

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: P387077

Luminaire Tested: **GWC-SA2D-740-U-T4W**

Issue Date: 3/3/2020

**Test Information**

Test Method: LM-79-08  
Report Number: P387077  
TEST IS SCALED FROM IESNA LM-79-08 TEST DATA (G2-1903-205-18)  
Test Lab: INNOVATION CENTER  
Issue Date: 3/3/2020  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: McGRAW-EDISON  
Catalog Number: GWC-SA2D-740-U-T4W  
Description: GALLEON WALL LUMINAIRE  
(2) 70 CRI, 4000K, 1200mA LIGHTSQUARES WITH 16 LEDS EACH AND TYPE IV WIDE OPTICS  
Light Source: -  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 16080 lumens  
Efficiency: N/A  
Efficacy: 124.7 lumens/watt  
Luminous Opening: Rectangular (W 1' x L: 0.5' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B3 - U0 - G3

Input Watts (W): 129  
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

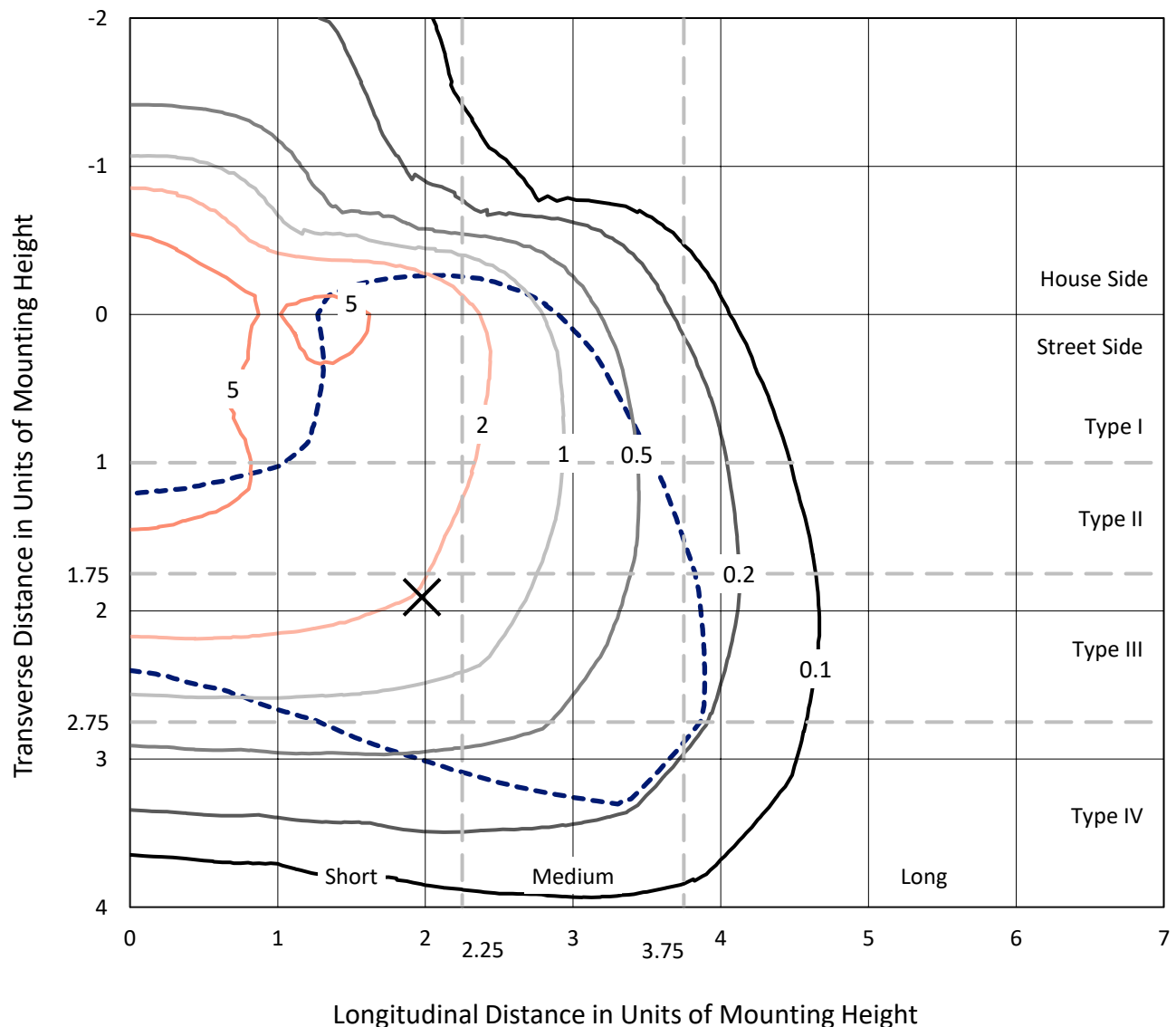


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## Iso-Footcandle Lines of Horizontal Illumination

✕ Max cd  
 - - - 1/2 Max cd

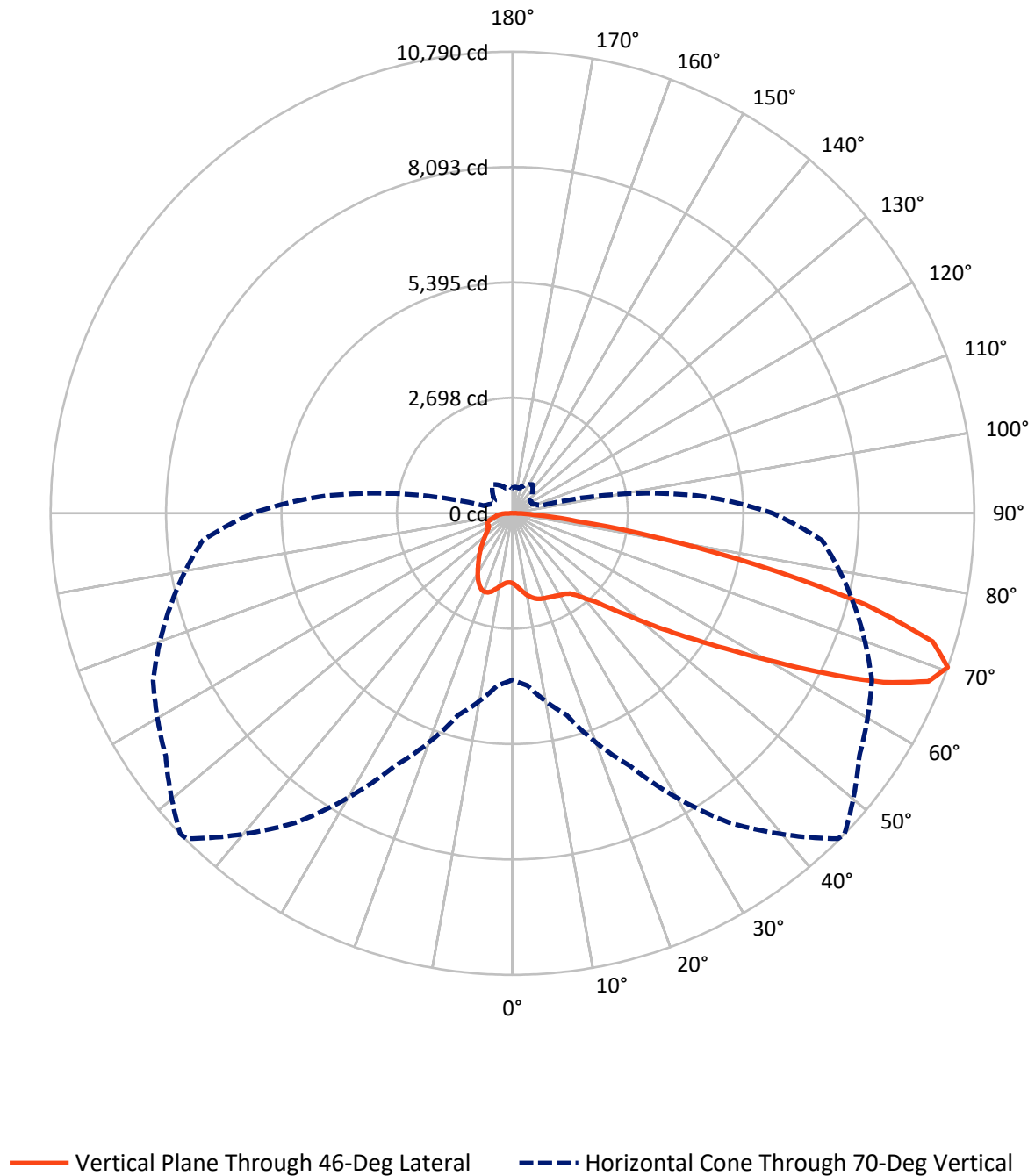


Based on 15 foot mounting height. Maximum calculated value = 9.1 fc  
 Type IV - Short - N/A

