

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: P386836

Luminaire Tested: **GWC-SA2C-735-U-SL4-HSS**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386836  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-25)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2C-735-U-SL4-HSS  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 3500K, 1050mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV  
SPILL LIGHT ELIMINATOR OPTICS WITH HOUSE SIDE SHIELD  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 11253.9 lumens  
Efficiency: N/A  
Efficacy: 99.6 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B1 - U0 - G3

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



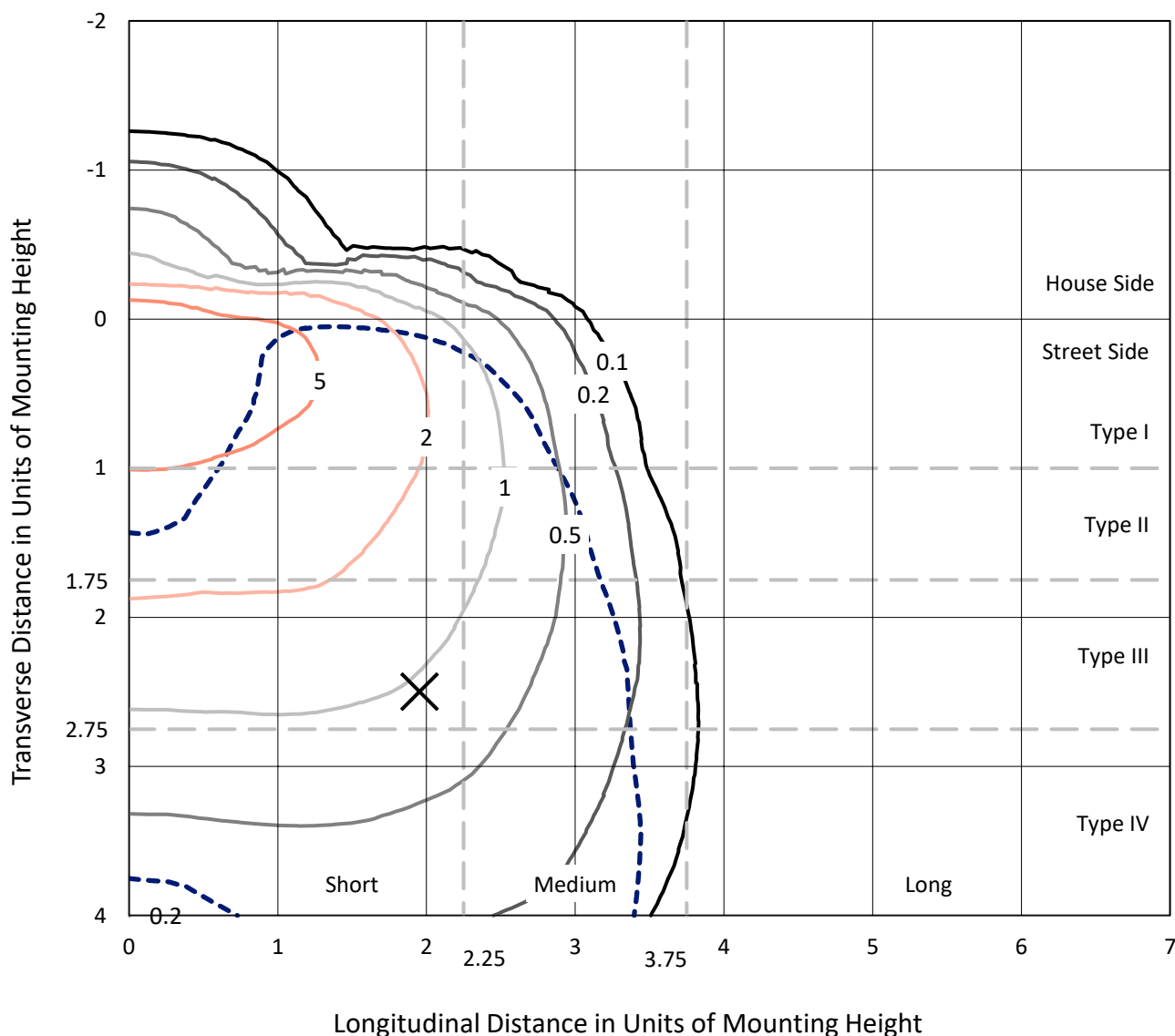
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd



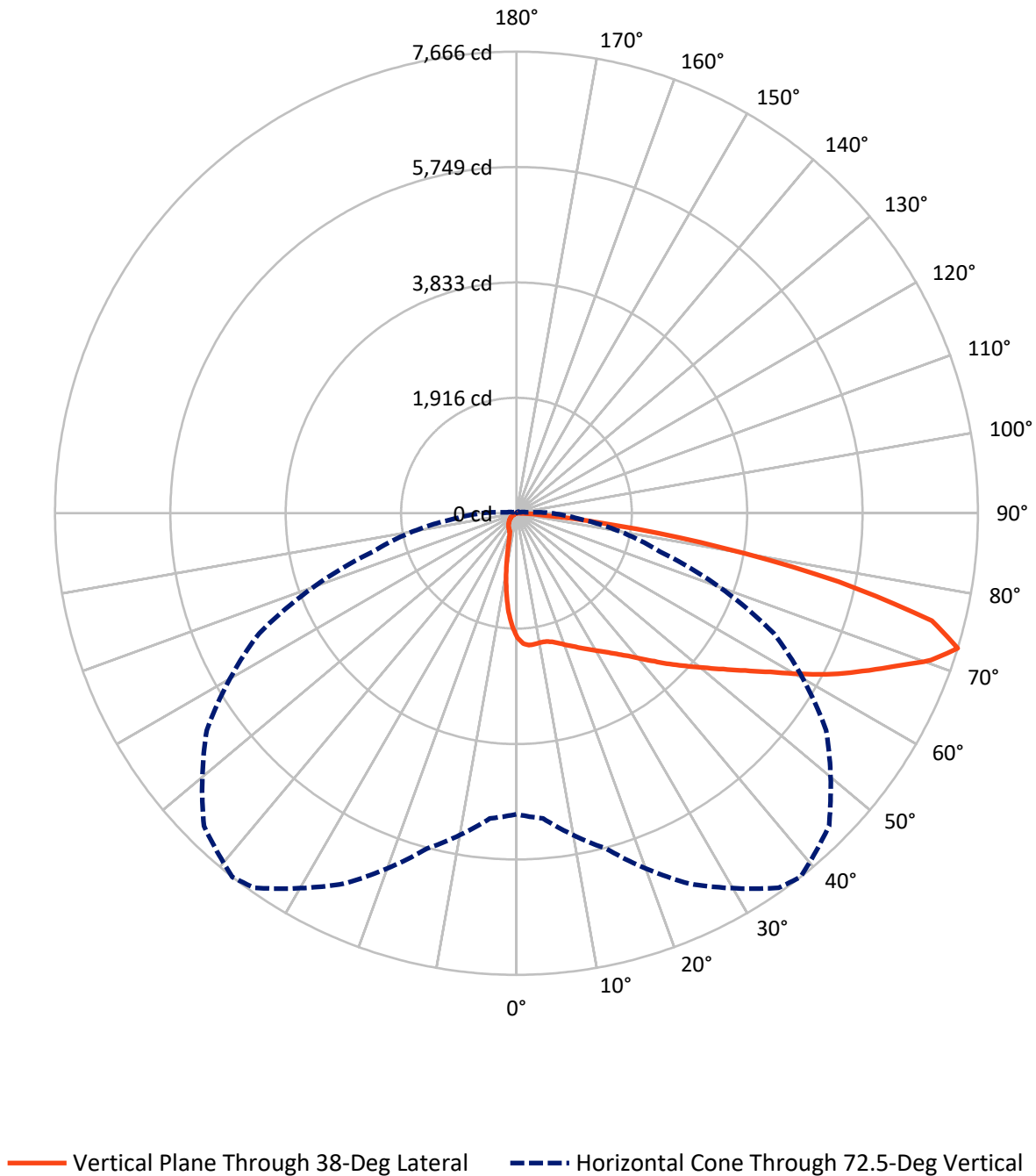
Based on 15 foot mounting height. Maximum calculated value = 9.7 fc

Type IV - Short - N/A

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CATALOG NUMBER: GWC-SA2C-735-U-SL4-HSS

