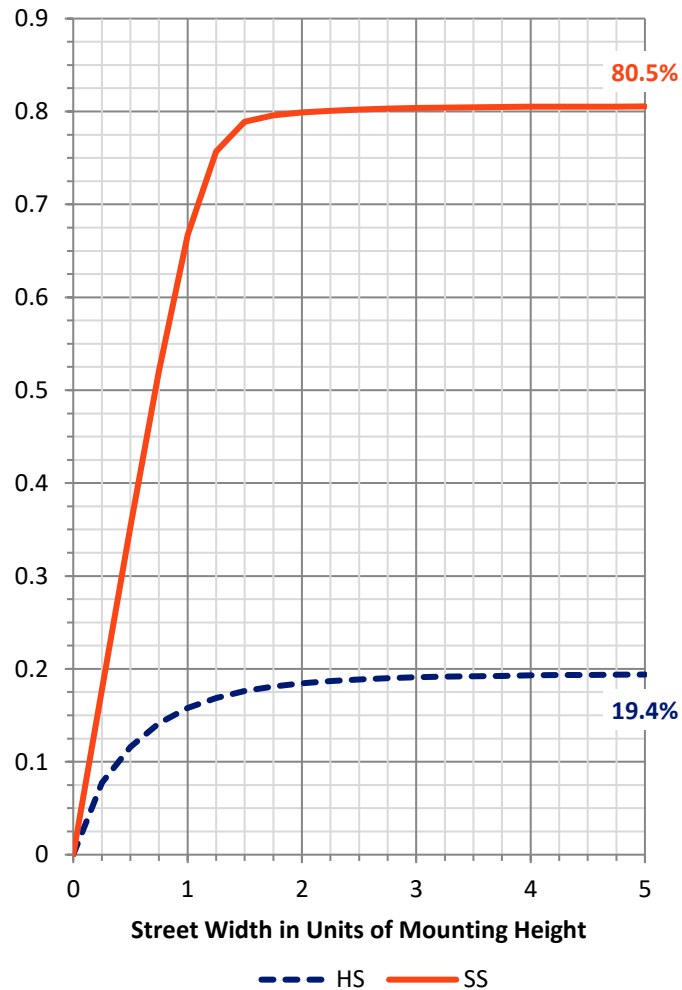
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 8093.9   | 0.0    | 8093.9  |
|                    | % Fixture | 19.5     | 0.0    | 19.5    |
| <b>Street Side</b> | Lumens    | 33447.1  | 0.0    | 33447.1 |
|                    | % Fixture | 80.5     | 0.0    | 80.5    |
| <b>Total</b>       | Lumens    | 41541.0  | 0.0    | 41541.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 1154.2  | 2.8       |
| 10°-20°   | 2999.0  | 7.2       |
| 20°-30°   | 4876.2  | 11.7      |
| 30°-40°   | 7727.6  | 18.6      |
| 40°-50°   | 11655.0 | 28.1      |
| 50°-60°   | 10082.4 | 24.3      |
| 60°-70°   | 2285.8  | 5.5       |
| 70°-80°   | 674.0   | 1.6       |
| 80°-90°   | 86.8    | 0.2       |
| 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°    | 41541.0 | 100.0     |
| 0°-180°   | 41541.0 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P643248

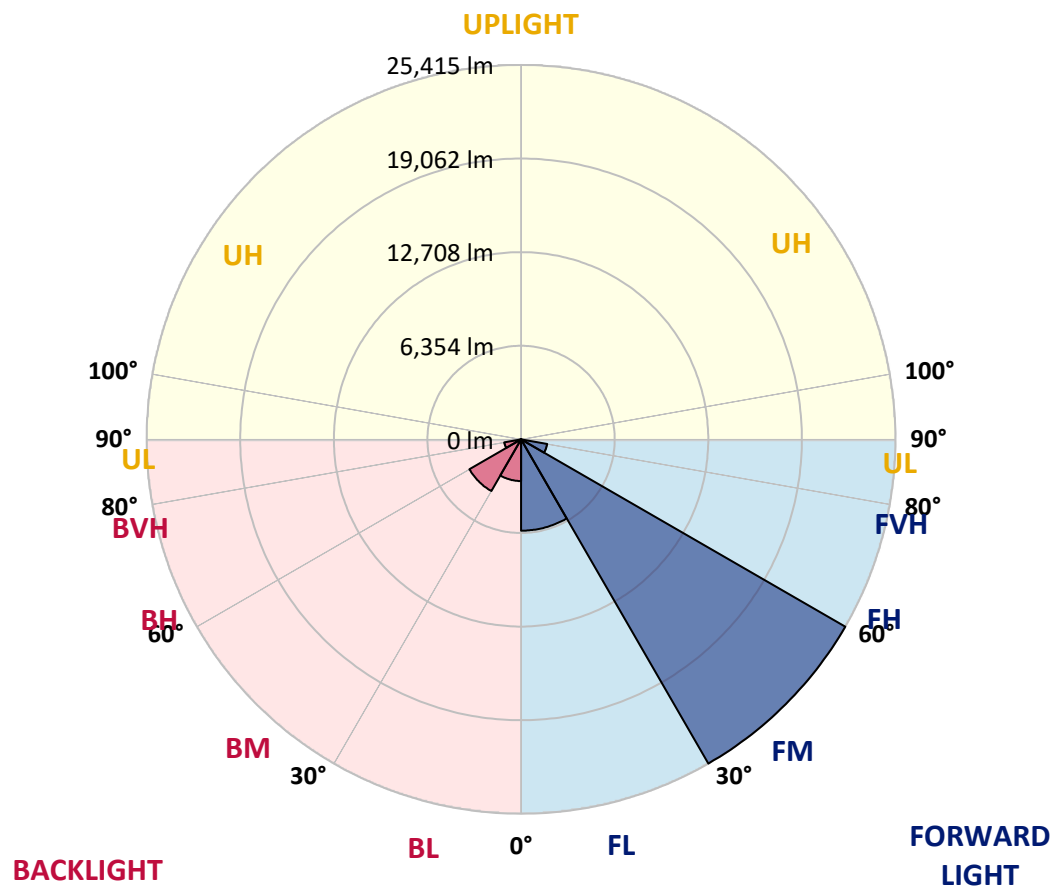
CATALOG NUMBER: GWS-SA6E-750-U-AFL-W-GRSWH

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

| Zone |             | Lumens  | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|---------|-----------|-------------------------|------|---------|
|      |             |         |           | B                       | U    | G       |
| FL   | (0°-30°)    | 6200.1  | 14.9      |                         |      |         |
| FM   | (30°-60°)   | 25415.4 | 61.2      |                         |      |         |
| FH   | (60°-80°)   | 1798.9  | 4.3       |                         |      | G1/1800 |
| FVH  | (80°-90°)   | 32.7    | 0.1       |                         |      | G1/100  |
| BL   | (0°-30°)    | 2829.3  | 6.8       | B4/5000                 |      |         |
| BM   | (30°-60°)   | 4049.7  | 9.7       | B3/5000                 |      |         |
| BH   | (60°-80°)   | 1160.9  | 2.8       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 54.1    | 0.1       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0     | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0     | 0.0       |                         | U0/0 |         |

