

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: P386359

Luminaire Tested: **GWC-SA2A-730-U-SL3**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P386359  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-22)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: MCGRAW-EDISON  
Catalog Number: GWC-SA2A-730-U-SL3  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 3000K, 615mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE III  
SPILL LIGHT ELIMINATOR OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 8858 lumens  
Efficiency: N/A  
Efficacy: 134.2 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type III - Medium  
BUG Rating: B1 - U0 - G3

Input Watts (W): 66  
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

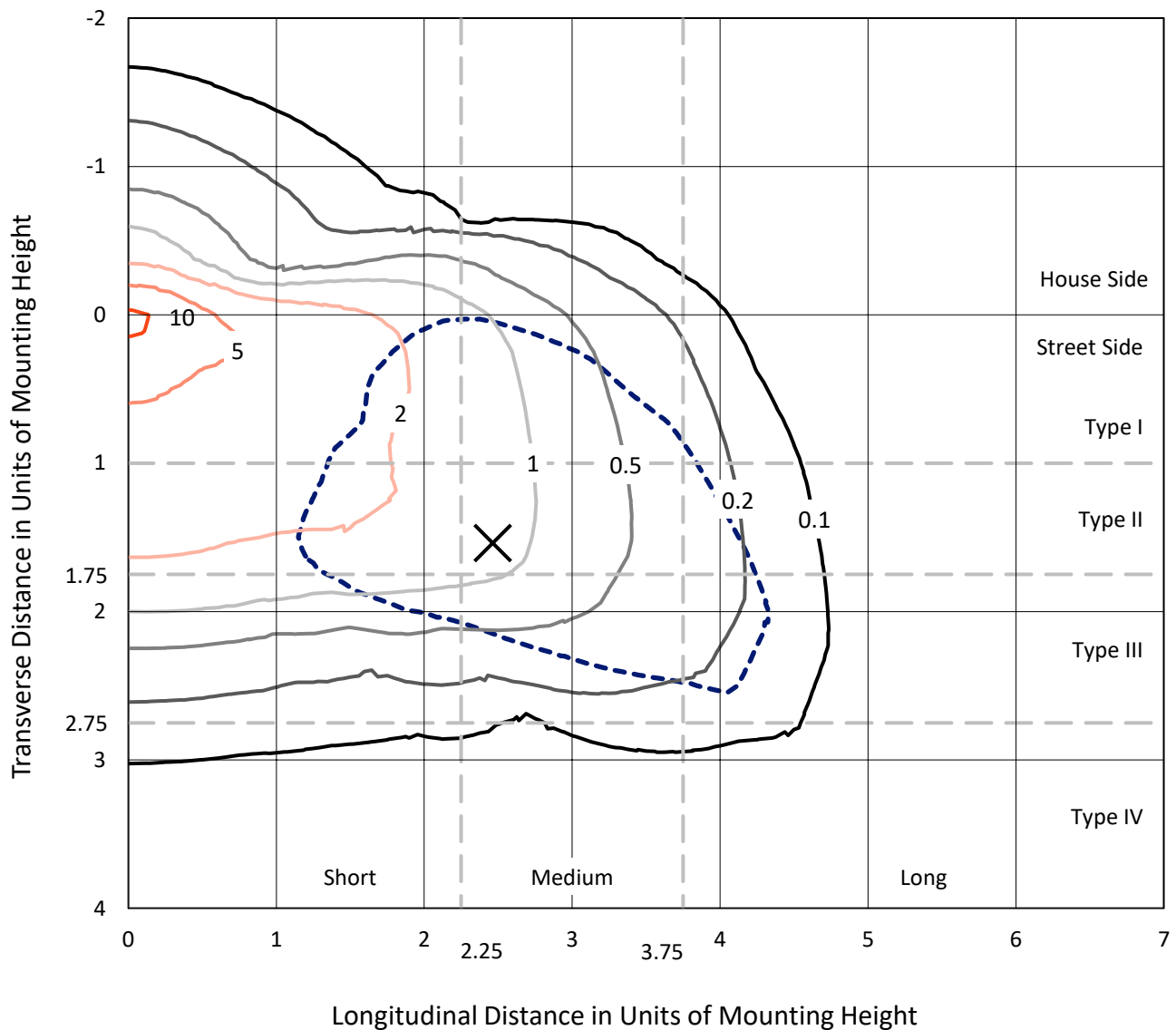


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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd  
 - - - 1/2 Max cd

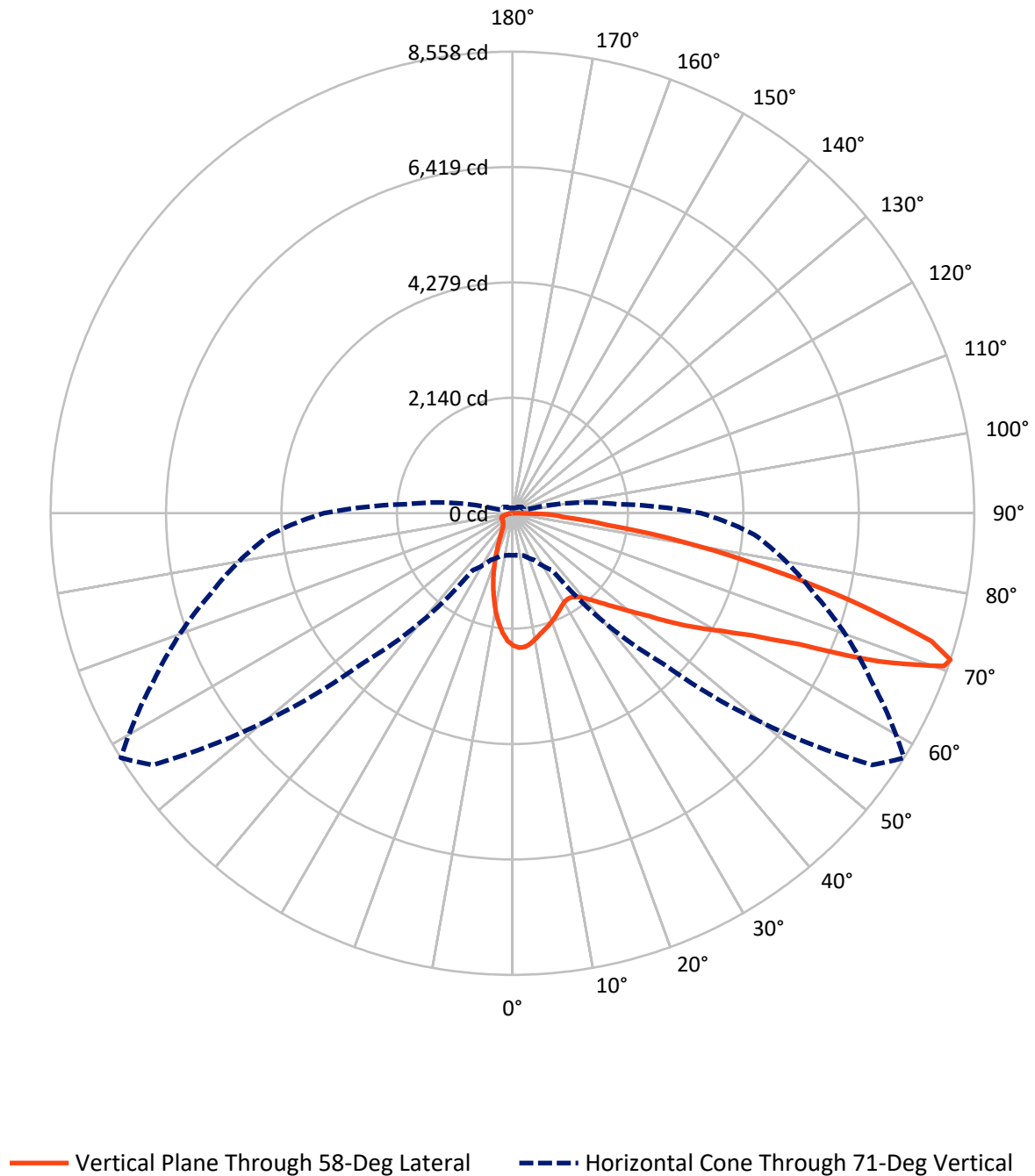


Based on 15 foot mounting height. Maximum calculated value = 10.9 fc  
 Type III - Medium - N/A

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CATALOG NUMBER: GWC-SA2A-730-U-SL3