## Luminous Intensity Polar Plot



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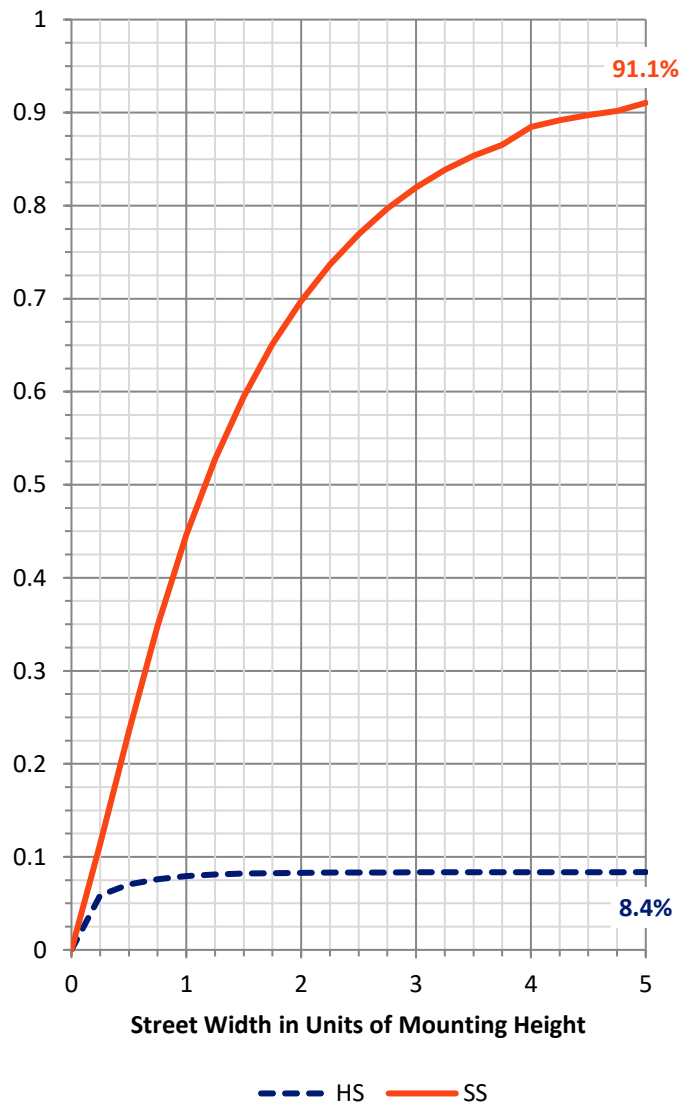
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 947.1    | 0.0    | 947.1   |
|                    | % Fixture | 8.4      | 0.0    | 8.4     |
| <b>Street Side</b> | Lumens    | 10306.9  | 0.0    | 10306.9 |
|                    | % Fixture | 91.6     | 0.0    | 91.6    |
| <b>Total</b>       | Lumens    | 11253.9  | 0.0    | 11253.9 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 176.4   | 1.6       |
| 10°-20°   | 431.3   | 3.8       |
| 20°-30°   | 685.9   | 6.1       |
| 30°-40°   | 1031.2  | 9.2       |
| 40°-50°   | 1573.1  | 14.0      |
| 50°-60°   | 2223.4  | 19.8      |
| 60°-70°   | 2788.9  | 24.8      |
| 70°-80°   | 2085.3  | 18.5      |
| 80°-90°   | 258.6   | 2.3       |
| 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°    | 11253.9 | 100.0     |
| 0°-180°   | 11253.9 | 100.0     |

**Coefficient of Utilization**



REPORT NUMBER: P386836

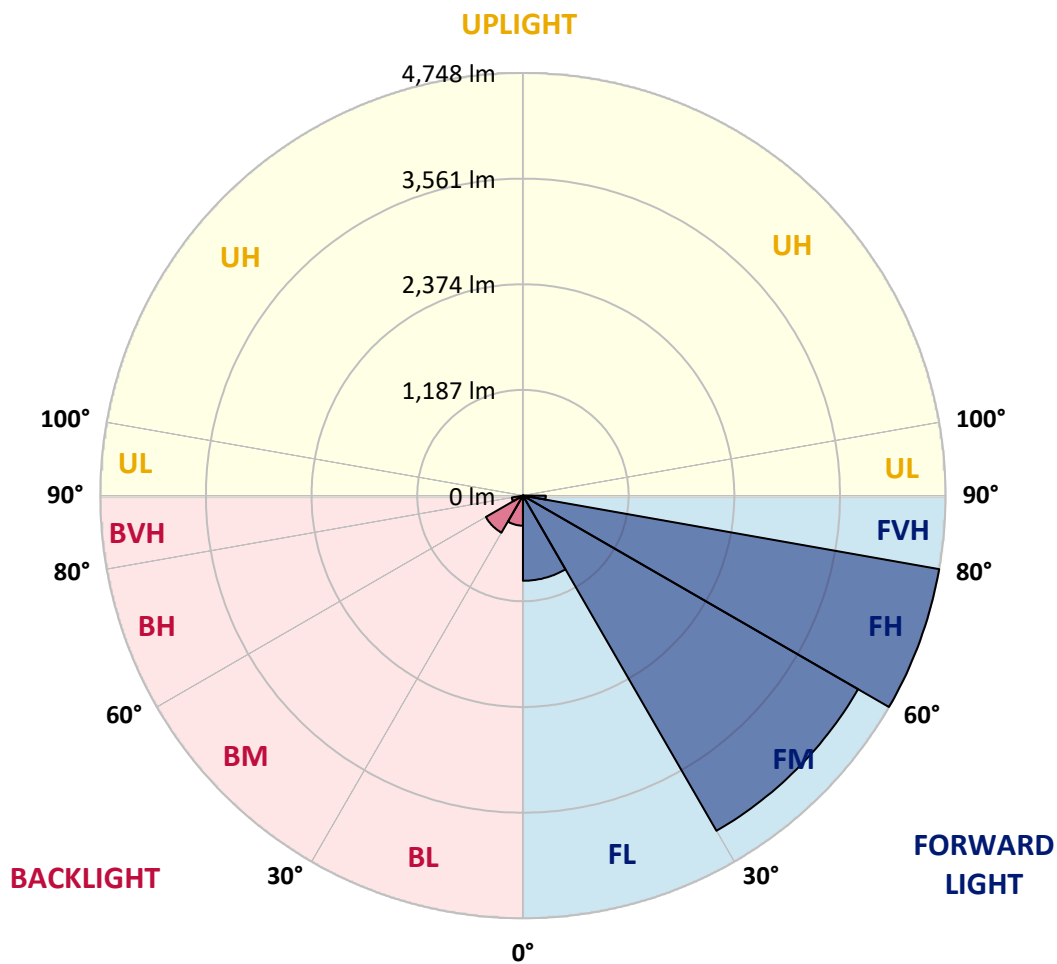
CATALOG NUMBER: GWC-SA2C-735-U-SL4-HSS

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 956.3  | 8.5       |                         |      |         |
| FM   | (30°-60°)   | 4346.8 | 38.6      |                         |      |         |
| FH   | (60°-80°)   | 4747.6 | 42.2      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 256.2  | 2.3       |                         |      | G3/500  |
| BL   | (0°-30°)    | 337.2  | 3.0       | B1/500                  |      |         |
| BM   | (30°-60°)   | 480.9  | 4.3       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 126.5  | 1.1       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 2.4    | 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-G3**

Type IV Short



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CATALOG NUMBER: GWC-SA2C-735-U-SL4-HSS

