

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: McGRAW-EDISON

Report Number: P386778

Luminaire Tested: **GWC-SA2C-727-U-SL3-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386778  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-23)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA2C-727-U-SL3-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 2700K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10547 lumens  
Efficiency: N/A  
Efficacy: 93.3 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G2

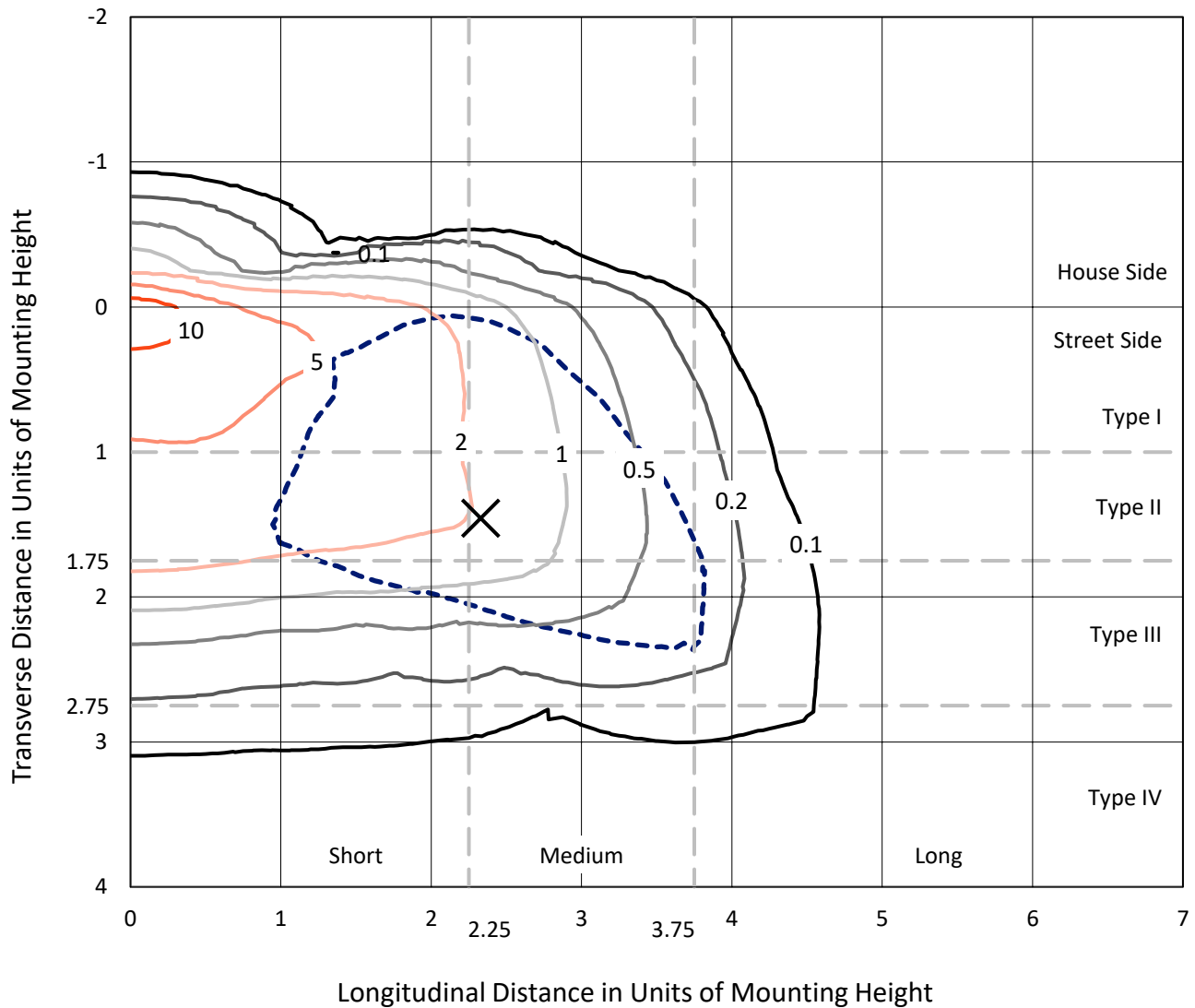
Input Watts (W): 113  
Input Voltage (V): NR  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: NR  
Total Harmonic Distortion (THDi): NR  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT



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## Iso-Footcandle Lines of Horizontal Illumination

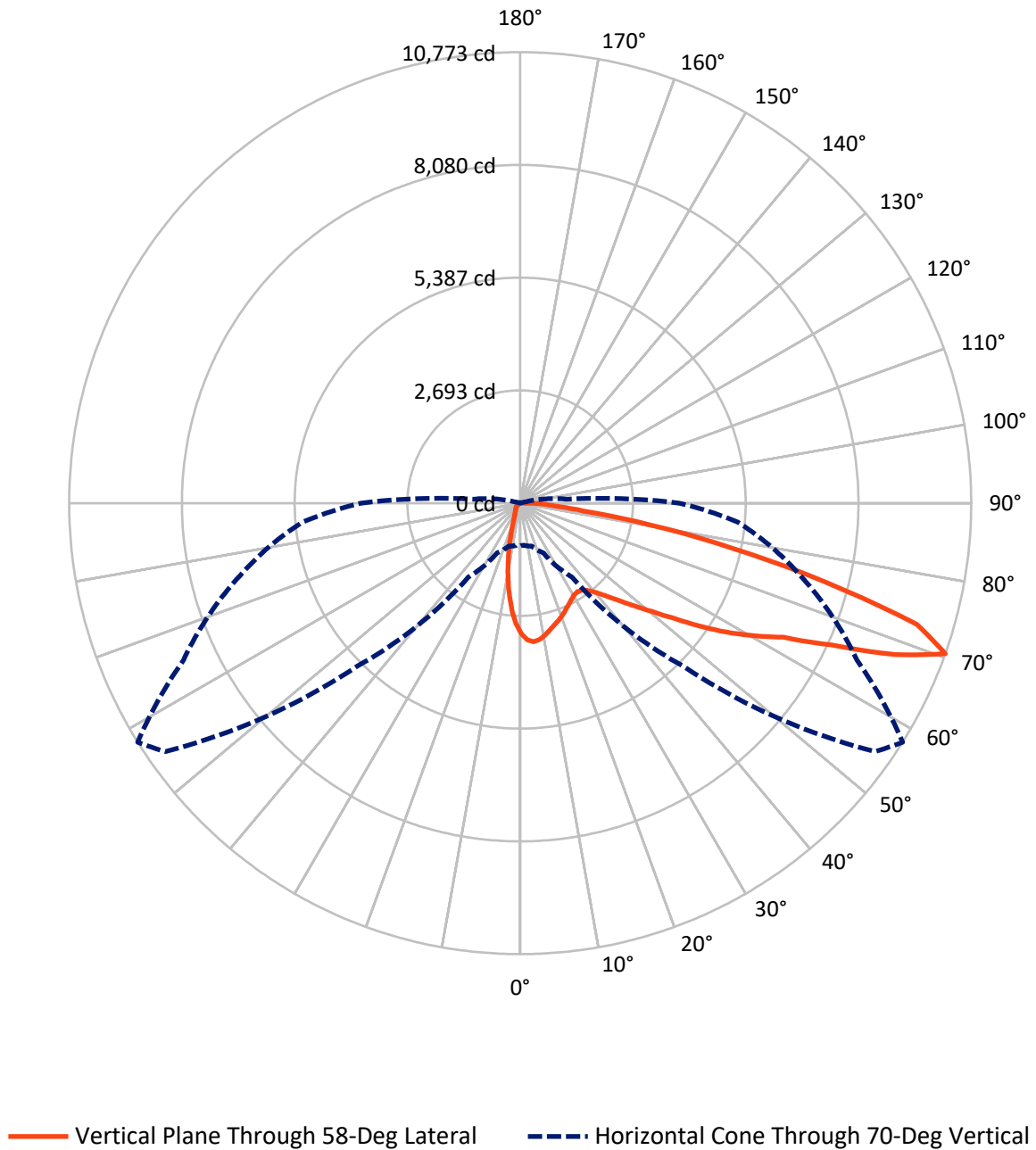
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 14.1 fc  
 Type III - Medium - N/A

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## Luminous Intensity Polar Plot