REPORT NUMBER: P387077

CATALOG NUMBER: GWC-SA2D-740-U-T4W

## Luminous Intensity Polar Plot



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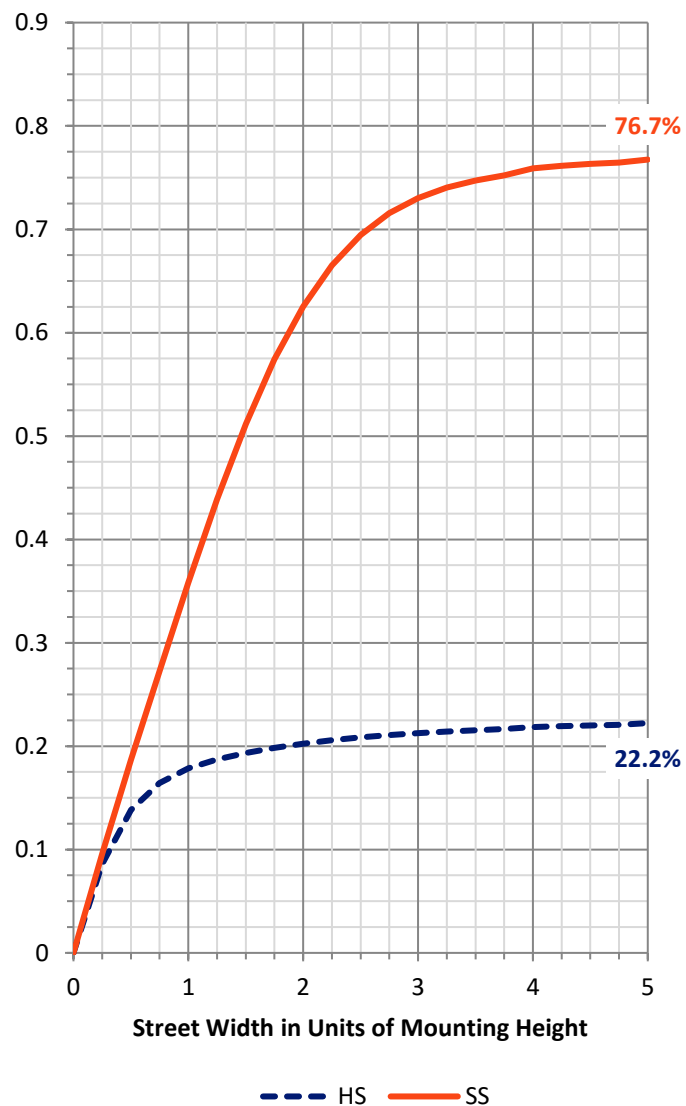
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 3685.5   | 0.0    | 3685.5  |
|                    | % Fixture | 22.9     | 0.0    | 22.9    |
| <b>Street Side</b> | Lumens    | 12394.5  | 0.0    | 12394.5 |
|                    | % Fixture | 77.1     | 0.0    | 77.1    |
| <b>Total</b>       | Lumens    | 16080.0  | 0.0    | 16080.0 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 167.0   | 1.0       |
| 10°-20°   | 556.4   | 3.5       |
| 20°-30°   | 927.8   | 5.8       |
| 30°-40°   | 1316.5  | 8.2       |
| 40°-50°   | 1936.6  | 12.0      |
| 50°-60°   | 3279.6  | 20.4      |
| 60°-70°   | 4655.3  | 29.0      |
| 70°-80°   | 2828.1  | 17.6      |
| 80°-90°   | 412.7   | 2.6       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 16080.0 | 100.0     |
| 0°-180°   | 16080.0 | 100.0     |

**Coefficient of Utilization**



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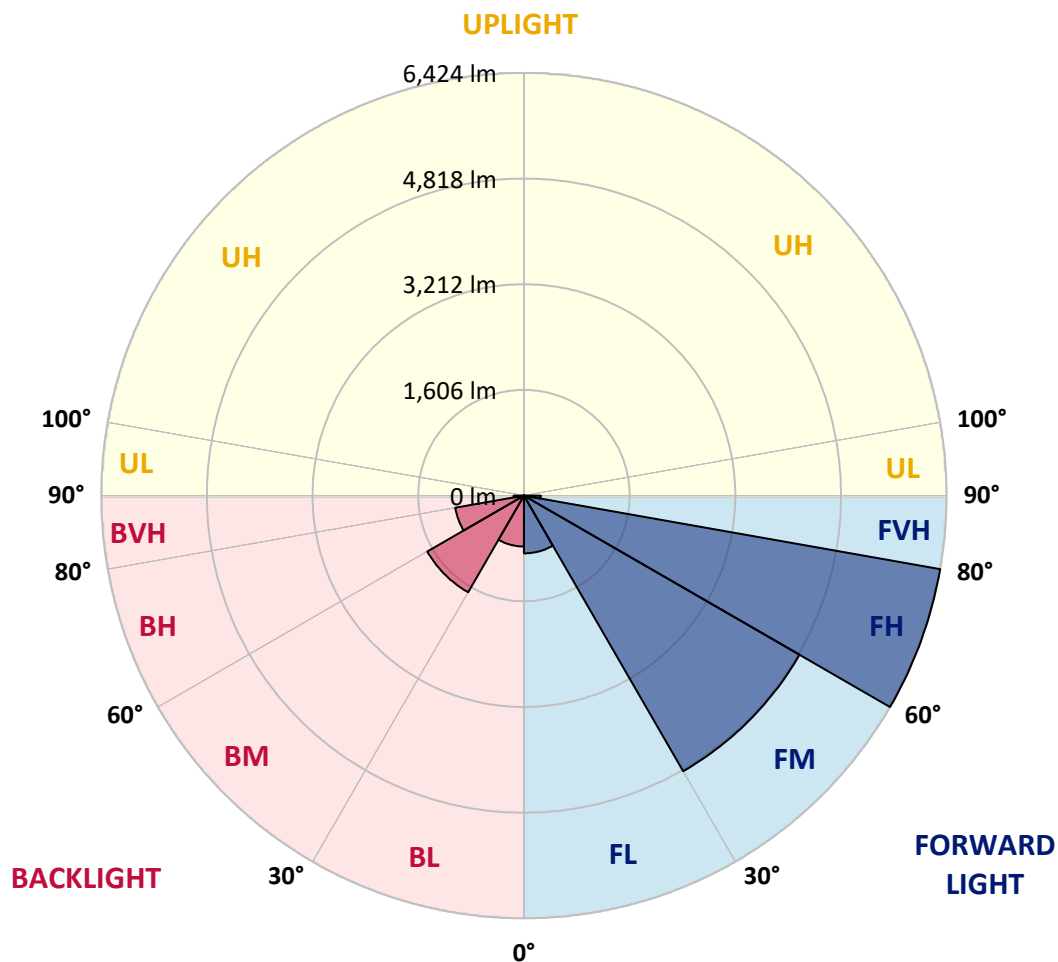
CATALOG NUMBER: GWC-SA2D-740-U-T4W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 877.4  | 5.5       |                         |      |         |
| FM   | (30°-60°)   | 4836.1 | 30.1      |                         |      |         |
| FH   | (60°-80°)   | 6423.9 | 39.9      |                         |      | G3/7500 |
| FVH  | (80°-90°)   | 257.1  | 1.6       |                         |      | G3/500  |
| BL   | (0°-30°)    | 773.8  | 4.8       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1696.5 | 10.6      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 1059.5 | 6.6       | B3/2500                 |      | G3/2500 |
| BVH  | (80°-90°)   | 155.6  | 1.0       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type IV Short





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CATALOG NUMBER: GWC-SA2D-740-U-T4W

