

Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269

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Scaled data based on original data using  
LM-79-2024 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions

Brand: STREETWORKS

Report Number: P1461334

Luminaire Tested: USSL-70-727-U-T4W

Issue Date: 06/10/2026

**Test Information**

Test Method: LM-79-2024  
Report Number: P1461334  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 6/11/2026  
Manufacturer: COOPER LIGHTING SOLUTIONS  
Product Line: STREETWORKS  
Catalog Number: USSL-70-727-U-T4W  
Description: USSL DISCRETE LED 1 SQUARE 70W 70CRI 2700K FIXTURE w/ TYPE IV WIDE DISTRIBUTION OPTIC  
Light Source: (40) 2700K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10692.4 lumens  
Efficiency: N/A  
Efficacy: 146.5 lumens/watt  
Luminous Opening: Rectangular (W 0.67' x L: 0.67' x H: 0')  
IES Classification: Type IV - Short  
BUG Rating: B2 - U0 - G2

Input Watts (W): 73  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.98  
Total Harmonic Distortion (THDi): 2.73%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 28.75 FT

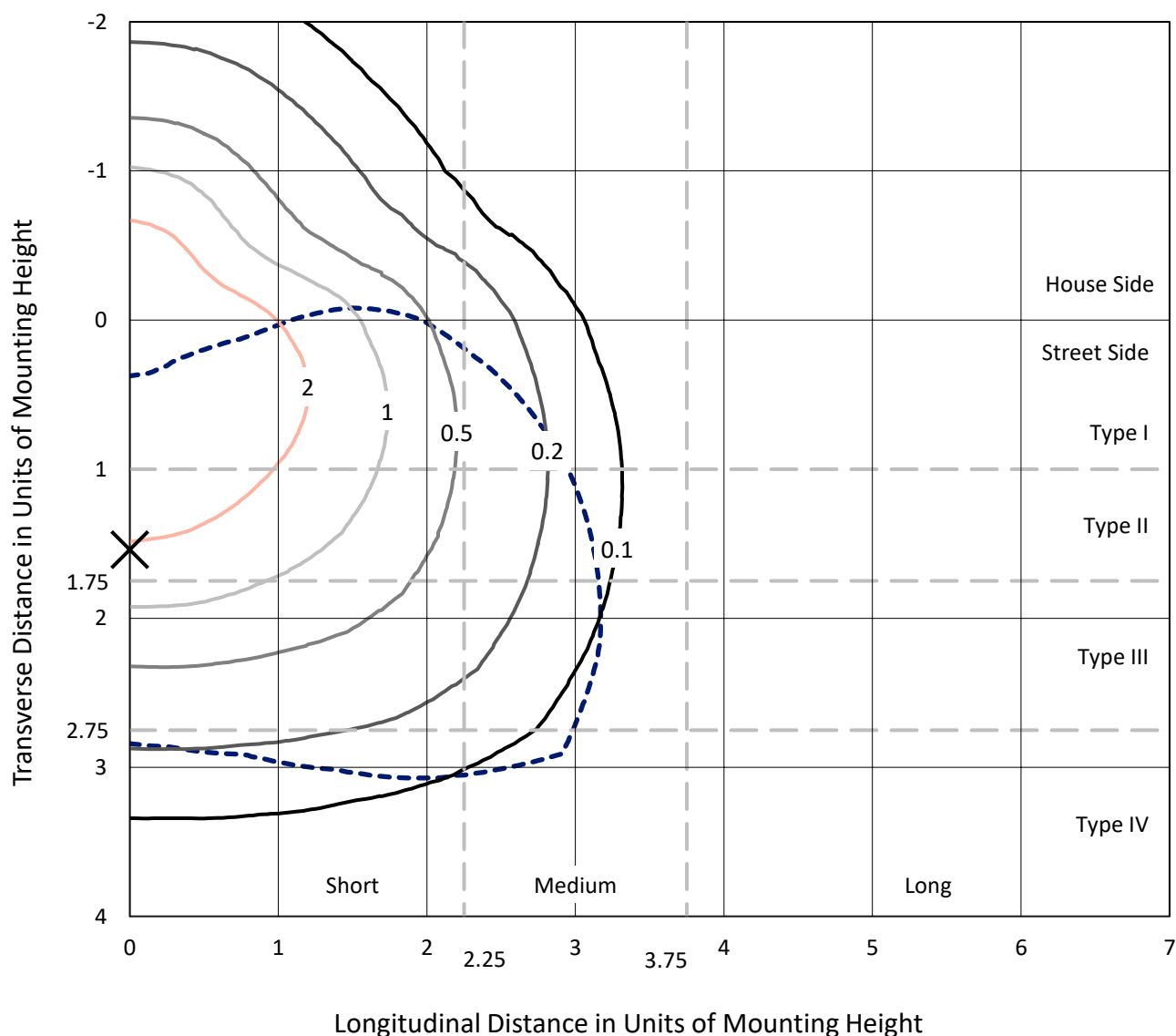
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## Iso-Footcandle Lines of Horizontal Illumination

× Max cd

--- 1/2 Max cd

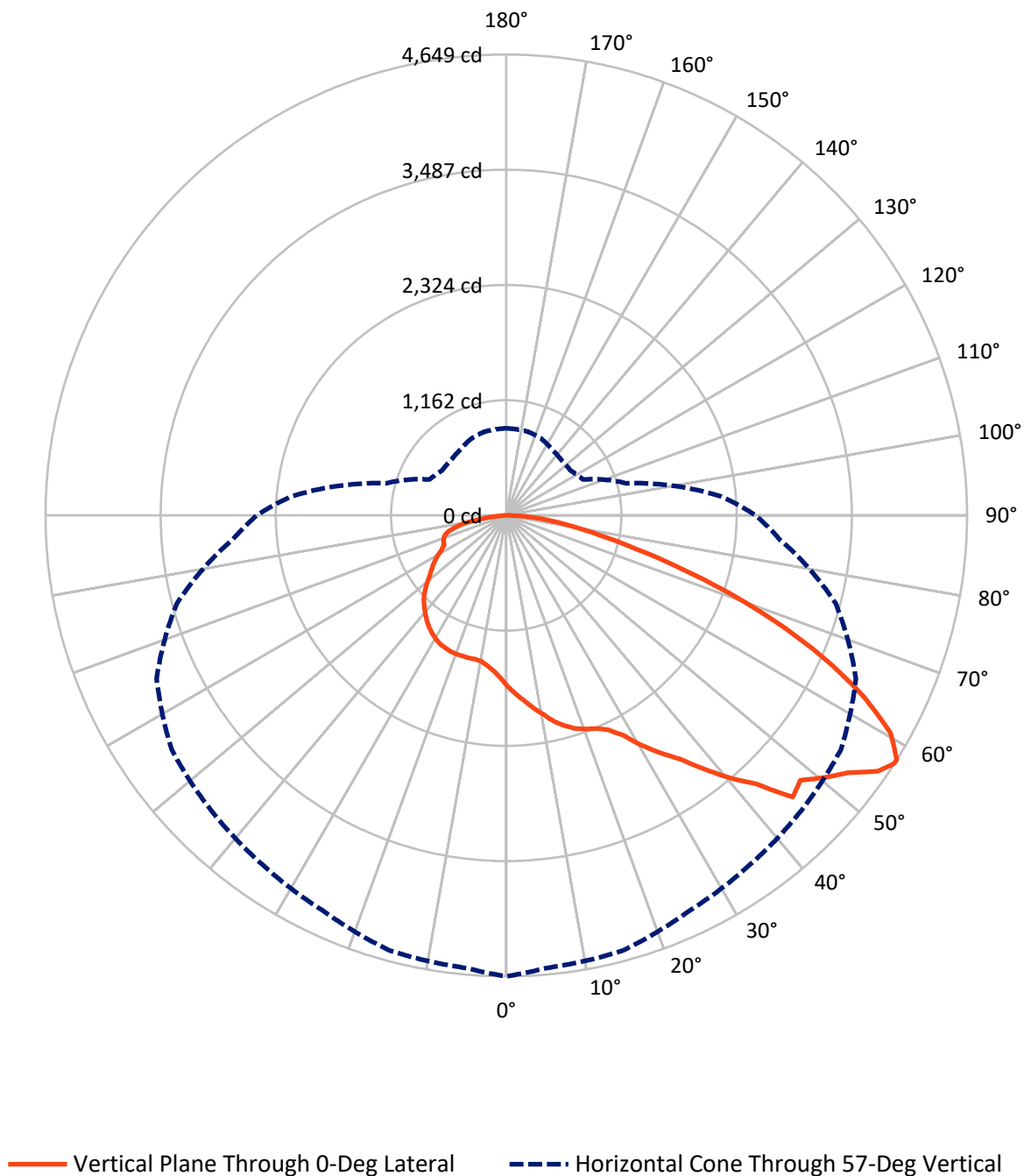


Based on 20 foot mounting height. Maximum calculated value = 5 fc  
 Type IV - Short - N/A