## Luminous Intensity Polar Plot



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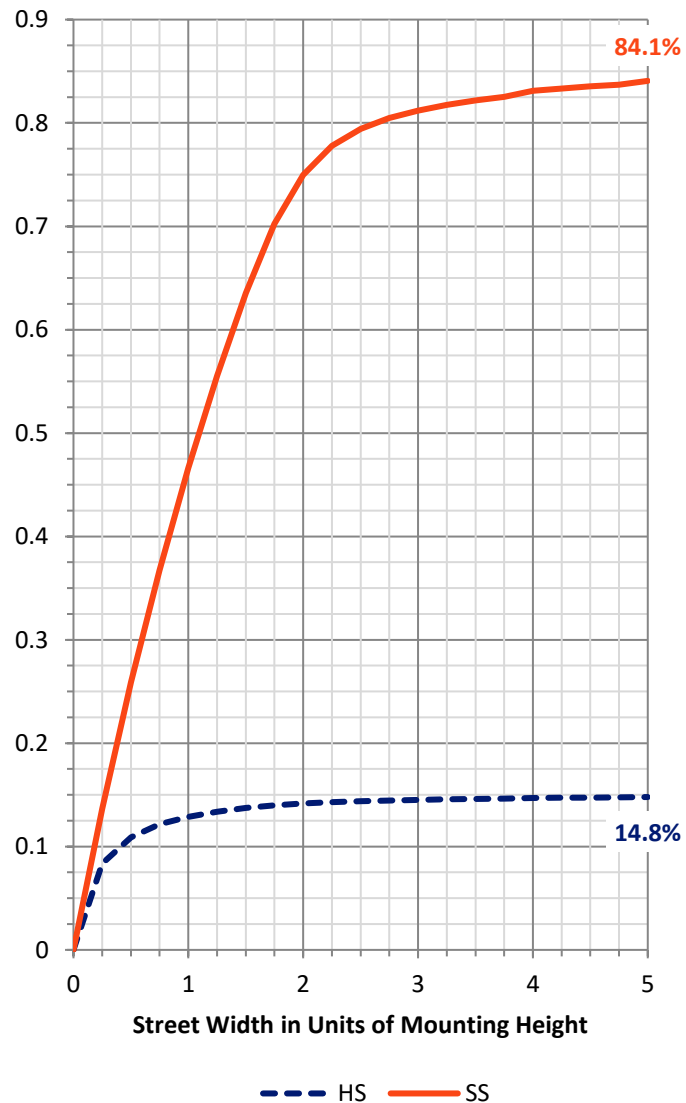
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total  |
|--------------------|-----------|----------|--------|--------|
| <b>House Side</b>  | Lumens    | 1324.3   | 0.0    | 1324.3 |
|                    | % Fixture | 15.0     | 0.0    | 15.0   |
| <b>Street Side</b> | Lumens    | 7533.7   | 0.0    | 7533.7 |
|                    | % Fixture | 85.0     | 0.0    | 85.0   |
| <b>Total</b>       | Lumens    | 8858.0   | 0.0    | 8858.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0  |

**ZONAL LUMENS:**

| Zone      | Lumens | % Fixture |
|-----------|--------|-----------|
| 0°-10°    | 211.7  | 2.4       |
| 10°-20°   | 470.8  | 5.3       |
| 20°-30°   | 598.3  | 6.8       |
| 30°-40°   | 762.2  | 8.6       |
| 40°-50°   | 1080.8 | 12.2      |
| 50°-60°   | 1672.6 | 18.9      |
| 60°-70°   | 2277.0 | 25.7      |
| 70°-80°   | 1519.0 | 17.1      |
| 80°-90°   | 265.6  | 3.0       |
| 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°    | 8858.0 | 100.0     |
| 0°-180°   | 8858.0 | 100.0     |

**Coefficient of Utilization**



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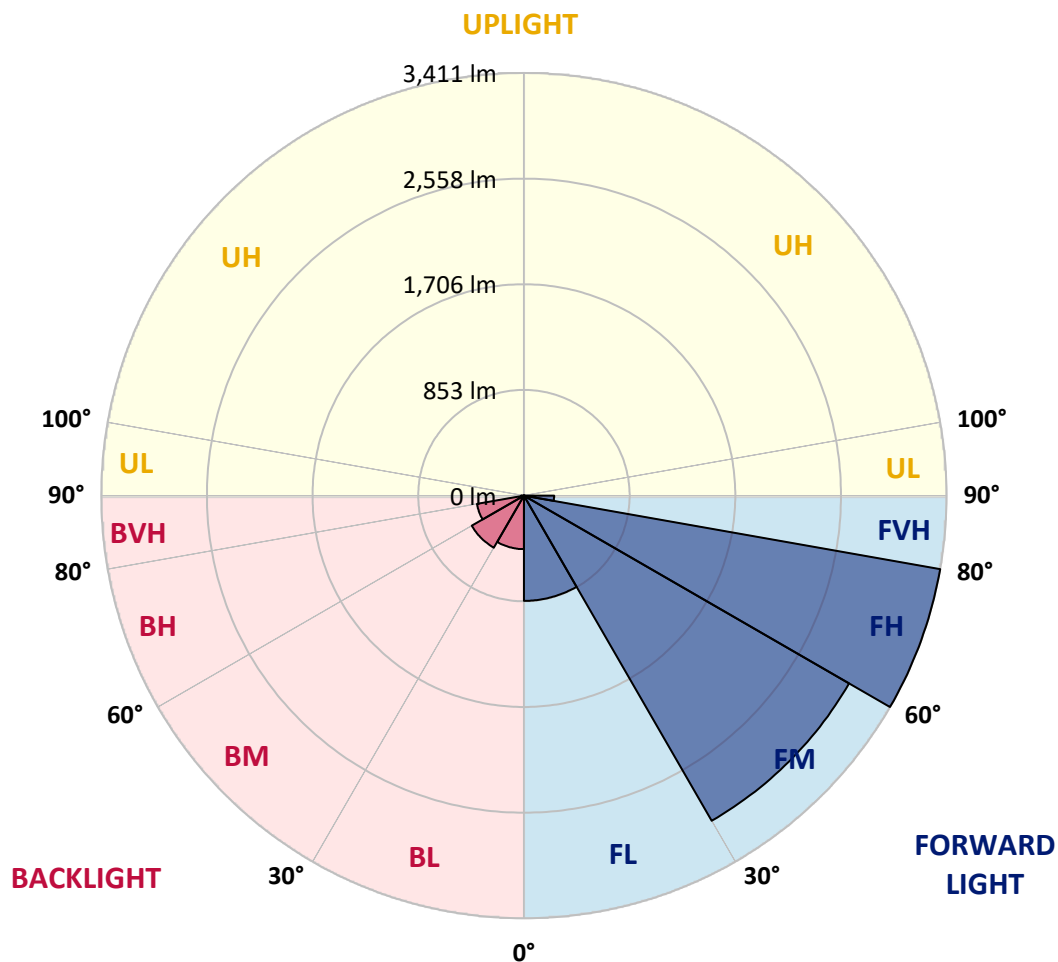
CATALOG NUMBER: GWC-SA2A-730-U-SL3

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 849.2  | 9.6       |                         |      |         |
| FM   | (30°-60°)   | 3029.9 | 34.2      |                         |      |         |
| FH   | (60°-80°)   | 3411.1 | 38.5      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 243.5  | 2.7       |                         |      | G3/500  |
| BL   | (0°-30°)    | 431.7  | 4.9       | B1/500                  |      |         |
| BM   | (30°-60°)   | 485.7  | 5.5       | B1/1000                 |      |         |
| BH   | (60°-80°)   | 384.9  | 4.3       | B1/500                  |      | G1/500  |
| BVH  | (80°-90°)   | 22.1   | 0.2       |                         |      | G1/100  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B1-U0-G3**