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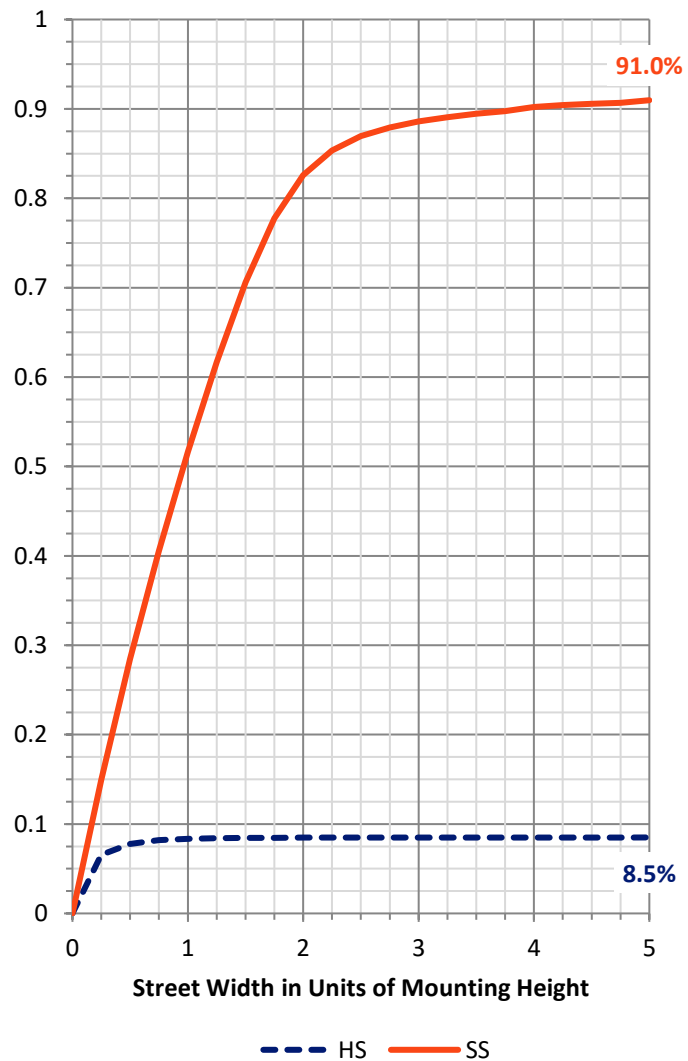
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 902.6    | 0.0    | 902.6   |
|                    | % Fixture | 8.6      | 0.0    | 8.6     |
| <b>Street Side</b> | Lumens    | 9644.4   | 0.0    | 9644.4  |
|                    | % Fixture | 91.4     | 0.0    | 91.4    |
| <b>Total</b>       | Lumens    | 10547.0  | 0.0    | 10547.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 254.8   | 2.4       |
| 10°-20°   | 534.7   | 5.1       |
| 20°-30°   | 703.0   | 6.7       |
| 30°-40°   | 931.0   | 8.8       |
| 40°-50°   | 1391.5  | 13.2      |
| 50°-60°   | 2229.2  | 21.1      |
| 60°-70°   | 2809.9  | 26.6      |
| 70°-80°   | 1515.6  | 14.4      |
| 80°-90°   | 177.4   | 1.7       |
| 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°    | 10547.0 | 100.0     |
| 0°-180°   | 10547.0 | 100.0     |

**Coefficient of Utilization**



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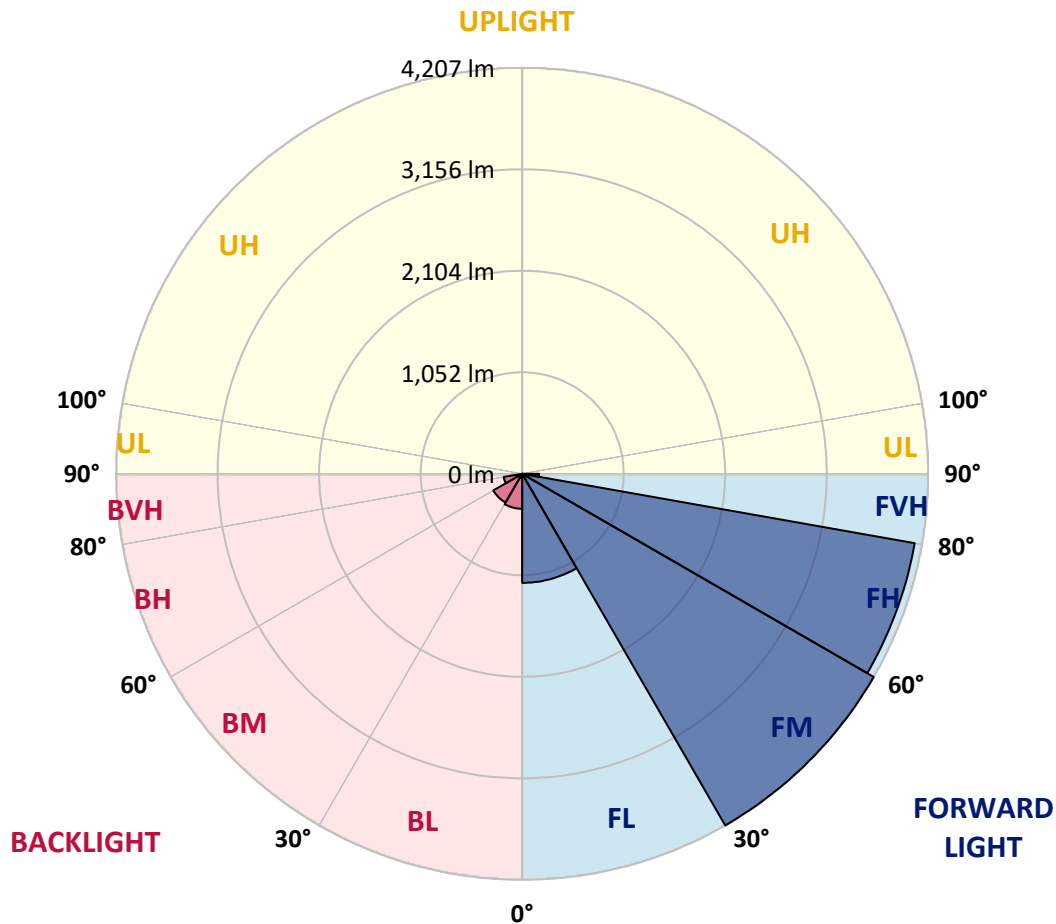
CATALOG NUMBER: GWC-SA2C-727-U-SL3-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 1129.8 | 10.7      |                         |      |         |
| FM   | (30°-60°)   | 4207.4 | 39.9      |                         |      |         |
| FH   | (60°-80°)   | 4131.4 | 39.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 175.9  | 1.7       |                         |      | G2/225  |
| BL   | (0°-30°)    | 362.6  | 3.4       | B1/500                  |      |         |
| BM   | (30°-60°)   | 344.3  | 3.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 194.1  | 1.8       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 1.5    | 0.0       |                         |      | G0/10   |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G2**