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## Luminous Intensity Polar Plot



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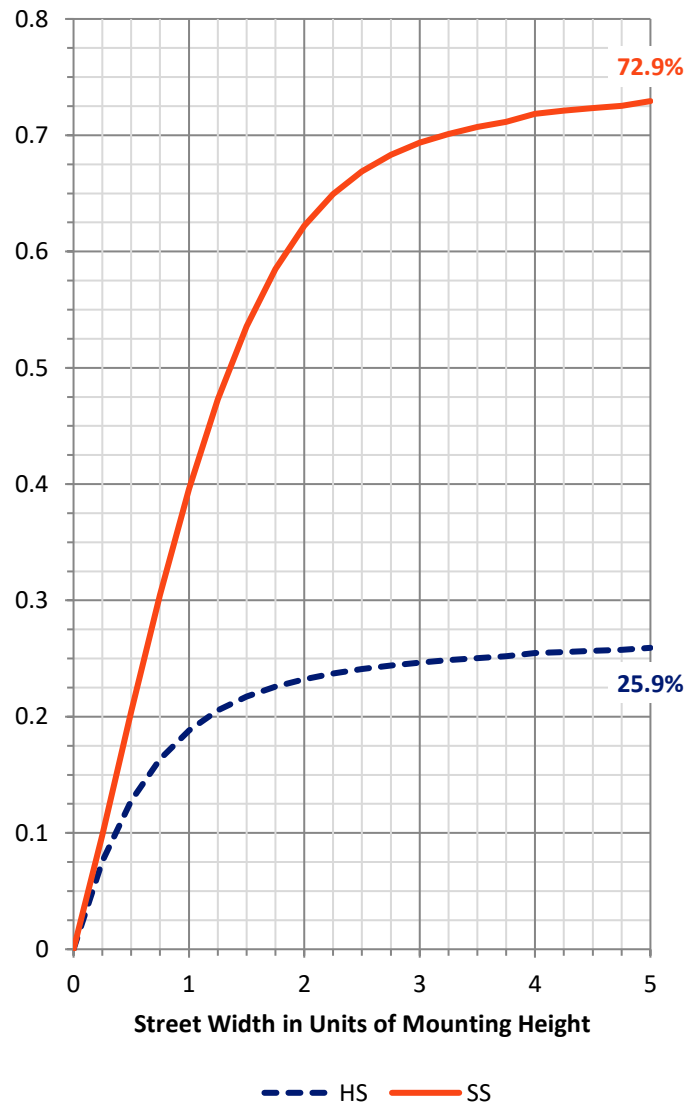
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 2819.2   | 0.0    | 2819.2  |
|                    | % Fixture | 26.4     | 0.0    | 26.4    |
| <b>Street Side</b> | Lumens    | 7873.2   | 0.0    | 7873.2  |
|                    | % Fixture | 73.6     | 0.0    | 73.6    |
| <b>Total</b>       | Lumens    | 10692.4  | 0.0    | 10692.4 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 165.3   | 1.5       |
| 10°-20°   | 509.5   | 4.8       |
| 20°-30°   | 872.9   | 8.2       |
| 30°-40°   | 1284.4  | 12.0      |
| 40°-50°   | 1767.4  | 16.5      |
| 50°-60°   | 2230.2  | 20.9      |
| 60°-70°   | 2259.9  | 21.1      |
| 70°-80°   | 1297.8  | 12.1      |
| 80°-90°   | 305.0   | 2.9       |
| 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°    | 10692.4 | 100.0     |
| 0°-180°   | 10692.4 | 100.0     |

**Coefficient of Utilization**



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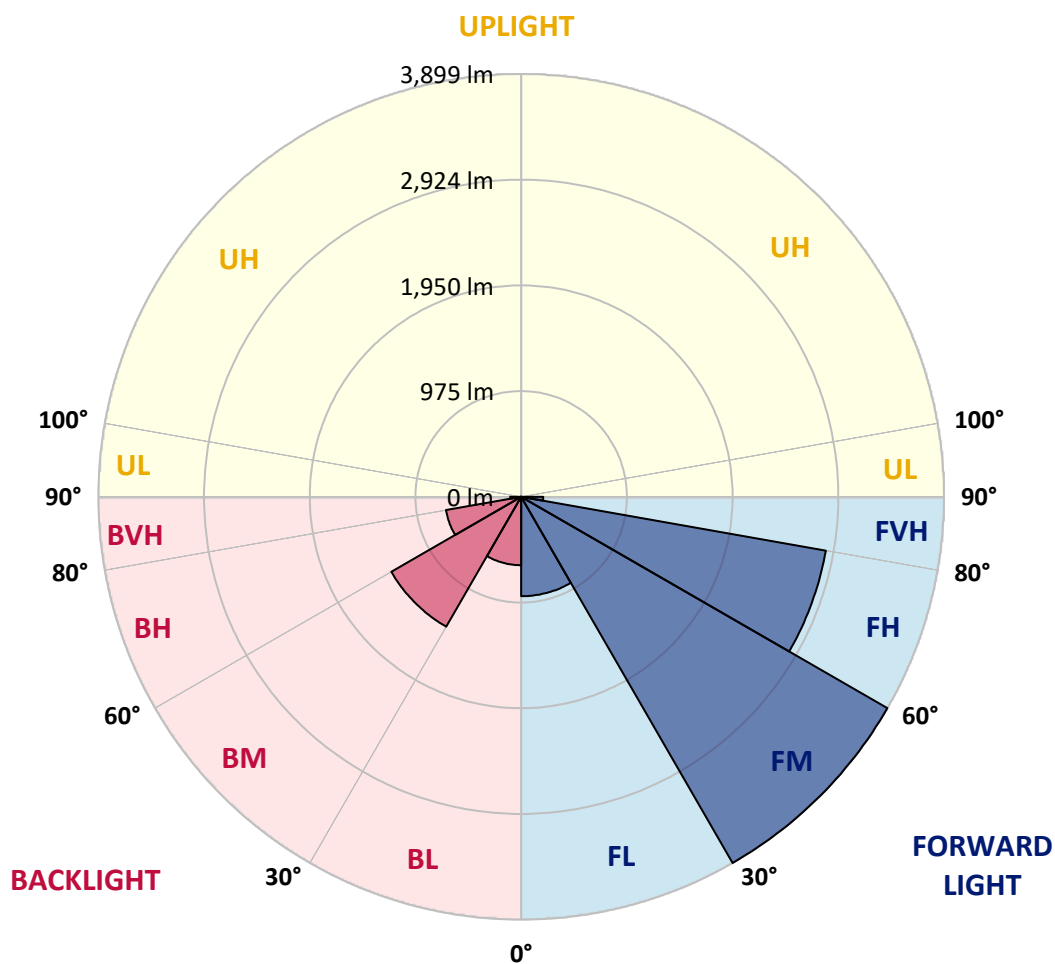
CATALOG NUMBER: USSL-70-727-U-T4W