**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°     | 46°     | 55°    | 65°    | 75°    | 85°    |
|-------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 0°    | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2  | 1638.2  | 1638.2 | 1638.2 | 1638.2 | 1638.2 |
| 2.5°  | 1720.2 | 1721.3 | 1723.5 | 1718.0 | 1702.6 | 1698.2  | 1696.6  | 1680.6 | 1670.2 | 1654.7 | 1641.5 |
| 5°    | 1857.8 | 1858.9 | 1855.6 | 1840.2 | 1806.1 | 1780.8  | 1778.6  | 1742.2 | 1709.2 | 1674.0 | 1647.6 |
| 7.5°  | 2001.4 | 2003.1 | 1992.6 | 1963.5 | 1915.6 | 1871.6  | 1868.8  | 1819.3 | 1769.2 | 1715.8 | 1676.2 |
| 10°   | 2128.6 | 2121.9 | 2104.9 | 2064.2 | 2007.5 | 1953.6  | 1951.4  | 1899.6 | 1841.8 | 1777.5 | 1724.6 |
| 12.5° | 2213.3 | 2207.8 | 2185.8 | 2136.3 | 2074.1 | 2024.5  | 2020.1  | 1972.3 | 1916.1 | 1845.7 | 1782.4 |
| 15°   | 2260.1 | 2263.9 | 2234.2 | 2178.1 | 2117.5 | 2075.7  | 2071.9  | 2037.8 | 1987.7 | 1916.7 | 1844.0 |
| 17.5° | 2266.1 | 2269.4 | 2240.8 | 2185.2 | 2135.7 | 2107.1  | 2105.4  | 2082.9 | 2046.6 | 1978.3 | 1902.4 |
| 20°   | 2230.9 | 2233.1 | 2209.4 | 2163.8 | 2131.3 | 2122.5  | 2121.9  | 2112.0 | 2085.1 | 2024.5 | 1950.8 |
| 22.5° | 2179.7 | 2181.4 | 2164.3 | 2131.3 | 2120.3 | 2134.1  | 2137.9  | 2134.1 | 2114.8 | 2058.1 | 1988.8 |
| 25°   | 2167.1 | 2166.0 | 2148.4 | 2114.8 | 2124.2 | 2153.3  | 2158.3  | 2159.9 | 2146.7 | 2097.2 | 2037.2 |
| 27.5° | 2228.2 | 2224.3 | 2190.7 | 2136.8 | 2142.9 | 2178.1  | 2184.7  | 2200.6 | 2192.4 | 2148.9 | 2092.2 |
| 30°   | 2404.8 | 2398.2 | 2329.4 | 2220.5 | 2190.7 | 2208.9  | 2217.2  | 2242.5 | 2244.1 | 2207.8 | 2165.4 |
| 32.5° | 2703.1 | 2694.8 | 2571.5 | 2376.7 | 2271.6 | 2240.3  | 2248.0  | 2285.9 | 2306.3 | 2278.2 | 2232.6 |
| 35°   | 3080.0 | 3070.7 | 2908.9 | 2642.5 | 2407.0 | 2300.2  | 2305.7  | 2336.0 | 2376.7 | 2337.1 | 2276.6 |
| 37.5° | 3472.9 | 3450.4 | 3294.6 | 2955.1 | 2622.2 | 2428.5  | 2428.5  | 2432.3 | 2451.6 | 2369.0 | 2328.3 |
| 40°   | 3863.6 | 3841.1 | 3700.2 | 3322.7 | 2900.6 | 2630.4  | 2617.8  | 2532.5 | 2517.1 | 2446.1 | 2432.3 |
| 42.5° | 4226.8 | 4220.2 | 4137.1 | 3738.2 | 3227.5 | 2829.1  | 2811.5  | 2666.7 | 2670.0 | 2626.0 | 2626.6 |
| 45°   | 4613.1 | 4613.1 | 4545.5 | 4157.5 | 3608.3 | 3148.3  | 3130.6  | 2917.7 | 2950.7 | 2930.3 | 2979.3 |
| 47.5° | 4928.5 | 4938.4 | 4929.0 | 4594.4 | 4051.3 | 3553.8  | 3521.9  | 3265.5 | 3357.9 | 3427.8 | 3570.3 |
| 50°   | 5250.4 | 5265.8 | 5267.5 | 5073.7 | 4586.7 | 4035.9  | 3999.6  | 3727.2 | 3933.5 | 4133.8 | 4413.9 |
| 52.5° | 5717.6 | 5752.3 | 5614.1 | 5552.0 | 5242.7 | 4608.2  | 4572.4  | 4320.9 | 4665.4 | 4946.6 | 5429.2 |
| 55°   | 6150.7 | 6120.4 | 6021.9 | 6060.4 | 5944.9 | 5259.7  | 5232.8  | 5012.1 | 5481.0 | 5846.4 | 6473.2 |
| 57.5° | 6385.1 | 6382.9 | 6482.0 | 6647.1 | 6702.1 | 6063.2  | 6040.6  | 5826.0 | 6400.5 | 6675.1 | 7453.2 |
| 60°   | 6660.3 | 6664.1 | 6909.5 | 7284.3 | 7511.0 | 7063.6  | 7053.7  | 6890.8 | 7293.7 | 7448.8 | 8222.0 |
| 62.5° | 6698.8 | 6768.1 | 7190.7 | 7835.7 | 8268.2 | 8232.5  | 8254.5  | 7850.0 | 8092.7 | 8066.3 | 8796.0 |
| 65°   | 6255.8 | 6347.1 | 7112.1 | 8002.4 | 9021.0 | 9510.8  | 9531.2  | 8814.7 | 8722.8 | 8594.0 | 9001.2 |
| 67.5° | 5347.8 | 5483.2 | 6314.1 | 7639.8 | 9269.2 | 10455.7 | 10484.3 | 9562.5 | 9245.6 | 8772.9 | 8507.1 |
| 70°   | 3891.7 | 4041.9 | 4878.4 | 6524.9 | 8826.8 | 10757.8 | 10790.2 | 9893.3 | 9265.4 | 8263.8 | 7262.3 |
| 72.5° | 2350.9 | 2468.6 | 3158.2 | 4803.6 | 7449.9 | 10207.5 | 10265.3 | 9473.9 | 8459.2 | 6999.8 | 5362.7 |
| 75°   | 1032.4 | 1109.4 | 1527.1 | 2768.0 | 5333.5 | 8445.4  | 8517.5  | 8109.2 | 6873.2 | 5087.0 | 3169.7 |
| 77.5° | 439.7  | 461.7  | 626.2  | 1202.4 | 3015.1 | 5771.0  | 5870.0  | 5925.1 | 4663.2 | 2768.0 | 1339.4 |
| 80°   | 274.0  | 282.9  | 354.4  | 544.2  | 1411.0 | 3241.3  | 3348.0  | 3486.1 | 2315.7 | 1017.5 | 467.8  |
| 82.5° | 166.7  | 176.6  | 235.5  | 329.1  | 734.6  | 1469.3  | 1520.5  | 1617.9 | 898.6  | 439.7  | 242.1  |
| 85°   | 100.2  | 107.3  | 144.2  | 208.0  | 418.2  | 577.8   | 577.3   | 638.3  | 423.2  | 282.9  | 127.7  |
| 87.5° | 47.9   | 53.4   | 77.0   | 107.9  | 210.8  | 216.8   | 203.1   | 230.0  | 257.0  | 185.5  | 64.4   |
| 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-SA2D-740-U-T4W