Type III Medium



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CATALOG NUMBER: GWC-SA2C-727-U-SL3-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°     | 58°     | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|
| 0°    | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5  | 3115.5  | 3115.5 | 3115.5 | 3115.5 |
| 2.5°  | 3373.8 | 3365.5 | 3362.4 | 3357.2 | 3337.0 | 3317.3 | 3278.2  | 3267.3  | 3242.7 | 3184.4 | 3122.6 |
| 5°    | 3376.5 | 3376.0 | 3385.2 | 3383.1 | 3376.0 | 3366.8 | 3338.8  | 3324.3  | 3282.6 | 3199.3 | 3086.2 |
| 7.5°  | 3213.8 | 3222.1 | 3242.7 | 3259.4 | 3278.7 | 3303.7 | 3307.2  | 3293.2  | 3258.9 | 3169.0 | 3019.1 |
| 10°   | 2995.4 | 3008.5 | 3037.5 | 3070.4 | 3120.8 | 3170.8 | 3215.5  | 3213.8  | 3201.9 | 3113.3 | 2938.4 |
| 12.5° | 2776.5 | 2791.9 | 2825.2 | 2873.9 | 2945.4 | 3026.9 | 3106.8  | 3117.7  | 3137.5 | 3063.3 | 2863.8 |
| 15°   | 2584.9 | 2598.0 | 2630.9 | 2690.6 | 2779.2 | 2888.8 | 3005.9  | 3026.1  | 3076.9 | 3024.3 | 2801.5 |
| 17.5° | 2422.2 | 2430.5 | 2454.6 | 2520.8 | 2623.5 | 2756.4 | 2908.5  | 2948.0  | 3023.9 | 2993.6 | 2747.6 |
| 20°   | 2308.6 | 2309.9 | 2325.7 | 2372.2 | 2474.8 | 2623.5 | 2807.7  | 2864.2  | 2967.7 | 2967.3 | 2691.9 |
| 22.5° | 2252.4 | 2248.1 | 2251.1 | 2277.9 | 2353.3 | 2496.7 | 2706.8  | 2773.9  | 2917.3 | 2944.9 | 2635.3 |
| 25°   | 2241.9 | 2238.4 | 2229.6 | 2233.2 | 2278.8 | 2385.8 | 2605.0  | 2682.7  | 2873.0 | 2931.3 | 2586.2 |
| 27.5° | 2274.8 | 2278.3 | 2263.4 | 2247.6 | 2251.1 | 2313.8 | 2514.7  | 2604.6  | 2837.0 | 2931.3 | 2551.5 |
| 30°   | 2341.0 | 2342.8 | 2331.8 | 2311.2 | 2283.6 | 2293.7 | 2452.0  | 2541.9  | 2819.1 | 2951.5 | 2529.6 |
| 32.5° | 2414.3 | 2423.9 | 2422.6 | 2405.9 | 2366.5 | 2325.7 | 2437.1  | 2519.1  | 2817.8 | 2996.2 | 2527.4 |
| 35°   | 2505.1 | 2516.0 | 2534.4 | 2530.9 | 2489.7 | 2422.6 | 2488.0  | 2552.4  | 2843.6 | 3069.9 | 2551.1 |
| 37.5° | 2601.5 | 2618.2 | 2657.7 | 2676.5 | 2649.8 | 2573.9 | 2602.0  | 2648.0  | 2912.9 | 3189.2 | 2611.2 |
| 40°   | 2695.0 | 2713.8 | 2785.7 | 2859.9 | 2839.7 | 2761.6 | 2774.8  | 2811.6  | 3036.2 | 3360.7 | 2725.2 |
| 42.5° | 2786.6 | 2814.7 | 2920.4 | 3042.3 | 3066.4 | 3004.1 | 3011.2  | 3040.5  | 3219.0 | 3596.6 | 2911.6 |
| 45°   | 2896.3 | 2927.8 | 3084.4 | 3234.8 | 3299.3 | 3272.1 | 3301.9  | 3321.2  | 3458.0 | 3908.5 | 3162.9 |
| 47.5° | 3057.2 | 3093.6 | 3285.7 | 3457.2 | 3570.3 | 3587.9 | 3647.9  | 3660.7  | 3760.2 | 4271.6 | 3490.5 |
| 50°   | 3371.2 | 3381.3 | 3555.0 | 3710.7 | 3873.8 | 3979.1 | 4047.5  | 4057.1  | 4126.0 | 4668.5 | 3899.7 |
| 52.5° | 3766.4 | 3772.9 | 3871.2 | 3975.6 | 4161.1 | 4376.0 | 4536.0  | 4549.6  | 4564.1 | 5055.3 | 4303.6 |
| 55°   | 4158.9 | 4158.0 | 4222.9 | 4284.3 | 4496.6 | 4808.8 | 5156.2  | 5164.5  | 5060.5 | 5422.4 | 4612.3 |
| 57.5° | 4404.0 | 4427.7 | 4526.4 | 4605.3 | 4901.8 | 5302.2 | 5784.2  | 5814.9  | 5582.0 | 5694.3 | 4917.6 |
| 60°   | 4326.0 | 4337.4 | 4556.2 | 4848.3 | 5406.6 | 6003.5 | 6419.6  | 6427.5  | 5974.1 | 5965.7 | 5303.5 |
| 62.5° | 3685.7 | 3691.8 | 4035.6 | 4637.8 | 5662.3 | 6913.0 | 7186.3  | 7057.8  | 6424.9 | 6342.5 | 5765.3 |
| 65°   | 2526.1 | 2566.0 | 2853.3 | 3597.5 | 5192.6 | 7483.6 | 8373.0  | 8160.3  | 7112.1 | 6885.4 | 6182.8 |
| 67.5° | 1487.6 | 1479.3 | 1621.4 | 2169.6 | 3813.7 | 7104.7 | 9874.2  | 9662.8  | 8049.3 | 7249.0 | 6060.5 |
| 70°   | 1016.1 | 1010.4 | 1064.8 | 1313.5 | 2152.9 | 5511.4 | 10346.5 | 10773.2 | 8876.9 | 7004.2 | 5215.8 |
| 72.5° | 725.4  | 728.4  | 808.7  | 1020.5 | 1351.6 | 3211.1 | 8897.5  | 9907.5  | 8617.7 | 6106.1 | 3964.6 |
| 75°   | 492.5  | 500.8  | 615.7  | 837.2  | 1185.0 | 1633.6 | 6314.0  | 7531.4  | 7017.4 | 4437.8 | 2278.8 |
| 77.5° | 264.9  | 274.1  | 409.6  | 674.5  | 1071.4 | 1135.0 | 4061.5  | 5183.3  | 4408.0 | 1995.0 | 660.5  |
| 80°   | 110.5  | 115.8  | 191.7  | 490.3  | 925.8  | 996.8  | 2389.7  | 3143.2  | 1878.4 | 393.4  | 147.4  |
| 82.5° | 47.8   | 50.4   | 79.8   | 292.5  | 692.0  | 841.6  | 1265.2  | 1512.2  | 569.3  | 86.4   | 74.1   |
| 85°   | 9.2    | 9.6    | 32.9   | 154.8  | 441.6  | 475.0  | 820.1   | 803.9   | 255.7  | 37.3   | 53.9   |
| 87.5° | 0.0    | 0.0    | 7.9    | 48.7   | 129.8  | 258.8  | 500.4   | 494.3   | 86.8   | 18.0   | 20.2   |
| 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: P386778