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 38°    | 45°    | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 |
| 2.5°  | 2196.7 | 2197.1 | 2192.0 | 2183.6 | 2172.8 | 2167.3 | 2157.9 | 2142.9 | 2127.1 | 2098.5 | 2067.7 |
| 5°    | 2241.6 | 2241.6 | 2235.0 | 2223.8 | 2206.5 | 2201.4 | 2183.6 | 2159.8 | 2127.1 | 2080.8 | 2028.9 |
| 7.5°  | 2236.9 | 2237.8 | 2228.9 | 2217.3 | 2200.0 | 2195.3 | 2173.8 | 2147.2 | 2106.5 | 2050.4 | 1984.0 |
| 10°   | 2212.6 | 2214.9 | 2208.0 | 2202.3 | 2186.4 | 2181.3 | 2161.2 | 2134.5 | 2093.9 | 2034.1 | 1957.9 |
| 12.5° | 2187.8 | 2190.1 | 2192.5 | 2197.6 | 2187.8 | 2186.0 | 2170.1 | 2147.6 | 2108.8 | 2046.7 | 1960.7 |
| 15°   | 2171.9 | 2176.6 | 2193.4 | 2213.5 | 2215.8 | 2214.0 | 2203.7 | 2182.7 | 2143.4 | 2078.9 | 1980.8 |
| 17.5° | 2171.9 | 2179.4 | 2214.4 | 2252.8 | 2266.3 | 2267.7 | 2258.9 | 2229.4 | 2182.7 | 2113.5 | 1999.5 |
| 20°   | 2190.1 | 2200.4 | 2255.1 | 2309.3 | 2331.8 | 2331.8 | 2314.5 | 2273.3 | 2218.7 | 2144.8 | 2012.1 |
| 22.5° | 2236.9 | 2250.4 | 2319.2 | 2381.7 | 2405.6 | 2400.4 | 2377.1 | 2317.3 | 2256.0 | 2180.3 | 2028.0 |
| 25°   | 2328.9 | 2339.3 | 2410.8 | 2473.8 | 2488.4 | 2476.6 | 2447.2 | 2370.6 | 2303.7 | 2228.4 | 2056.9 |
| 27.5° | 2447.7 | 2449.1 | 2522.9 | 2576.2 | 2567.4 | 2559.4 | 2522.5 | 2437.4 | 2372.4 | 2297.2 | 2107.0 |
| 30°   | 2578.1 | 2578.1 | 2643.1 | 2683.7 | 2656.6 | 2650.0 | 2613.1 | 2518.2 | 2460.3 | 2390.7 | 2178.0 |
| 32.5° | 2704.2 | 2709.9 | 2762.7 | 2788.4 | 2758.1 | 2751.5 | 2715.5 | 2620.6 | 2577.1 | 2533.2 | 2288.7 |
| 35°   | 2826.3 | 2830.5 | 2880.5 | 2894.5 | 2865.5 | 2867.4 | 2841.7 | 2761.3 | 2744.9 | 2739.3 | 2455.6 |
| 37.5° | 2944.5 | 2945.5 | 2996.4 | 3005.2 | 2990.7 | 3006.6 | 3009.0 | 2938.0 | 2968.3 | 3013.7 | 2690.7 |
| 40°   | 3052.5 | 3053.4 | 3103.9 | 3126.8 | 3151.6 | 3172.1 | 3190.4 | 3152.5 | 3252.9 | 3358.1 | 2970.6 |
| 42.5° | 3138.9 | 3148.8 | 3212.8 | 3256.2 | 3321.7 | 3361.0 | 3410.5 | 3408.6 | 3591.9 | 3749.8 | 3309.0 |
| 45°   | 3215.1 | 3232.0 | 3321.2 | 3397.4 | 3509.6 | 3572.2 | 3649.7 | 3710.5 | 3973.2 | 4185.8 | 3651.6 |
| 47.5° | 3315.6 | 3331.5 | 3433.4 | 3558.1 | 3707.7 | 3790.0 | 3918.5 | 4049.8 | 4392.4 | 4614.0 | 3986.3 |
| 50°   | 3457.3 | 3450.2 | 3550.7 | 3729.7 | 3921.8 | 4029.7 | 4213.0 | 4409.7 | 4808.4 | 4987.0 | 4183.0 |
| 52.5° | 3608.2 | 3605.4 | 3679.7 | 3916.1 | 4174.2 | 4300.4 | 4542.4 | 4781.8 | 5206.1 | 5244.0 | 4273.3 |
| 55°   | 3795.2 | 3775.0 | 3837.7 | 4128.8 | 4473.8 | 4609.3 | 4894.4 | 5150.0 | 5523.1 | 5388.9 | 4318.6 |
| 57.5° | 3990.9 | 3957.8 | 4017.6 | 4365.8 | 4811.7 | 4972.0 | 5284.2 | 5509.0 | 5733.9 | 5487.9 | 4318.1 |
| 60°   | 4193.4 | 4154.1 | 4225.1 | 4662.1 | 5231.4 | 5416.9 | 5706.7 | 5751.6 | 5930.6 | 5538.0 | 4286.4 |
| 62.5° | 4362.5 | 4339.2 | 4444.8 | 4979.0 | 5700.1 | 5882.5 | 6025.9 | 5972.2 | 6096.5 | 5576.8 | 4212.1 |
| 65°   | 4541.5 | 4542.9 | 4713.5 | 5348.7 | 6198.4 | 6321.4 | 6333.5 | 6258.2 | 6235.3 | 5568.8 | 3960.6 |
| 67.5° | 4783.7 | 4806.0 | 5090.7 | 5850.6 | 6683.0 | 6777.9 | 6777.0 | 6568.1 | 6336.8 | 5252.9 | 3403.0 |
| 70°   | 5039.8 | 5092.5 | 5525.4 | 6425.1 | 7212.2 | 7308.4 | 7258.9 | 6765.3 | 5966.6 | 4247.6 | 2408.4 |
| 72.5° | 4996.7 | 5088.4 | 5767.0 | 6787.3 | 7592.1 | 7665.5 | 7343.5 | 6280.7 | 4715.9 | 2468.7 | 1025.4 |
| 75°   | 3855.0 | 3961.0 | 5287.9 | 6428.4 | 7193.5 | 7127.6 | 6309.6 | 4887.4 | 2577.1 | 689.0  | 230.9  |
| 77.5° | 2036.4 | 2093.0 | 3493.2 | 4897.2 | 5609.0 | 5471.1 | 4444.8 | 2711.3 | 785.7  | 170.6  | 103.8  |
| 80°   | 1066.6 | 1079.6 | 1522.3 | 2778.5 | 3461.9 | 3462.8 | 2634.2 | 1190.9 | 323.9  | 87.4   | 69.6   |
| 82.5° | 571.2  | 582.3  | 804.4  | 1283.9 | 1813.9 | 1644.2 | 1008.6 | 655.2  | 188.3  | 49.5   | 66.8   |
| 85°   | 137.4  | 139.8  | 456.2  | 586.6  | 713.2  | 509.4  | 299.6  | 550.1  | 50.9   | 28.9   | 54.2   |
| 87.5° | 52.8   | 53.7   | 169.2  | 253.8  | 181.8  | 117.8  | 140.3  | 205.2  | 6.6    | 11.2   | 8.5    |
| 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: P386836