**CANDELA DISTRIBUTION (continued):**

|       | 90°    | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 | 1638.2 |
| 2.5°  | 1637.1 | 1634.9 | 1627.8 | 1622.3 | 1621.2 | 1617.9 | 1615.1 | 1616.8 | 1619.0 | 1619.5 | 1619.5 |
| 5°    | 1636.6 | 1630.5 | 1621.2 | 1617.3 | 1622.3 | 1628.9 | 1637.1 | 1648.1 | 1654.7 | 1659.7 | 1663.0 |
| 7.5°  | 1663.0 | 1651.4 | 1641.0 | 1638.8 | 1648.7 | 1666.3 | 1685.0 | 1708.1 | 1724.1 | 1735.1 | 1737.3 |
| 10°   | 1707.0 | 1692.7 | 1682.3 | 1684.5 | 1702.1 | 1727.4 | 1753.8 | 1783.5 | 1807.7 | 1822.6 | 1823.7 |
| 12.5° | 1757.7 | 1743.9 | 1734.0 | 1743.3 | 1772.5 | 1803.3 | 1830.8 | 1856.7 | 1878.7 | 1893.6 | 1893.6 |
| 15°   | 1816.0 | 1806.1 | 1794.5 | 1816.0 | 1855.6 | 1883.1 | 1894.7 | 1907.3 | 1919.4 | 1930.4 | 1928.2 |
| 17.5° | 1872.1 | 1862.8 | 1856.7 | 1882.0 | 1923.3 | 1935.9 | 1928.2 | 1918.9 | 1918.9 | 1924.9 | 1926.0 |
| 20°   | 1920.5 | 1912.3 | 1916.1 | 1940.9 | 1962.4 | 1949.2 | 1920.5 | 1890.8 | 1878.7 | 1882.0 | 1885.3 |
| 22.5° | 1962.9 | 1959.1 | 1970.6 | 1982.2 | 1966.8 | 1920.5 | 1867.7 | 1827.5 | 1812.7 | 1811.6 | 1812.7 |
| 25°   | 2012.4 | 2011.9 | 2026.2 | 2005.3 | 1937.0 | 1851.8 | 1780.8 | 1741.7 | 1733.4 | 1740.0 | 1751.0 |
| 27.5° | 2074.1 | 2080.1 | 2087.3 | 2010.8 | 1876.5 | 1747.7 | 1675.7 | 1648.7 | 1656.9 | 1672.9 | 1683.4 |
| 30°   | 2152.8 | 2169.3 | 2153.9 | 1997.0 | 1789.6 | 1628.9 | 1560.1 | 1552.4 | 1575.0 | 1597.5 | 1608.5 |
| 32.5° | 2229.3 | 2255.1 | 2217.7 | 1961.3 | 1677.3 | 1502.9 | 1449.5 | 1447.3 | 1474.8 | 1496.8 | 1512.2 |
| 35°   | 2290.9 | 2342.1 | 2265.6 | 1890.3 | 1547.4 | 1386.8 | 1347.7 | 1332.8 | 1342.7 | 1368.6 | 1386.2 |
| 37.5° | 2371.2 | 2456.5 | 2298.6 | 1781.9 | 1406.6 | 1291.0 | 1245.3 | 1211.2 | 1202.4 | 1212.9 | 1221.7 |
| 40°   | 2518.2 | 2631.0 | 2314.0 | 1630.5 | 1269.0 | 1195.2 | 1149.0 | 1098.9 | 1064.3 | 1039.0 | 1039.5 |
| 42.5° | 2758.1 | 2858.2 | 2304.1 | 1446.7 | 1141.9 | 1101.7 | 1049.4 | 991.6  | 935.5  | 878.3  | 873.9  |
| 45°   | 3147.7 | 3196.1 | 2274.4 | 1251.9 | 1030.2 | 1003.7 | 954.8  | 897.0  | 822.1  | 757.2  | 751.2  |
| 47.5° | 3771.2 | 3663.9 | 2228.2 | 1081.9 | 931.7  | 920.6  | 875.5  | 808.9  | 729.7  | 677.4  | 673.0  |
| 50°   | 4621.4 | 4339.1 | 2205.6 | 946.5  | 844.7  | 848.0  | 811.1  | 740.7  | 665.9  | 627.3  | 622.9  |
| 52.5° | 5638.4 | 5125.5 | 2249.1 | 842.0  | 774.8  | 786.4  | 758.9  | 692.8  | 630.1  | 599.8  | 595.4  |
| 55°   | 6693.3 | 5939.9 | 2295.8 | 766.0  | 708.8  | 731.3  | 722.0  | 667.5  | 610.8  | 582.8  | 578.9  |
| 57.5° | 7596.3 | 6548.0 | 2202.3 | 704.4  | 649.9  | 685.1  | 693.4  | 651.6  | 600.9  | 575.6  | 571.2  |
| 60°   | 8164.8 | 6792.9 | 1956.9 | 646.6  | 603.1  | 648.3  | 676.9  | 647.2  | 604.8  | 602.6  | 599.3  |
| 62.5° | 8434.4 | 6771.4 | 1588.7 | 600.9  | 574.0  | 632.3  | 689.0  | 671.9  | 648.8  | 668.6  | 670.3  |
| 65°   | 8313.4 | 6447.8 | 1183.1 | 570.7  | 553.0  | 638.3  | 725.3  | 718.7  | 661.5  | 681.3  | 684.0  |
| 67.5° | 7516.5 | 5675.8 | 876.1  | 544.2  | 529.9  | 655.4  | 791.3  | 734.1  | 636.7  | 651.0  | 642.2  |
| 70°   | 6075.3 | 4499.8 | 675.8  | 514.5  | 506.3  | 653.2  | 821.0  | 724.7  | 609.7  | 613.0  | 589.4  |
| 72.5° | 4189.4 | 3068.5 | 549.7  | 487.0  | 472.2  | 595.4  | 800.1  | 701.6  | 587.2  | 561.9  | 530.5  |
| 75°   | 2278.2 | 1647.0 | 467.2  | 458.4  | 412.2  | 522.8  | 761.6  | 685.1  | 566.8  | 533.2  | 515.6  |
| 77.5° | 896.4  | 683.5  | 405.6  | 419.3  | 360.4  | 461.7  | 718.7  | 653.8  | 538.7  | 494.7  | 485.9  |
| 80°   | 365.9  | 348.9  | 336.2  | 362.6  | 309.8  | 403.9  | 667.0  | 616.9  | 505.2  | 458.9  | 441.3  |
| 82.5° | 207.5  | 216.8  | 261.4  | 286.2  | 251.5  | 372.0  | 642.2  | 587.2  | 465.0  | 411.1  | 390.2  |
| 85°   | 106.2  | 127.1  | 182.1  | 205.3  | 184.9  | 316.4  | 591.6  | 514.0  | 373.1  | 314.8  | 316.4  |
| 87.5° | 51.2   | 71.0   | 115.0  | 128.8  | 120.0  | 228.9  | 441.9  | 372.6  | 290.6  | 230.0  | 222.9  |
| 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: SP1-2104-224-3

Luminaire Tested: CCW-SA-2A-740-U-SL4

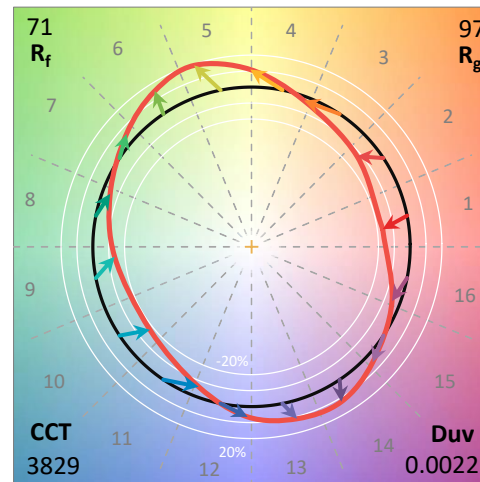
Test Date: 04/26/2021

### Test Information

Test Method: LM-79-08  
 Report Number: SP1-2104-224-3  
 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-740-U-SL4**  
 Description: INVUE WALL PACK ClearCurve Light Square

### Spectral Parameters

|                           |        |           |      |      |       |
|---------------------------|--------|-----------|------|------|-------|
| CCT (K):                  | 3829   | CRI (Ra): | 69.8 |      |       |
| CIE u':                   | 0.2271 | R1:       | 67.2 | R9:  | -35.1 |
| CIE v':                   | 0.5076 | R2:       | 75.2 | R10: | 43.1  |
| Duv:                      | 0.0022 | R3:       | 83.2 | R11: | 69.0  |
| CIE x:                    | 0.3900 | R4:       | 71.0 | R12: | 44.3  |
| CIE y:                    | 0.3873 | R5:       | 67.4 | R13: | 67.6  |
| CIE z:                    | 0.2227 | R6:       | 66.8 | R14: | 90.3  |
| Peak Wavelength (nm):     | 440    | R7:       | 77.6 |      |       |
| Dominant Wavelength (nm): | 578    | R8:       | 50.3 |      |       |
| Purity:                   | 33.4   |           |      |      |       |
| Rf:                       | 70.6   |           |      |      |       |
| Rg:                       | 96.7   |           |      |      |       |



### Test Conditions

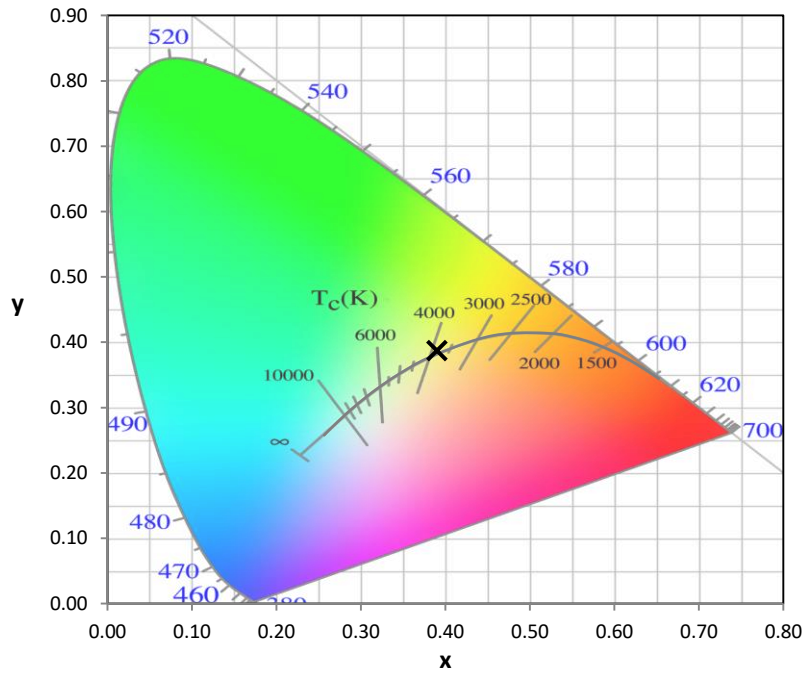
Stabilization Time: 62M  
 Operation Time: 12H  
 Room Temperature (°C) / RH%: 24.8/39%  
 Sphere Temperature (°C): 24.2