CATALOG NUMBER: GWC-SA2C-727-U-SL3-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 | 3115.5 |
| 2.5°  | 3091.0 | 3060.7 | 2997.1 | 2918.6 | 2858.5 | 2792.3 | 2739.7 | 2673.0 | 2644.1 | 2645.4 | 2629.6 |
| 5°    | 3021.7 | 2959.4 | 2818.6 | 2641.0 | 2504.2 | 2363.0 | 2241.5 | 2120.4 | 2049.0 | 2025.7 | 2003.8 |
| 7.5°  | 2922.6 | 2823.9 | 2599.3 | 2325.7 | 2094.1 | 1867.8 | 1670.9 | 1497.7 | 1388.0 | 1334.5 | 1314.8 |
| 10°   | 2810.7 | 2672.1 | 2347.2 | 1986.7 | 1656.0 | 1349.9 | 1094.6 | 872.7  | 784.1  | 724.1  | 708.7  |
| 12.5° | 2712.5 | 2524.8 | 2100.7 | 1638.9 | 1246.4 | 877.1  | 633.7  | 495.6  | 435.5  | 411.8  | 407.9  |
| 15°   | 2620.0 | 2387.1 | 1863.4 | 1324.0 | 863.1  | 539.9  | 403.0  | 356.1  | 342.1  | 338.1  | 338.1  |
| 17.5° | 2532.7 | 2256.0 | 1631.4 | 1014.0 | 571.0  | 378.5  | 333.7  | 323.2  | 318.8  | 318.4  | 318.8  |
| 20°   | 2441.5 | 2124.8 | 1403.4 | 742.9  | 398.7  | 320.6  | 308.3  | 302.6  | 301.3  | 301.3  | 301.3  |
| 22.5° | 2354.2 | 1993.7 | 1181.5 | 530.7  | 319.7  | 292.5  | 286.4  | 282.4  | 281.1  | 280.7  | 279.8  |
| 25°   | 2270.4 | 1869.1 | 964.8  | 375.0  | 280.7  | 268.0  | 262.7  | 257.4  | 253.5  | 251.3  | 250.0  |
| 27.5° | 2201.6 | 1758.2 | 763.1  | 300.9  | 253.5  | 242.5  | 235.9  | 228.1  | 218.4  | 214.0  | 212.3  |
| 30°   | 2146.8 | 1656.9 | 588.1  | 253.9  | 228.1  | 217.1  | 207.0  | 193.4  | 179.4  | 171.9  | 171.5  |
| 32.5° | 2103.8 | 1557.3 | 446.5  | 224.5  | 205.2  | 191.7  | 177.2  | 160.1  | 143.8  | 135.5  | 135.1  |
| 35°   | 2082.7 | 1469.6 | 341.2  | 203.1  | 185.1  | 168.0  | 150.0  | 131.1  | 115.3  | 107.4  | 106.6  |
| 37.5° | 2096.8 | 1395.5 | 266.2  | 185.1  | 168.0  | 148.2  | 127.2  | 107.4  | 93.4   | 86.4   | 86.0   |
| 40°   | 2148.1 | 1348.1 | 216.2  | 169.7  | 153.5  | 129.4  | 106.6  | 88.2   | 76.3   | 70.6   | 70.2   |
| 42.5° | 2257.3 | 1330.6 | 184.6  | 157.0  | 139.5  | 111.8  | 88.6   | 72.8   | 61.8   | 57.9   | 57.0   |
| 45°   | 2439.7 | 1356.5 | 163.1  | 144.7  | 125.0  | 95.2   | 73.2   | 59.6   | 50.0   | 46.9   | 46.5   |
| 47.5° | 2682.7 | 1424.4 | 147.8  | 132.9  | 111.8  | 80.3   | 61.0   | 48.2   | 40.8   | 37.7   | 37.3   |
| 50°   | 2995.8 | 1532.3 | 135.1  | 121.0  | 99.6   | 68.0   | 50.4   | 38.2   | 31.6   | 29.4   | 29.4   |
| 52.5° | 3336.6 | 1660.8 | 123.7  | 110.1  | 87.3   | 56.6   | 40.8   | 29.4   | 25.0   | 22.4   | 22.4   |
| 55°   | 3618.1 | 1773.1 | 111.4  | 101.7  | 72.4   | 46.9   | 31.1   | 22.4   | 18.4   | 17.1   | 17.1   |
| 57.5° | 3899.2 | 1892.8 | 97.4   | 87.3   | 57.9   | 38.2   | 23.7   | 16.7   | 13.6   | 12.7   | 12.7   |
| 60°   | 4263.7 | 2039.3 | 83.8   | 71.0   | 45.6   | 28.9   | 17.5   | 11.8   | 10.1   | 9.6    | 9.6    |
| 62.5° | 4664.5 | 2125.3 | 71.5   | 57.0   | 35.5   | 21.5   | 12.7   | 7.9    | 7.5    | 7.5    | 7.0    |
| 65°   | 4909.7 | 2003.8 | 60.1   | 45.6   | 27.6   | 16.2   | 8.3    | 5.7    | 6.6    | 6.1    | 5.3    |
| 67.5° | 4597.0 | 1568.7 | 49.1   | 35.5   | 21.5   | 12.3   | 5.3    | 3.9    | 7.0    | 5.7    | 4.4    |
| 70°   | 3806.3 | 1098.2 | 38.2   | 25.0   | 17.1   | 10.5   | 3.5    | 2.6    | 7.5    | 5.7    | 3.5    |
| 72.5° | 2848.5 | 735.0  | 30.3   | 16.7   | 12.7   | 9.2    | 3.1    | 1.3    | 6.6    | 4.8    | 3.1    |
| 75°   | 1556.5 | 296.0  | 24.1   | 10.5   | 7.9    | 6.6    | 2.2    | 0.9    | 4.4    | 3.5    | 2.2    |
| 77.5° | 409.6  | 78.1   | 17.5   | 7.0    | 4.4    | 2.6    | 1.3    | 0.4    | 2.2    | 1.8    | 0.9    |
| 80°   | 104.4  | 30.3   | 11.4   | 4.8    | 3.1    | 1.3    | 0.0    | 0.0    | 0.4    | 0.0    | 0.0    |
| 82.5° | 55.7   | 12.7   | 7.0    | 3.5    | 1.8    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 85°   | 42.1   | 8.3    | 3.9    | 2.2    | 0.4    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 87.5° | 16.2   | 2.6    | 1.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |



LM-79-08: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2012-088-8-R2

Luminaire Tested: CCW-SA1B-727-U-SL4

Test Date: 01/20/2021

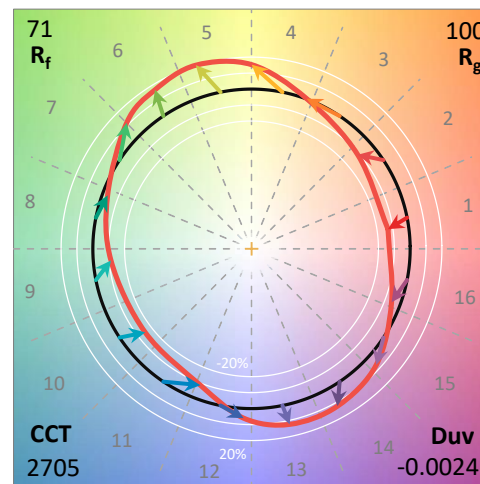
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-8-R2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 01/20/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA1B-727-U-SL4**  
 Description: INVUE WALL PACK

\*\*\*THIS IS A REVISION OF SP1-2012-088-8. TO UPDATE THE CATALOG INFORMATION.\*\*\*TESTED IN SITU. INVUE WALL PACK LIGHT SQUARE SL4 OPTICS 1-SQUARE

### Spectral Parameters

|                           |         |           |      |      |      |
|---------------------------|---------|-----------|------|------|------|
| CCT (K):                  | 2705    | CRI (Ra): | 73.8 |      |      |
| CIE u':                   | 0.2629  | R1:       | 72.2 | R9:  | -7.6 |
| CIE v':                   | 0.5237  | R2:       | 81.9 | R10: | 56.9 |
| Duv:                      | -0.0024 | R3:       | 89.3 | R11: | 66.0 |
| CIE x:                    | 0.4552  | R4:       | 71.3 | R12: | 47.9 |
| CIE y:                    | 0.4030  | R5:       | 69.5 | R13: | 73.4 |
| CIE z:                    | 0.1418  | R6:       | 73.6 | R14: | 93.2 |
| Peak Wavelength (nm):     | 603     | R7:       | 80.1 |      |      |
| Dominant Wavelength (nm): | 585     | R8:       | 52.8 |      |      |
| Purity:                   | 57.7    |           |      |      |      |
| Rf:                       | 71.2    |           |      |      |      |
| Rg:                       | 100.1   |           |      |      |      |



### Test Conditions

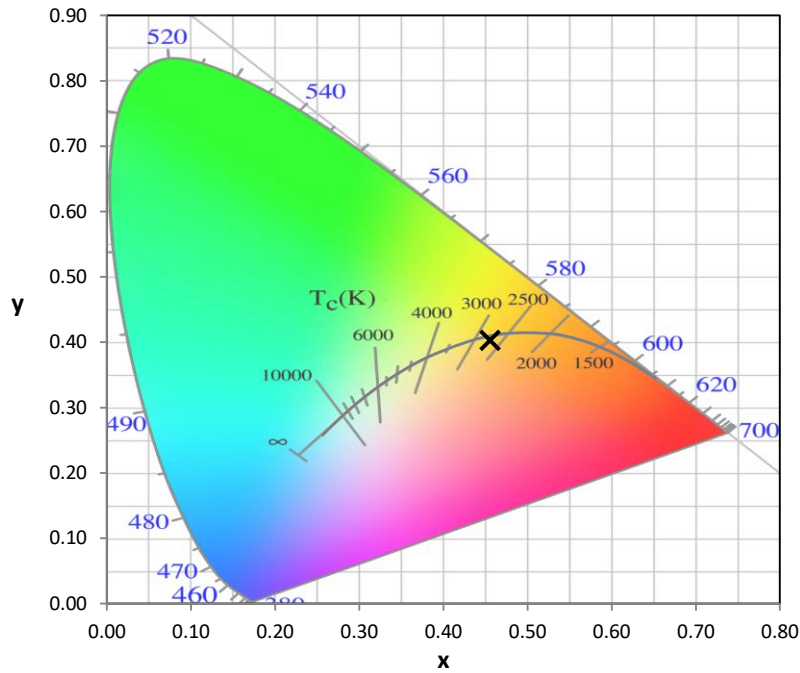
Stabilization Time: 177M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/34%  
 Sphere Temperature (°C): 24.7