**BUG Rating: B4-U0-G3**

Type II Short





REPORT NUMBER: P643248

CATALOG NUMBER: GWS-SA6E-750-U-AFL-W-GRSWH

**CANDELA DISTRIBUTION (FULL):**

|       | 0°      | 5°      | 15°     | 25°     | 35°     | 45°     | 51°     | 55°     | 65°     | 75°     | 85°     |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 |
| 2.5°  | 13783.6 | 13862.4 | 13741.0 | 13695.0 | 13619.5 | 13488.2 | 13337.2 | 13294.5 | 12969.5 | 12756.2 | 12516.5 |
| 5°    | 15168.9 | 15211.6 | 15113.1 | 15014.6 | 14827.5 | 14594.4 | 14302.3 | 14239.9 | 13649.0 | 13159.9 | 12651.1 |
| 7.5°  | 15477.4 | 15461.0 | 15546.4 | 15602.2 | 15579.2 | 15487.3 | 15228.0 | 15106.5 | 14400.8 | 13626.1 | 12874.3 |
| 10°   | 14256.3 | 14164.4 | 14479.5 | 14853.8 | 15303.5 | 15822.1 | 15792.6 | 15782.7 | 15168.9 | 14253.0 | 13159.9 |
| 12.5° | 12638.0 | 12592.0 | 12848.1 | 13317.5 | 14167.7 | 15316.6 | 15746.6 | 16081.4 | 15861.5 | 14850.5 | 13478.3 |
| 15°   | 11712.3 | 11695.9 | 11869.9 | 12208.0 | 12884.2 | 14335.1 | 15254.2 | 15917.3 | 16455.7 | 15490.6 | 13816.5 |
| 17.5° | 11544.9 | 11554.7 | 11613.8 | 11807.5 | 12293.3 | 13488.2 | 14551.8 | 15477.4 | 16918.5 | 16193.1 | 14239.9 |
| 20°   | 12034.0 | 12099.7 | 11997.9 | 12027.4 | 12290.0 | 13182.9 | 14072.5 | 15034.3 | 17213.9 | 16898.8 | 14696.2 |
| 22.5° | 13120.5 | 13097.6 | 12874.3 | 12743.0 | 12746.3 | 13370.0 | 14020.0 | 14827.5 | 17407.6 | 17584.9 | 15109.8 |
| 25°   | 14351.5 | 14325.3 | 14059.4 | 13767.2 | 13583.4 | 13878.8 | 14397.5 | 15047.4 | 17581.6 | 18211.9 | 15441.3 |
| 27.5° | 15805.7 | 15723.6 | 15428.2 | 15054.0 | 14647.0 | 14775.0 | 15126.2 | 15641.6 | 17850.8 | 18829.0 | 15661.3 |
| 30°   | 17213.9 | 17309.1 | 16885.7 | 16442.5 | 16012.5 | 15933.7 | 16137.3 | 16603.4 | 18399.0 | 19551.2 | 15923.9 |
| 32.5° | 19081.7 | 19048.9 | 18579.5 | 18001.8 | 17387.9 | 17328.8 | 17489.7 | 17916.4 | 19383.7 | 20549.1 | 16324.4 |
| 35°   | 21343.5 | 21350.0 | 20683.6 | 19902.4 | 19029.2 | 18871.7 | 19140.8 | 19554.4 | 20851.1 | 21901.5 | 16957.9 |
| 37.5° | 23693.8 | 23683.9 | 23102.9 | 22216.6 | 21025.0 | 20801.8 | 21110.4 | 21419.0 | 22686.0 | 23743.0 | 17942.7 |
| 40°   | 25341.7 | 25407.3 | 25134.9 | 24668.7 | 23539.5 | 22994.6 | 23267.1 | 23480.4 | 24681.9 | 25909.5 | 19239.3 |
| 42.5° | 26277.2 | 26375.7 | 26434.8 | 26713.8 | 26119.6 | 25538.6 | 25440.1 | 25551.7 | 26464.3 | 27921.8 | 20457.1 |
| 45°   | 26477.4 | 26608.7 | 27038.8 | 28072.8 | 28302.6 | 28138.4 | 27816.7 | 27547.6 | 27793.8 | 29349.7 | 21254.8 |
| 47.5° | 25594.4 | 25824.2 | 26743.3 | 28552.0 | 29894.6 | 30410.0 | 30052.2 | 29641.9 | 28561.9 | 29717.4 | 21172.8 |
| 50°   | 22095.2 | 22364.3 | 24435.7 | 27573.8 | 30121.1 | 31998.8 | 32031.6 | 31424.3 | 28470.0 | 28657.1 | 20142.0 |
| 52.5° | 17493.0 | 17676.8 | 18861.8 | 23375.4 | 27898.8 | 31933.1 | 33246.1 | 32596.2 | 28026.8 | 27330.9 | 18852.0 |
| 55°   | 10455.1 | 10750.5 | 11856.7 | 15421.6 | 21734.1 | 28302.6 | 31099.3 | 31414.5 | 27810.2 | 26218.1 | 17972.2 |
| 57.5° | 3528.8  | 3673.2  | 4730.2  | 6811.4  | 12808.7 | 20723.0 | 24028.6 | 25308.8 | 25246.5 | 24517.7 | 16255.4 |
| 60°   | 1680.7  | 1713.5  | 1926.9  | 2583.4  | 5127.4  | 10829.3 | 14223.5 | 15700.7 | 17046.5 | 17181.1 | 10113.7 |
| 62.5° | 1280.2  | 1299.9  | 1408.2  | 1549.4  | 2061.5  | 4562.8  | 6519.2  | 7648.5  | 8170.4  | 7011.6  | 3683.1  |
| 65°   | 1070.1  | 1086.5  | 1168.6  | 1257.2  | 1401.7  | 1976.1  | 2501.3  | 2885.4  | 2599.8  | 2025.4  | 1756.2  |
| 67.5° | 892.9   | 906.0   | 968.4   | 1063.6  | 1162.0  | 1322.9  | 1388.5  | 1427.9  | 1496.9  | 1680.7  | 1615.0  |
| 70°   | 699.2   | 712.3   | 778.0   | 860.0   | 955.2   | 994.6   | 1057.0  | 1096.4  | 1234.3  | 1470.6  | 1464.0  |
| 72.5° | 538.3   | 554.8   | 590.9   | 643.4   | 722.2   | 761.6   | 830.5   | 876.5   | 955.2   | 1145.6  | 1224.4  |
| 75°   | 393.9   | 403.8   | 436.6   | 453.0   | 462.8   | 453.0   | 521.9   | 574.5   | 679.5   | 751.7   | 771.4   |
| 77.5° | 160.8   | 180.5   | 174.0   | 174.0   | 206.8   | 249.5   | 285.6   | 318.4   | 390.6   | 433.3   | 436.6   |
| 80°   | 65.7    | 72.2    | 85.3    | 95.2    | 114.9   | 147.7   | 170.7   | 183.8   | 216.7   | 242.9   | 262.6   |
| 82.5° | 39.4    | 42.7    | 49.2    | 52.5    | 65.7    | 85.3    | 98.5    | 108.3   | 134.6   | 160.8   | 170.7   |
| 85°   | 19.7    | 19.7    | 23.0    | 26.3    | 32.8    | 39.4    | 46.0    | 52.5    | 68.9    | 85.3    | 95.2    |
| 87.5° | 3.3     | 3.3     | 3.3     | 6.6     | 9.8     | 13.1    | 16.4    | 19.7    | 23.0    | 26.3    | 32.8    |
| 90°   | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     |