Type III Medium



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 58°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 |
| 2.5°  | 2519.4 | 2516.0 | 2517.2 | 2514.7 | 2508.9 | 2503.0 | 2494.4 | 2495.9 | 2483.9 | 2466.0 | 2443.8 |
| 5°    | 2471.8 | 2470.6 | 2479.9 | 2485.1 | 2489.4 | 2486.0 | 2483.6 | 2486.7 | 2469.1 | 2444.4 | 2405.8 |
| 7.5°  | 2372.2 | 2358.6 | 2370.3 | 2387.9 | 2404.6 | 2417.2 | 2433.9 | 2436.1 | 2424.9 | 2399.0 | 2348.4 |
| 10°   | 2230.6 | 2217.6 | 2234.9 | 2262.3 | 2295.7 | 2325.9 | 2359.5 | 2365.7 | 2367.9 | 2344.4 | 2283.0 |
| 12.5° | 2083.7 | 2073.8 | 2091.1 | 2129.7 | 2184.9 | 2231.5 | 2285.2 | 2294.4 | 2313.6 | 2297.8 | 2222.5 |
| 15°   | 1952.2 | 1948.5 | 1969.5 | 2007.5 | 2071.0 | 2142.3 | 2219.8 | 2236.7 | 2269.1 | 2263.9 | 2175.3 |
| 17.5° | 1838.7 | 1837.8 | 1853.8 | 1893.6 | 1964.0 | 2054.1 | 2154.6 | 2183.3 | 2231.5 | 2237.7 | 2136.4 |
| 20°   | 1754.1 | 1752.3 | 1763.4 | 1792.7 | 1865.2 | 1967.4 | 2084.3 | 2123.8 | 2193.2 | 2214.8 | 2096.3 |
| 22.5° | 1708.8 | 1708.5 | 1708.8 | 1722.7 | 1781.9 | 1876.9 | 2015.8 | 2063.9 | 2155.9 | 2196.6 | 2051.9 |
| 25°   | 1701.1 | 1700.1 | 1693.4 | 1691.8 | 1725.4 | 1801.4 | 1947.9 | 2001.0 | 2120.4 | 2184.0 | 2009.6 |
| 27.5° | 1721.1 | 1722.4 | 1713.4 | 1698.9 | 1705.7 | 1751.7 | 1889.0 | 1945.8 | 2092.0 | 2181.5 | 1980.3 |
| 30°   | 1762.8 | 1762.2 | 1754.5 | 1739.3 | 1726.1 | 1733.2 | 1847.0 | 1903.8 | 2072.9 | 2192.3 | 1960.3 |
| 32.5° | 1808.8 | 1812.2 | 1810.6 | 1802.3 | 1782.5 | 1754.1 | 1834.4 | 1889.9 | 2067.3 | 2218.2 | 1951.6 |
| 35°   | 1864.0 | 1867.7 | 1878.8 | 1885.3 | 1862.1 | 1816.5 | 1861.5 | 1909.7 | 2083.4 | 2267.0 | 1965.5 |
| 37.5° | 1916.4 | 1926.0 | 1957.2 | 1984.6 | 1964.9 | 1914.0 | 1933.7 | 1968.0 | 2133.1 | 2343.8 | 2002.8 |
| 40°   | 1976.9 | 1985.3 | 2036.2 | 2094.5 | 2091.4 | 2038.6 | 2050.0 | 2072.9 | 2220.7 | 2453.9 | 2070.4 |
| 42.5° | 2036.5 | 2053.1 | 2126.9 | 2209.6 | 2233.3 | 2186.7 | 2204.9 | 2217.0 | 2344.1 | 2599.9 | 2188.3 |
| 45°   | 2115.8 | 2133.7 | 2236.1 | 2335.8 | 2391.3 | 2365.1 | 2394.1 | 2398.7 | 2499.3 | 2798.6 | 2359.5 |
| 47.5° | 2235.8 | 2256.2 | 2375.6 | 2480.2 | 2565.0 | 2567.8 | 2615.6 | 2613.8 | 2693.1 | 3026.0 | 2575.2 |
| 50°   | 2422.8 | 2452.1 | 2549.9 | 2647.7 | 2750.8 | 2808.2 | 2872.0 | 2863.1 | 2925.4 | 3268.2 | 2823.6 |
| 52.5° | 2667.8 | 2681.4 | 2753.9 | 2826.1 | 2954.1 | 3082.8 | 3174.4 | 3166.4 | 3188.9 | 3517.2 | 3105.6 |
| 55°   | 2921.7 | 2931.9 | 2961.8 | 3001.3 | 3173.5 | 3383.3 | 3577.1 | 3564.4 | 3507.4 | 3775.8 | 3384.2 |
| 57.5° | 3150.1 | 3170.7 | 3191.4 | 3207.8 | 3394.4 | 3697.4 | 3989.0 | 3989.9 | 3852.9 | 4054.7 | 3672.1 |
| 60°   | 3185.5 | 3203.7 | 3340.4 | 3469.4 | 3772.4 | 4116.5 | 4429.9 | 4420.7 | 4210.6 | 4357.4 | 3993.0 |
| 62.5° | 2815.9 | 2856.9 | 3085.3 | 3428.4 | 4136.5 | 4882.9 | 4992.4 | 4981.0 | 4638.2 | 4730.5 | 4366.7 |
| 65°   | 2018.0 | 2064.6 | 2340.1 | 2855.7 | 3960.0 | 5727.4 | 6007.6 | 5853.9 | 5221.4 | 5189.3 | 4804.2 |
| 67.5° | 1164.2 | 1175.3 | 1294.7 | 1708.8 | 3015.2 | 5771.5 | 7556.2 | 7341.2 | 6127.0 | 5709.8 | 5018.4 |
| 70°   | 860.9  | 860.6  | 889.0  | 1051.6 | 1631.6 | 4710.4 | 8292.8 | 8485.6 | 7080.4 | 5881.1 | 4715.7 |
| 71°   | 778.5  | 779.4  | 811.2  | 957.1  | 1292.2 | 3942.7 | 8136.3 | 8558.4 | 7331.6 | 5796.5 | 4496.6 |
| 72.5° | 665.9  | 669.0  | 713.1  | 858.4  | 1087.0 | 2719.0 | 7462.4 | 8121.5 | 7450.7 | 5588.0 | 4153.8 |
| 75°   | 505.1  | 512.2  | 573.3  | 723.6  | 993.6  | 1378.9 | 5476.9 | 6485.2 | 6618.8 | 4930.7 | 3086.5 |
| 77.5° | 360.4  | 368.4  | 437.5  | 608.5  | 944.5  | 1039.2 | 3667.8 | 4730.5 | 4870.9 | 3159.9 | 1392.2 |
| 80°   | 227.7  | 237.3  | 289.4  | 484.1  | 887.4  | 986.8  | 2304.9 | 3179.7 | 2656.1 | 1011.1 | 354.2  |
| 82.5° | 133.6  | 141.0  | 179.6  | 316.3  | 724.8  | 950.4  | 1356.1 | 1762.5 | 1033.7 | 305.5  | 161.1  |
| 85°   | 77.4   | 80.8   | 112.0  | 201.5  | 526.4  | 897.0  | 996.3  | 985.2  | 448.6  | 149.3  | 76.2   |
| 87.5° | 36.1   | 40.1   | 66.3   | 105.2  | 292.2  | 650.1  | 787.4  | 680.4  | 278.9  | 70.0   | 35.8   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

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CATALOG NUMBER: GWC-SA2A-730-U-SL3