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

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 916.5  | 8.6       |                         |      |         |
| FM   | (30°-60°)   | 3899.2 | 36.5      |                         |      |         |
| FH   | (60°-80°)   | 2853.3 | 26.7      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 204.1  | 1.9       |                         |      | G2/225  |
| BL   | (0°-30°)    | 631.1  | 5.9       | B2/1000                 |      |         |
| BM   | (30°-60°)   | 1382.8 | 12.9      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 704.4  | 6.6       | B2/1000                 |      | G2/1000 |
| BVH  | (80°-90°)   | 100.8  | 0.9       |                         |      | G2/225  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B2-U0-G2**

Type IV Short



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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 |
| 2.5°  | 1802.2 | 1806.8 | 1802.7 | 1795.6 | 1784.5 | 1777.9 | 1774.4 | 1756.7 | 1745.5 | 1734.4 | 1724.3 |
| 5°    | 1875.1 | 1881.6 | 1880.1 | 1864.9 | 1853.8 | 1840.2 | 1818.4 | 1790.6 | 1766.3 | 1736.4 | 1721.3 |
| 7.5°  | 1960.1 | 1960.1 | 1948.9 | 1939.8 | 1915.0 | 1894.3 | 1866.5 | 1829.0 | 1788.0 | 1747.6 | 1721.8 |
| 10°   | 2039.5 | 2044.6 | 2036.0 | 2018.8 | 1989.4 | 1959.6 | 1920.1 | 1878.6 | 1820.4 | 1764.8 | 1733.4 |
| 12.5° | 2130.6 | 2130.6 | 2121.0 | 2094.1 | 2067.8 | 2025.8 | 1978.8 | 1923.6 | 1861.9 | 1789.6 | 1749.6 |
| 15°   | 2200.4 | 2202.9 | 2195.8 | 2178.6 | 2145.8 | 2106.8 | 2042.0 | 1978.3 | 1896.3 | 1813.3 | 1763.2 |
| 17.5° | 2260.6 | 2260.1 | 2254.0 | 2242.4 | 2224.2 | 2184.7 | 2114.9 | 2032.4 | 1936.8 | 1834.1 | 1778.4 |
| 20°   | 2299.6 | 2303.1 | 2298.0 | 2304.1 | 2292.5 | 2259.6 | 2190.3 | 2092.6 | 1982.3 | 1858.9 | 1795.6 |
| 22.5° | 2335.0 | 2335.5 | 2339.5 | 2346.1 | 2347.1 | 2332.4 | 2275.3 | 2164.5 | 2030.9 | 1887.7 | 1811.8 |
| 25°   | 2396.2 | 2393.2 | 2393.7 | 2393.7 | 2404.3 | 2404.8 | 2357.7 | 2252.0 | 2093.1 | 1925.7 | 1839.1 |
| 27.5° | 2509.5 | 2505.0 | 2482.2 | 2466.0 | 2466.0 | 2478.7 | 2449.8 | 2343.1 | 2161.9 | 1963.1 | 1864.9 |
| 30°   | 2689.1 | 2680.0 | 2634.0 | 2575.3 | 2554.6 | 2566.7 | 2544.9 | 2444.3 | 2234.3 | 2009.6 | 1891.3 |
| 32.5° | 2855.6 | 2854.1 | 2809.6 | 2736.2 | 2687.6 | 2671.4 | 2652.2 | 2554.6 | 2324.9 | 2058.2 | 1929.2 |
| 35°   | 3016.5 | 3014.0 | 2966.9 | 2926.4 | 2858.1 | 2798.4 | 2758.5 | 2645.1 | 2394.2 | 2104.3 | 1963.6 |
| 37.5° | 3246.2 | 3234.6 | 3179.4 | 3130.8 | 3029.7 | 2898.1 | 2854.1 | 2756.4 | 2496.4 | 2168.5 | 2022.3 |
| 40°   | 3484.5 | 3472.4 | 3378.8 | 3313.0 | 3205.7 | 3052.9 | 2971.5 | 2883.9 | 2596.6 | 2246.9 | 2089.6 |
| 42.5° | 3704.1 | 3687.9 | 3593.3 | 3469.3 | 3350.9 | 3216.9 | 3116.2 | 3003.8 | 2723.0 | 2326.4 | 2155.9 |
| 45°   | 4052.7 | 3928.2 | 3814.9 | 3718.3 | 3506.3 | 3376.7 | 3273.0 | 3159.7 | 2858.1 | 2418.0 | 2235.3 |
| 47.5° | 3991.5 | 3966.7 | 3961.1 | 3960.6 | 3661.6 | 3550.3 | 3440.5 | 3305.9 | 2994.7 | 2506.5 | 2311.2 |
| 50°   | 4156.4 | 4123.0 | 4186.3 | 4099.7 | 3810.3 | 3724.3 | 3610.0 | 3461.7 | 3132.4 | 2588.0 | 2385.6 |
| 52.5° | 4312.2 | 4317.3 | 4300.6 | 4144.3 | 3979.8 | 3885.2 | 3794.1 | 3624.1 | 3258.8 | 2669.9 | 2450.3 |
| 55°   | 4553.1 | 4504.0 | 4454.9 | 4304.7 | 4154.9 | 4050.2 | 3986.9 | 3773.4 | 3371.7 | 2738.7 | 2496.9 |
| 57°   | 4648.7 | 4582.9 | 4543.0 | 4392.7 | 4295.5 | 4209.5 | 4120.5 | 3892.3 | 3442.0 | 2768.1 | 2517.1 |
| 57.5° | 4645.7 | 4585.0 | 4560.2 | 4400.8 | 4318.8 | 4243.9 | 4142.2 | 3911.5 | 3449.6 | 2766.0 | 2513.1 |
| 60°   | 4455.9 | 4445.8 | 4537.9 | 4407.9 | 4406.9 | 4387.6 | 4271.8 | 3990.5 | 3467.3 | 2736.7 | 2469.6 |
| 62.5° | 4064.3 | 4108.3 | 4293.0 | 4346.1 | 4473.1 | 4514.6 | 4329.4 | 3963.6 | 3388.4 | 2625.4 | 2357.7 |
| 65°   | 3583.2 | 3666.1 | 3893.8 | 4144.8 | 4463.0 | 4590.0 | 4317.8 | 3822.0 | 3201.2 | 2424.0 | 2147.3 |
| 67.5° | 3033.2 | 3111.1 | 3375.7 | 3765.3 | 4291.0 | 4472.6 | 4167.0 | 3555.3 | 2896.1 | 2149.8 | 1877.1 |
| 70°   | 2446.8 | 2506.0 | 2725.6 | 3183.5 | 3867.5 | 4129.1 | 3765.8 | 3153.6 | 2472.1 | 1816.4 | 1558.8 |
| 72.5° | 1863.4 | 1886.2 | 2092.1 | 2523.7 | 3182.4 | 3508.3 | 3132.9 | 2592.0 | 2044.1 | 1455.6 | 1253.8 |
| 75°   | 1351.9 | 1375.2 | 1549.7 | 1814.4 | 2314.7 | 2731.6 | 2441.2 | 2014.2 | 1556.3 | 1109.1 | 961.8  |
| 77.5° | 965.9  | 991.2  | 1088.3 | 1241.6 | 1583.6 | 1939.3 | 1732.4 | 1470.8 | 1073.1 | 726.5  | 666.8  |
| 80°   | 686.1  | 696.2  | 797.9  | 857.1  | 1028.1 | 1249.2 | 1191.5 | 1014.9 | 687.1  | 485.7  | 446.3  |
| 82.5° | 473.1  | 481.2  | 566.7  | 597.0  | 664.3  | 790.8  | 790.8  | 691.6  | 435.6  | 316.7  | 302.6  |
| 85°   | 279.8  | 281.3  | 349.1  | 377.9  | 388.6  | 470.0  | 483.2  | 375.9  | 239.3  | 143.2  | 141.7  |
| 87.5° | 104.2  | 103.7  | 159.4  | 145.7  | 127.5  | 143.2  | 166.0  | 113.3  | 82.5   | 36.9   | 28.3   |
| 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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**CANDELA DISTRIBUTION (continued):**