REPORT NUMBER: SP1-2012-088-8-R2

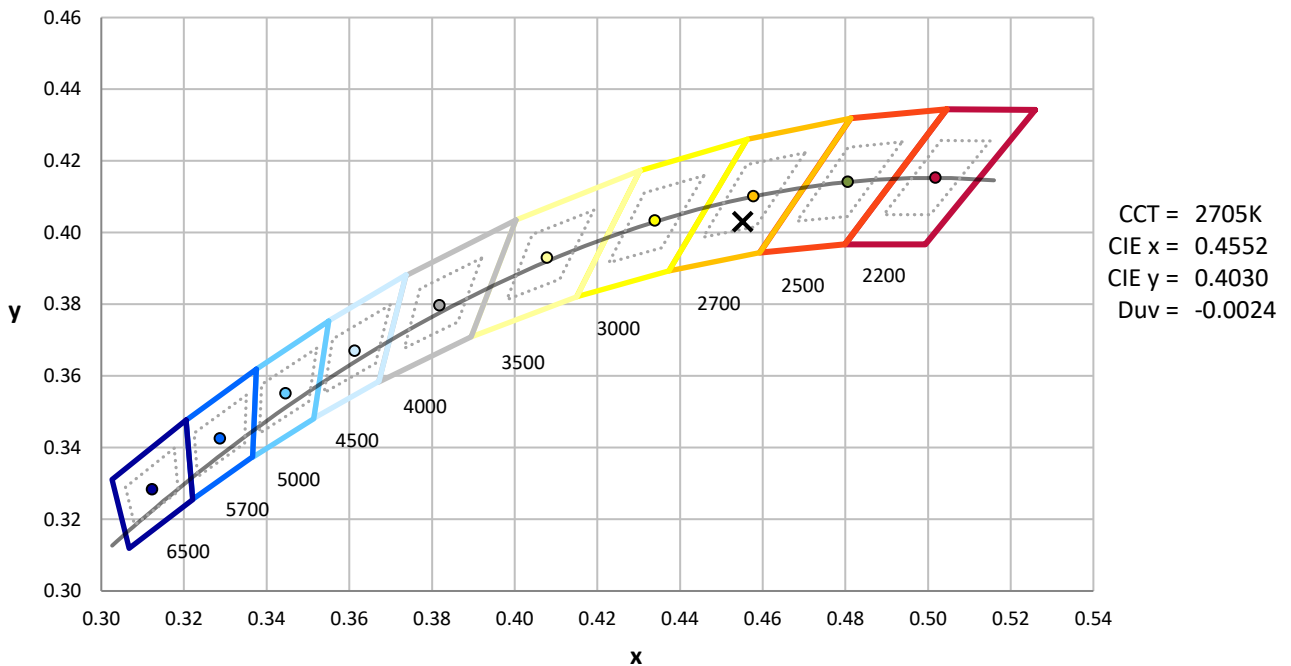
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 7/29/2020        | 1/29/2021            |
| Power Meter                    | IN0071                | 12/1/2020        | 12/1/2021            |
| AC Power Source                | IN0063                | 12/1/2020        | 12/1/2021            |
| DC Power Source                | IN0208                | 12/1/2020        | 12/1/2021            |
| Sphere Thermometer             | IN0085                | 12/1/2020        | 12/1/2021            |
| Room Thermometer               | IN0046                | 12/1/2020        | 12/1/2021            |

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**CIE 1931 Chromaticity Diagram**



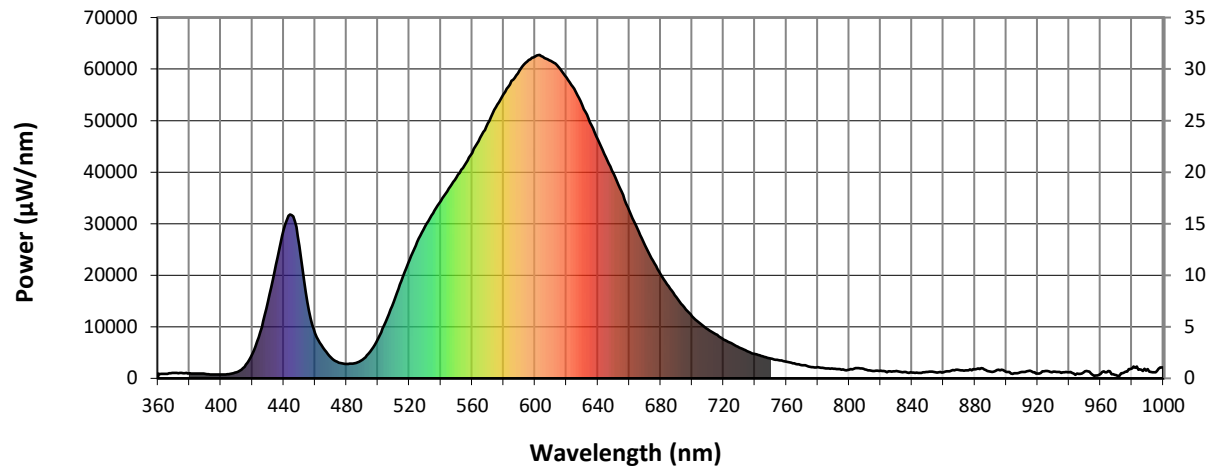
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 2700K 4-step quadrangle

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### Photopic Flux vs. Wavelength

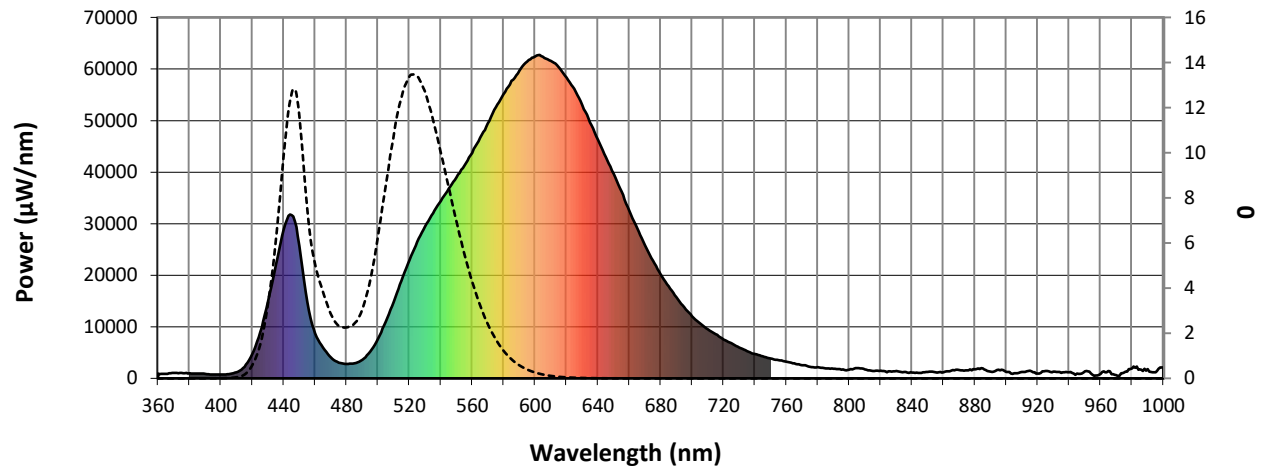


#####

| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 926              | 0.0              | 490       | 3601             | 0.5              | 620       | 58340            | 15.2             | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 0.9              | 625       | 56180            | 12.4             | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 1.7              | 630       | 53018            | 9.6              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 3.1              | 635       | 49683            | 7.5              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 5.1              | 640       | 46308            | 5.5              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 7.9              | 645       | 42927            | 4.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 11.1             | 650       | 39728            | 2.9              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 14.2             | 655       | 36260            | 2.1              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 17.4             | 660       | 32543            | 1.4              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 19.9             | 665       | 29105            | 0.9              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 22.4             | 670       | 25817            | 0.6              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.0              | 545       | 36784            | 24.5             | 675       | 22832            | 0.4              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.0              | 550       | 39017            | 26.5             | 680       | 20201            | 0.2              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 0.0              | 555       | 41253            | 28.2             | 685       | 17863            | 0.2              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 0.1              | 560       | 43733            | 29.7             | 690       | 15761            | 0.1              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 0.3              | 565       | 46694            | 31.0             | 695       | 13762            | 0.1              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 0.5              | 570       | 49493            | 32.2             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 0.7              | 575       | 52587            | 32.7             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 0.7              | 580       | 55129            | 32.8             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 0.5              | 585       | 57737            | 32.1             | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 0.4              | 590       | 59688            | 30.9             | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 0.3              | 595       | 61458            | 29.1             | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 0.3              | 600       | 62443            | 26.9             | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 0.2              | 605       | 62403            | 24.2             | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 0.3              | 610       | 61581            | 21.2             | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 0.3              | 615       | 60386            | 18.2             | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