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 | 2454.3 |
| 2.5°  | 2433.0 | 2427.7 | 2405.8 | 2386.4 | 2366.0 | 2339.5 | 2310.2 | 2306.5 | 2288.6 | 2292.0 | 2285.8 |
| 5°    | 2384.8 | 2371.6 | 2318.8 | 2271.0 | 2214.5 | 2163.9 | 2109.0 | 2083.7 | 2047.3 | 2044.8 | 2035.5 |
| 7.5°  | 2316.0 | 2291.3 | 2209.6 | 2118.9 | 2028.1 | 1941.7 | 1856.3 | 1800.1 | 1742.7 | 1718.4 | 1716.2 |
| 10°   | 2238.6 | 2196.6 | 2076.3 | 1942.1 | 1811.2 | 1685.0 | 1562.8 | 1472.4 | 1391.0 | 1352.4 | 1350.9 |
| 12.5° | 2165.1 | 2103.1 | 1938.0 | 1755.4 | 1576.4 | 1412.9 | 1245.3 | 1126.5 | 1024.4 | 990.2  | 975.7  |
| 15°   | 2102.8 | 2015.5 | 1803.5 | 1569.9 | 1352.7 | 1125.6 | 934.9  | 810.0  | 715.5  | 682.8  | 676.7  |
| 17.5° | 2042.3 | 1930.0 | 1665.6 | 1382.6 | 1120.1 | 870.4  | 679.4  | 586.6  | 536.3  | 523.0  | 522.7  |
| 20°   | 1982.2 | 1842.1 | 1521.5 | 1191.0 | 895.1  | 651.1  | 522.4  | 480.7  | 463.8  | 462.2  | 459.7  |
| 22.5° | 1914.0 | 1748.9 | 1370.0 | 998.8  | 698.6  | 511.9  | 444.0  | 427.4  | 425.2  | 430.7  | 430.7  |
| 25°   | 1850.1 | 1656.3 | 1216.3 | 810.6  | 543.4  | 427.0  | 396.5  | 393.1  | 399.0  | 408.8  | 409.8  |
| 27.5° | 1790.6 | 1567.2 | 1066.4 | 643.3  | 435.4  | 376.1  | 363.5  | 367.5  | 378.0  | 389.4  | 389.7  |
| 30°   | 1741.5 | 1482.9 | 920.7  | 507.0  | 367.8  | 338.2  | 336.0  | 344.0  | 355.5  | 364.4  | 366.6  |
| 32.5° | 1703.5 | 1411.0 | 780.0  | 407.6  | 323.7  | 309.8  | 311.6  | 318.4  | 325.5  | 330.5  | 333.9  |
| 35°   | 1686.0 | 1349.3 | 650.1  | 343.7  | 295.6  | 287.9  | 290.4  | 294.1  | 297.1  | 300.8  | 303.6  |
| 37.5° | 1689.0 | 1301.5 | 534.1  | 303.9  | 276.8  | 272.8  | 272.8  | 272.8  | 272.8  | 274.6  | 274.9  |
| 40°   | 1717.7 | 1274.0 | 439.7  | 278.6  | 264.1  | 259.8  | 256.4  | 253.3  | 250.9  | 252.1  | 251.5  |
| 42.5° | 1791.2 | 1271.6 | 370.6  | 262.6  | 253.9  | 246.8  | 240.1  | 235.7  | 232.7  | 233.9  | 234.5  |
| 45°   | 1915.8 | 1302.4 | 324.0  | 251.2  | 244.4  | 233.6  | 224.9  | 220.3  | 218.1  | 222.2  | 222.8  |
| 47.5° | 2077.2 | 1369.7 | 295.6  | 242.8  | 235.4  | 221.2  | 212.0  | 207.7  | 208.3  | 214.1  | 215.7  |
| 50°   | 2285.2 | 1478.9 | 282.0  | 237.6  | 229.3  | 210.7  | 201.2  | 197.5  | 199.3  | 207.7  | 209.5  |
| 52.5° | 2513.5 | 1636.3 | 283.6  | 236.0  | 225.2  | 203.0  | 192.8  | 188.5  | 191.6  | 199.3  | 200.9  |
| 55°   | 2777.0 | 1825.4 | 309.2  | 238.2  | 219.4  | 198.1  | 186.1  | 178.7  | 181.1  | 188.2  | 189.5  |
| 57.5° | 3069.8 | 2042.0 | 360.7  | 237.6  | 212.0  | 193.5  | 179.0  | 167.9  | 169.7  | 174.0  | 175.3  |
| 60°   | 3374.7 | 2303.7 | 440.6  | 239.4  | 208.6  | 187.9  | 169.4  | 155.5  | 154.9  | 158.6  | 159.2  |
| 62.5° | 3740.6 | 2606.4 | 532.0  | 240.7  | 210.7  | 180.8  | 156.7  | 143.2  | 141.3  | 142.2  | 142.9  |
| 65°   | 4117.7 | 2825.5 | 497.7  | 235.7  | 217.5  | 175.0  | 145.6  | 131.1  | 127.7  | 127.1  | 127.4  |
| 67.5° | 4129.4 | 2590.6 | 349.0  | 225.9  | 220.3  | 171.9  | 137.3  | 121.0  | 115.4  | 113.2  | 112.9  |
| 70°   | 3703.3 | 2104.7 | 271.8  | 215.4  | 209.2  | 166.9  | 129.6  | 112.6  | 104.3  | 100.9  | 100.6  |
| 71°   | 3495.3 | 1937.4 | 257.6  | 210.1  | 200.9  | 162.0  | 126.2  | 108.9  | 100.3  | 96.6   | 96.0   |
| 72.5° | 3169.2 | 1736.9 | 240.4  | 201.8  | 184.8  | 149.3  | 119.7  | 103.7  | 94.7   | 90.4   | 89.5   |
| 75°   | 2274.4 | 1135.8 | 206.4  | 179.9  | 153.0  | 119.1  | 104.9  | 93.2   | 85.5   | 80.2   | 79.6   |
| 77.5° | 876.3  | 452.0  | 156.1  | 149.6  | 117.3  | 93.2   | 86.4   | 80.5   | 75.0   | 69.7   | 69.4   |
| 80°   | 270.9  | 202.1  | 113.9  | 112.6  | 84.9   | 69.4   | 67.3   | 65.7   | 63.6   | 58.0   | 56.8   |
| 82.5° | 144.7  | 116.0  | 78.4   | 72.8   | 55.5   | 46.3   | 48.8   | 49.4   | 49.7   | 43.8   | 43.2   |
| 85°   | 69.1   | 61.4   | 44.1   | 41.3   | 32.4   | 25.9   | 29.9   | 32.4   | 32.7   | 26.8   | 25.0   |
| 87.5° | 33.0   | 32.1   | 20.7   | 15.7   | 12.0   | 8.6    | 10.5   | 13.0   | 14.2   | 10.2   | 8.9    |
| 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: SP1-2012-088-7

Luminaire Tested: WIS-SA-730-2A-U-SL3-HSS

Test Date: 01/20/2021

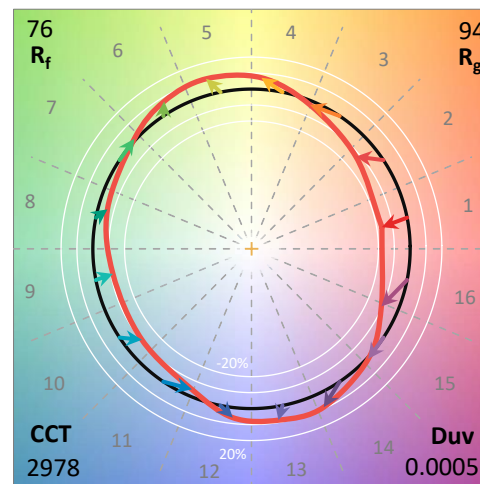
### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2012-088-7  
 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: **WIS-SA-730-2A-U-SL3-HSS**  
 Description: INVUE WALL PACK

SHIELD

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 2978   | CRI (Ra): | 72.4 |      |       |
| CIE u':                   | 0.2511 | R1:       | 68.2 | R9:  | -36.8 |
| CIE v':                   | 0.5225 | R2:       | 83.1 | R10: | 63.2  |
| Duv:                      | 0.0005 | R3:       | 94.9 | R11: | 65.5  |
| CIE x:                    | 0.4391 | R4:       | 68.7 | R12: | 58.5  |
| CIE y:                    | 0.4060 | R5:       | 68.6 | R13: | 71.0  |
| CIE z:                    | 0.1549 | R6:       | 78.2 | R14: | 97.4  |
| Peak Wavelength (nm):     | 596    | R7:       | 76.3 |      |       |
| Dominant Wavelength (nm): | 582    | R8:       | 41.2 |      |       |
| Purity:                   | 54     |           |      |      |       |
|                           |        |           |      |      |       |
| Rf:                       | 76.2   |           |      |      |       |
| Rg:                       | 94.2   |           |      |      |       |



### Test Conditions

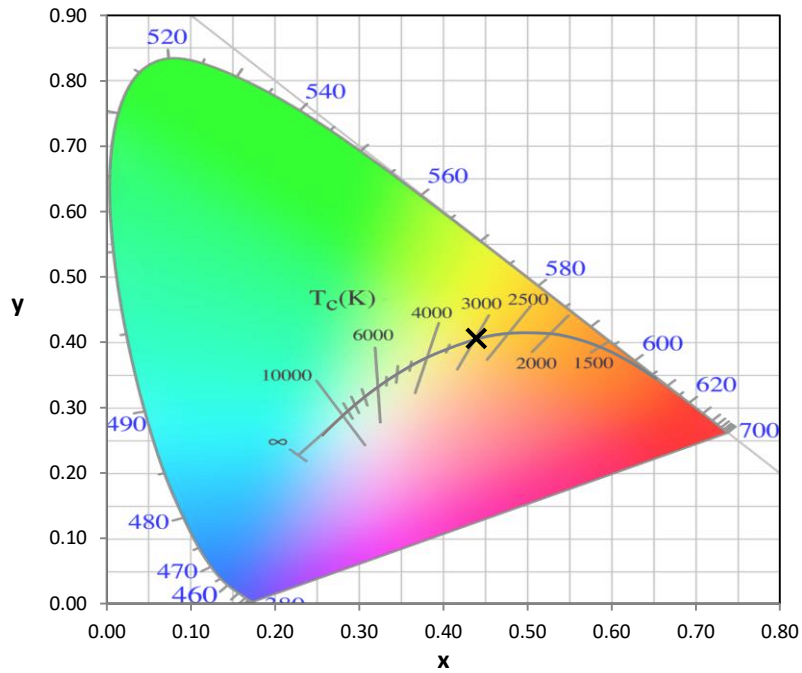
Stabilization Time: 82M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 25.6/28%  
 Sphere Temperature (°C): 25.5