REPORT NUMBER: P643248

CATALOG NUMBER: GWS-SA6E-750-U-AFL-W-GRSWH

**CANDELA DISTRIBUTION (continued):**

|       | 90°     | 95°     | 105°    | 115°    | 125°    | 135°    | 145°    | 155°    | 165°    | 175°    | 180°    |
|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 0°    | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 | 12368.8 |
| 2.5°  | 12375.4 | 12198.1 | 11991.3 | 11827.2 | 11636.8 | 11495.7 | 11295.4 | 11170.7 | 11052.5 | 10954.0 | 10881.8 |
| 5°    | 12388.5 | 12089.8 | 11659.8 | 11279.0 | 10885.1 | 10510.9 | 10126.8 | 9815.0  | 9535.9  | 9302.9  | 9283.2  |
| 7.5°  | 12464.0 | 12034.0 | 11361.1 | 10694.7 | 9926.6  | 9184.7  | 8442.8  | 7838.8  | 7379.3  | 7139.7  | 7090.4  |
| 10°   | 12592.0 | 12027.4 | 11055.8 | 9992.2  | 8682.5  | 7487.6  | 6607.9  | 6148.3  | 5882.4  | 5787.2  | 5754.4  |
| 12.5° | 12726.6 | 12011.0 | 10665.2 | 9000.9  | 7182.3  | 6135.2  | 5652.6  | 5596.8  | 5646.1  | 5652.6  | 5649.4  |
| 15°   | 12890.8 | 12001.2 | 10172.8 | 7838.8  | 6085.9  | 5508.2  | 5541.0  | 5659.2  | 5774.1  | 5800.4  | 5800.4  |
| 17.5° | 13091.0 | 11978.2 | 9503.1  | 6703.1  | 5399.9  | 5386.7  | 5560.7  | 5718.3  | 5826.6  | 5846.3  | 5846.3  |
| 20°   | 13301.1 | 11919.1 | 8679.2  | 5777.4  | 5120.9  | 5311.2  | 5498.4  | 5619.8  | 5695.3  | 5721.6  | 5724.9  |
| 22.5° | 13445.5 | 11761.5 | 7730.5  | 5091.3  | 4946.9  | 5166.8  | 5301.4  | 5426.1  | 5426.1  | 5360.5  | 5340.8  |
| 25°   | 13475.1 | 11423.4 | 6703.1  | 4621.9  | 4740.1  | 4943.6  | 5081.5  | 5009.2  | 4874.7  | 4822.1  | 4818.9  |
| 27.5° | 13366.7 | 10931.1 | 5688.7  | 4287.1  | 4490.6  | 4694.1  | 4671.1  | 4566.1  | 4507.0  | 4454.5  | 4474.2  |
| 30°   | 13235.4 | 10340.2 | 4809.0  | 4011.3  | 4201.7  | 4402.0  | 4323.2  | 4287.1  | 4244.4  | 4185.3  | 4198.4  |
| 32.5° | 13146.8 | 9680.4  | 4132.8  | 3798.0  | 4008.1  | 4040.9  | 4096.7  | 4093.4  | 4054.0  | 3942.4  | 3935.8  |
| 35°   | 13173.1 | 9014.0  | 3679.8  | 3624.0  | 3847.2  | 3834.1  | 3939.1  | 3919.4  | 3647.0  | 3492.7  | 3482.8  |
| 37.5° | 13383.2 | 8373.9  | 3413.9  | 3486.1  | 3591.2  | 3673.2  | 3765.1  | 3528.8  | 3433.6  | 3335.1  | 3341.7  |
| 40°   | 13783.6 | 7779.8  | 3269.5  | 3410.6  | 3436.9  | 3558.3  | 3345.0  | 3341.7  | 3299.0  | 3210.4  | 3207.1  |
| 42.5° | 14236.6 | 7277.5  | 3171.0  | 3374.5  | 3338.4  | 3361.4  | 3134.9  | 3161.1  | 3157.9  | 3102.1  | 3085.6  |
| 45°   | 14512.4 | 6814.7  | 3092.2  | 3239.9  | 3249.8  | 3020.0  | 2951.1  | 2980.6  | 2997.0  | 2967.5  | 2964.2  |
| 47.5° | 14226.8 | 6282.9  | 3010.1  | 3033.1  | 3118.5  | 2865.7  | 2780.4  | 2783.6  | 2813.2  | 2816.5  | 2803.3  |
| 50°   | 13425.8 | 5688.7  | 2911.7  | 2855.9  | 2800.1  | 2704.9  | 2626.1  | 2609.7  | 2639.2  | 2668.8  | 2678.6  |
| 52.5° | 12391.8 | 5120.9  | 2747.5  | 2662.2  | 2530.9  | 2530.9  | 2494.8  | 2442.3  | 2481.6  | 2521.0  | 2534.2  |
| 55°   | 11633.5 | 4700.7  | 2514.5  | 2419.3  | 2274.8  | 2324.1  | 2317.5  | 2271.6  | 2324.1  | 2353.6  | 2363.5  |
| 57.5° | 10080.9 | 3778.3  | 2212.5  | 2182.9  | 2061.5  | 2120.6  | 2133.7  | 2074.6  | 2048.3  | 2054.9  | 2064.8  |
| 60°   | 5984.2  | 2439.0  | 1995.8  | 1992.5  | 1884.2  | 1953.1  | 1992.5  | 1933.5  | 1854.7  | 1864.5  | 1877.6  |
| 62.5° | 2685.2  | 1864.5  | 1723.4  | 1710.2  | 1707.0  | 1795.6  | 1838.3  | 1782.5  | 1670.8  | 1680.7  | 1693.8  |
| 65°   | 1690.5  | 1611.8  | 1496.9  | 1496.9  | 1549.4  | 1624.9  | 1657.7  | 1611.8  | 1483.7  | 1467.3  | 1480.5  |
| 67.5° | 1569.1  | 1500.1  | 1382.0  | 1359.0  | 1385.3  | 1447.6  | 1450.9  | 1362.3  | 1286.8  | 1273.6  | 1273.6  |
| 70°   | 1408.2  | 1355.7  | 1240.8  | 1194.9  | 1185.0  | 1181.7  | 1171.9  | 1148.9  | 1099.7  | 1086.5  | 1093.1  |
| 72.5° | 1165.3  | 1129.2  | 1057.0  | 1007.8  | 981.5   | 978.2   | 938.8   | 919.1   | 876.5   | 869.9   | 866.6   |
| 75°   | 771.4   | 781.3   | 781.3   | 774.7   | 751.7   | 741.9   | 699.2   | 679.5   | 630.3   | 610.6   | 607.3   |
| 77.5° | 456.3   | 466.1   | 479.3   | 482.5   | 479.3   | 479.3   | 439.9   | 416.9   | 367.7   | 341.4   | 334.8   |
| 80°   | 279.0   | 285.6   | 292.2   | 302.0   | 288.9   | 279.0   | 242.9   | 219.9   | 197.0   | 180.5   | 177.3   |
| 82.5° | 180.5   | 187.1   | 190.4   | 197.0   | 190.4   | 177.3   | 147.7   | 134.6   | 118.2   | 105.0   | 101.8   |
| 85°   | 101.8   | 105.0   | 111.6   | 111.6   | 101.8   | 91.9    | 75.5    | 65.7    | 55.8    | 49.2    | 49.2    |
| 87.5° | 36.1    | 36.1    | 36.1    | 39.4    | 32.8    | 29.5    | 19.7    | 13.1    | 9.8     | 9.8     | 9.8     |
| 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: SP1-1908-441-4-R4

Test Date: 10/02/2019

Luminaire Tested: SA1C-750-U-5WQ

Data in this report applies to families of products SA1C-760-U-5WQ .