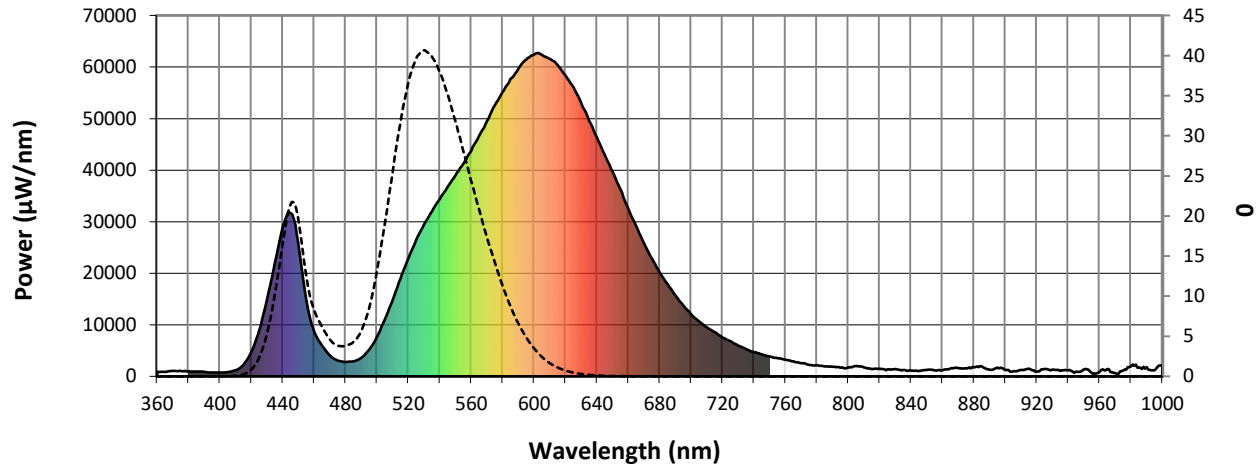
Scotopic Lumens: 1073.3

S/P: 0.36

| 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       | 926              | 0.0              | 490       | 3601             | 5.5              | 620       | 58340            | 0.7              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 8.3              | 625       | 56180            | 0.5              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 12.9             | 630       | 53018            | 0.3              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 18.7             | 635       | 49683            | 0.2              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 25.1             | 640       | 46308            | 0.1              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 31.4             | 645       | 42927            | 0.1              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 36.5             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 39.6             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 40.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 39.9             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.1              | 540       | 34386            | 38.0             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.2              | 545       | 36784            | 35.3             | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.8              | 550       | 39017            | 31.9             | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 2.2              | 555       | 41253            | 28.2             | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 5.1              | 560       | 43733            | 24.4             | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 9.9              | 565       | 46694            | 20.9             | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 16.1             | 570       | 49493            | 17.5             | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 21.2             | 575       | 52587            | 14.3             | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 19.9             | 580       | 55129            | 11.4             | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 12.9             | 585       | 57737            | 8.8              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 8.5              | 590       | 59688            | 6.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 6.3              | 595       | 61458            | 4.9              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 4.7              | 600       | 62443            | 3.5              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 3.8              | 605       | 62403            | 2.5              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 3.8              | 610       | 61581            | 1.7              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 4.2              | 615       | 60386            | 1.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



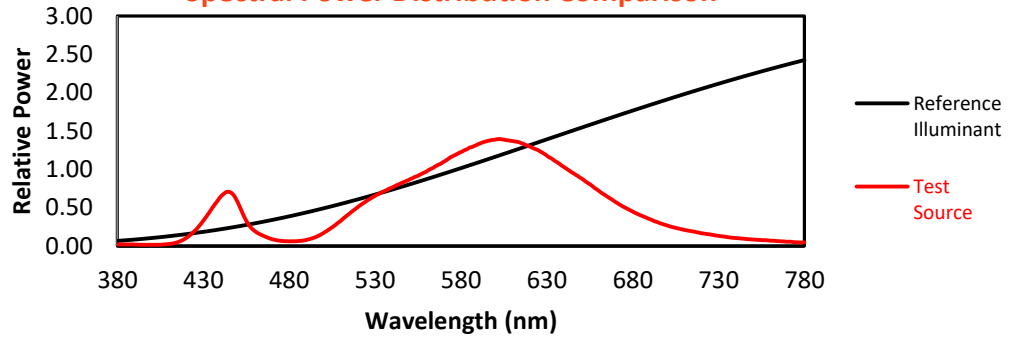
**Melanopic Lumens: 3157.6**      **S/P: 1.07**

| 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       | 926              | 0.0              | 490       | 3601             | 3.0              | 620       | 58340            | 0.0              | 750       | 3861             | 0.0              | 880       | 1742             | 0.0              |
| 365       | 867              | 0.0              | 495       | 5135             | 4.2              | 625       | 56180            | 0.0              | 755       | 3520             | 0.0              | 885       | 1920             | 0.0              |
| 370       | 1032             | 0.0              | 500       | 7689             | 6.2              | 630       | 53018            | 0.0              | 760       | 3223             | 0.0              | 890       | 1286             | 0.0              |
| 375       | 1034             | 0.0              | 505       | 11015            | 8.5              | 635       | 49683            | 0.0              | 765       | 2910             | 0.0              | 895       | 1660             | 0.0              |
| 380       | 979              | 0.0              | 510       | 14817            | 10.6             | 640       | 46308            | 0.0              | 770       | 2560             | 0.0              | 900       | 1274             | 0.0              |
| 385       | 938              | 0.0              | 515       | 18962            | 12.4             | 645       | 42927            | 0.0              | 775       | 2242             | 0.0              | 905       | 1020             | 0.0              |
| 390       | 893              | 0.0              | 520       | 22933            | 13.4             | 650       | 39728            | 0.0              | 780       | 2156             | 0.0              | 910       | 1258             | 0.0              |
| 395       | 757              | 0.0              | 525       | 26438            | 13.4             | 655       | 36260            | 0.0              | 785       | 1926             | 0.0              | 915       | 1481             | 0.0              |
| 400       | 728              | 0.0              | 530       | 29492            | 12.7             | 660       | 32543            | 0.0              | 790       | 1871             | 0.0              | 920       | 923              | 0.0              |
| 405       | 812              | 0.0              | 535       | 32054            | 11.5             | 665       | 29105            | 0.0              | 795       | 1697             | 0.0              | 925       | 1444             | 0.0              |
| 410       | 1197             | 0.0              | 540       | 34386            | 10.1             | 670       | 25817            | 0.0              | 800       | 1691             | 0.0              | 930       | 1315             | 0.0              |
| 415       | 2254             | 0.1              | 545       | 36784            | 8.5              | 675       | 22832            | 0.0              | 805       | 1967             | 0.0              | 935       | 1037             | 0.0              |
| 420       | 4742             | 0.5              | 550       | 39017            | 7.0              | 680       | 20201            | 0.0              | 810       | 1719             | 0.0              | 940       | 1195             | 0.0              |
| 425       | 8975             | 1.4              | 555       | 41253            | 5.6              | 685       | 17863            | 0.0              | 815       | 1436             | 0.0              | 945       | 914              | 0.0              |
| 430       | 14905            | 3.1              | 560       | 43733            | 4.3              | 690       | 15761            | 0.0              | 820       | 1465             | 0.0              | 950       | 1373             | 0.0              |
| 435       | 22096            | 5.9              | 565       | 46694            | 3.3              | 695       | 13762            | 0.0              | 825       | 1365             | 0.0              | 955       | 692              | 0.0              |
| 440       | 28868            | 9.6              | 570       | 49493            | 2.4              | 700       | 12064            | 0.0              | 830       | 1404             | 0.0              | 960       | 844              | 0.0              |
| 445       | 31683            | 12.5             | 575       | 52587            | 1.8              | 705       | 10683            | 0.0              | 835       | 1222             | 0.0              | 965       | 1427             | 0.0              |
| 450       | 25690            | 11.8             | 580       | 55129            | 1.2              | 710       | 9480             | 0.0              | 840       | 1144             | 0.0              | 970       | 654              | 0.0              |
| 455       | 14802            | 7.8              | 585       | 57737            | 0.9              | 715       | 8582             | 0.0              | 845       | 1078             | 0.0              | 975       | 1127             | 0.0              |
| 460       | 8755             | 5.2              | 590       | 59688            | 0.6              | 720       | 7530             | 0.0              | 850       | 1254             | 0.0              | 980       | 1935             | 0.0              |
| 465       | 5978             | 3.9              | 595       | 61458            | 0.4              | 725       | 6824             | 0.0              | 855       | 1203             | 0.0              | 985       | 1754             | 0.0              |
| 470       | 4047             | 2.9              | 600       | 62443            | 0.3              | 730       | 5968             | 0.0              | 860       | 1183             | 0.0              | 990       | 1822             | 0.0              |
| 475       | 3070             | 2.3              | 605       | 62403            | 0.2              | 735       | 5266             | 0.0              | 865       | 1505             | 0.0              | 995       | 1176             | 0.0              |
| 480       | 2814             | 2.3              | 610       | 61581            | 0.1              | 740       | 4712             | 0.0              | 870       | 1624             | 0.0              | 1000      | 2143             | 0.0              |
| 485       | 2926             | 2.4              | 615       | 60386            | 0.1              | 745       | 4264             | 0.0              | 875       | 1559             | 0.0              |           |                  |                  |