CATALOG NUMBER: GWC-SA2C-735-U-SL4-HSS

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 | 2069.6 |
| 2.5°  | 2049.0 | 2036.9 | 2006.9 | 1969.1 | 1935.4 | 1911.1 | 1874.7 | 1850.8 | 1834.9 | 1834.4 | 1828.4 |
| 5°    | 1997.2 | 1972.4 | 1907.8 | 1831.2 | 1761.6 | 1698.9 | 1625.1 | 1566.6 | 1523.2 | 1516.2 | 1501.2 |
| 7.5°  | 1941.5 | 1900.9 | 1801.8 | 1682.1 | 1565.2 | 1446.6 | 1308.7 | 1223.1 | 1149.7 | 1114.7 | 1110.9 |
| 10°   | 1907.3 | 1850.3 | 1709.7 | 1536.8 | 1353.6 | 1160.5 | 980.1  | 855.3  | 765.1  | 739.4  | 720.2  |
| 12.5° | 1900.4 | 1825.1 | 1638.7 | 1400.3 | 1138.5 | 883.3  | 683.8  | 551.0  | 479.1  | 456.2  | 450.1  |
| 15°   | 1907.3 | 1813.4 | 1578.8 | 1265.2 | 920.7  | 626.8  | 459.0  | 381.9  | 354.7  | 348.2  | 347.8  |
| 17.5° | 1911.6 | 1799.4 | 1511.0 | 1115.2 | 709.5  | 447.7  | 351.4  | 329.1  | 324.8  | 324.4  | 325.3  |
| 20°   | 1911.1 | 1777.9 | 1430.2 | 947.8  | 527.7  | 351.9  | 317.8  | 313.1  | 312.3  | 312.7  | 312.3  |
| 22.5° | 1907.8 | 1752.7 | 1341.4 | 775.4  | 398.7  | 314.5  | 303.3  | 300.5  | 300.0  | 300.0  | 300.0  |
| 25°   | 1913.9 | 1732.6 | 1243.7 | 610.4  | 328.6  | 297.2  | 290.3  | 287.9  | 287.5  | 287.5  | 286.5  |
| 27.5° | 1935.9 | 1721.3 | 1136.7 | 469.7  | 296.8  | 281.8  | 276.2  | 275.7  | 274.4  | 273.9  | 274.9  |
| 30°   | 1971.4 | 1721.3 | 1019.3 | 365.5  | 277.6  | 265.9  | 261.7  | 260.8  | 260.3  | 259.8  | 260.3  |
| 32.5° | 2034.1 | 1734.5 | 891.3  | 303.8  | 259.4  | 248.2  | 245.4  | 246.8  | 245.4  | 245.4  | 245.4  |
| 35°   | 2147.2 | 1773.7 | 757.2  | 265.0  | 240.2  | 230.9  | 228.1  | 230.0  | 229.0  | 229.0  | 228.6  |
| 37.5° | 2312.1 | 1846.7 | 622.1  | 241.6  | 223.4  | 213.6  | 209.9  | 212.7  | 211.7  | 211.7  | 211.3  |
| 40°   | 2513.1 | 1952.7 | 493.6  | 223.9  | 207.0  | 196.8  | 193.5  | 194.9  | 192.6  | 192.6  | 193.5  |
| 42.5° | 2761.3 | 2087.3 | 381.4  | 206.6  | 190.7  | 180.8  | 179.0  | 177.6  | 173.4  | 171.1  | 171.5  |
| 45°   | 3037.1 | 2227.5 | 297.2  | 189.8  | 175.3  | 167.3  | 164.5  | 160.8  | 153.8  | 149.1  | 149.6  |
| 47.5° | 3283.4 | 2335.5 | 241.6  | 173.4  | 161.2  | 155.2  | 151.0  | 143.9  | 133.7  | 128.0  | 128.5  |
| 50°   | 3412.8 | 2351.9 | 205.6  | 157.1  | 148.1  | 142.1  | 136.0  | 125.2  | 113.1  | 107.0  | 106.5  |
| 52.5° | 3446.0 | 2275.2 | 179.0  | 142.1  | 135.1  | 128.0  | 120.1  | 105.6  | 92.1   | 85.5   | 84.6   |
| 55°   | 3458.2 | 2158.4 | 155.2  | 128.0  | 121.1  | 113.1  | 102.9  | 86.4   | 73.8   | 67.3   | 66.8   |
| 57.5° | 3418.0 | 1984.0 | 136.5  | 115.5  | 107.0  | 97.2   | 84.6   | 69.1   | 57.0   | 51.9   | 51.9   |
| 60°   | 3328.6 | 1748.0 | 122.0  | 101.9  | 92.5   | 81.4   | 68.2   | 53.7   | 42.6   | 38.3   | 38.3   |
| 62.5° | 3150.6 | 1442.3 | 108.4  | 87.8   | 79.0   | 67.3   | 55.1   | 40.7   | 29.9   | 27.6   | 28.1   |
| 65°   | 2814.6 | 1094.1 | 94.9   | 75.2   | 67.3   | 55.6   | 43.0   | 28.9   | 20.1   | 20.1   | 21.0   |
| 67.5° | 2295.3 | 760.0  | 80.9   | 64.1   | 58.0   | 45.4   | 32.7   | 20.1   | 14.0   | 15.9   | 17.8   |
| 70°   | 1519.5 | 426.3  | 69.1   | 52.8   | 49.5   | 36.0   | 24.3   | 13.5   | 11.2   | 14.9   | 18.2   |
| 72.5° | 573.5  | 165.9  | 58.0   | 42.6   | 43.0   | 27.6   | 17.3   | 10.2   | 10.2   | 16.3   | 21.5   |
| 75°   | 159.9  | 81.4   | 41.6   | 31.3   | 33.6   | 20.1   | 12.6   | 8.9    | 9.8    | 18.7   | 25.3   |
| 77.5° | 93.9   | 59.8   | 27.1   | 18.2   | 22.9   | 14.0   | 8.5    | 7.0    | 8.5    | 15.9   | 24.3   |
| 80°   | 75.7   | 31.8   | 15.9   | 9.4    | 12.6   | 8.0    | 5.6    | 4.2    | 2.3    | 6.1    | 12.6   |
| 82.5° | 75.7   | 19.2   | 7.5    | 6.6    | 6.6    | 4.2    | 2.8    | 1.9    | 0.5    | 0.0    | 3.3    |
| 85°   | 50.9   | 8.0    | 4.7    | 4.2    | 3.3    | 1.4    | 0.9    | 0.5    | 0.0    | 0.0    | 0.0    |
| 87.5° | 8.5    | 3.3    | 1.9    | 0.9    | 0.5    | 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    |



Report Prepared for

Cooper Lighting Solutions

(formerly Eaton)

INVUE

Report Number: SP1-2104-224-2

Luminaire Tested: CCW-SA-2A-735-U-SL4

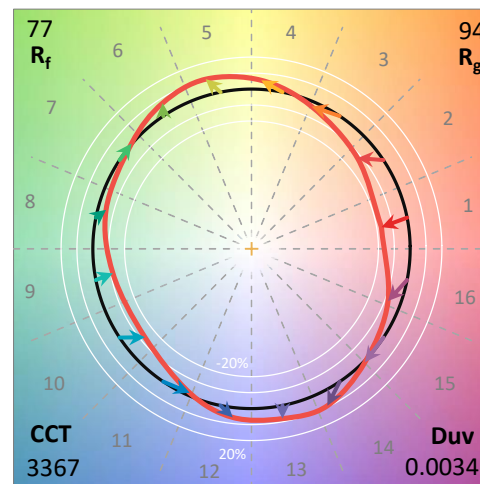
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-2  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/26/2021  
 Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
 Product Line: INVUE  
 Catalog Number: **CCW-SA-2A-735-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3367   | CRI (Ra): | 73.3 |      |       |
| CIE u':                   | 0.2376 | R1:       | 69.1 | R9:  | -34.3 |
| CIE v':                   | 0.5184 | R2:       | 81.3 | R10: | 58.3  |
| Duv:                      | 0.0034 | R3:       | 93.4 | R11: | 69.1  |
| CIE x:                    | 0.4168 | R4:       | 71.8 | R12: | 54.2  |
| CIE y:                    | 0.4041 | R5:       | 69.6 | R13: | 71.1  |
| CIE z:                    | 0.1791 | R6:       | 75.4 | R14: | 96.4  |
| Peak Wavelength (nm):     | 590    | R7:       | 79.5 |      |       |
| Dominant Wavelength (nm): | 580    | R8:       | 46.4 |      |       |
| Purity:                   | 46.5   |           |      |      |       |
| Rf:                       | 77.2   |           |      |      |       |
| Rg:                       | 94.4   |           |      |      |       |



### Test Conditions

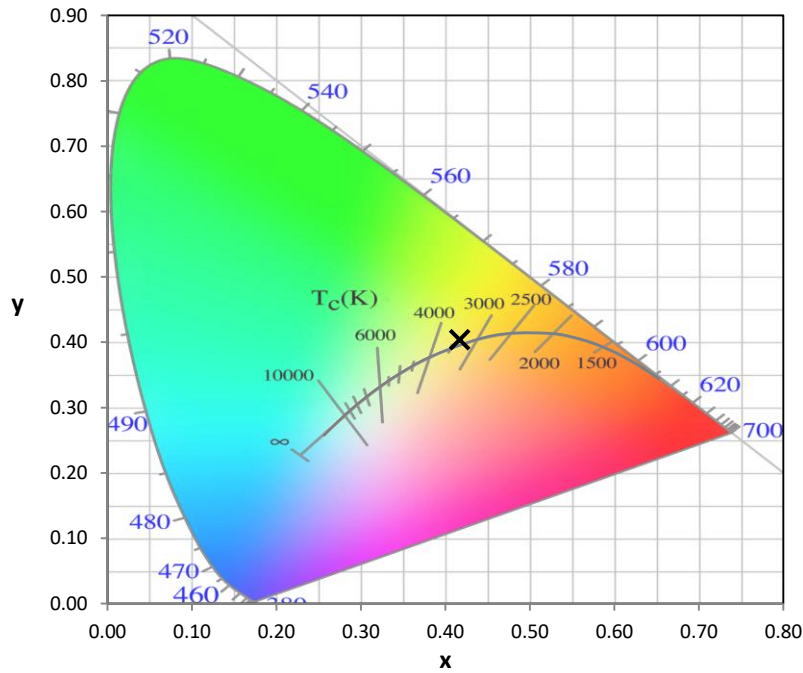
Stabilization Time: 71M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.9/38%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-2