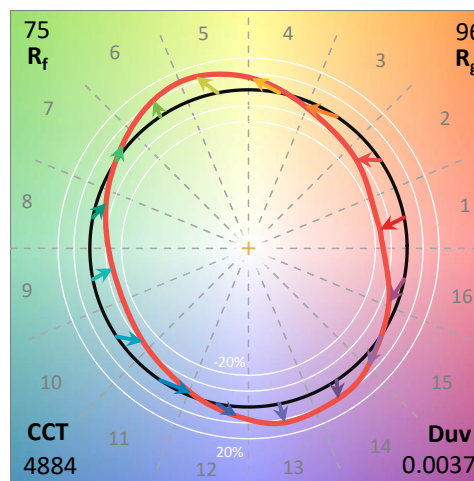
### Test Information

Test Method: LM-79-2008  
 Report Number: SP1-1908-441-4-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-750-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):                  | 4884   | CRI (Ra): | 73.5 |      |       |
| CIE u':                   | 0.2101 | R1:       | 70.5 | R9:  | -28.4 |
| CIE v':                   | 0.4904 | R2:       | 77.7 | R10: | 48.6  |
| Duv:                      | 0.0037 | R3:       | 84.6 | R11: | 73.2  |
| CIE x:                    | 0.3493 | R4:       | 74.7 | R12: | 50.7  |
| CIE y:                    | 0.3624 | R5:       | 71.9 | R13: | 71.2  |
| CIE z:                    | 0.2884 | R6:       | 70.7 | R14: | 91.4  |
| Peak Wavelength (nm):     | 444    | R7:       | 81.2 |      |       |
| Dominant Wavelength (nm): | 571    | R8:       | 56.9 |      |       |
| Purity:                   | 13.7   |           |      |      |       |
| Rf:                       | 74.9   |           |      |      |       |
| Rg:                       | 96.3   |           |      |      |       |



### Test Conditions

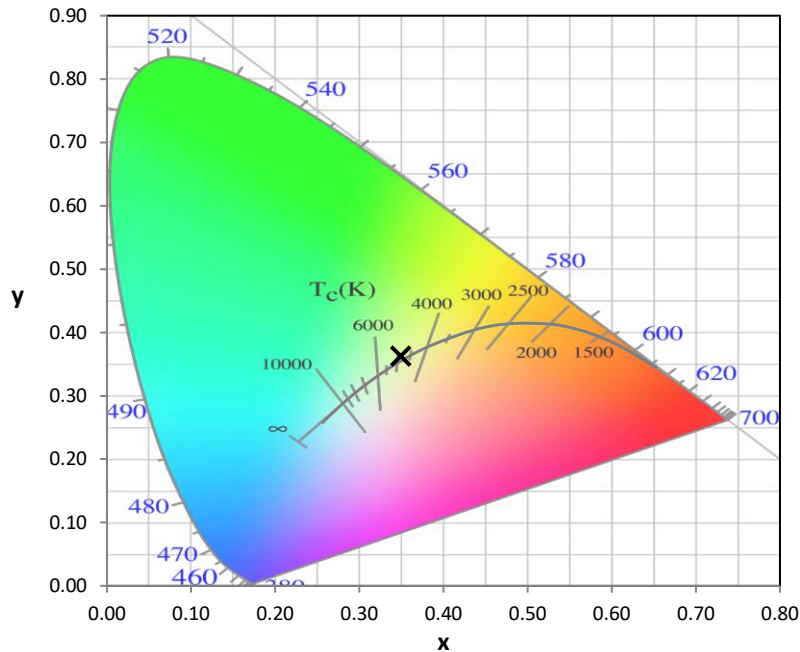
Stabilization Time: 240M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.0./44%  
 Sphere Temperature (°C): 25.7

REPORT NUMBER: SP1-1908-441-4-R4

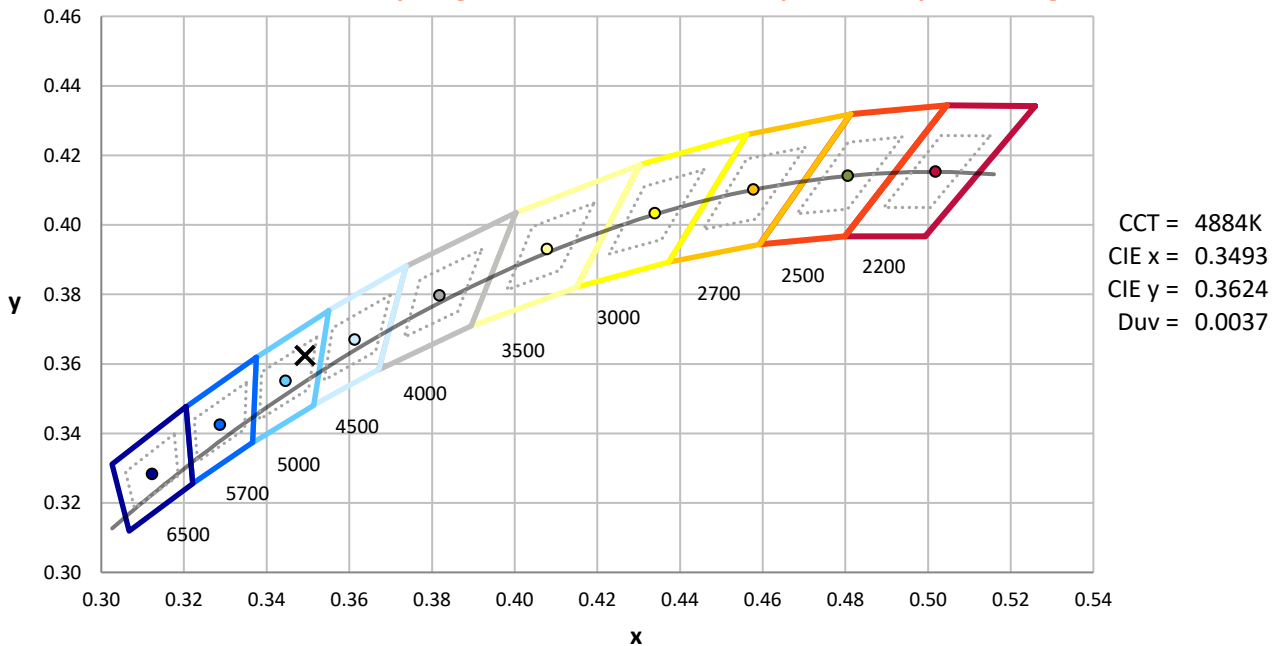
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/28/2019        | 12/28/2019           |
| Power Meter                    | IN0071                | 12/5/2018        | 12/5/2019            |
| AC Power Source                | IN0063                | 12/5/2018        | 12/5/2019            |
| DC Power Source                | IN0208                | 12/5/2018        | 12/5/2019            |
| Sphere Thermometer             | IN0085                | 12/5/2018        | 12/5/2019            |
| Room Thermometer               | IN0046                | 12/5/2018        | 12/5/2019            |