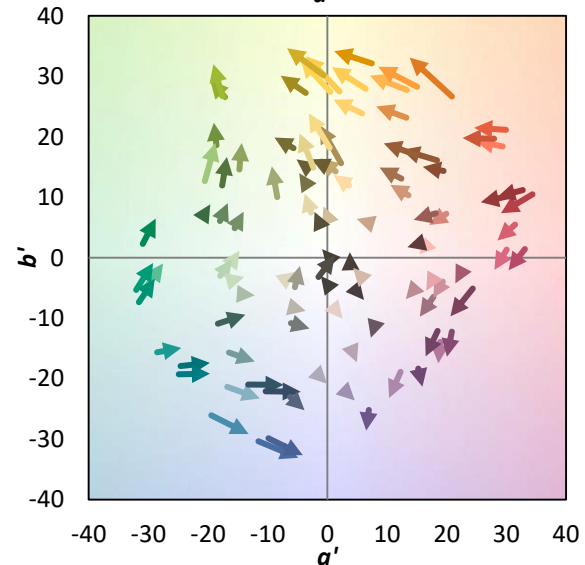
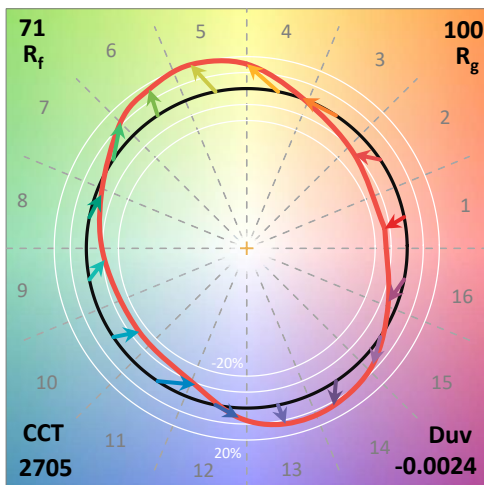
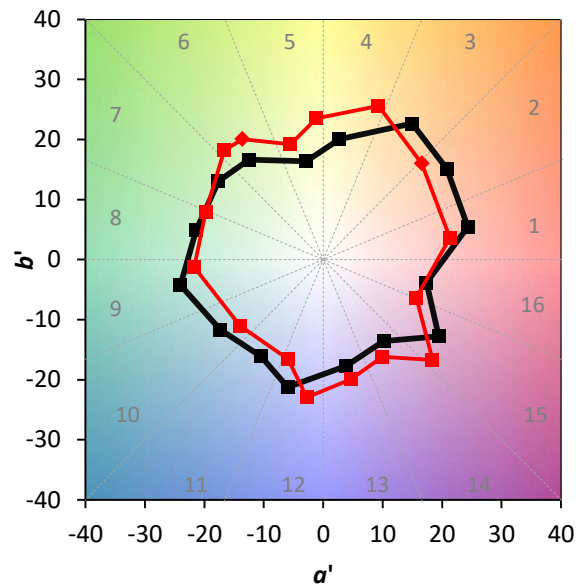
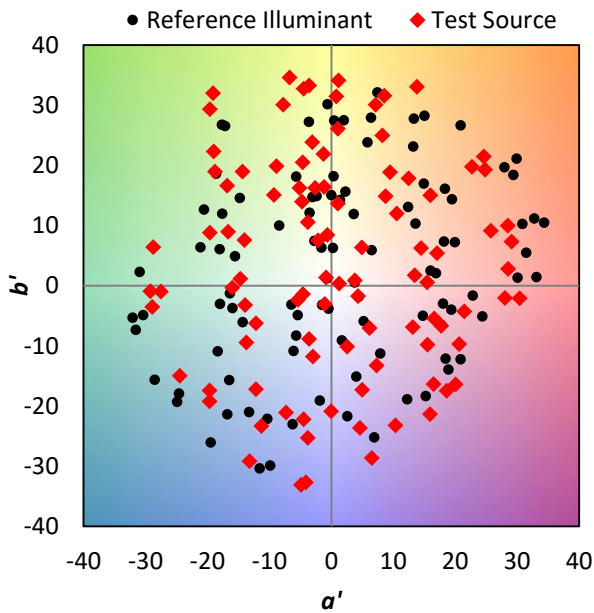
### Summary