REPORT NUMBER: SP1-2012-088-7

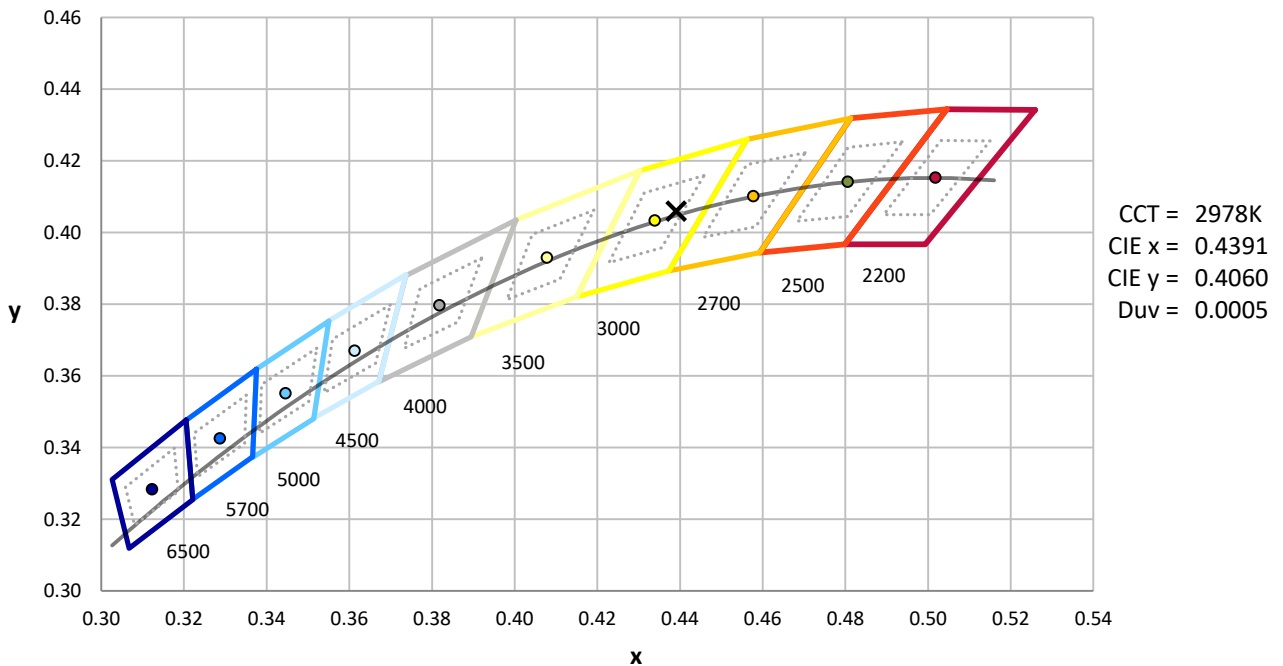
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



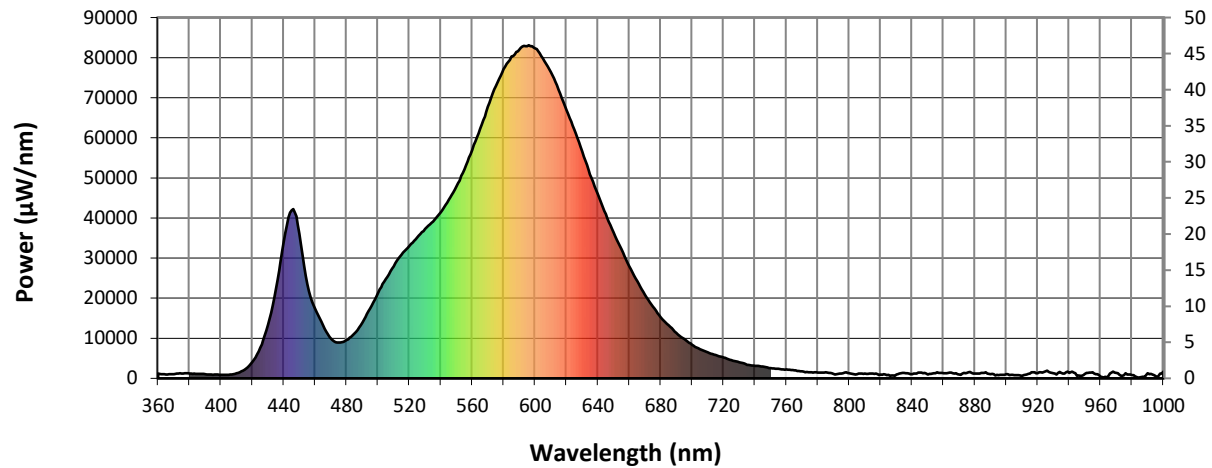
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 3000K 4-step quadrangle

REPORT NUMBER: SP1-2012-088-7

### Photopic Flux vs. Wavelength

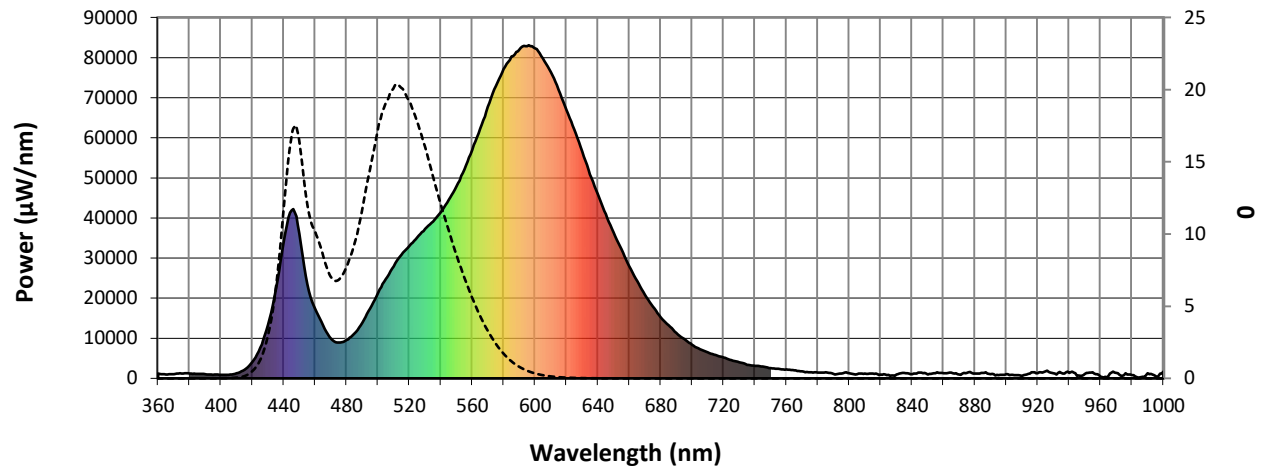


#####

| 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       | 1195             | 0.0              | 490       | 13880            | 2.0              | 620       | 66879            | 17.4             | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 3.2              | 625       | 62111            | 13.7             | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 4.7              | 630       | 56551            | 10.2             | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 6.9              | 635       | 50866            | 7.6              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 9.6              | 640       | 45859            | 5.5              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 12.8             | 645       | 40924            | 3.9              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 16.0             | 650       | 36434            | 2.7              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 18.9             | 655       | 32132            | 1.8              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 22.0             | 660       | 27953            | 1.2              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 24.3             | 665       | 24284            | 0.8              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 27.0             | 670       | 20822            | 0.5              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.0              | 545       | 44515            | 29.6             | 675       | 17848            | 0.3              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.0              | 550       | 47864            | 32.5             | 680       | 15278            | 0.2              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 0.0              | 555       | 52101            | 35.6             | 685       | 13213            | 0.1              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 0.1              | 560       | 56892            | 38.7             | 690       | 11304            | 0.1              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 0.3              | 565       | 62242            | 41.4             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 0.5              | 570       | 67731            | 44.0             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 0.9              | 575       | 72883            | 45.3             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 0.9              | 580       | 77104            | 45.8             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 0.8              | 585       | 80305            | 44.6             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 0.7              | 590       | 82039            | 42.4             | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 0.7              | 595       | 82883            | 39.3             | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 0.6              | 600       | 82307            | 35.5             | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 0.7              | 605       | 79818            | 30.9             | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 0.9              | 610       | 76405            | 26.2             | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 1.3              | 615       | 71967            | 21.7             | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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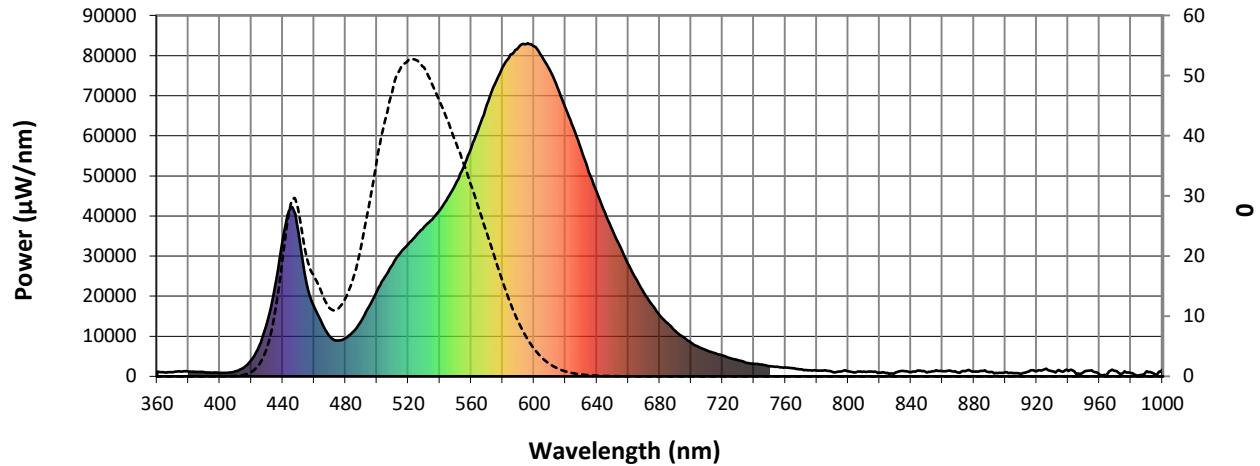
### Scotopic Flux vs. Wavelength