|       | 95°    | 105°   | 115°   | 125°   | 135°   | 145°   | 155°   | 165°   | 175°   | 180°   |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 | 1723.3 |
| 2.5°  | 1713.7 | 1702.0 | 1694.4 | 1681.8 | 1671.2 | 1658.5 | 1655.0 | 1643.8 | 1642.3 | 1639.3 |
| 5°    | 1705.6 | 1678.2 | 1651.9 | 1628.7 | 1612.0 | 1595.8 | 1587.2 | 1577.1 | 1571.0 | 1574.5 |
| 7.5°  | 1703.5 | 1662.1 | 1619.6 | 1588.7 | 1564.4 | 1540.1 | 1530.5 | 1525.5 | 1525.5 | 1530.5 |
| 10°   | 1707.1 | 1648.9 | 1595.8 | 1552.8 | 1522.4 | 1500.7 | 1490.5 | 1486.5 | 1492.6 | 1494.6 |
| 12.5° | 1713.7 | 1642.8 | 1578.1 | 1526.0 | 1493.1 | 1470.3 | 1468.3 | 1471.3 | 1479.4 | 1483.0 |
| 15°   | 1717.7 | 1631.2 | 1555.3 | 1495.6 | 1466.8 | 1454.6 | 1452.6 | 1463.7 | 1480.9 | 1486.5 |
| 17.5° | 1727.8 | 1618.0 | 1526.0 | 1469.3 | 1443.0 | 1441.5 | 1447.5 | 1459.2 | 1480.9 | 1485.0 |
| 20°   | 1727.3 | 1600.3 | 1497.1 | 1436.9 | 1424.3 | 1429.3 | 1441.0 | 1456.6 | 1478.9 | 1486.0 |
| 22.5° | 1736.4 | 1579.1 | 1465.7 | 1404.5 | 1399.0 | 1416.2 | 1433.4 | 1448.5 | 1475.4 | 1483.5 |
| 25°   | 1749.1 | 1561.4 | 1428.8 | 1369.6 | 1371.6 | 1393.9 | 1419.2 | 1438.4 | 1464.7 | 1471.8 |
| 27.5° | 1761.7 | 1544.7 | 1389.3 | 1326.6 | 1330.7 | 1362.5 | 1401.5 | 1422.7 | 1447.5 | 1460.2 |
| 30°   | 1777.4 | 1526.0 | 1347.9 | 1279.1 | 1284.6 | 1323.1 | 1367.1 | 1395.9 | 1423.8 | 1435.4 |
| 32.5° | 1795.1 | 1510.3 | 1305.9 | 1228.5 | 1230.0 | 1279.1 | 1337.2 | 1369.6 | 1391.9 | 1405.5 |
| 35°   | 1817.9 | 1497.6 | 1264.9 | 1172.8 | 1173.3 | 1227.9 | 1298.8 | 1337.2 | 1357.0 | 1372.1 |
| 37.5° | 1863.9 | 1494.6 | 1226.9 | 1120.2 | 1118.7 | 1183.9 | 1256.8 | 1300.8 | 1317.5 | 1330.2 |
| 40°   | 1915.5 | 1492.6 | 1187.0 | 1067.6 | 1068.1 | 1136.4 | 1213.3 | 1259.3 | 1271.5 | 1283.6 |
| 42.5° | 1972.2 | 1487.5 | 1144.5 | 1018.5 | 1021.5 | 1091.8 | 1171.3 | 1215.8 | 1225.4 | 1235.5 |
| 45°   | 2029.4 | 1476.9 | 1094.9 | 972.9  | 975.5  | 1048.3 | 1124.2 | 1167.7 | 1175.3 | 1186.0 |
| 47.5° | 2084.0 | 1455.1 | 1048.3 | 929.4  | 940.6  | 1002.8 | 1071.1 | 1107.0 | 1111.6 | 1123.7 |
| 50°   | 2134.6 | 1424.3 | 1000.3 | 894.5  | 900.6  | 953.2  | 1012.9 | 1040.2 | 1043.3 | 1048.8 |
| 52.5° | 2176.1 | 1379.2 | 945.6  | 857.1  | 861.6  | 902.1  | 954.7  | 978.0  | 975.5  | 978.5  |
| 55°   | 2190.8 | 1316.0 | 894.5  | 819.1  | 818.6  | 848.0  | 896.6  | 922.9  | 919.3  | 918.3  |
| 57°   | 2179.6 | 1252.7 | 855.1  | 789.8  | 787.8  | 808.0  | 849.0  | 871.8  | 875.3  | 878.3  |
| 57.5° | 2169.0 | 1237.1 | 842.9  | 782.2  | 779.7  | 798.4  | 837.9  | 859.6  | 865.2  | 864.7  |
| 60°   | 2087.1 | 1137.4 | 790.8  | 748.8  | 738.2  | 750.8  | 783.7  | 800.9  | 800.9  | 805.0  |
| 62.5° | 1938.3 | 1026.1 | 745.8  | 709.9  | 690.1  | 704.8  | 731.6  | 744.8  | 735.7  | 738.2  |
| 65°   | 1727.3 | 912.7  | 700.7  | 667.4  | 642.1  | 660.3  | 686.6  | 703.3  | 695.2  | 693.7  |
| 67.5° | 1485.0 | 808.0  | 652.7  | 618.3  | 600.1  | 618.3  | 651.7  | 685.6  | 686.1  | 685.6  |
| 70°   | 1230.5 | 716.4  | 601.1  | 567.7  | 552.0  | 574.8  | 621.8  | 672.4  | 675.4  | 672.9  |
| 72.5° | 994.2  | 637.0  | 546.4  | 516.1  | 503.4  | 533.3  | 588.9  | 647.6  | 651.7  | 653.2  |
| 75°   | 785.2  | 564.6  | 484.7  | 462.4  | 455.9  | 486.7  | 549.0  | 610.7  | 602.6  | 607.7  |
| 77.5° | 561.1  | 478.6  | 419.4  | 404.3  | 401.2  | 424.5  | 485.2  | 526.7  | 515.1  | 514.6  |
| 80°   | 400.7  | 393.6  | 352.1  | 343.5  | 338.0  | 354.7  | 399.2  | 437.1  | 425.5  | 416.4  |
| 82.5° | 309.6  | 308.6  | 288.4  | 261.6  | 256.0  | 286.9  | 324.8  | 340.5  | 247.4  | 249.9  |
| 85°   | 186.7  | 194.8  | 172.0  | 173.5  | 186.7  | 205.4  | 226.2  | 236.3  | 118.4  | 93.6   |
| 87.5° | 43.5   | 45.0   | 53.6   | 65.3   | 67.8   | 79.4   | 108.8  | 130.5  | 52.6   | 43.0   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

McGraw-Edison

Report Number: SP2-2501-321-3

Test Date: 04/09/2025

Luminaire Tested: GKO-PB1E-727-U-T4W

Data in this report applies to families of products including GKO-PB1E-727-U-T4W

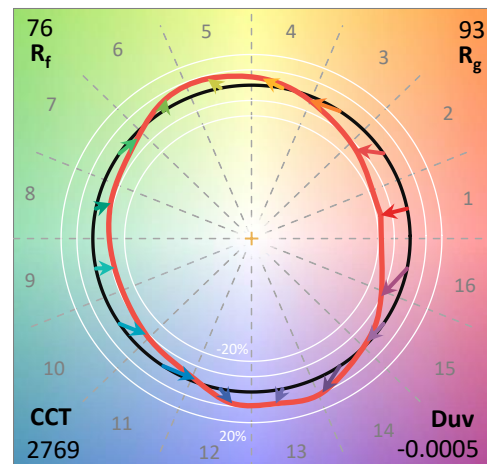
### Test Information

Test Method: LM-79-2019  
 Report Number: SP2-2501-321-3  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP2 - 165CM SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 04/10/2025  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: McGraw-Edison  
 Catalog Number: **GKO-PB1E-727-U-T4W**  
 Description: Gekko Wedge Wall Pack Fixture 1 SQ w/ T4W distribution