REPORT NUMBER: SP1-1908-441-4-R4

CIE 1931 Chromaticity Diagram



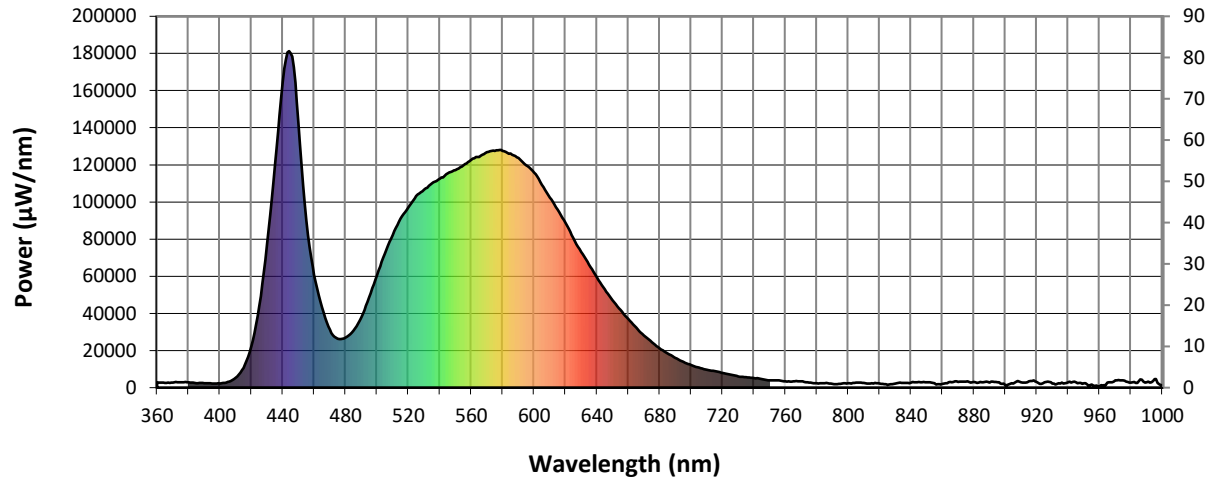
CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles



Point lies inside the ANSI 5000K 4-step quadrangle

REPORT NUMBER: SP1-1908-441-4-R4

**Photopic Flux vs. Wavelength**

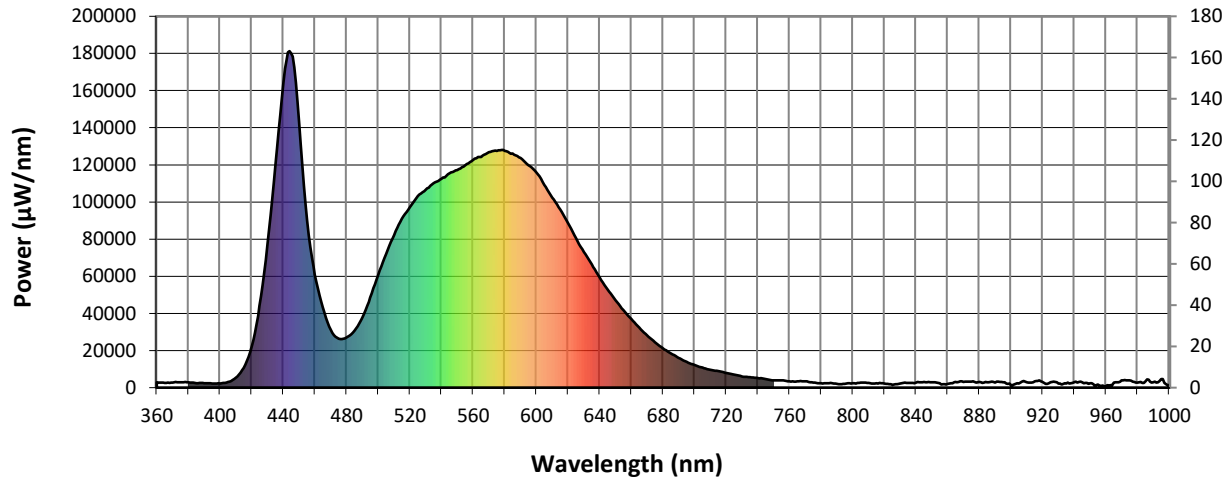


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

Scotopic Flux vs. Wavelength



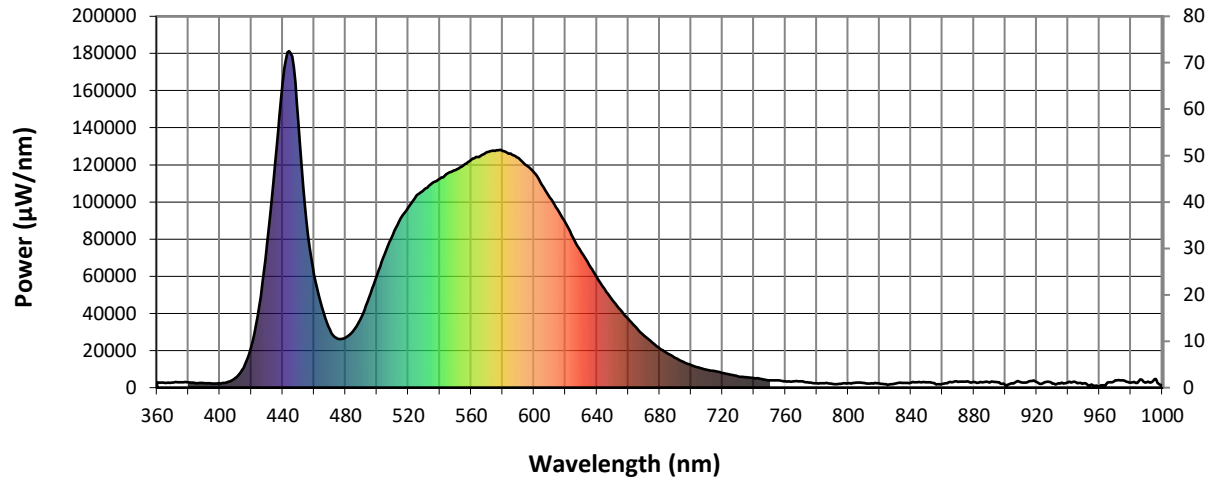
Scotopic Lumens: 13493.5

S/P: 1.77

| 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       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