**Scotopic Lumens: 1728.4**
**S/P: 0.45**

| 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       | 1195             | 0.0              | 490       | 13880            | 21.4             | 620       | 66879            | 0.8              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 28.1             | 625       | 62111            | 0.5              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 35.6             | 630       | 56551            | 0.3              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 42.1             | 635       | 50866            | 0.2              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 47.4             | 640       | 45859            | 0.1              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 51.1             | 645       | 40924            | 0.1              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 52.5             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 52.6             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 51.4             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 48.8             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.1              | 540       | 41391            | 45.7             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.2              | 545       | 44515            | 42.7             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.7              | 550       | 47864            | 39.1             | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.9              | 555       | 52101            | 35.6             | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 4.5              | 560       | 56892            | 31.8             | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 10.0             | 565       | 62242            | 27.9             | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 19.0             | 570       | 67731            | 23.9             | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 28.0             | 575       | 72883            | 19.8             | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 28.0             | 580       | 77104            | 15.9             | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 20.5             | 585       | 80305            | 12.3             | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 16.8             | 590       | 82039            | 9.1              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 14.0             | 595       | 82883            | 6.6              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 11.4             | 600       | 82307            | 4.6              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 11.1             | 605       | 79818            | 3.1              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 12.9             | 610       | 76405            | 2.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 16.2             | 615       | 71967            | 1.3              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength


**Melanopic Lumens: 4752**
**S/P: 1.23**

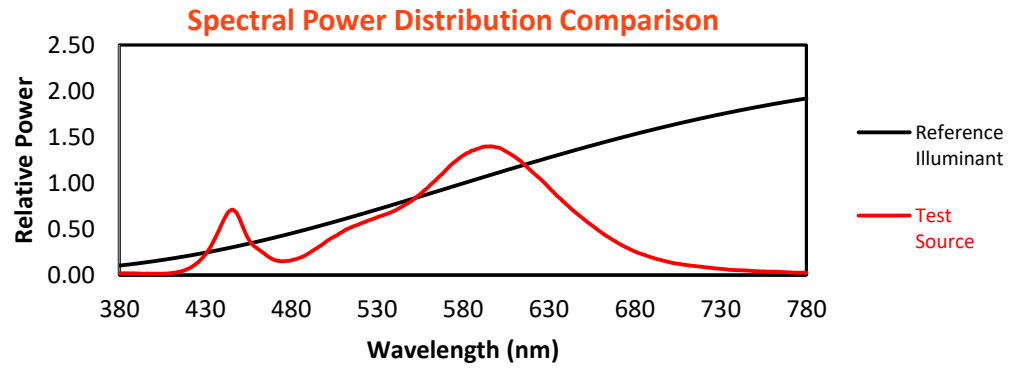
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1195             | 0.0              | 490       | 13880            | 11.5             | 620       | 66879            | 0.1              | 750       | 2571             | 0.0              | 880       | 1235             | 0.0              |
| 365       | 985              | 0.0              | 495       | 17408            | 14.4             | 625       | 62111            | 0.0              | 755       | 2394             | 0.0              | 885       | 1368             | 0.0              |
| 370       | 1066             | 0.0              | 500       | 21285            | 17.1             | 630       | 56551            | 0.0              | 760       | 2199             | 0.0              | 890       | 1027             | 0.0              |
| 375       | 1227             | 0.0              | 505       | 24779            | 19.0             | 635       | 50866            | 0.0              | 765       | 2031             | 0.0              | 895       | 822              | 0.0              |
| 380       | 1176             | 0.0              | 510       | 27951            | 20.1             | 640       | 45859            | 0.0              | 770       | 1735             | 0.0              | 900       | 1068             | 0.0              |
| 385       | 1115             | 0.0              | 515       | 30815            | 20.1             | 645       | 40924            | 0.0              | 775       | 1538             | 0.0              | 905       | 823              | 0.0              |
| 390       | 1039             | 0.0              | 520       | 33040            | 19.2             | 650       | 36434            | 0.0              | 780       | 1455             | 0.0              | 910       | 531              | 0.0              |
| 395       | 908              | 0.0              | 525       | 35159            | 17.8             | 655       | 32132            | 0.0              | 785       | 1506             | 0.0              | 915       | 1184             | 0.0              |
| 400       | 903              | 0.0              | 530       | 37292            | 16.1             | 660       | 27953            | 0.0              | 790       | 1154             | 0.0              | 920       | 1320             | 0.0              |
| 405       | 911              | 0.0              | 535       | 39123            | 14.1             | 665       | 24284            | 0.0              | 795       | 1232             | 0.0              | 925       | 1757             | 0.0              |
| 410       | 1264             | 0.0              | 540       | 41391            | 12.1             | 670       | 20822            | 0.0              | 800       | 1247             | 0.0              | 930       | 1279             | 0.0              |
| 415       | 2142             | 0.1              | 545       | 44515            | 10.3             | 675       | 17848            | 0.0              | 805       | 1043             | 0.0              | 935       | 1399             | 0.0              |
| 420       | 4052             | 0.5              | 550       | 47864            | 8.6              | 680       | 15278            | 0.0              | 810       | 1235             | 0.0              | 940       | 1325             | 0.0              |
| 425       | 7647             | 1.2              | 555       | 52101            | 7.0              | 685       | 13213            | 0.0              | 815       | 1173             | 0.0              | 945       | 612              | 0.0              |
| 430       | 13366            | 2.8              | 560       | 56892            | 5.6              | 690       | 11304            | 0.0              | 820       | 948              | 0.0              | 950       | 1094             | 0.0              |
| 435       | 22367            | 6.0              | 565       | 62242            | 4.4              | 695       | 9794             | 0.0              | 825       | 846              | 0.0              | 955       | 1493             | 0.0              |
| 440       | 34007            | 11.4             | 570       | 67731            | 3.3              | 700       | 8390             | 0.0              | 830       | 987              | 0.0              | 960       | 385              | 0.0              |
| 445       | 41889            | 16.5             | 575       | 72883            | 2.4              | 705       | 7303             | 0.0              | 835       | 1395             | 0.0              | 965       | 585              | 0.0              |
| 450       | 36090            | 16.6             | 580       | 77104            | 1.7              | 710       | 6501             | 0.0              | 840       | 1079             | 0.0              | 970       | 1360             | 0.0              |
| 455       | 23459            | 12.3             | 585       | 80305            | 1.2              | 715       | 5811             | 0.0              | 845       | 1430             | 0.0              | 975       | 805              | 0.0              |
| 460       | 17429            | 10.3             | 590       | 82039            | 0.8              | 720       | 5196             | 0.0              | 850       | 984              | 0.0              | 980       | 813              | 0.0              |
| 465       | 13265            | 8.7              | 595       | 82883            | 0.5              | 725       | 4576             | 0.0              | 855       | 1315             | 0.0              | 985       | 214              | 0.0              |
| 470       | 9887             | 7.1              | 600       | 82307            | 0.3              | 730       | 4031             | 0.0              | 860       | 1245             | 0.0              | 990       | 1247             | 0.0              |
| 475       | 8912             | 6.8              | 605       | 79818            | 0.2              | 735       | 3393             | 0.0              | 865       | 1445             | 0.0              | 995       | 597              | 0.0              |
| 480       | 9543             | 7.7              | 610       | 76405            | 0.1              | 740       | 3117             | 0.0              | 870       | 998              | 0.0              | 1000      | 1691             | 0.0              |
| 485       | 11169            | 9.2              | 615       | 71967            | 0.1              | 745       | 2946             | 0.0              | 875       | 1326             | 0.0              |           |                  |                  |