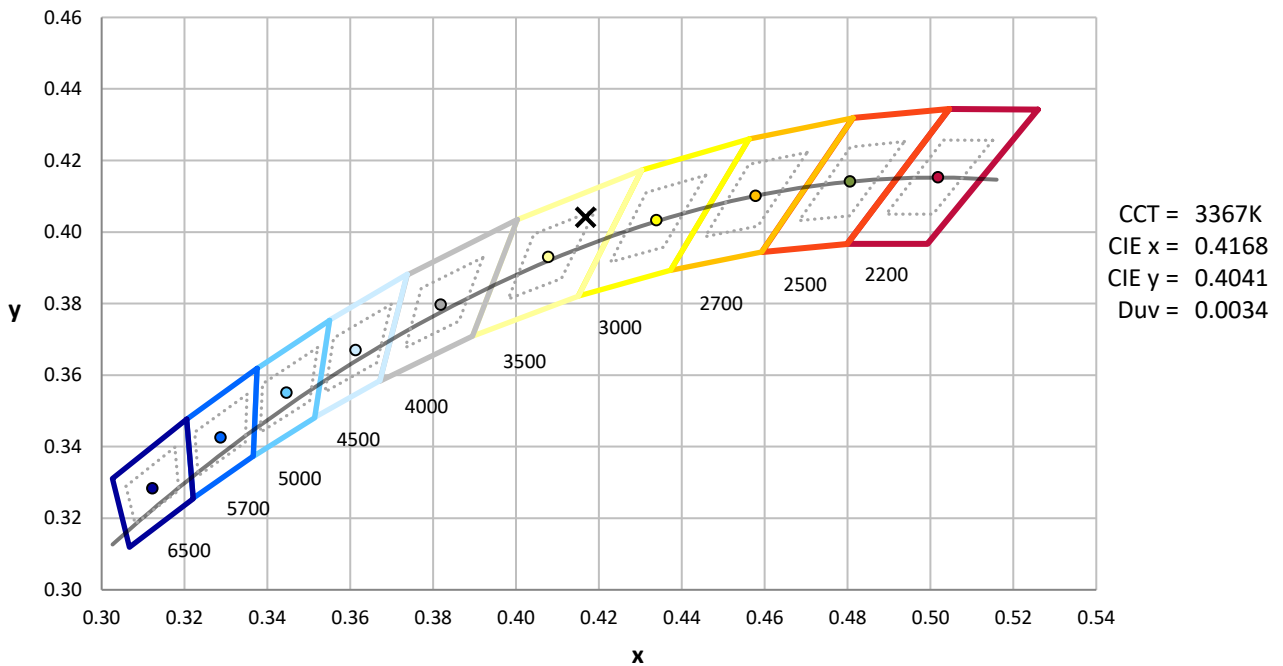
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 1/31/2021        | 7/31/2021            |
| 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**



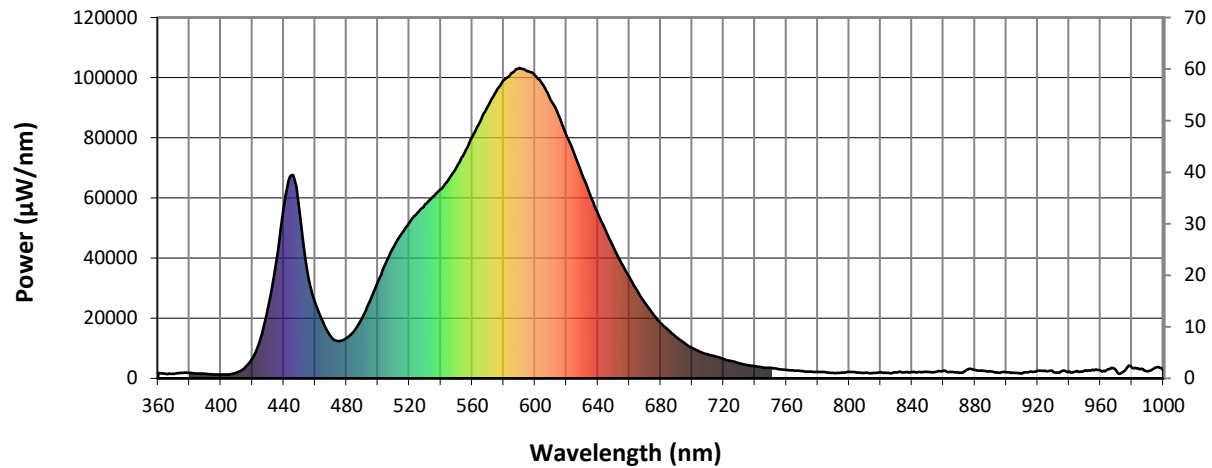
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3500K 4-step quadrangle

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### Photopic Flux vs. Wavelength

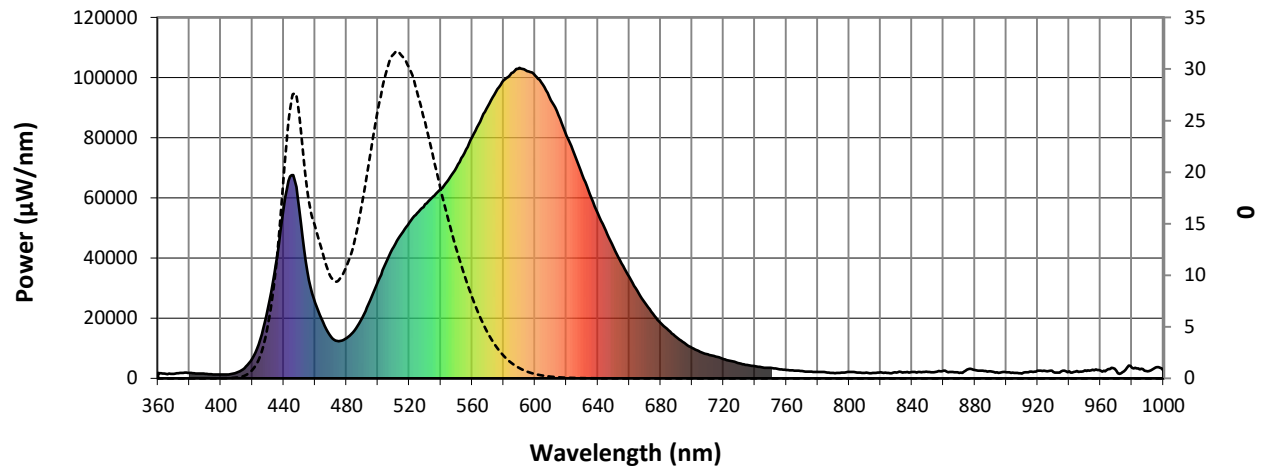


#####

| 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       | 1840             | 0.0              | 490       | 20271            | 2.9              | 620       | 80709            | 21.0             | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 4.7              | 625       | 74695            | 16.5             | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 7.1              | 630       | 67709            | 12.3             | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 10.7             | 635       | 61156            | 9.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 15.0             | 640       | 54795            | 6.5              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 19.9             | 645       | 49111            | 4.7              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 25.1             | 650       | 43533            | 3.2              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 29.5             | 655       | 38234            | 2.2              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 34.1             | 660       | 33754            | 1.4              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 37.5             | 665       | 29162            | 0.9              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.0              | 540       | 62857            | 41.0             | 670       | 25117            | 0.5              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.0              | 545       | 66165            | 44.0             | 675       | 21511            | 0.4              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.0              | 550       | 70124            | 47.7             | 680       | 18435            | 0.2              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 0.1              | 555       | 74973            | 51.2             | 685       | 16004            | 0.1              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 0.2              | 560       | 80227            | 54.5             | 690       | 13701            | 0.1              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 0.5              | 565       | 85358            | 56.8             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 0.9              | 570       | 90422            | 58.8             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 1.4              | 575       | 95259            | 59.3             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 1.5              | 580       | 99033            | 58.8             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 1.2              | 585       | 101572           | 56.4             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 1.0              | 590       | 103264           | 53.4             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 1.0              | 595       | 102194           | 48.4             | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 0.9              | 600       | 100645           | 43.4             | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 1.0              | 605       | 97644            | 37.8             | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 1.3              | 610       | 92487            | 31.8             | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 1.9              | 615       | 87436            | 26.4             | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