REPORT NUMBER: SP1-2104-224-3

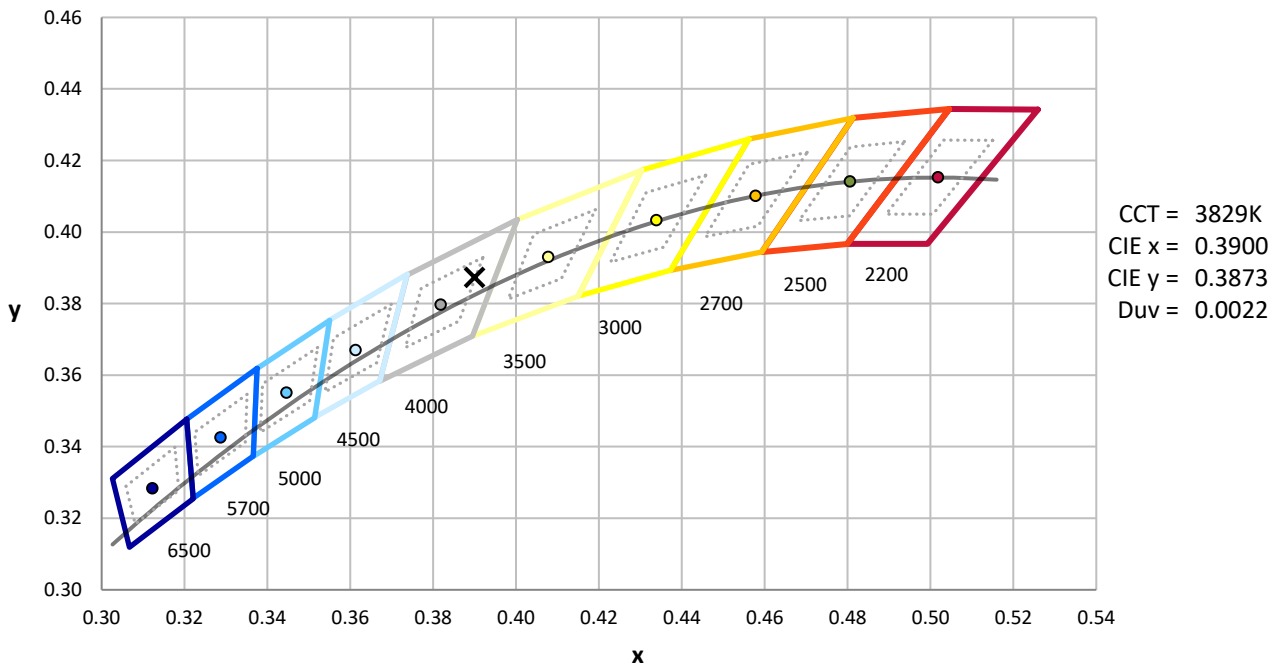
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date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



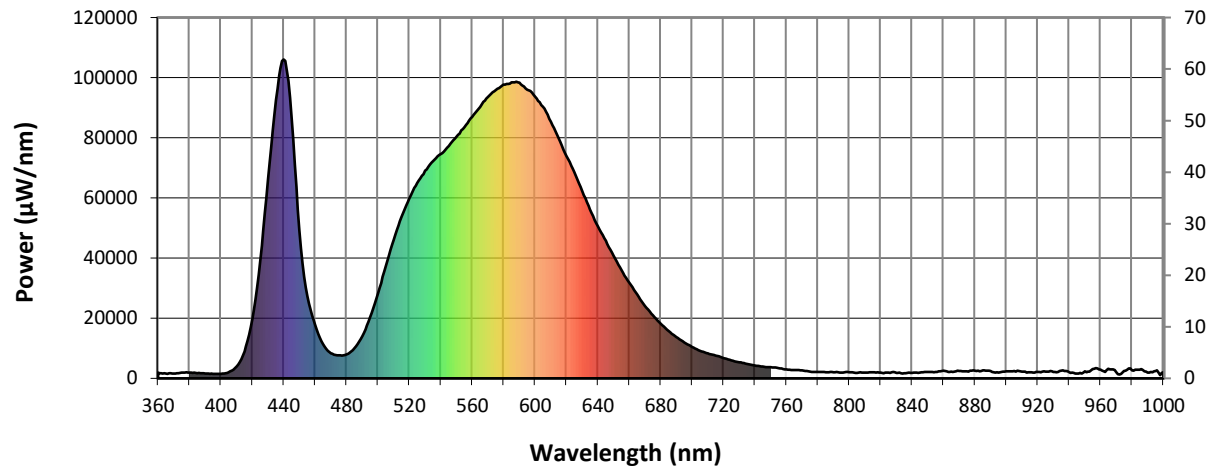
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 4000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

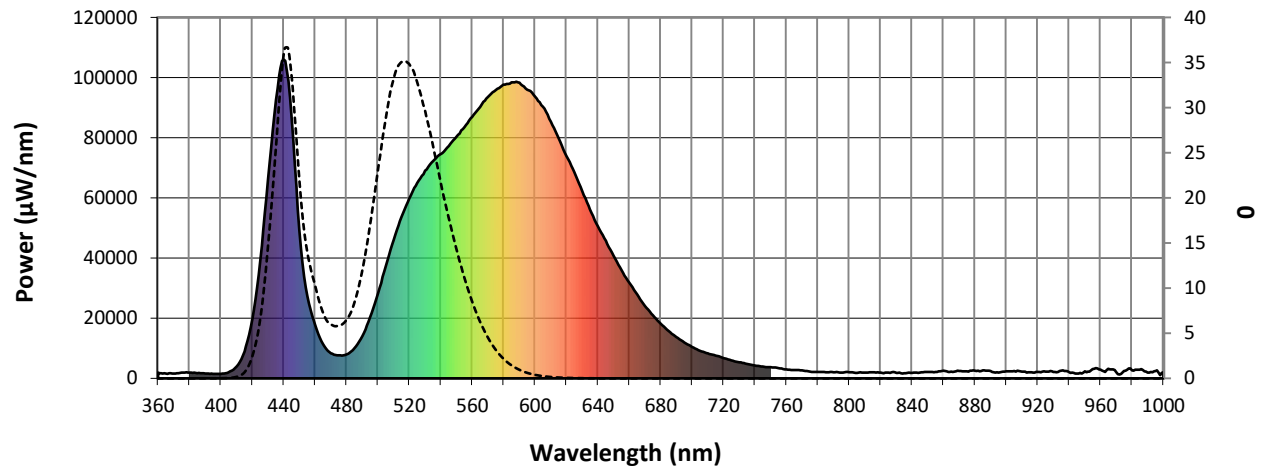


#####

| 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       | 1901             | 0.0              | 490       | 14057            | 2.0              | 620       | 73853            | 19.2             | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 3.7              | 625       | 68653            | 15.1             | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 6.3              | 630       | 62254            | 11.3             | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 10.4             | 635       | 56177            | 8.4              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 15.8             | 640       | 50521            | 6.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 22.2             | 645       | 45727            | 4.4              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 29.0             | 650       | 40814            | 3.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 34.9             | 655       | 35925            | 2.1              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 40.7             | 660       | 31824            | 1.3              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 44.8             | 665       | 27860            | 0.9              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.0              | 540       | 74621            | 48.6             | 670       | 24069            | 0.5              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.0              | 545       | 77288            | 51.4             | 675       | 20926            | 0.4              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 0.1              | 550       | 80334            | 54.6             | 680       | 18170            | 0.2              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 0.2              | 555       | 83561            | 57.1             | 685       | 15785            | 0.1              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 0.5              | 560       | 86964            | 59.1             | 690       | 13770            | 0.1              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 1.1              | 565       | 90264            | 60.0             | 695       | 11953            | 0.1              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 1.7              | 570       | 93519            | 60.8             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 1.8              | 575       | 95920            | 59.7             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 1.3              | 580       | 97650            | 58.0             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 0.9              | 585       | 98486            | 54.7             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 0.7              | 590       | 98332            | 50.8             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 0.6              | 595       | 96023            | 45.5             | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 0.5              | 600       | 93650            | 40.4             | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 0.6              | 605       | 90313            | 35.0             | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 0.8              | 610       | 85305            | 29.3             | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 1.2              | 615       | 79870            | 24.1             | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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### Scotopic Flux vs. Wavelength