$R_f = 71.2$   
 $R_g = 100.1$   
 CIE  $R_a = 73.8$   
 $R_g = -7.6$

### Spectral Power Distribution Comparison



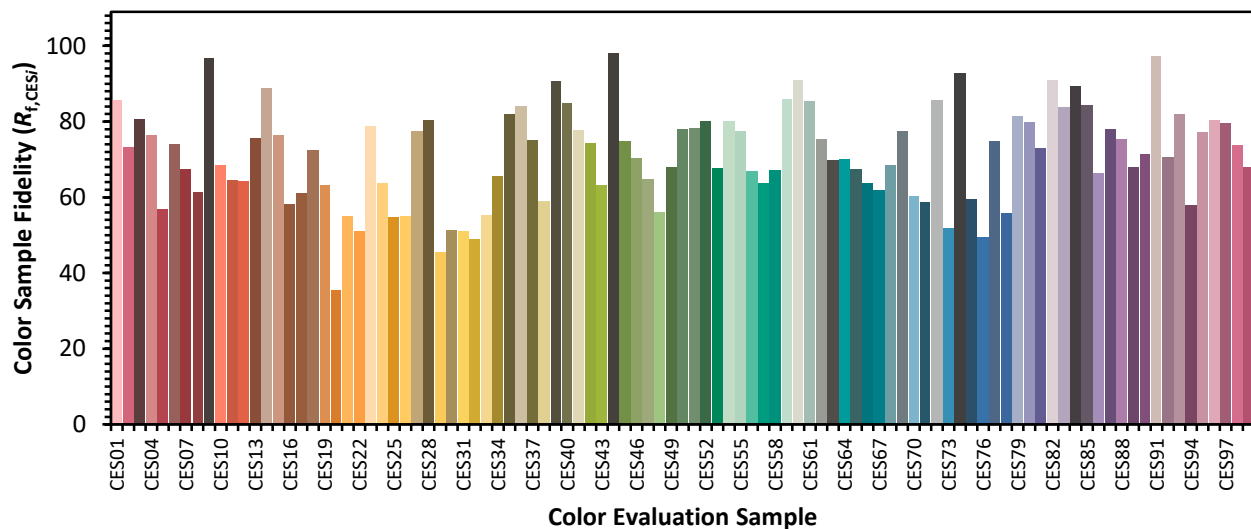
### Color Vector Graphics

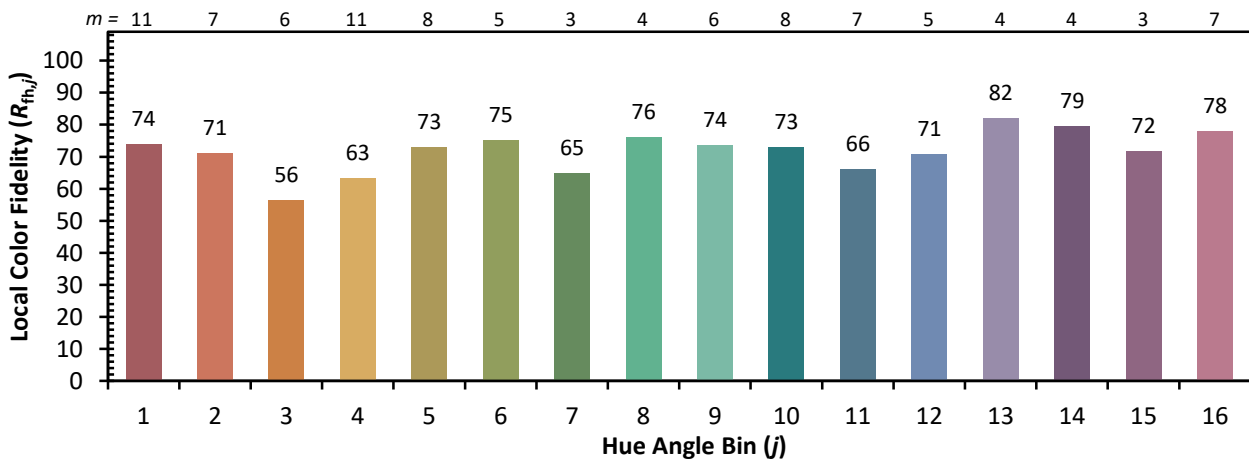
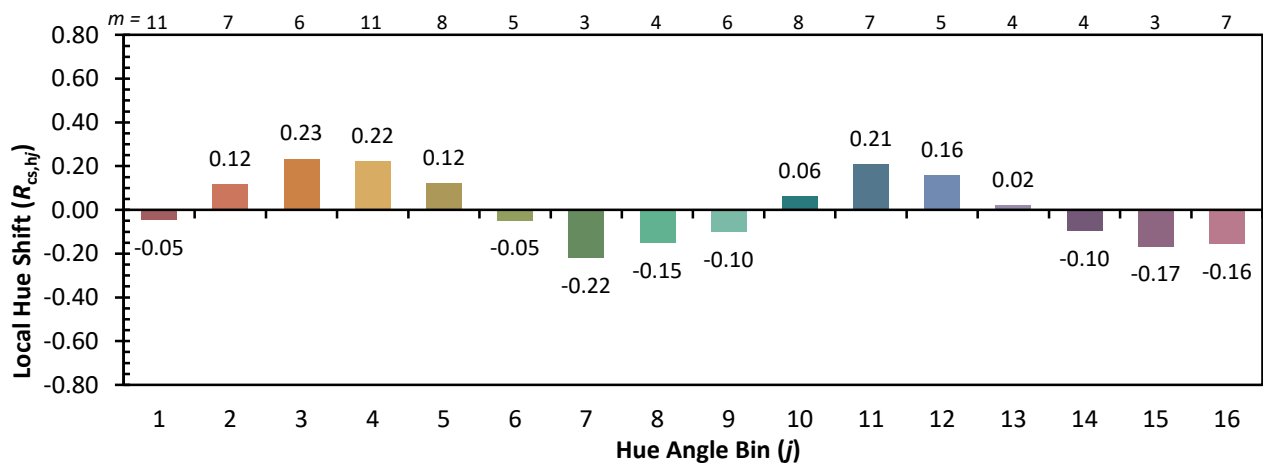
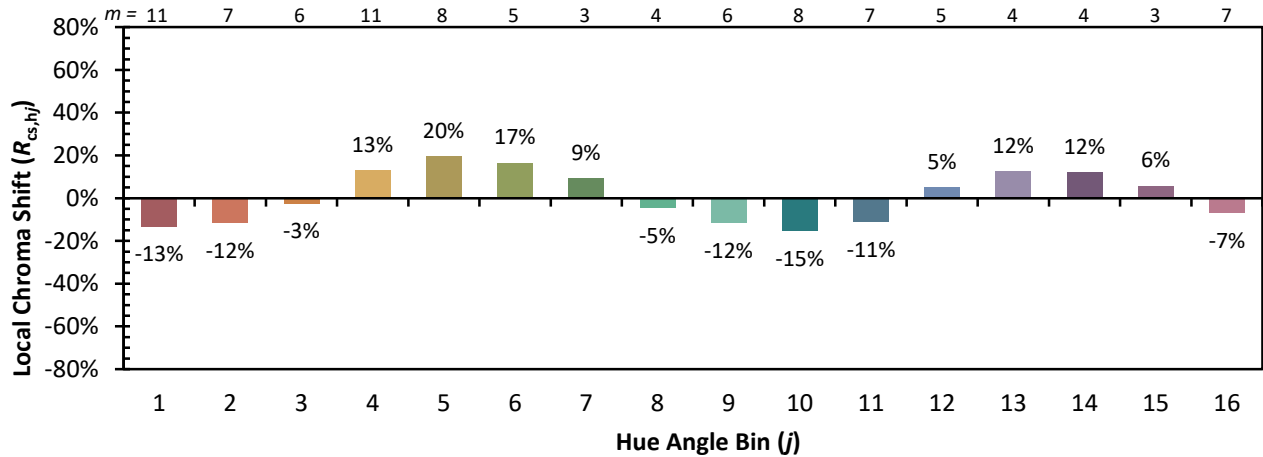


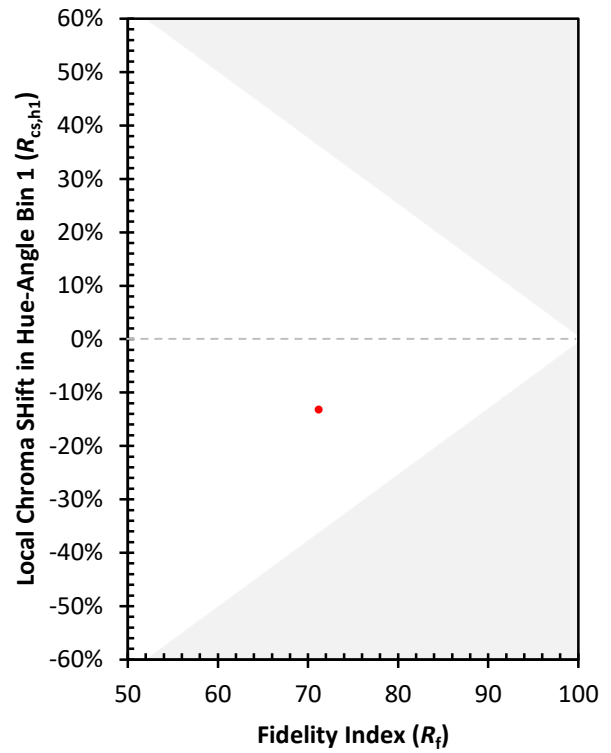
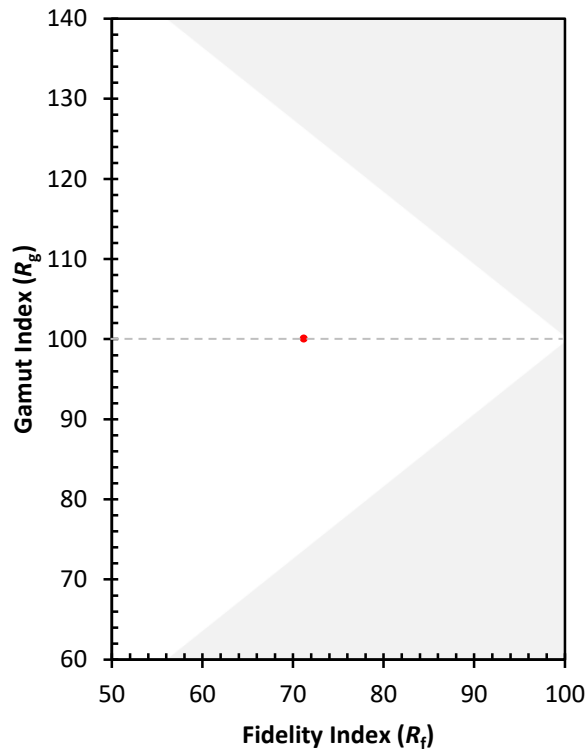


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 55 | CES51 = 78 | CES76 = 50 |
| CES02 = 63 | CES27 = 77 | CES52 = 80 | CES77 = 75 |
| CES03 = 31 | CES28 = 80 | CES53 = 68 | CES78 = 56 |
| CES04 = 71 | CES29 = 46 | CES54 = 80 | CES79 = 81 |
| CES05 = 50 | CES30 = 51 | CES55 = 78 | CES80 = 80 |
| CES06 = 52 | CES31 = 51 | CES56 = 67 | CES81 = 73 |
| CES07 = 43 | CES32 = 49 | CES57 = 64 | CES82 = 91 |
| CES08 = 41 | CES33 = 55 | CES58 = 67 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 77 | CES35 = 82 | CES60 = 91 | CES85 = 84 |
| CES11 = 60 | CES36 = 84 | CES61 = 85 | CES86 = 66 |
| CES12 = 66 | CES37 = 75 | CES62 = 75 | CES87 = 78 |
| CES13 = 44 | CES38 = 59 | CES63 = 70 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 68 |
| CES15 = 72 | CES40 = 85 | CES65 = 67 | CES90 = 71 |
| CES16 = 48 | CES41 = 78 | CES66 = 64 | CES91 = 97 |
| CES17 = 51 | CES42 = 74 | CES67 = 62 | CES92 = 71 |
| CES18 = 57 | CES43 = 63 | CES68 = 68 | CES93 = 82 |
| CES19 = 73 | CES44 = 98 | CES69 = 77 | CES94 = 58 |
| CES20 = 67 | CES45 = 75 | CES70 = 60 | CES95 = 77 |
| CES21 = 88 | CES46 = 70 | CES71 = 59 | CES96 = 80 |
| CES22 = 80 | CES47 = 65 | CES72 = 86 | CES97 = 80 |
| CES23 = 92 | CES48 = 56 | CES73 = 52 | CES98 = 74 |
| CES24 = 91 | CES49 = 68 | CES74 = 93 | CES99 = 68 |
| CES25 = 73 | CES50 = 78 | CES75 = 59 |            |



**Color Rendition by Hue-Angle Bin**


**Measure Comparisons**


(END OF REPORT)