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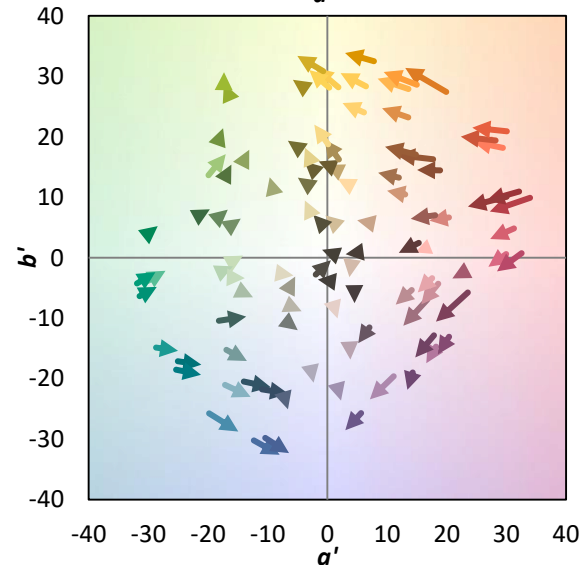
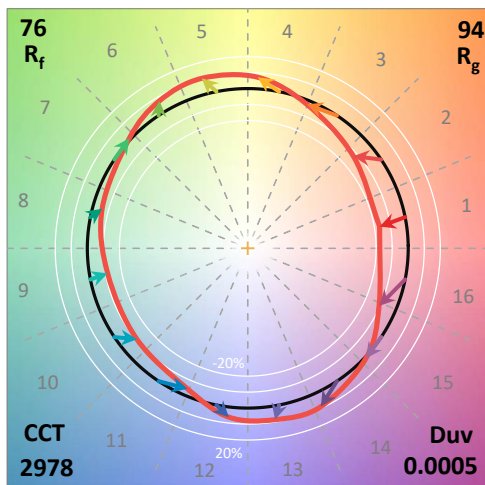
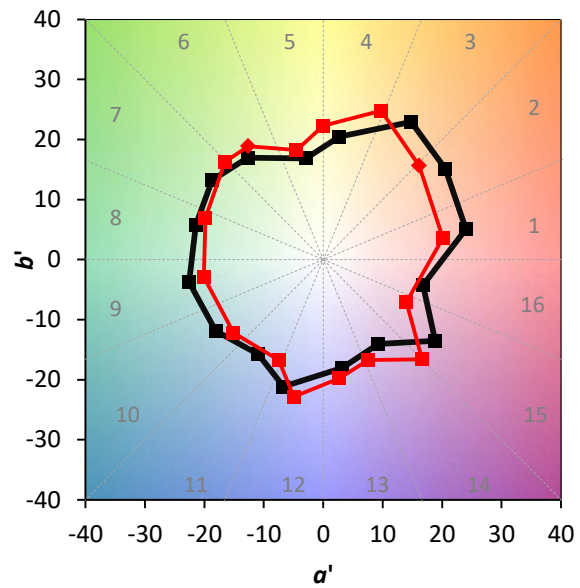
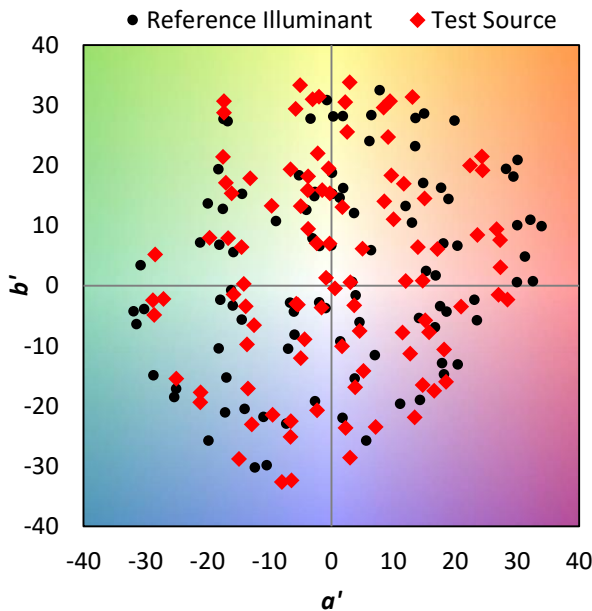
TM-30-18