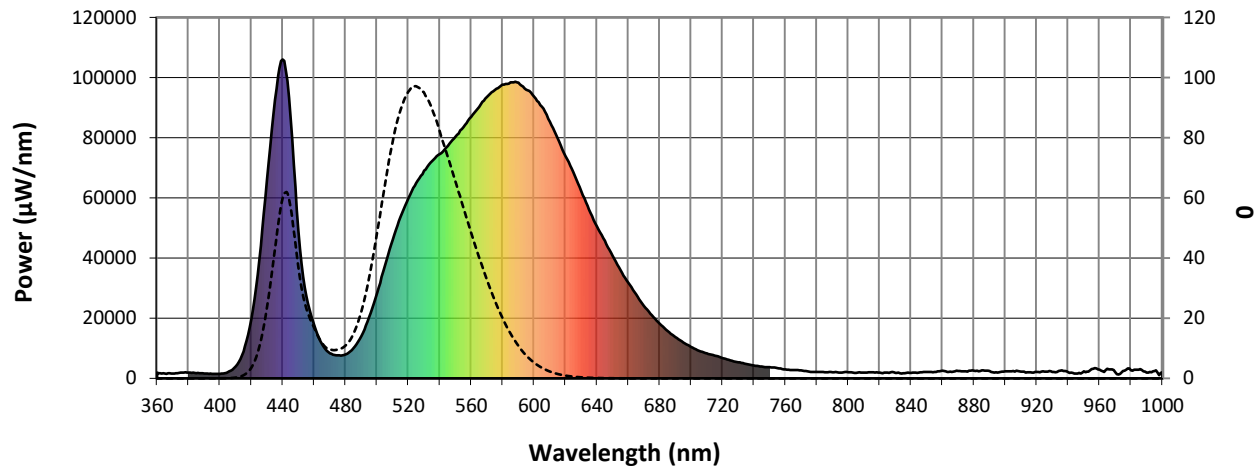
Scotopic Lumens: 7682.8

S/P: 1.42

| 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       | 1901             | 0.0              | 490       | 14057            | 21.6             | 620       | 73853            | 0.9              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 32.8             | 625       | 68653            | 0.6              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 47.4             | 630       | 62254            | 0.4              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 63.3             | 635       | 56177            | 0.2              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 78.0             | 640       | 50521            | 0.1              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 88.9             | 645       | 45727            | 0.1              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 95.2             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 97.2             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 95.2             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.1              | 535       | 72246            | 90.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 82.5             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.9              | 545       | 77288            | 74.1             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 3.2              | 550       | 80334            | 65.7             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 9.6              | 555       | 83561            | 57.1             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 22.5             | 560       | 86964            | 48.6             | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 41.4             | 565       | 90264            | 40.5             | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 59.3             | 570       | 93519            | 33.0             | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 57.8             | 575       | 95920            | 26.1             | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 38.1             | 580       | 97650            | 20.1             | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 23.9             | 585       | 98486            | 15.1             | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 17.2             | 590       | 98332            | 10.9             | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 12.0             | 595       | 96023            | 7.7              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 9.6              | 600       | 93650            | 5.3              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 9.6              | 605       | 90313            | 3.5              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 10.8             | 610       | 85305            | 2.3              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 14.5             | 615       | 79870            | 1.5              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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### Melanopic Flux vs. Wavelength



**Melanopic Lumens: 2823**

**M/P: 0.52**

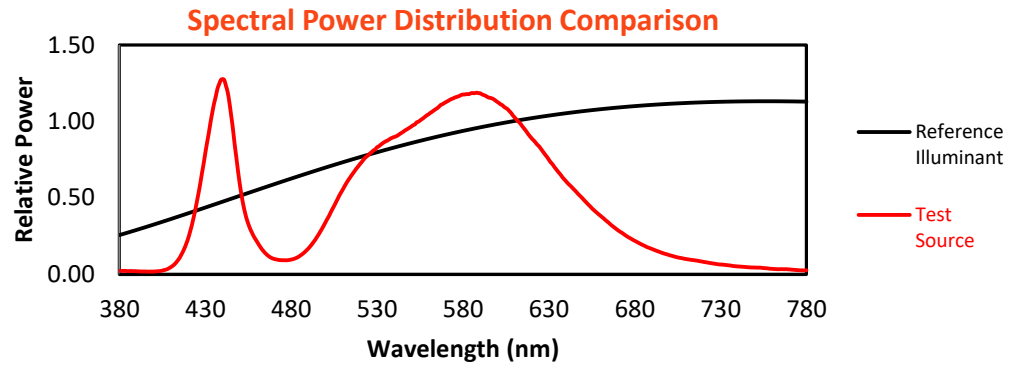
| λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>(μW/nm) | Lumens<br>(Φ/nm) |
|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|-----------|------------------|------------------|
| 360       | 1901             | 0.0              | 490       | 14057            | 11.7             | 620       | 73853            | 0.1              | 750       | 3678             | 0.0              | 880       | 2528             | 0.0              |
| 365       | 1585             | 0.0              | 495       | 20304            | 16.8             | 625       | 68653            | 0.0              | 755       | 3385             | 0.0              | 885       | 2638             | 0.0              |
| 370       | 1604             | 0.0              | 500       | 28346            | 22.8             | 630       | 62254            | 0.0              | 760       | 2963             | 0.0              | 890       | 2417             | 0.0              |
| 375       | 1905             | 0.0              | 505       | 37228            | 28.6             | 635       | 56177            | 0.0              | 765       | 2782             | 0.0              | 895       | 1902             | 0.0              |
| 380       | 1882             | 0.0              | 510       | 46037            | 33.1             | 640       | 50521            | 0.0              | 770       | 2657             | 0.0              | 900       | 2330             | 0.0              |
| 385       | 1693             | 0.0              | 515       | 53619            | 35.0             | 645       | 45727            | 0.0              | 775       | 2259             | 0.0              | 905       | 2456             | 0.0              |
| 390       | 1640             | 0.0              | 520       | 59890            | 34.9             | 650       | 40814            | 0.0              | 780       | 2169             | 0.0              | 910       | 2205             | 0.0              |
| 395       | 1513             | 0.0              | 525       | 64946            | 32.9             | 655       | 35925            | 0.0              | 785       | 2065             | 0.0              | 915       | 2002             | 0.0              |
| 400       | 1481             | 0.0              | 530       | 69048            | 29.8             | 660       | 31824            | 0.0              | 790       | 2054             | 0.0              | 920       | 2125             | 0.0              |
| 405       | 2044             | 0.0              | 535       | 72246            | 26.0             | 665       | 27860            | 0.0              | 795       | 1908             | 0.0              | 925       | 2266             | 0.0              |
| 410       | 3966             | 0.2              | 540       | 74621            | 21.8             | 670       | 24069            | 0.0              | 800       | 2026             | 0.0              | 930       | 2159             | 0.0              |
| 415       | 8943             | 0.6              | 545       | 77288            | 18.0             | 675       | 20926            | 0.0              | 805       | 1766             | 0.0              | 935       | 2581             | 0.0              |
| 420       | 19566            | 2.2              | 550       | 80334            | 14.4             | 680       | 18170            | 0.0              | 810       | 1913             | 0.0              | 940       | 2052             | 0.0              |
| 425       | 39243            | 6.1              | 555       | 83561            | 11.3             | 685       | 15785            | 0.0              | 815       | 2019             | 0.0              | 945       | 1631             | 0.0              |
| 430       | 66113            | 14.0             | 560       | 86964            | 8.6              | 690       | 13770            | 0.0              | 820       | 1876             | 0.0              | 950       | 2301             | 0.0              |
| 435       | 92550            | 24.7             | 565       | 90264            | 6.3              | 695       | 11953            | 0.0              | 825       | 1869             | 0.0              | 955       | 3077             | 0.0              |
| 440       | 106034           | 35.4             | 570       | 93519            | 4.6              | 700       | 10452            | 0.0              | 830       | 1862             | 0.0              | 960       | 2911             | 0.0              |
| 445       | 86383            | 34.1             | 575       | 95920            | 3.2              | 705       | 9162             | 0.0              | 835       | 1663             | 0.0              | 965       | 3163             | 0.0              |
| 450       | 49216            | 22.7             | 580       | 97650            | 2.2              | 710       | 8266             | 0.0              | 840       | 1843             | 0.0              | 970       | 1995             | 0.0              |
| 455       | 27376            | 14.3             | 585       | 98486            | 1.5              | 715       | 7583             | 0.0              | 845       | 1921             | 0.0              | 975       | 2418             | 0.0              |
| 460       | 17830            | 10.5             | 590       | 98332            | 1.0              | 720       | 6750             | 0.0              | 850       | 2105             | 0.0              | 980       | 2674             | 0.0              |
| 465       | 11374            | 7.4              | 595       | 96023            | 0.6              | 725       | 5965             | 0.0              | 855       | 2096             | 0.0              | 985       | 2850             | 0.0              |
| 470       | 8344             | 6.0              | 600       | 93650            | 0.4              | 730       | 5310             | 0.0              | 860       | 2601             | 0.0              | 990       | 1972             | 0.0              |
| 475       | 7639             | 5.8              | 605       | 90313            | 0.2              | 735       | 4838             | 0.0              | 865       | 2199             | 0.0              | 995       | 2443             | 0.0              |
| 480       | 7991             | 6.4              | 610       | 85305            | 0.2              | 740       | 4280             | 0.0              | 870       | 2491             | 0.0              | 1000      | 1979             | 0.0              |
| 485       | 9994             | 8.2              | 615       | 79870            | 0.1              | 745       | 3928             | 0.0              | 875       | 2370             | 0.0              |           |                  |                  |