**Melanopic Flux vs. Wavelength**



**Melanopic Lumens: 5378.9**

**M/P: 0.71**

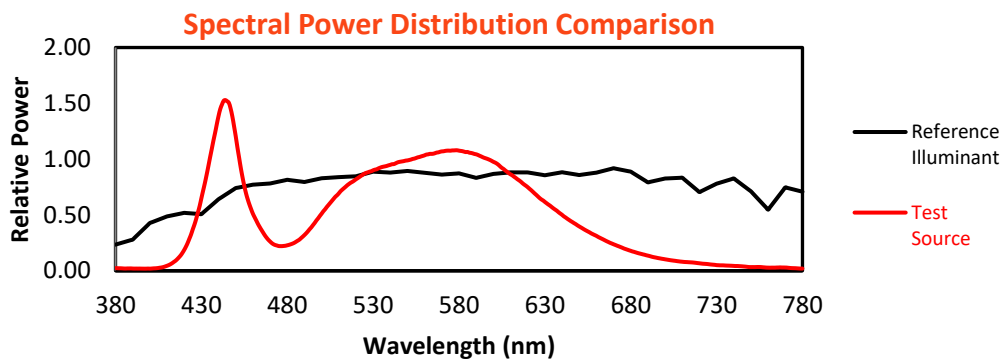
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 2945             | NR               | 490       | 37941            | NR               | 620       | 88803            | NR               | 750       | 3908             | NR               | 880       | 2997             | NR               |
| 365       | 2596             | NR               | 495       | 48525            | NR               | 625       | 80578            | NR               | 755       | 3988             | NR               | 885       | 2927             | NR               |
| 370       | 2732             | NR               | 500       | 60609            | NR               | 630       | 73127            | NR               | 760       | 3335             | NR               | 890       | 2649             | NR               |
| 375       | 2894             | NR               | 505       | 72036            | NR               | 635       | 66244            | NR               | 765       | 3438             | NR               | 895       | 2828             | NR               |
| 380       | 2822             | NR               | 510       | 82168            | NR               | 640       | 59440            | NR               | 770       | 3427             | NR               | 900       | 1407             | NR               |
| 385       | 2394             | NR               | 515       | 90898            | NR               | 645       | 52864            | NR               | 775       | 2759             | NR               | 905       | 2224             | NR               |
| 390       | 2370             | NR               | 520       | 97142            | NR               | 650       | 47085            | NR               | 780       | 2340             | NR               | 910       | 2905             | NR               |
| 395       | 2267             | NR               | 525       | 103255           | NR               | 655       | 41789            | NR               | 785       | 2412             | NR               | 915       | 3350             | NR               |
| 400       | 2262             | NR               | 530       | 106697           | NR               | 660       | 37064            | NR               | 790       | 1999             | NR               | 920       | 3114             | NR               |
| 405       | 3000             | NR               | 535       | 110081           | NR               | 665       | 32299            | NR               | 795       | 2054             | NR               | 925       | 2834             | NR               |
| 410       | 5324             | NR               | 540       | 112494           | NR               | 670       | 28142            | NR               | 800       | 2331             | NR               | 930       | 2271             | NR               |
| 415       | 10725            | NR               | 545       | 115513           | NR               | 675       | 24505            | NR               | 805       | 2648             | NR               | 935       | 2228             | NR               |
| 420       | 22128            | NR               | 550       | 117203           | NR               | 680       | 21162            | NR               | 810       | 2485             | NR               | 940       | 2833             | NR               |
| 425       | 44095            | NR               | 555       | 119753           | NR               | 685       | 18400            | NR               | 815       | 2409             | NR               | 945       | 2941             | NR               |
| 430       | 77002            | NR               | 560       | 122602           | NR               | 690       | 16065            | NR               | 820       | 2221             | NR               | 950       | 2323             | NR               |
| 435       | 119881           | NR               | 565       | 124314           | NR               | 695       | 13860            | NR               | 825       | 1562             | NR               | 955       | 1667             | NR               |
| 440       | 164454           | NR               | 570       | 126775           | NR               | 700       | 12177            | NR               | 830       | 2249             | NR               | 960       | 749              | NR               |
| 445       | 179997           | NR               | 575       | 127511           | NR               | 705       | 10757            | NR               | 835       | 2573             | NR               | 965       | 2669             | NR               |
| 450       | 142822           | NR               | 580       | 127577           | NR               | 710       | 9601             | NR               | 840       | 2764             | NR               | 970       | 3968             | NR               |
| 455       | 90008            | NR               | 585       | 126153           | NR               | 715       | 8944             | NR               | 845       | 3109             | NR               | 975       | 3886             | NR               |
| 460       | 60557            | NR               | 590       | 123678           | NR               | 720       | 7947             | NR               | 850       | 2963             | NR               | 980       | 2788             | NR               |
| 465       | 43305            | NR               | 595       | 119774           | NR               | 725       | 7062             | NR               | 855       | 2336             | NR               | 985       | 3496             | NR               |
| 470       | 31089            | NR               | 600       | 115733           | NR               | 730       | 6004             | NR               | 860       | 2118             | NR               | 990       | 2913             | NR               |
| 475       | 26278            | NR               | 605       | 109231           | NR               | 735       | 5594             | NR               | 865       | 3144             | NR               | 995       | 4659             | NR               |
| 480       | 27060            | NR               | 610       | 102408           | NR               | 740       | 5165             | NR               | 870       | 3069             | NR               | 1000      | 1308             | NR               |
| 485       | 30698            | NR               | 615       | 96015            | NR               | 745       | 4687             | NR               | 875       | 3311             | NR               |           |                  |                  |

REPORT NUMBER: SP1-1908-441-4-R4

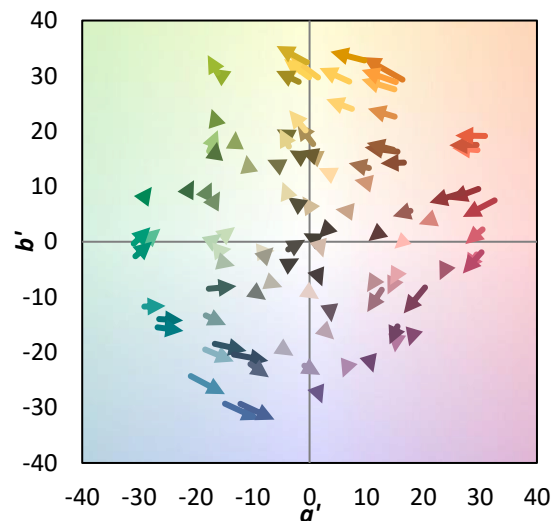
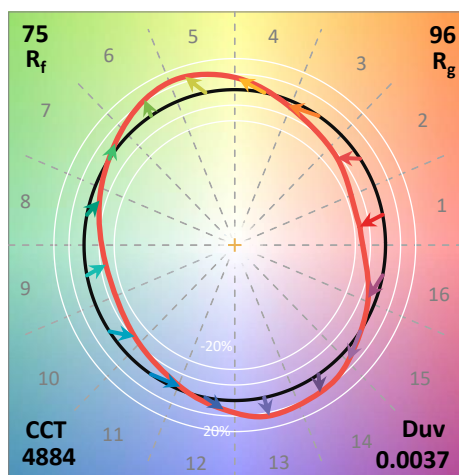
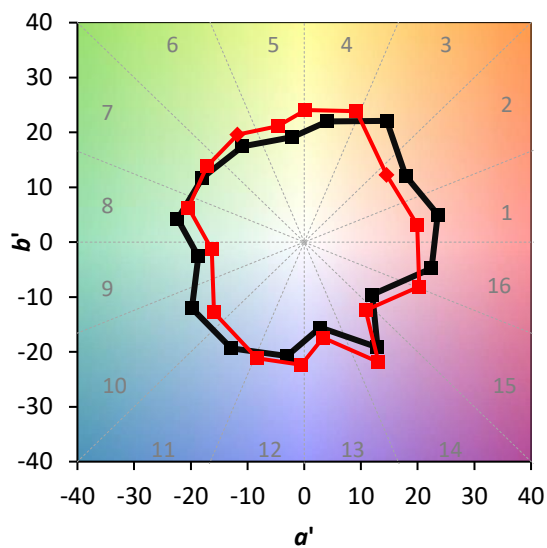
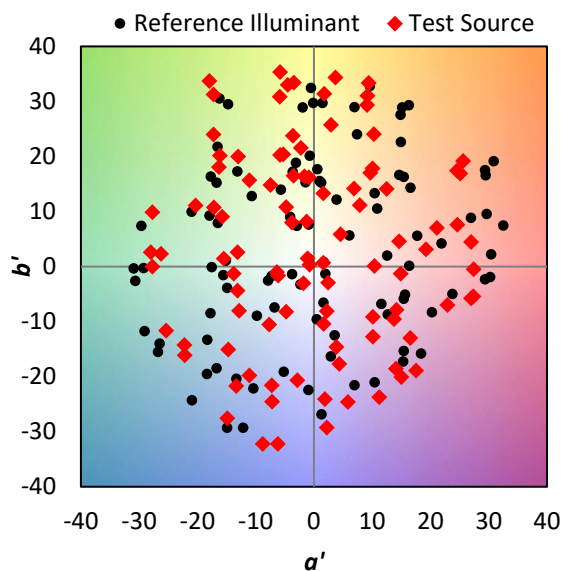
**TM-30-18**