### Spectral Parameters

CCT (K): 2769  
 CIE  $u'$ : 0.2596  
 CIE  $v'$ : 0.5253  
 Duv: -0.0005  
 CIE x: 0.4535  
 CIE y: 0.4078  
 CIE z: 0.1387  
 Peak Wavelength (nm): 597  
 Dominant Wavelength (nm): 584  
 Purity: 58.54014  
 R<sub>f</sub>: 75.7  
 R<sub>g</sub>: 93.2

CRI (Ra): 71.7  
 R1: 68.0  
 R2: 84.0  
 R3: 94.6  
 R4: 65.9  
 R5: 67.3  
 R6: 78.7  
 R7: 75.2  
 R8: 39.8  
 R9: -34.5  
 R10: 64.3  
 R11: 60.9  
 R12: 54.4  
 R13: 71.2  
 R14: 97.6  
 R15: 59.5



### Test Conditions

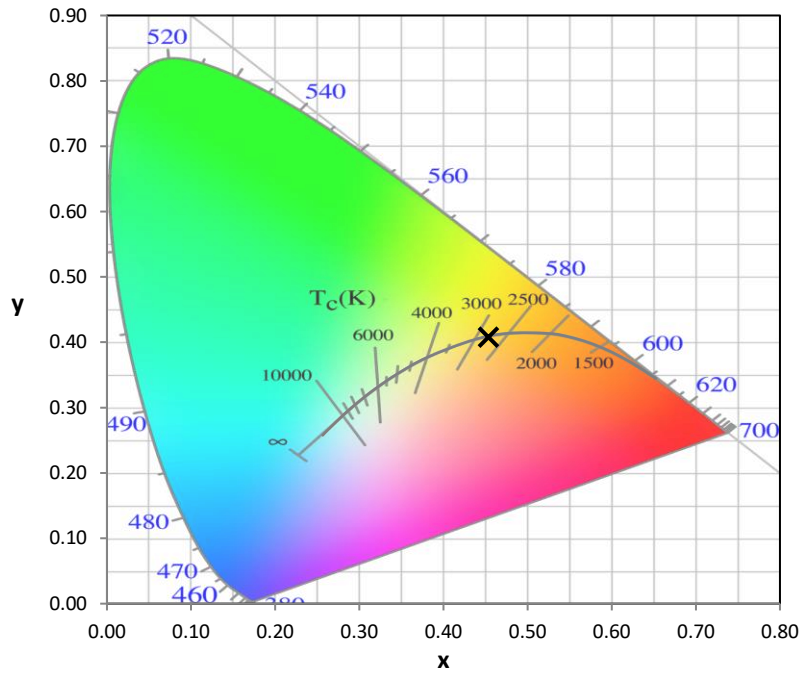
Stabilization Time: 36M  
 Operation Time: 1H 36M  
 Sphere Temperature (°C): 25.0

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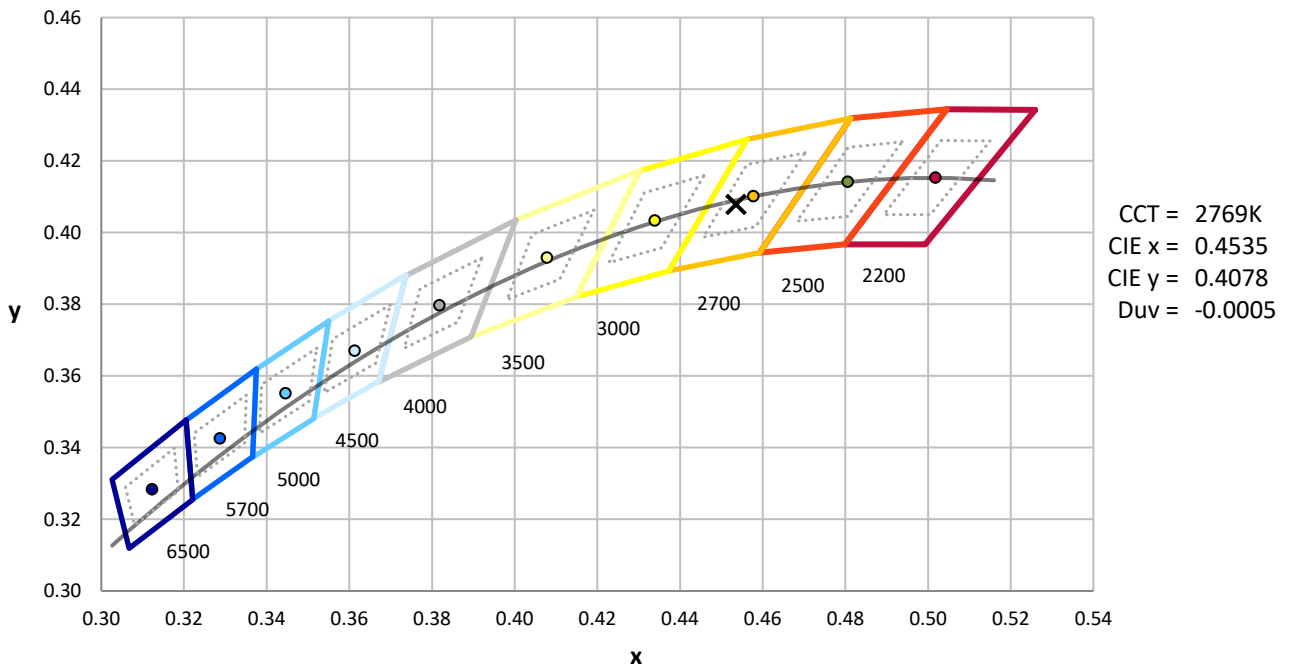
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN2187                | 1/6/2025         | 7/6/2025             |
| Power Meter                    | INXT2011002           | 1/21/2025        | 1/21/2026            |
| AC Power Source                | IN0458                | 10/22/2024       | 10/22/2025           |
| DC Power Source                | IN0212                | 10/22/2024       | 10/22/2025           |
| Sphere Thermometer             | IN4036B               | 10/22/2024       | 10/22/2025           |
| Room Thermometer               | IN0046                | 10/22/2024       | 10/22/2025           |

REPORT NUMBER: SP2-2501-321-3

**CIE 1931 Chromaticity Diagram**



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



REPORT NUMBER: SP2-2501-321-3

### Photopic Flux vs. Wavelength



### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 114                                  | NR                             | 620               | 844                                  | NR                             | 750               | 22                                   | NR                             | 880               | 1                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 138                                  | NR                             | 625               | 785                                  | NR                             | 755               | 19                                   | NR                             | 885               | 1                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 176                                  | NR                             | 630               | 722                                  | NR                             | 760               | 16                                   | NR                             | 890               | 1                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 222                                  | NR                             | 635               | 655                                  | NR                             | 765               | 14                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 268                                  | NR                             | 640               | 591                                  | NR                             | 770               | 12                                   | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 311                                  | NR                             | 645               | 527                                  | NR                             | 775               | 10                                   | NR                             | 905               | 0                                    | NR                             |
| 390               | 0                                    | NR                             | 520               | 348                                  | NR                             | 650               | 467                                  | NR                             | 780               | 9                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 0                                    | NR                             | 525               | 381                                  | NR                             | 655               | 412                                  | NR                             | 785               | 8                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 2                                    | NR                             | 530               | 410                                  | NR                             | 660               | 360                                  | NR                             | 790               | 7                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 4                                    | NR                             | 535               | 438                                  | NR                             | 665               | 314                                  | NR                             | 795               | 6                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 7                                    | NR                             | 540               | 469                                  | NR                             | 670               | 272                                  | NR                             | 800               | 5                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 13                                   | NR                             | 545               | 503                                  | NR                             | 675               | 236                                  | NR                             | 805               | 4                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 25                                   | NR                             | 550               | 544                                  | NR                             | 680               | 203                                  | NR                             | 810               | 4                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 46                                   | NR                             | 555               | 594                                  | NR                             | 685               | 175                                  | NR                             | 815               | 3                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 79                                   | NR                             | 560               | 652                                  | NR                             | 690               | 149                                  | NR                             | 820               | 3                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 128                                  | NR                             | 565               | 714                                  | NR                             | 695               | 128                                  | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 196                                  | NR                             | 570               | 783                                  | NR                             | 700               | 109                                  | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 299                                  | NR                             | 575               | 847                                  | NR                             | 705               | 93                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 433                                  | NR                             | 580               | 906                                  | NR                             | 710               | 80                                   | NR                             | 840               | 2                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 433                                  | NR                             | 585               | 953                                  | NR                             | 715               | 68                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 293                                  | NR                             | 590               | 985                                  | NR                             | 720               | 58                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 215                                  | NR                             | 595               | 998                                  | NR                             | 725               | 50                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 173                                  | NR                             | 600               | 997                                  | NR                             | 730               | 42                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 127                                  | NR                             | 605               | 978                                  | NR                             | 735               | 36                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 104                                  | NR                             | 610               | 945                                  | NR                             | 740               | 30                                   | NR                             | 870               | 1                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 104                                  | NR                             | 615               | 902                                  | NR                             | 745               | 26                                   | NR                             | 875               | 1                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