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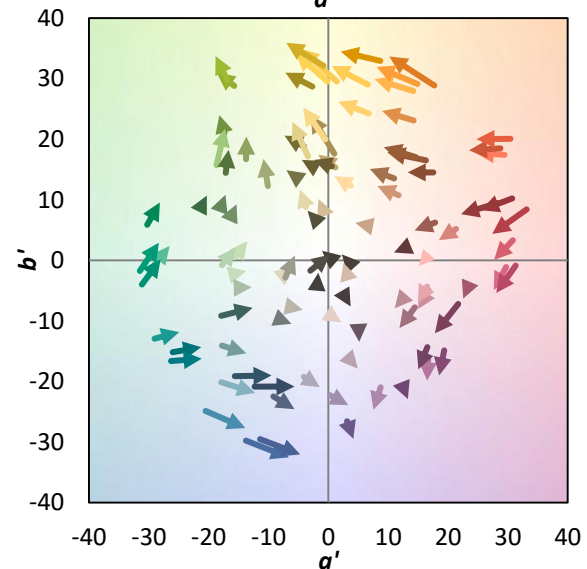
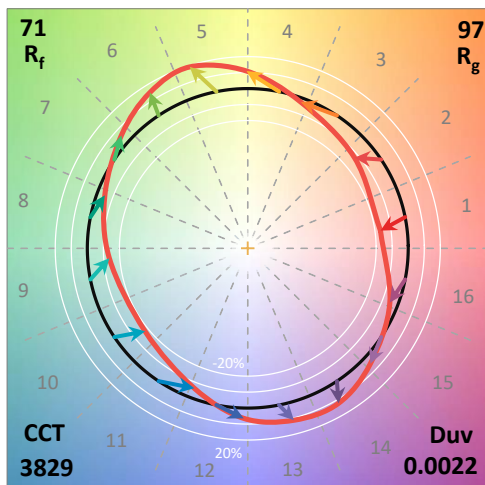
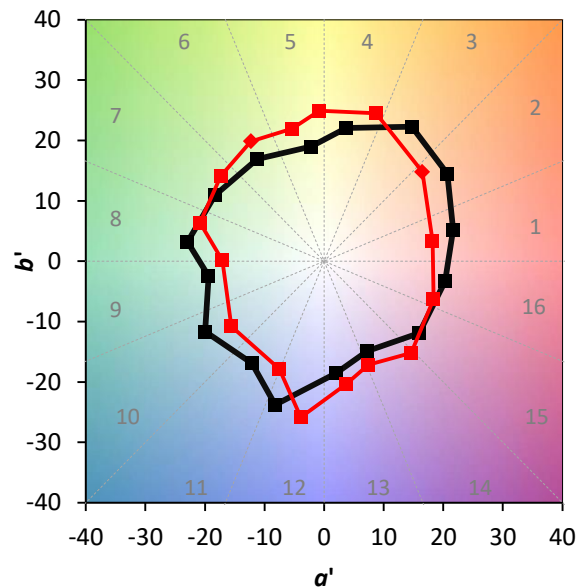
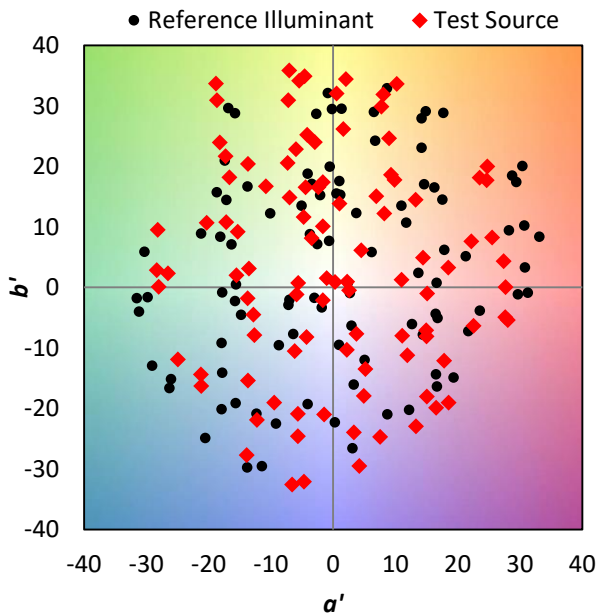
TM-30-18