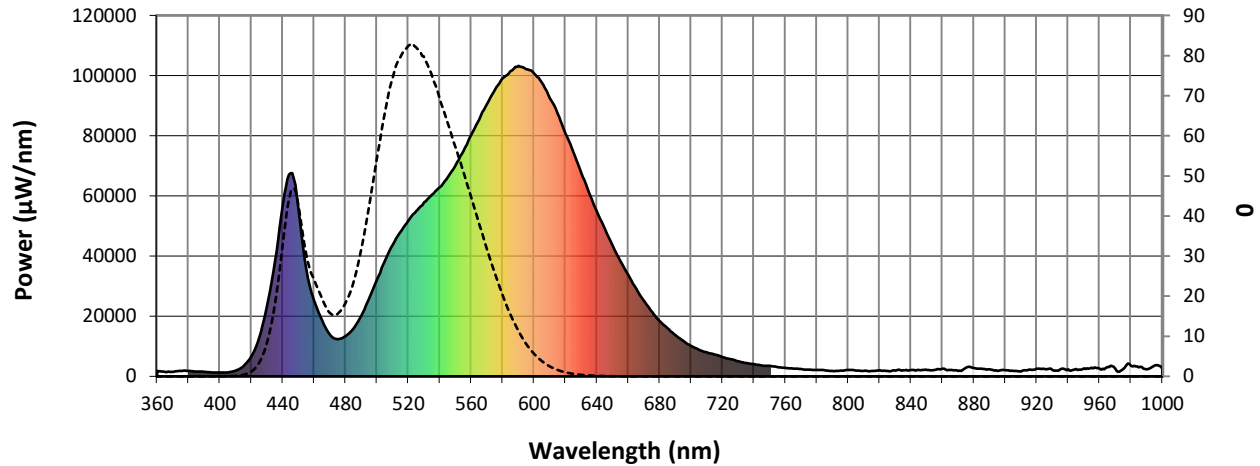
Scotopic Lumens: 7088.7

S/P: 1.35

| 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       | 1840             | 0.0              | 490       | 20271            | 31.2             | 620       | 80709            | 1.0              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 41.9             | 625       | 74695            | 0.6              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 53.9             | 630       | 67709            | 0.4              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 65.2             | 635       | 61156            | 0.2              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 74.1             | 640       | 54795            | 0.1              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 79.5             | 645       | 49111            | 0.1              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 82.4             | 650       | 43533            | 0.1              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 82.1             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 79.8             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 75.3             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 69.5             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.4              | 545       | 66165            | 63.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 1.1              | 550       | 70124            | 57.3             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 3.2              | 555       | 74973            | 51.2             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 8.0              | 560       | 80227            | 44.8             | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 17.1             | 565       | 85358            | 38.3             | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 31.7             | 570       | 90422            | 31.9             | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 45.3             | 575       | 95259            | 25.9             | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 43.4             | 580       | 99033            | 20.4             | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 31.1             | 585       | 101572           | 15.5             | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 24.4             | 590       | 103264           | 11.5             | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 19.8             | 595       | 102194           | 8.1              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 15.9             | 600       | 100645           | 5.7              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 15.5             | 605       | 97644            | 3.8              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 18.1             | 610       | 92487            | 2.5              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 23.0             | 615       | 87436            | 1.6              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: 2621

M/P: 0.5

| 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       | 1840             | 0.0              | 490       | 20271            | 16.9             | 620       | 80709            | 0.1              | 750       | 3465             | 0.0              | 880       | 2800             | 0.0              |
| 365       | 1514             | 0.0              | 495       | 25910            | 21.4             | 625       | 74695            | 0.0              | 755       | 3075             | 0.0              | 885       | 2582             | 0.0              |
| 370       | 1514             | 0.0              | 500       | 32216            | 25.9             | 630       | 67709            | 0.0              | 760       | 2794             | 0.0              | 890       | 2353             | 0.0              |
| 375       | 1843             | 0.0              | 505       | 38336            | 29.4             | 635       | 61156            | 0.0              | 765       | 2593             | 0.0              | 895       | 1819             | 0.0              |
| 380       | 1796             | 0.0              | 510       | 43738            | 31.4             | 640       | 54795            | 0.0              | 770       | 2401             | 0.0              | 900       | 2024             | 0.0              |
| 385       | 1575             | 0.0              | 515       | 47977            | 31.3             | 645       | 49111            | 0.0              | 775       | 2233             | 0.0              | 905       | 1851             | 0.0              |
| 390       | 1527             | 0.0              | 520       | 51818            | 30.2             | 650       | 43533            | 0.0              | 780       | 2166             | 0.0              | 910       | 1602             | 0.0              |
| 395       | 1326             | 0.0              | 525       | 54890            | 27.8             | 655       | 38234            | 0.0              | 785       | 2051             | 0.0              | 915       | 2200             | 0.0              |
| 400       | 1233             | 0.0              | 530       | 57872            | 25.0             | 660       | 33754            | 0.0              | 790       | 1765             | 0.0              | 920       | 2530             | 0.0              |
| 405       | 1329             | 0.0              | 535       | 60410            | 21.7             | 665       | 29162            | 0.0              | 795       | 1903             | 0.0              | 925       | 2487             | 0.0              |
| 410       | 1902             | 0.1              | 540       | 62857            | 18.4             | 670       | 25117            | 0.0              | 800       | 2127             | 0.0              | 930       | 2089             | 0.0              |
| 415       | 3436             | 0.2              | 545       | 66165            | 15.4             | 675       | 21511            | 0.0              | 805       | 1867             | 0.0              | 935       | 2293             | 0.0              |
| 420       | 6571             | 0.8              | 550       | 70124            | 12.6             | 680       | 18435            | 0.0              | 810       | 1775             | 0.0              | 940       | 2315             | 0.0              |
| 425       | 12957            | 2.0              | 555       | 74973            | 10.1             | 685       | 16004            | 0.0              | 815       | 1812             | 0.0              | 945       | 2481             | 0.0              |
| 430       | 23376            | 4.9              | 560       | 80227            | 7.9              | 690       | 13701            | 0.0              | 820       | 1973             | 0.0              | 950       | 2701             | 0.0              |
| 435       | 38205            | 10.2             | 565       | 85358            | 6.0              | 695       | 11765            | 0.0              | 825       | 1773             | 0.0              | 955       | 2892             | 0.0              |
| 440       | 56691            | 18.9             | 570       | 90422            | 4.4              | 700       | 10145            | 0.0              | 830       | 1925             | 0.0              | 960       | 2609             | 0.0              |
| 445       | 67585            | 26.7             | 575       | 95259            | 3.2              | 705       | 8865             | 0.0              | 835       | 2001             | 0.0              | 965       | 3066             | 0.0              |
| 450       | 55963            | 25.8             | 580       | 99033            | 2.2              | 710       | 7954             | 0.0              | 840       | 2142             | 0.0              | 970       | 2566             | 0.0              |
| 455       | 35549            | 18.6             | 585       | 101572           | 1.5              | 715       | 7285             | 0.0              | 845       | 2101             | 0.0              | 975       | 2375             | 0.0              |
| 460       | 25268            | 14.9             | 590       | 103264           | 1.0              | 720       | 6412             | 0.0              | 850       | 2097             | 0.0              | 980       | 3526             | 0.0              |
| 465       | 18712            | 12.2             | 595       | 102194           | 0.7              | 725       | 5721             | 0.0              | 855       | 2090             | 0.0              | 985       | 2982             | 0.0              |
| 470       | 13835            | 9.9              | 600       | 100645           | 0.4              | 730       | 5017             | 0.0              | 860       | 2535             | 0.0              | 990       | 2305             | 0.0              |
| 475       | 12398            | 9.5              | 605       | 97644            | 0.3              | 735       | 4459             | 0.0              | 865       | 2101             | 0.0              | 995       | 3671             | 0.0              |
| 480       | 13406            | 10.8             | 610       | 92487            | 0.2              | 740       | 4062             | 0.0              | 870       | 1798             | 0.0              | 1000      | 2560             | 0.0              |
| 485       | 15865            | 13.1             | 615       | 87436            | 0.1              | 745       | 3636             | 0.0              | 875       | 2857             | 0.0              |           |                  |                  |

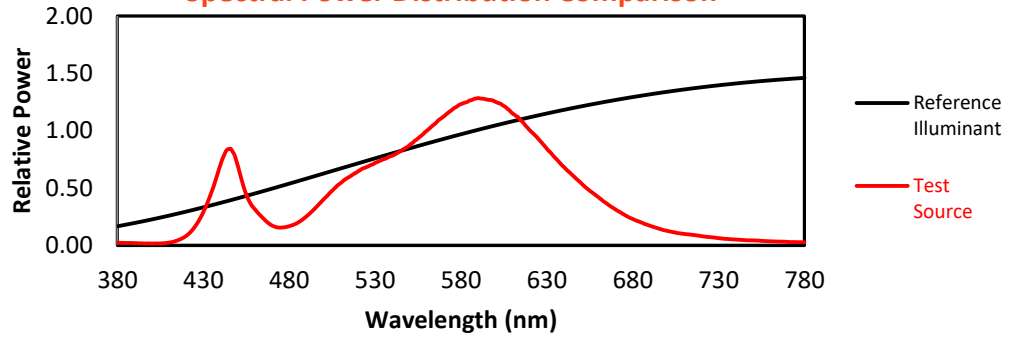
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TM-30-18