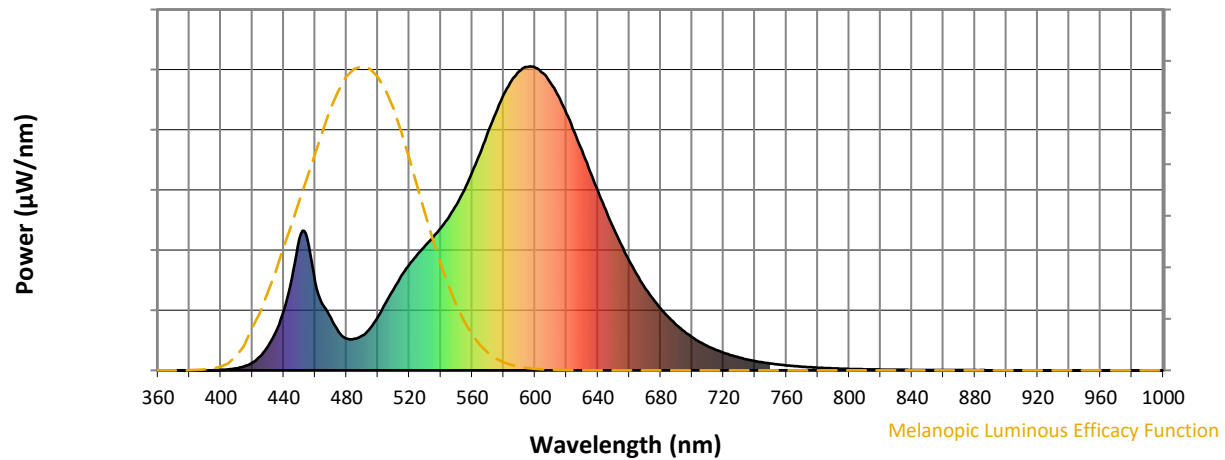
Scotopic Lumens: NR

S/P: 1.14

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 114                         | NR               | 620       | 844                         | NR               | 750       | 22                          | NR               | 880       | 1                           | NR               |
| 365       | 0                           | NR               | 495       | 138                         | NR               | 625       | 785                         | NR               | 755       | 19                          | NR               | 885       | 1                           | NR               |
| 370       | 0                           | NR               | 500       | 176                         | NR               | 630       | 722                         | NR               | 760       | 16                          | NR               | 890       | 1                           | NR               |
| 375       | 0                           | NR               | 505       | 222                         | NR               | 635       | 655                         | NR               | 765       | 14                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 268                         | NR               | 640       | 591                         | NR               | 770       | 12                          | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 311                         | NR               | 645       | 527                         | NR               | 775       | 10                          | NR               | 905       | 0                           | NR               |
| 390       | 0                           | NR               | 520       | 348                         | NR               | 650       | 467                         | NR               | 780       | 9                           | NR               | 910       | 0                           | NR               |
| 395       | 0                           | NR               | 525       | 381                         | NR               | 655       | 412                         | NR               | 785       | 8                           | NR               | 915       | 0                           | NR               |
| 400       | 2                           | NR               | 530       | 410                         | NR               | 660       | 360                         | NR               | 790       | 7                           | NR               | 920       | 0                           | NR               |
| 405       | 4                           | NR               | 535       | 438                         | NR               | 665       | 314                         | NR               | 795       | 6                           | NR               | 925       | 0                           | NR               |
| 410       | 7                           | NR               | 540       | 469                         | NR               | 670       | 272                         | NR               | 800       | 5                           | NR               | 930       | 0                           | NR               |
| 415       | 13                          | NR               | 545       | 503                         | NR               | 675       | 236                         | NR               | 805       | 4                           | NR               | 935       | 0                           | NR               |
| 420       | 25                          | NR               | 550       | 544                         | NR               | 680       | 203                         | NR               | 810       | 4                           | NR               | 940       | 0                           | NR               |
| 425       | 46                          | NR               | 555       | 594                         | NR               | 685       | 175                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 79                          | NR               | 560       | 652                         | NR               | 690       | 149                         | NR               | 820       | 3                           | NR               | 950       | 0                           | NR               |
| 435       | 128                         | NR               | 565       | 714                         | NR               | 695       | 128                         | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 196                         | NR               | 570       | 783                         | NR               | 700       | 109                         | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 299                         | NR               | 575       | 847                         | NR               | 705       | 93                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 433                         | NR               | 580       | 906                         | NR               | 710       | 80                          | NR               | 840       | 2                           | NR               | 970       | 0                           | NR               |
| 455       | 433                         | NR               | 585       | 953                         | NR               | 715       | 68                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 293                         | NR               | 590       | 985                         | NR               | 720       | 58                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 215                         | NR               | 595       | 998                         | NR               | 725       | 50                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 173                         | NR               | 600       | 997                         | NR               | 730       | 42                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 127                         | NR               | 605       | 978                         | NR               | 735       | 36                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 104                         | NR               | 610       | 945                         | NR               | 740       | 30                          | NR               | 870       | 1                           | NR               | 1000      | 0                           | NR               |
| 485       | 104                         | NR               | 615       | 902                         | NR               | 745       | 26                          | NR               | 875       | 1                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 2.08