**Summary**

$R_f = 74.9$   
 $R_g = 96.3$   
 CIE  $R_a = 73.5$   
 $R_g = -28.4$



**Color Vector Graphics**



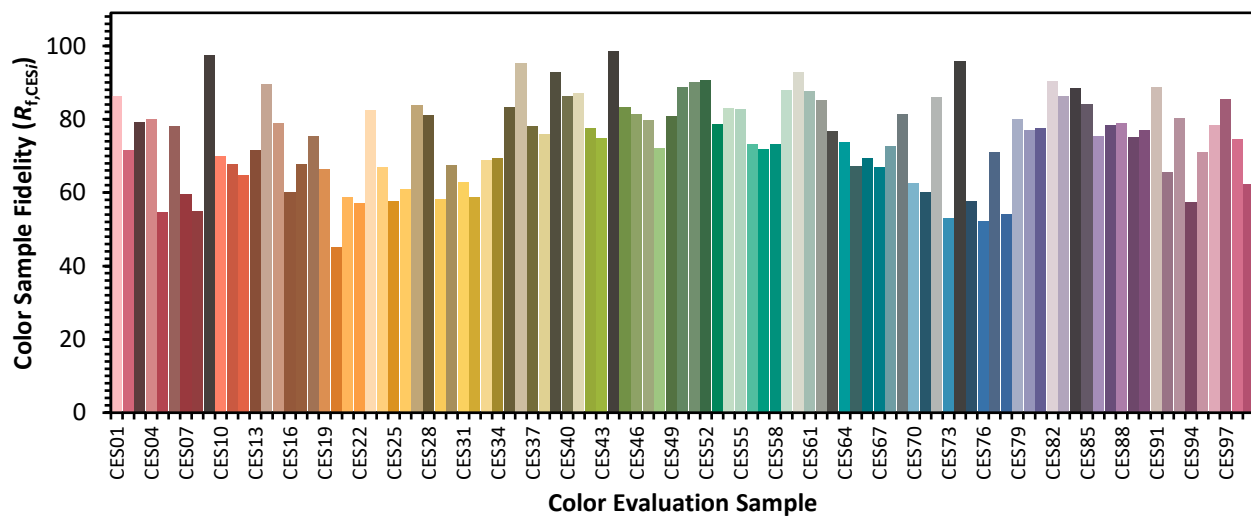


REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

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

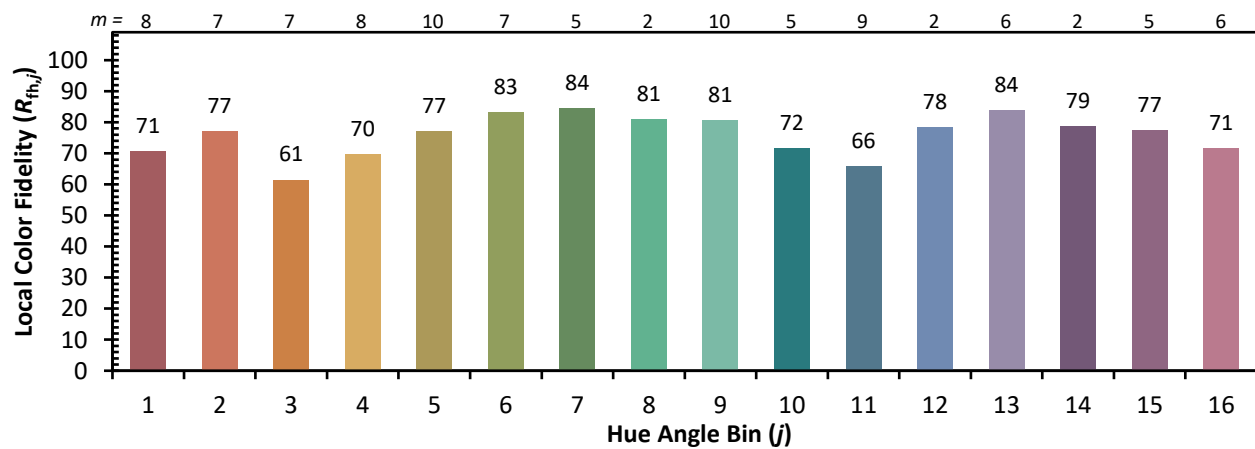
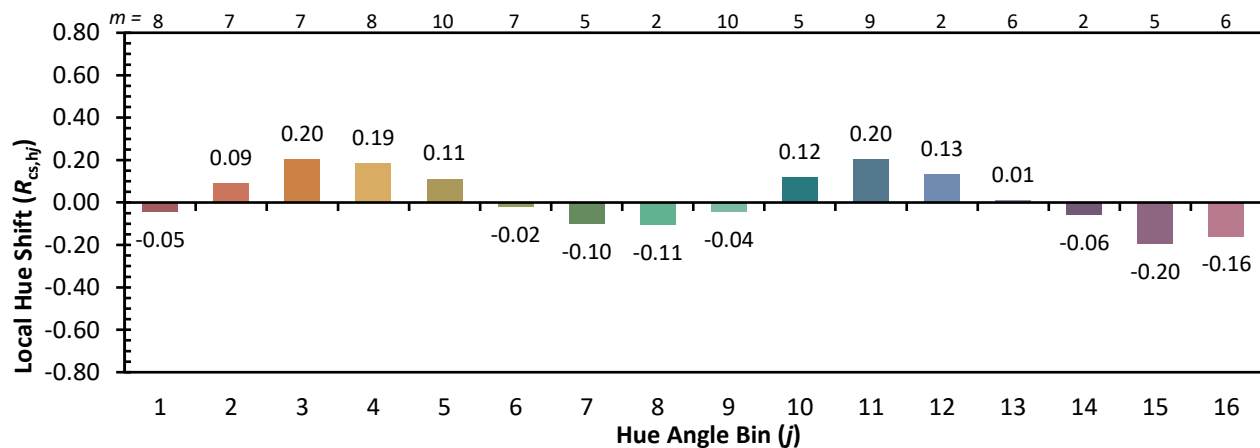
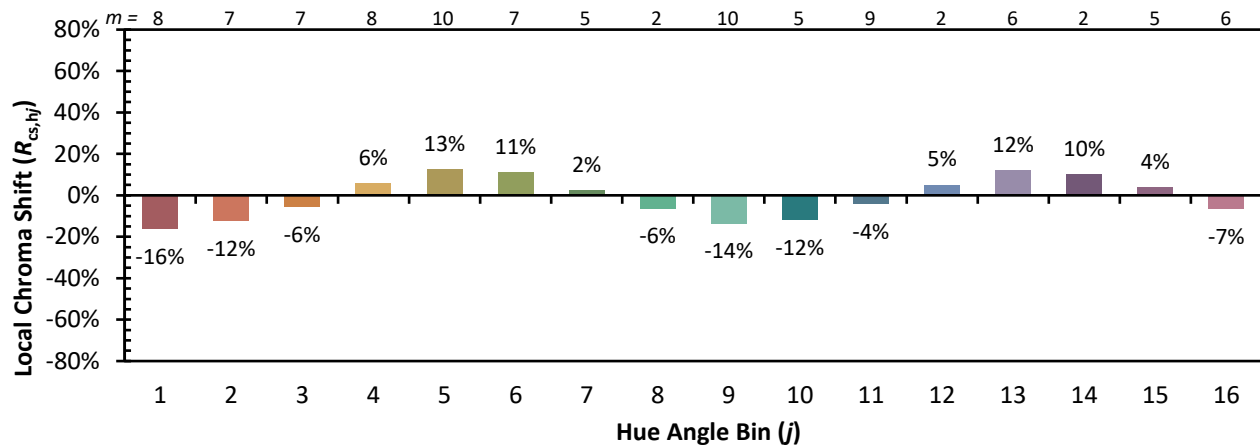
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 61 | CES51 = 90 | CES76 = 52 |
| CES02 = 60 | CES27 = 84 | CES52 = 91 | CES77 = 71 |
| CES03 = 30 | CES28 = 81 | CES53 = 79 | CES78 = 54 |
| CES04 = 69 | CES29 = 58 | CES54 = 83 | CES79 = 80 |
| CES05 = 46 | CES30 = 67 | CES55 = 83 | CES80 = 77 |
| CES06 = 50 | CES31 = 63 | CES56 = 73 | CES81 = 77 |
| CES07 = 39 | CES32 = 59 | CES57 = 72 | CES82 = 90 |
| CES08 = 38 | CES33 = 69 | CES58 = 73 | CES83 = 86 |
| CES09 = 29 | CES34 = 69 | CES59 = 88 | CES84 = 88 |
| CES10 = 73 | CES35 = 83 | CES60 = 93 | CES85 = 84 |
| CES11 = 56 | CES36 = 95 | CES61 = 88 | CES86 = 75 |