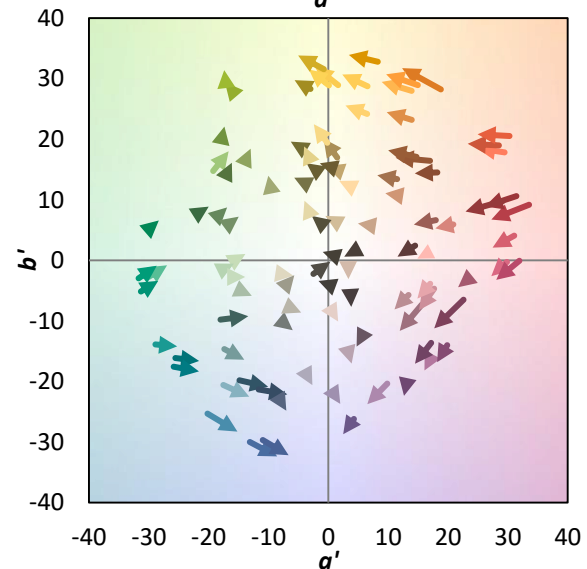
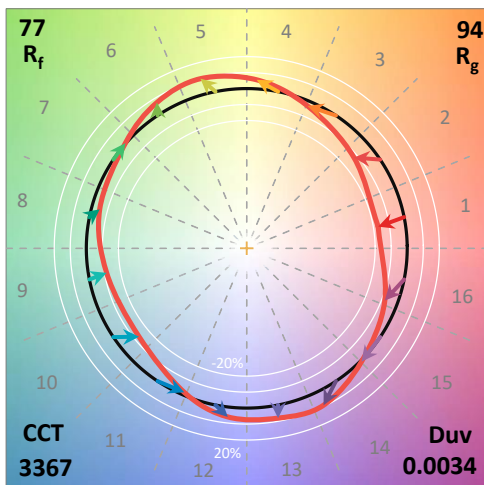
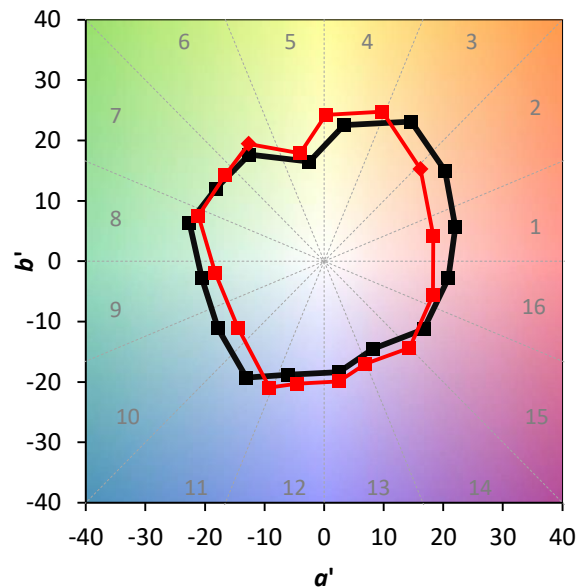
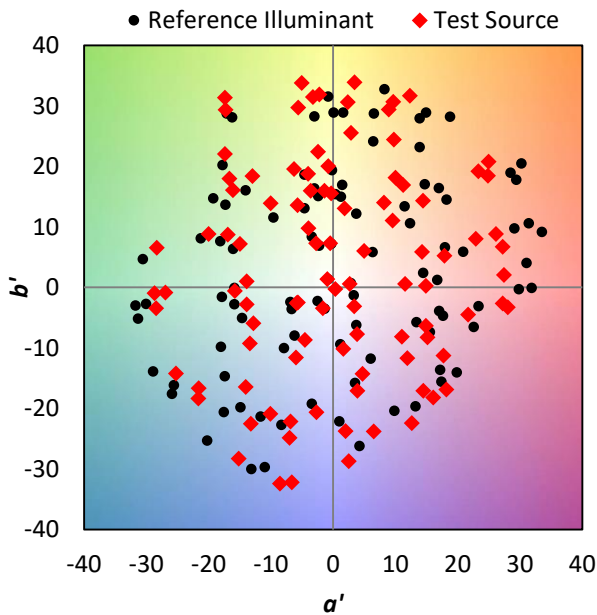
### Summary