### Summary

$R_f = 76.2$   
 $R_g = 94.2$   
 CIE  $R_a = 72.4$   
 $R_g = -36.8$



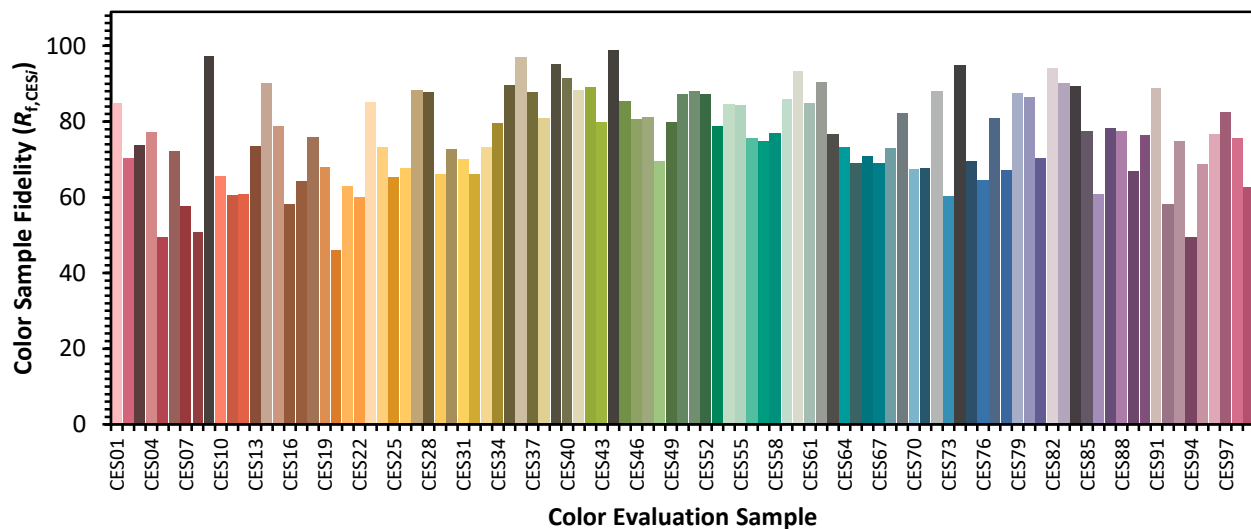
### Color Vector Graphics



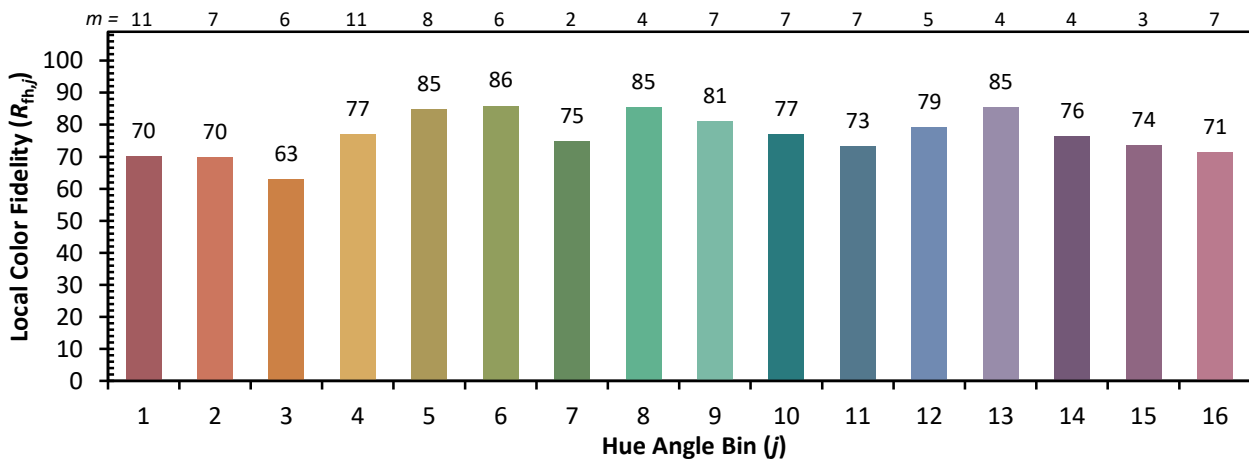
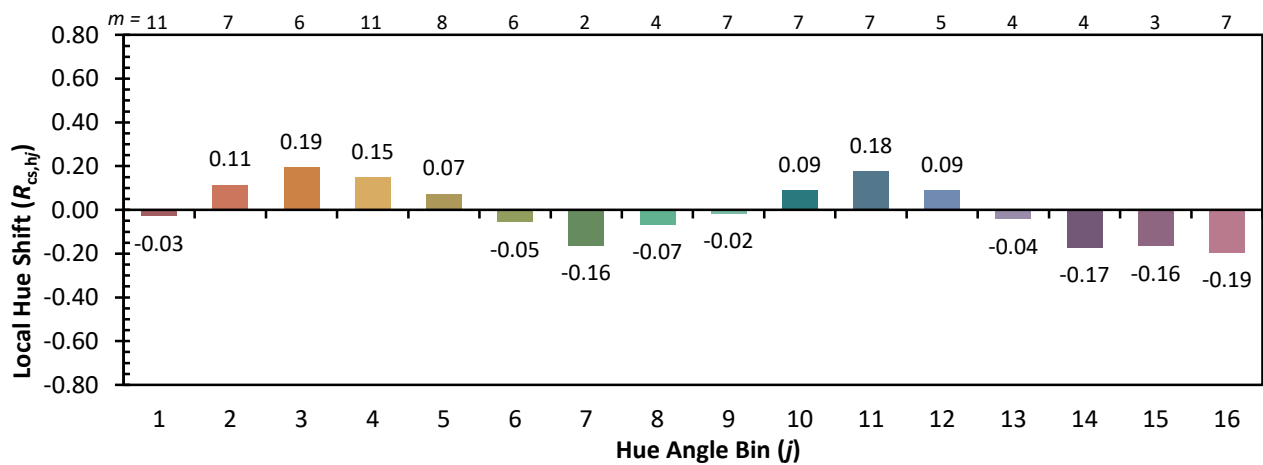
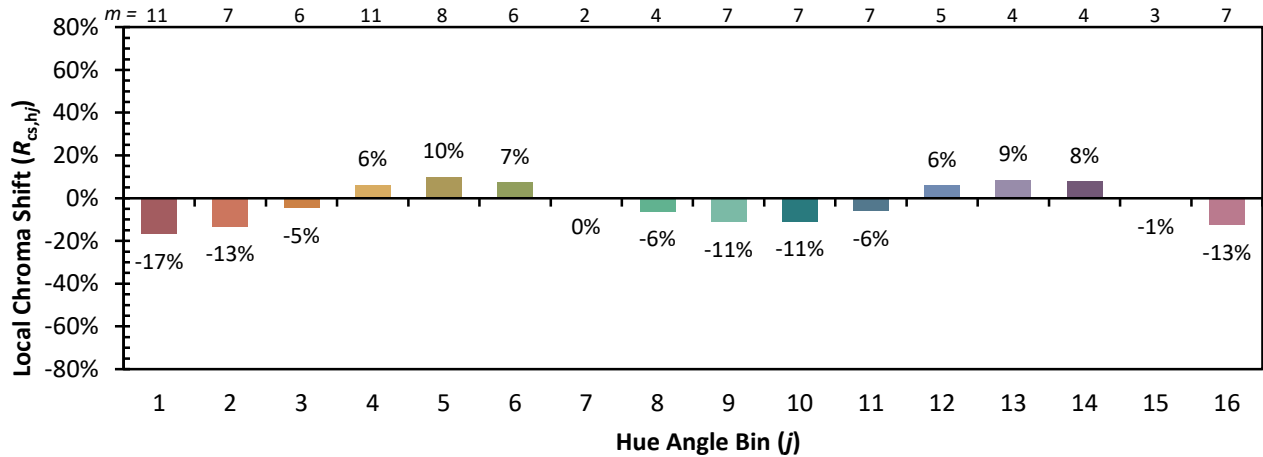


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

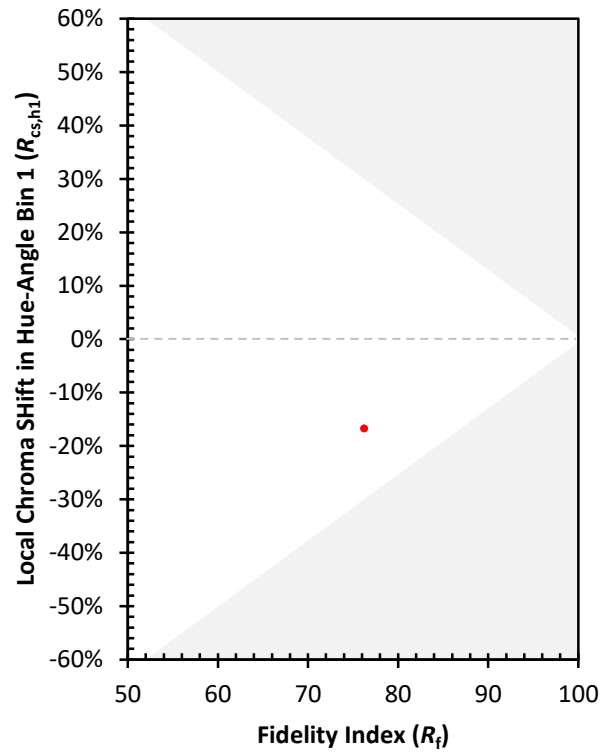
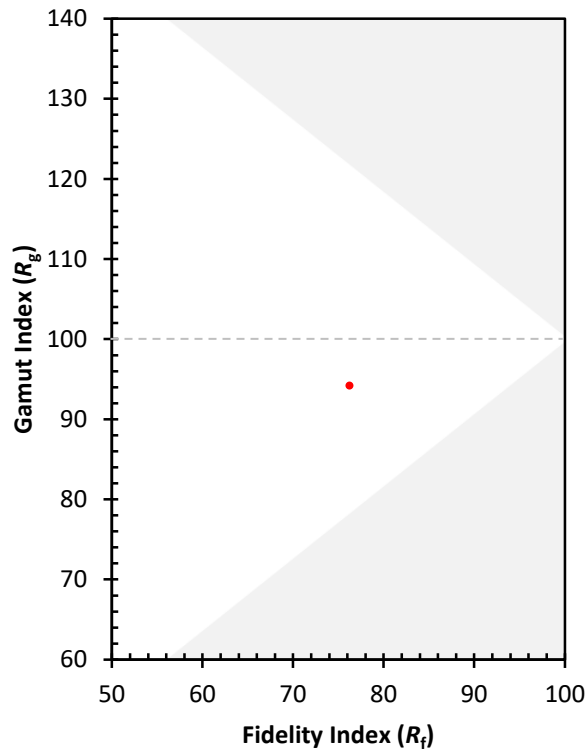
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 88 | CES76 = 65 |
| CES02 = 63 | CES27 = 88 | CES52 = 87 | CES77 = 81 |
| CES03 = 31 | CES28 = 88 | CES53 = 79 | CES78 = 67 |
| CES04 = 71 | CES29 = 66 | CES54 = 85 | CES79 = 87 |
| CES05 = 49 | CES30 = 73 | CES55 = 84 | CES80 = 87 |
| CES06 = 51 | CES31 = 70 | CES56 = 76 | CES81 = 70 |
| CES07 = 41 | CES32 = 66 | CES57 = 75 | CES82 = 94 |
| CES08 = 40 | CES33 = 73 | CES58 = 77 | CES83 = 90 |
| CES09 = 29 | CES34 = 80 | CES59 = 86 | CES84 = 89 |
| CES10 = 76 | CES35 = 90 | CES60 = 93 | CES85 = 77 |
| CES11 = 59 | CES36 = 97 | CES61 = 85 | CES86 = 61 |
| CES12 = 65 | CES37 = 88 | CES62 = 90 | CES87 = 78 |
| CES13 = 43 | CES38 = 81 | CES63 = 77 | CES88 = 78 |
| CES14 = 74 | CES39 = 95 | CES64 = 73 | CES89 = 67 |
| CES15 = 71 | CES40 = 91 | CES65 = 69 | CES90 = 76 |
| CES16 = 47 | CES41 = 88 | CES66 = 71 | CES91 = 89 |
| CES17 = 50 | CES42 = 89 | CES67 = 69 | CES92 = 58 |
| CES18 = 56 | CES43 = 80 | CES68 = 73 | CES93 = 75 |
| CES19 = 73 | CES44 = 99 | CES69 = 82 | CES94 = 49 |
| CES20 = 66 | CES45 = 85 | CES70 = 67 | CES95 = 69 |
| CES21 = 87 | CES46 = 81 | CES71 = 68 | CES96 = 77 |
| CES22 = 79 | CES47 = 81 | CES72 = 88 | CES97 = 83 |
| CES23 = 92 | CES48 = 69 | CES73 = 60 | CES98 = 75 |
| CES24 = 91 | CES49 = 80 | CES74 = 95 | CES99 = 63 |
| CES25 = 73 | CES50 = 87 | CES75 = 69 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)