| CES12 = 61 | CES37 = 78 | CES62 = 85 | CES87 = 78 |
| CES13 = 41 | CES38 = 76 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 93 | CES64 = 74 | CES89 = 75 |
| CES15 = 70 | CES40 = 86 | CES65 = 67 | CES90 = 77 |
| CES16 = 46 | CES41 = 87 | CES66 = 69 | CES91 = 89 |
| CES17 = 49 | CES42 = 78 | CES67 = 67 | CES92 = 66 |
| CES18 = 55 | CES43 = 75 | CES68 = 73 | CES93 = 80 |
| CES19 = 71 | CES44 = 99 | CES69 = 81 | CES94 = 57 |
| CES20 = 64 | CES45 = 83 | CES70 = 63 | CES95 = 71 |
| CES21 = 85 | CES46 = 81 | CES71 = 60 | CES96 = 78 |
| CES22 = 77 | CES47 = 80 | CES72 = 86 | CES97 = 85 |
| CES23 = 91 | CES48 = 72 | CES73 = 53 | CES98 = 75 |
| CES24 = 90 | CES49 = 81 | CES74 = 96 | CES99 = 62 |
| CES25 = 71 | CES50 = 89 | CES75 = 58 |            |



REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

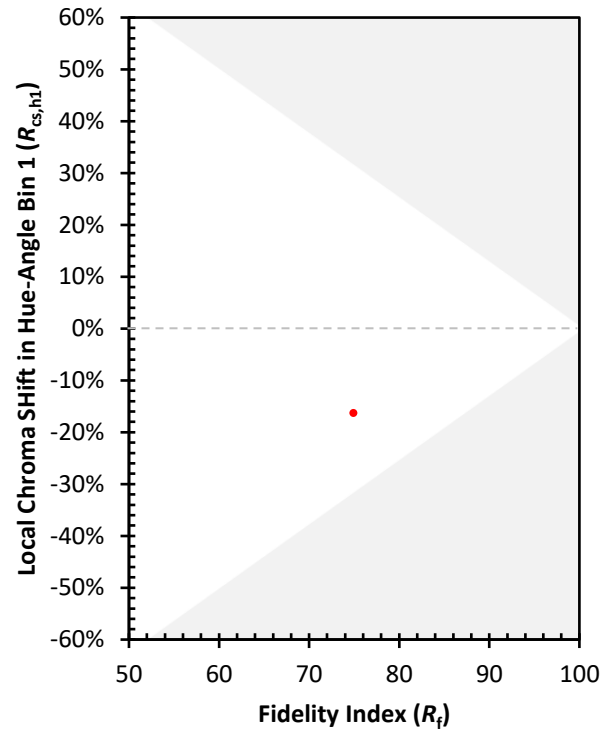
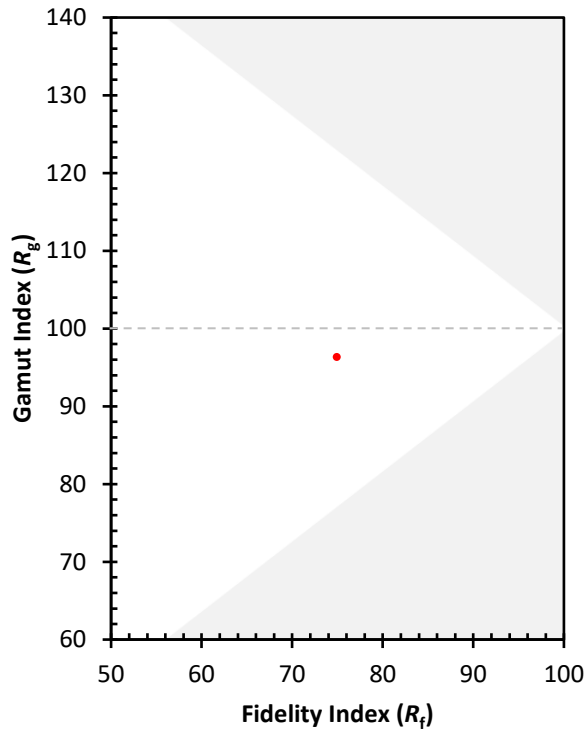
Color Rendition by Hue-Angle Bin



REPORT NUMBER: SP1-1908-441-4-R4

**TM-30-18**

**Measure Comparisons**



(END OF REPORT)