$R_f = 77.2$   
 $R_g = 94.4$   
 CIE  $R_a = 73.3$   
 $R_g = -34.3$

### Spectral Power Distribution Comparison



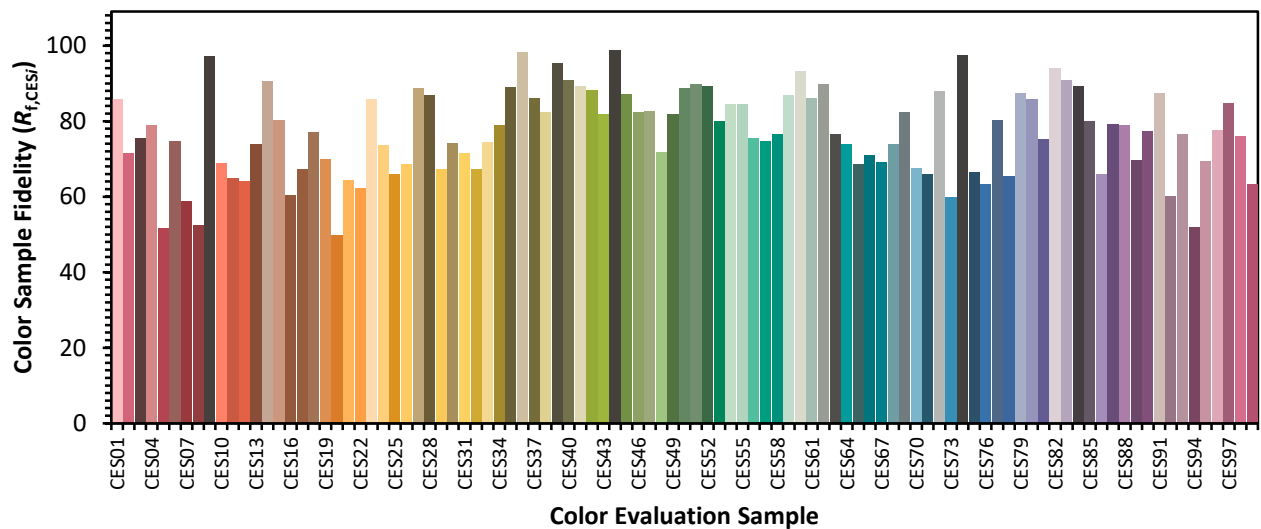
### Color Vector Graphics



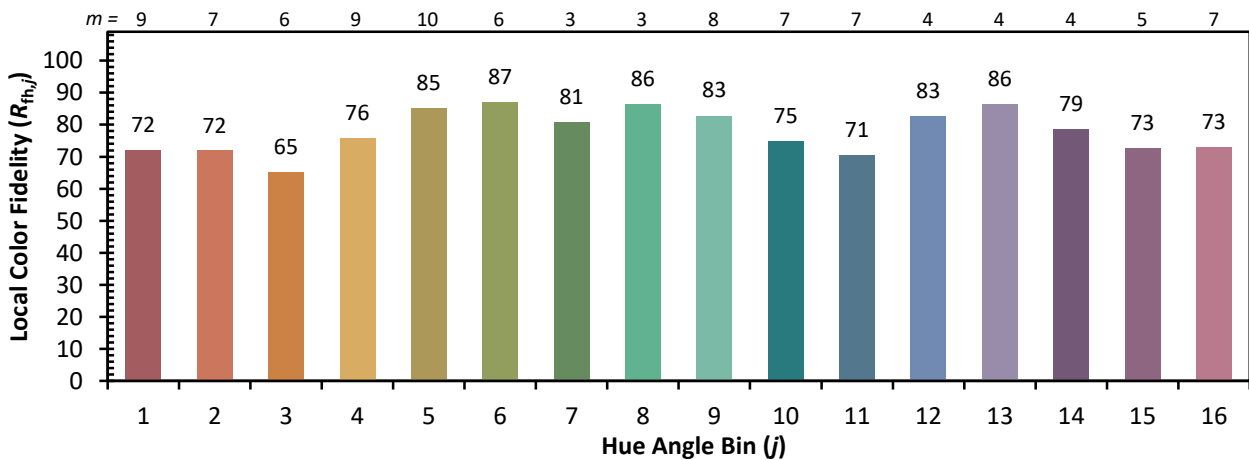
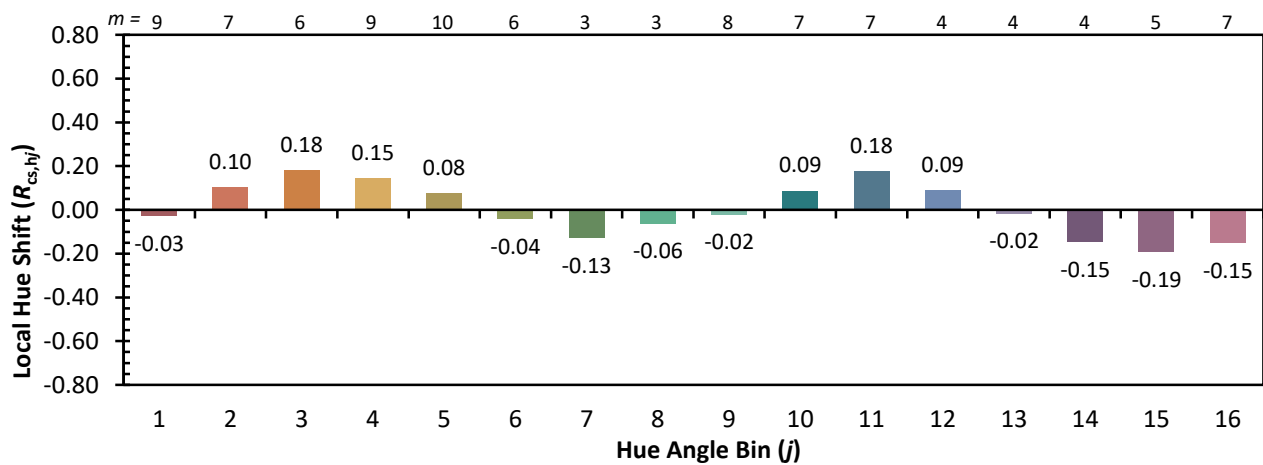
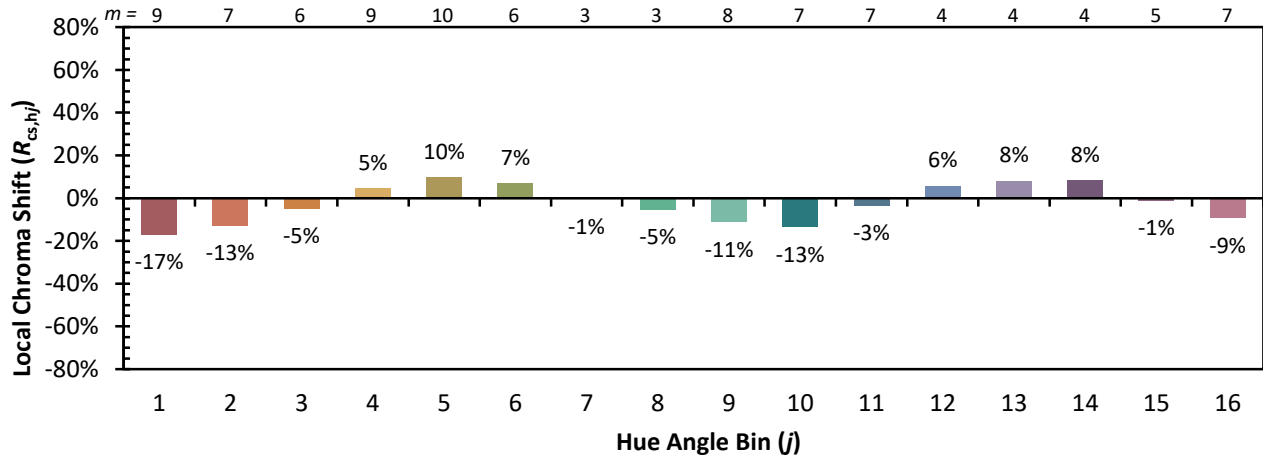


Individual Sample Fidelity Index ( $R_{f,i}$ )

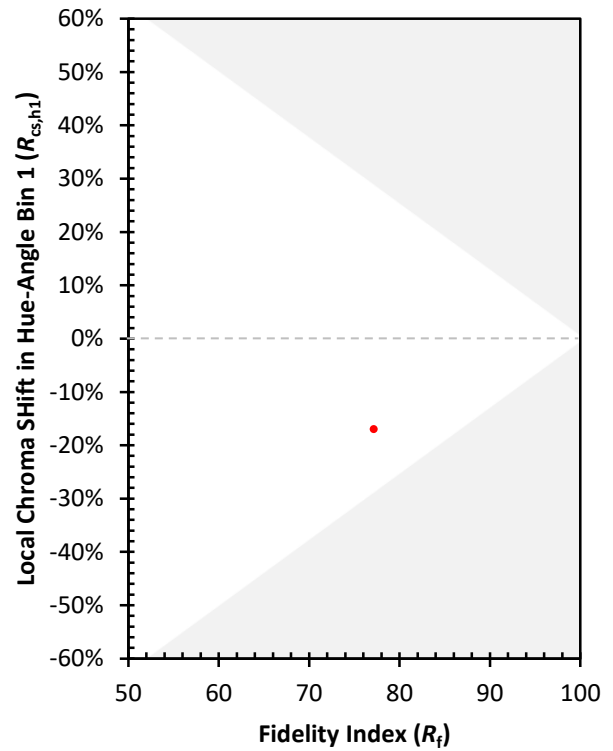
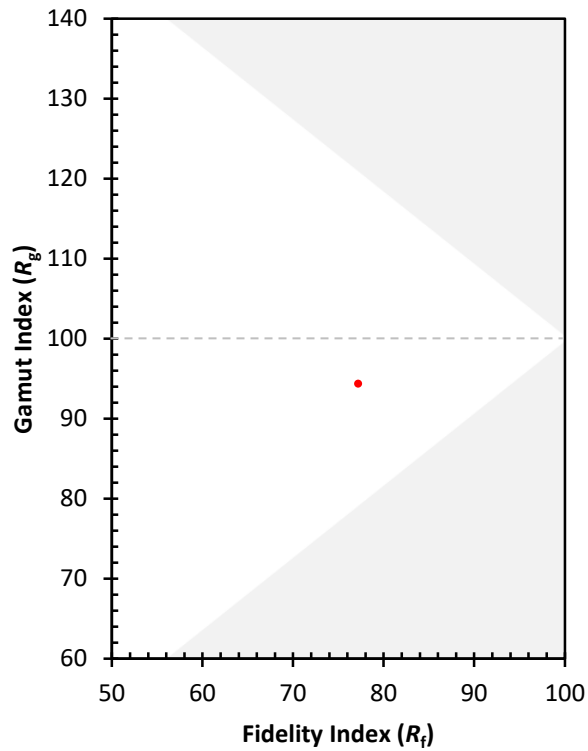
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 69 | CES51 = 90 | CES76 = 63 |
| CES02 = 62 | CES27 = 89 | CES52 = 89 | CES77 = 80 |
| CES03 = 31 | CES28 = 87 | CES53 = 80 | CES78 = 65 |
| CES04 = 70 | CES29 = 67 | CES54 = 85 | CES79 = 87 |
| CES05 = 48 | CES30 = 74 | CES55 = 84 | CES80 = 86 |
| CES06 = 51 | CES31 = 71 | CES56 = 76 | CES81 = 75 |
| CES07 = 41 | CES32 = 67 | CES57 = 75 | CES82 = 94 |
| CES08 = 39 | CES33 = 75 | CES58 = 77 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 87 | CES84 = 89 |
| CES10 = 75 | CES35 = 89 | CES60 = 93 | CES85 = 80 |
| CES11 = 58 | CES36 = 98 | CES61 = 86 | CES86 = 66 |
| CES12 = 64 | CES37 = 86 | CES62 = 90 | CES87 = 79 |
| CES13 = 43 | CES38 = 82 | CES63 = 77 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 74 | CES89 = 70 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 77 |
| CES16 = 47 | CES41 = 89 | CES66 = 71 | CES91 = 87 |
| CES17 = 50 | CES42 = 88 | CES67 = 69 | CES92 = 60 |
| CES18 = 56 | CES43 = 82 | CES68 = 74 | CES93 = 76 |
| CES19 = 72 | CES44 = 99 | CES69 = 82 | CES94 = 52 |
| CES20 = 65 | CES45 = 87 | CES70 = 67 | CES95 = 69 |
| CES21 = 86 | CES46 = 82 | CES71 = 66 | CES96 = 78 |
| CES22 = 79 | CES47 = 83 | CES72 = 88 | CES97 = 85 |
| CES23 = 92 | CES48 = 72 | CES73 = 60 | CES98 = 76 |
| CES24 = 91 | CES49 = 82 | CES74 = 97 | CES99 = 63 |
| CES25 = 72 | CES50 = 89 | CES75 = 67 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)