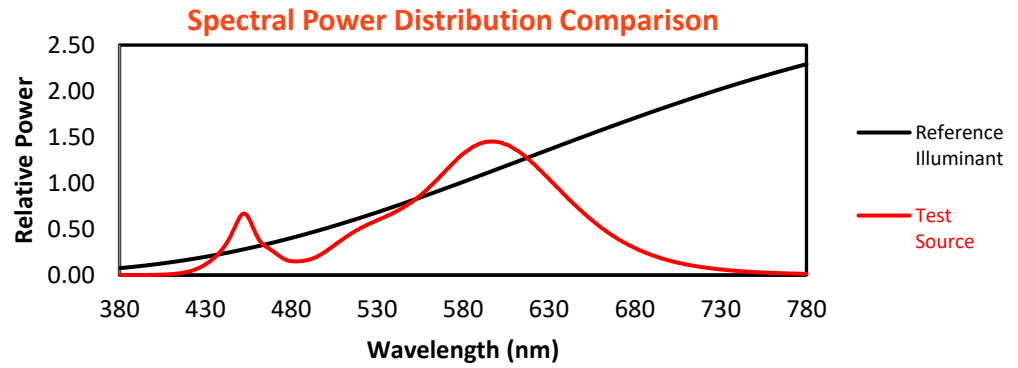
| $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^{\wedge}/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|-------------------|----------------------------------------|--------------------------------|
| 360               | 0                                      | NR                             | 490               | 114                                    | NR                             | 620               | 844                                    | NR                             | 750               | 22                                     | NR                             | 880               | 1                                      | NR                             |
| 365               | 0                                      | NR                             | 495               | 138                                    | NR                             | 625               | 785                                    | NR                             | 755               | 19                                     | NR                             | 885               | 1                                      | NR                             |
| 370               | 0                                      | NR                             | 500               | 176                                    | NR                             | 630               | 722                                    | NR                             | 760               | 16                                     | NR                             | 890               | 1                                      | NR                             |
| 375               | 0                                      | NR                             | 505               | 222                                    | NR                             | 635               | 655                                    | NR                             | 765               | 14                                     | NR                             | 895               | 0                                      | NR                             |
| 380               | 0                                      | NR                             | 510               | 268                                    | NR                             | 640               | 591                                    | NR                             | 770               | 12                                     | NR                             | 900               | 0                                      | NR                             |
| 385               | 0                                      | NR                             | 515               | 311                                    | NR                             | 645               | 527                                    | NR                             | 775               | 10                                     | NR                             | 905               | 0                                      | NR                             |
| 390               | 0                                      | NR                             | 520               | 348                                    | NR                             | 650               | 467                                    | NR                             | 780               | 9                                      | NR                             | 910               | 0                                      | NR                             |
| 395               | 0                                      | NR                             | 525               | 381                                    | NR                             | 655               | 412                                    | NR                             | 785               | 8                                      | NR                             | 915               | 0                                      | NR                             |
| 400               | 2                                      | NR                             | 530               | 410                                    | NR                             | 660               | 360                                    | NR                             | 790               | 7                                      | NR                             | 920               | 0                                      | NR                             |
| 405               | 4                                      | NR                             | 535               | 438                                    | NR                             | 665               | 314                                    | NR                             | 795               | 6                                      | NR                             | 925               | 0                                      | NR                             |
| 410               | 7                                      | NR                             | 540               | 469                                    | NR                             | 670               | 272                                    | NR                             | 800               | 5                                      | NR                             | 930               | 0                                      | NR                             |
| 415               | 13                                     | NR                             | 545               | 503                                    | NR                             | 675               | 236                                    | NR                             | 805               | 4                                      | NR                             | 935               | 0                                      | NR                             |
| 420               | 25                                     | NR                             | 550               | 544                                    | NR                             | 680               | 203                                    | NR                             | 810               | 4                                      | NR                             | 940               | 0                                      | NR                             |
| 425               | 46                                     | NR                             | 555               | 594                                    | NR                             | 685               | 175                                    | NR                             | 815               | 3                                      | NR                             | 945               | 0                                      | NR                             |
| 430               | 79                                     | NR                             | 560               | 652                                    | NR                             | 690               | 149                                    | NR                             | 820               | 3                                      | NR                             | 950               | 0                                      | NR                             |
| 435               | 128                                    | NR                             | 565               | 714                                    | NR                             | 695               | 128                                    | NR                             | 825               | 2                                      | NR                             | 955               | 0                                      | NR                             |
| 440               | 196                                    | NR                             | 570               | 783                                    | NR                             | 700               | 109                                    | NR                             | 830               | 2                                      | NR                             | 960               | 0                                      | NR                             |
| 445               | 299                                    | NR                             | 575               | 847                                    | NR                             | 705               | 93                                     | NR                             | 835               | 2                                      | NR                             | 965               | 0                                      | NR                             |
| 450               | 433                                    | NR                             | 580               | 906                                    | NR                             | 710               | 80                                     | NR                             | 840               | 2                                      | NR                             | 970               | 0                                      | NR                             |
| 455               | 433                                    | NR                             | 585               | 953                                    | NR                             | 715               | 68                                     | NR                             | 845               | 1                                      | NR                             | 975               | 0                                      | NR                             |
| 460               | 293                                    | NR                             | 590               | 985                                    | NR                             | 720               | 58                                     | NR                             | 850               | 1                                      | NR                             | 980               | 0                                      | NR                             |
| 465               | 215                                    | NR                             | 595               | 998                                    | NR                             | 725               | 50                                     | NR                             | 855               | 1                                      | NR                             | 985               | 0                                      | NR                             |
| 470               | 173                                    | NR                             | 600               | 997                                    | NR                             | 730               | 42                                     | NR                             | 860               | 1                                      | NR                             | 990               | 0                                      | NR                             |
| 475               | 127                                    | NR                             | 605               | 978                                    | NR                             | 735               | 36                                     | NR                             | 865               | 1                                      | NR                             | 995               | 0                                      | NR                             |
| 480               | 104                                    | NR                             | 610               | 945                                    | NR                             | 740               | 30                                     | NR                             | 870               | 1                                      | NR                             | 1000              | 0                                      | NR                             |
| 485               | 104                                    | NR                             | 615               | 902                                    | NR                             | 745               | 26                                     | NR                             | 875               | 1                                      | NR                             |                   |                                        |                                |

REPORT NUMBER: SP2-2501-321-3

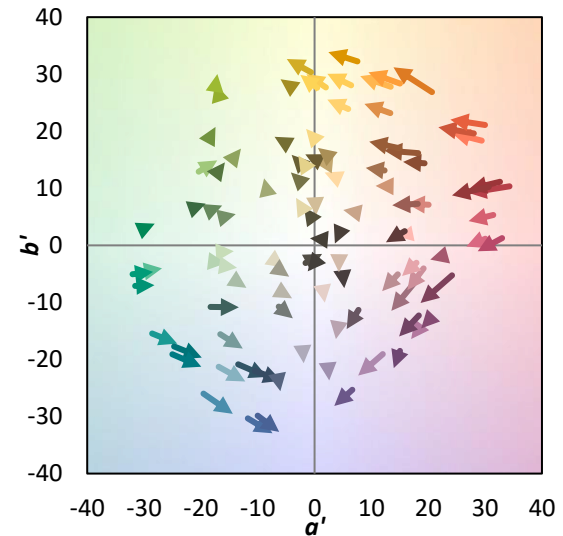
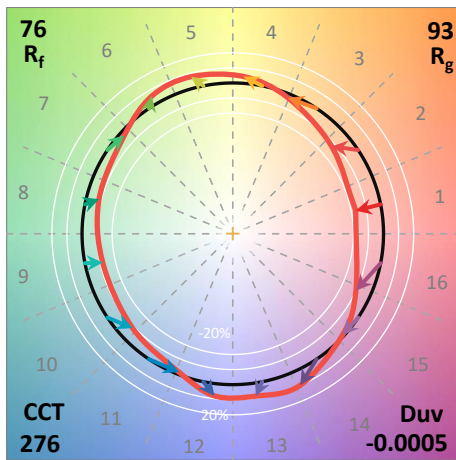
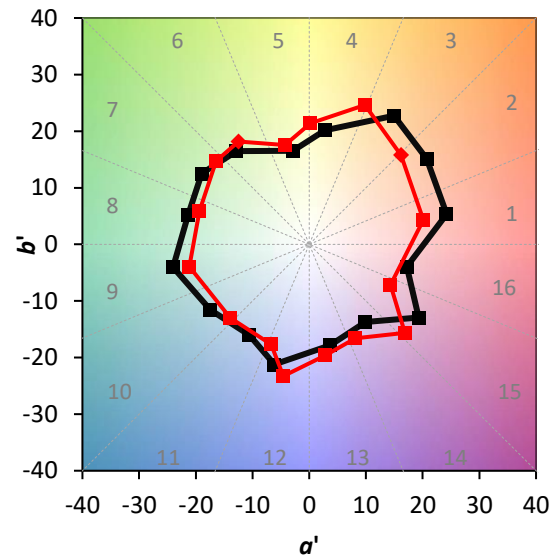
TM-30-18