### Summary

$R_f = 70.6$   
 $R_g = 96.7$   
 $CIE R_a = 69.8$   
 $R_g = -35.1$



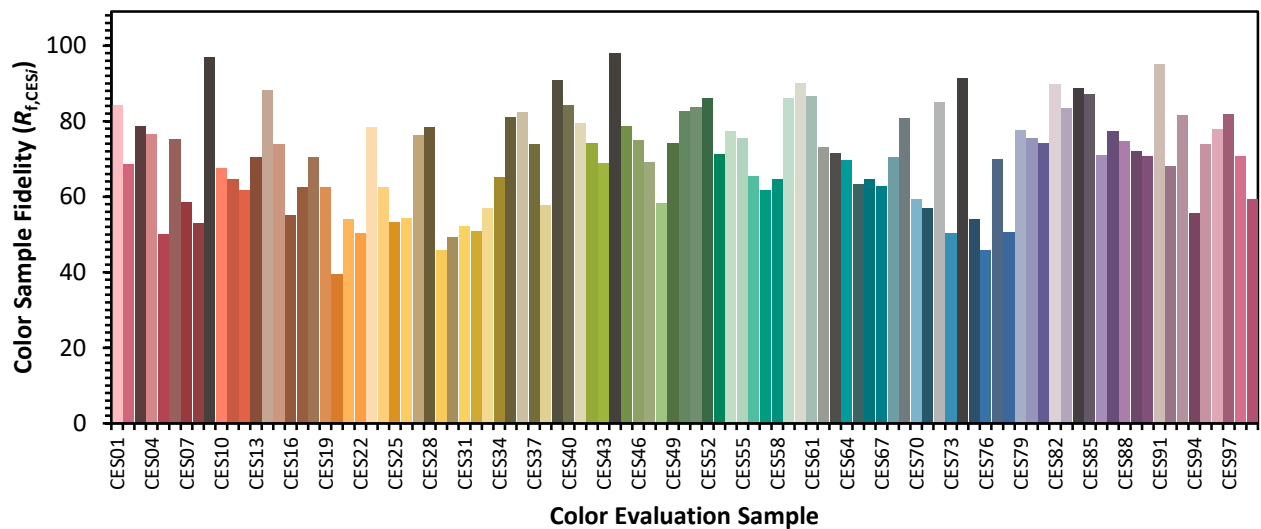
### Color Vector Graphics



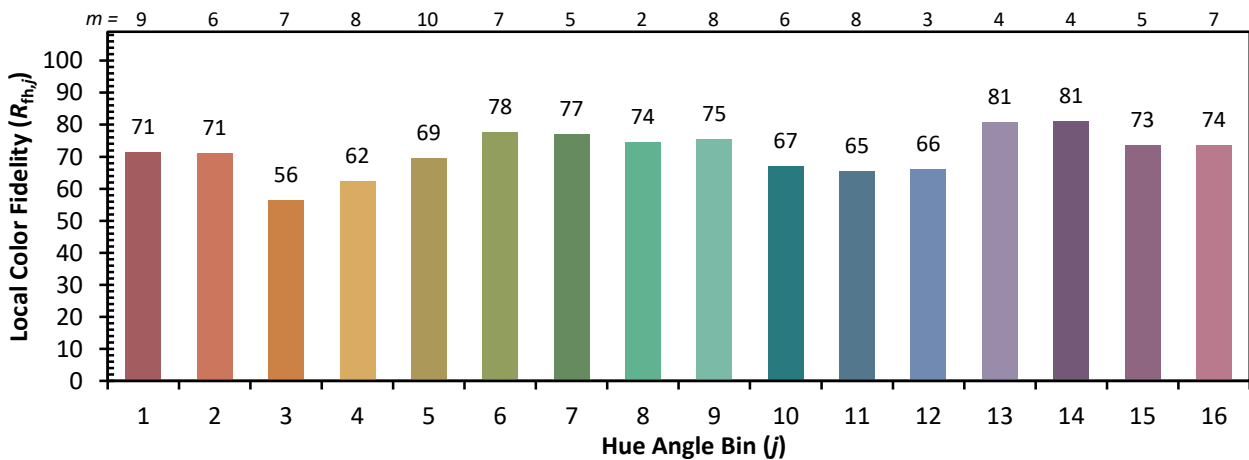
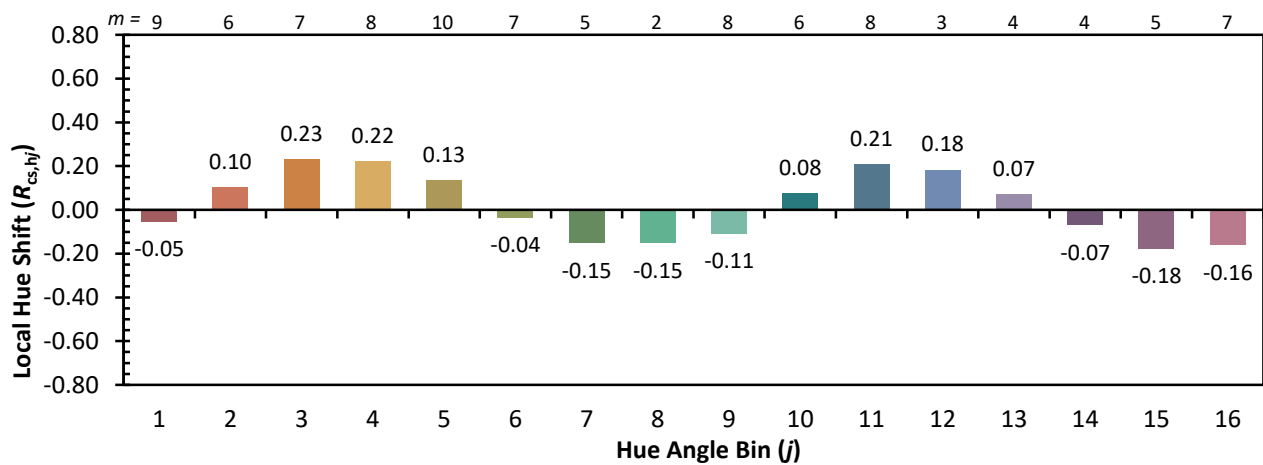
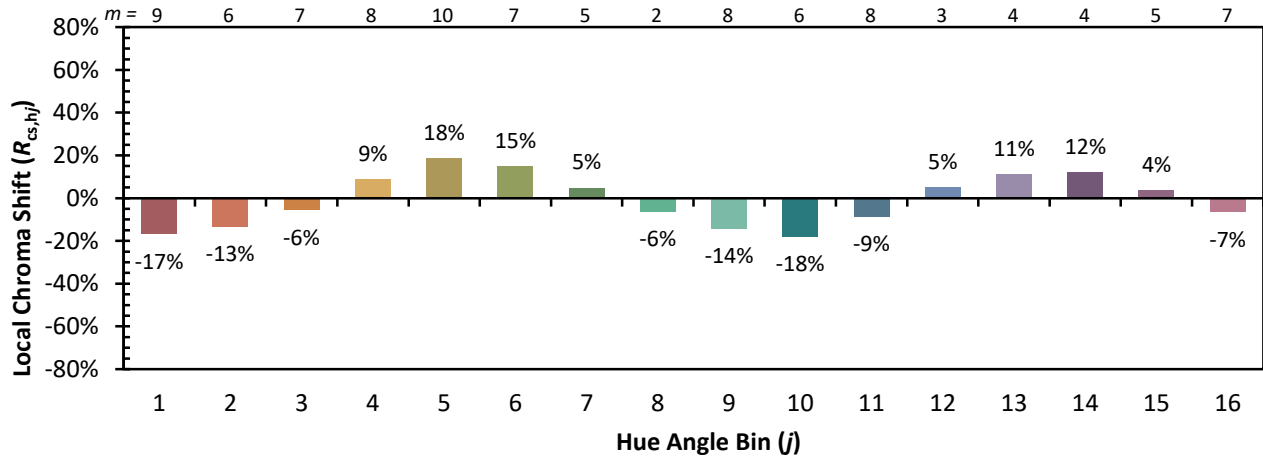


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

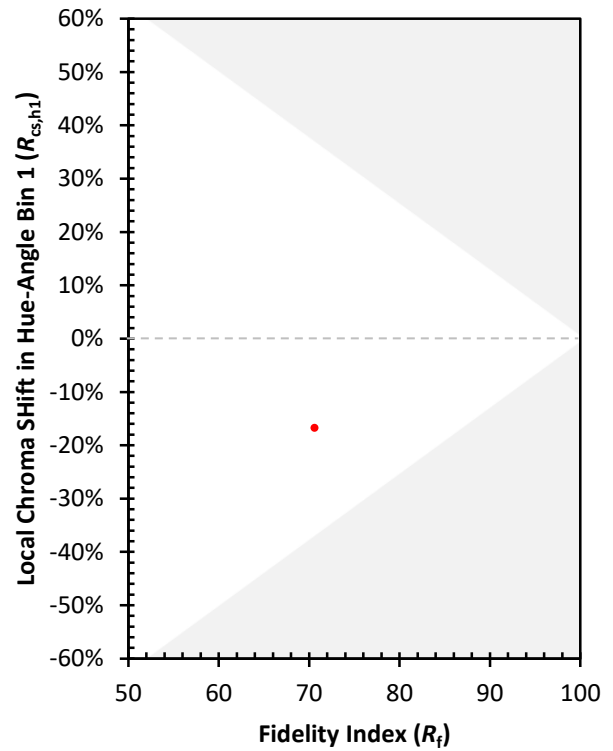
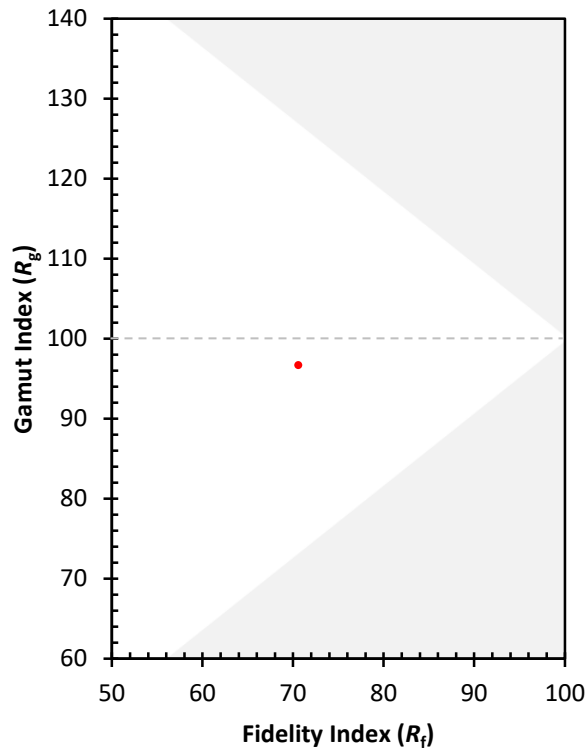
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 54 | CES51 = 84 | CES76 = 46 |
| CES02 = 61 | CES27 = 76 | CES52 = 86 | CES77 = 70 |
| CES03 = 30 | CES28 = 78 | CES53 = 71 | CES78 = 50 |
| CES04 = 70 | CES29 = 46 | CES54 = 77 | CES79 = 77 |
| CES05 = 47 | CES30 = 49 | CES55 = 76 | CES80 = 75 |
| CES06 = 50 | CES31 = 52 | CES56 = 65 | CES81 = 74 |
| CES07 = 40 | CES32 = 51 | CES57 = 62 | CES82 = 90 |
| CES08 = 39 | CES33 = 57 | CES58 = 65 | CES83 = 84 |
| CES09 = 29 | CES34 = 65 | CES59 = 86 | CES84 = 89 |
| CES10 = 74 | CES35 = 81 | CES60 = 90 | CES85 = 87 |
| CES11 = 57 | CES36 = 82 | CES61 = 87 | CES86 = 71 |
| CES12 = 63 | CES37 = 74 | CES62 = 73 | CES87 = 77 |
| CES13 = 42 | CES38 = 58 | CES63 = 72 | CES88 = 75 |
| CES14 = 74 | CES39 = 91 | CES64 = 70 | CES89 = 72 |
| CES15 = 71 | CES40 = 84 | CES65 = 63 | CES90 = 71 |
| CES16 = 46 | CES41 = 79 | CES66 = 65 | CES91 = 95 |
| CES17 = 49 | CES42 = 74 | CES67 = 63 | CES92 = 68 |
| CES18 = 56 | CES43 = 69 | CES68 = 70 | CES93 = 82 |
| CES19 = 72 | CES44 = 98 | CES69 = 81 | CES94 = 56 |
| CES20 = 65 | CES45 = 79 | CES70 = 59 | CES95 = 74 |
| CES21 = 86 | CES46 = 75 | CES71 = 57 | CES96 = 78 |
| CES22 = 78 | CES47 = 69 | CES72 = 85 | CES97 = 82 |
| CES23 = 92 | CES48 = 58 | CES73 = 50 | CES98 = 71 |
| CES24 = 91 | CES49 = 74 | CES74 = 91 | CES99 = 59 |
| CES25 = 72 | CES50 = 83 | CES75 = 54 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)