### Summary

$R_f = 75.7$   
 $R_g = 93.2$   
 $CIE R_a = 71.7$   
 $R_g = -34.5$

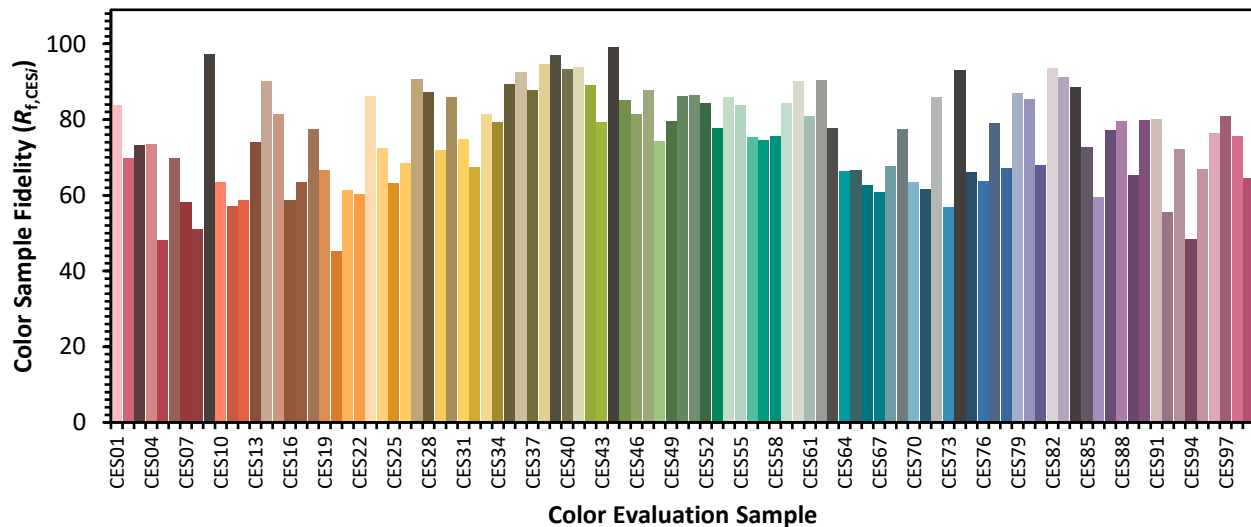


### Color Vector Graphics

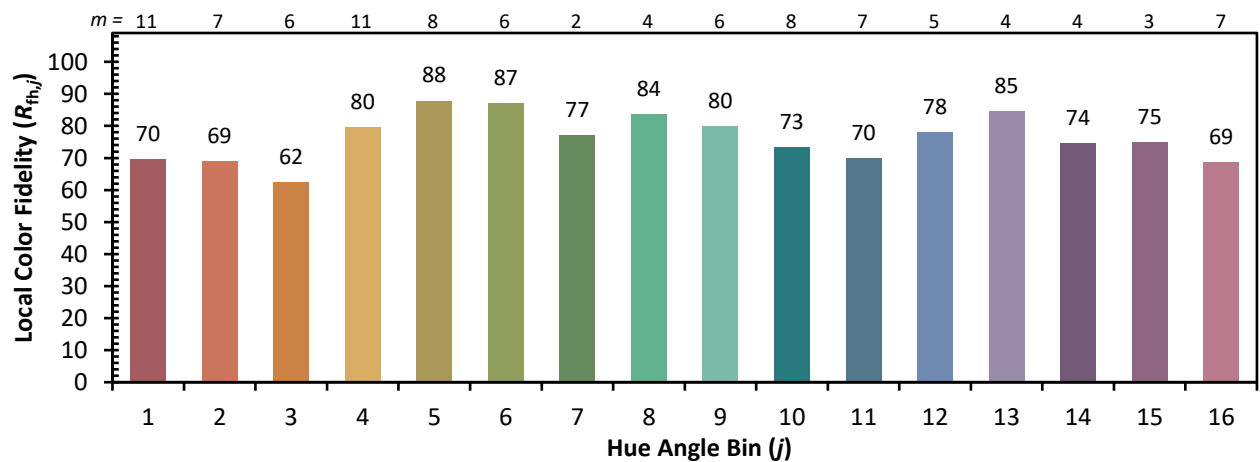
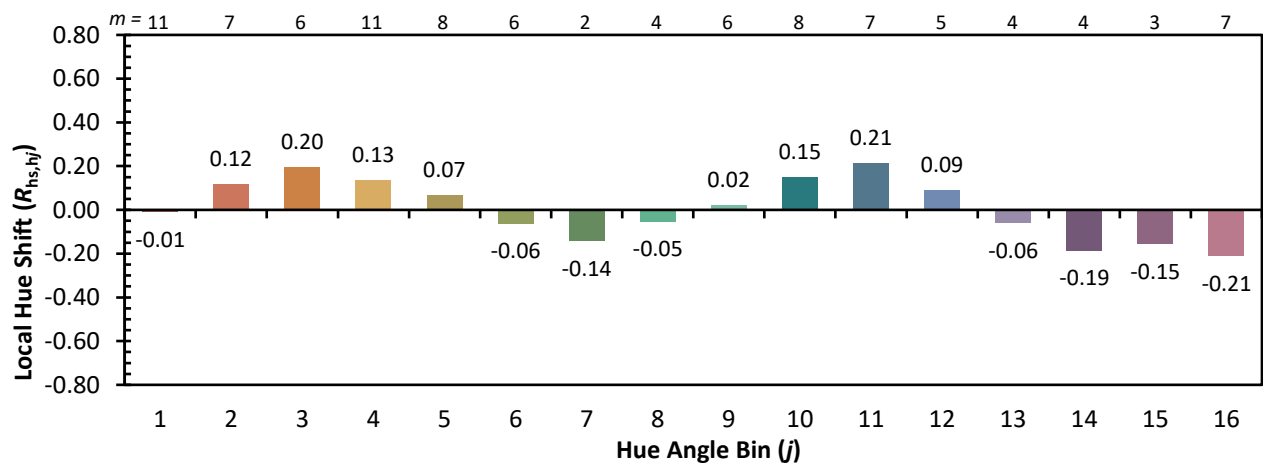


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

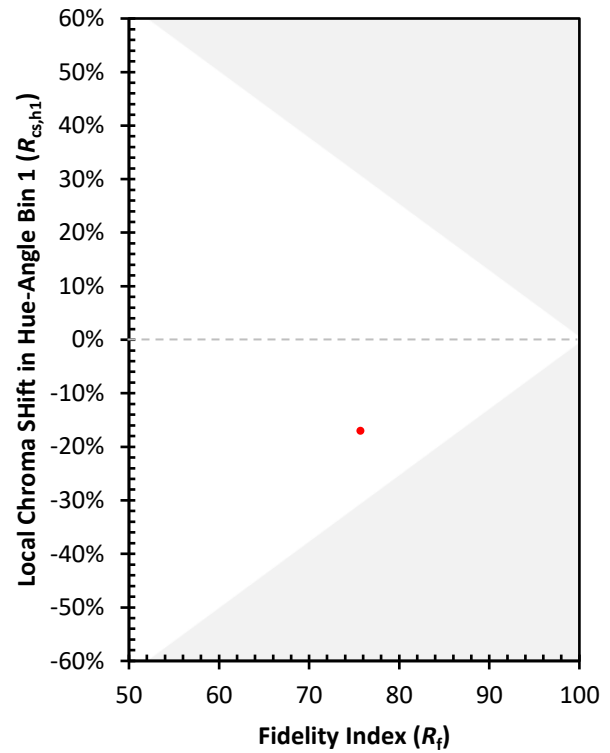
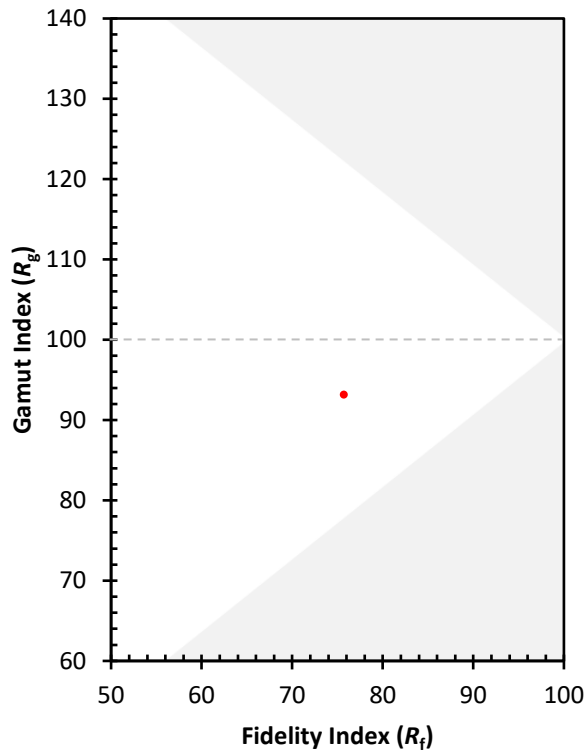
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 86 | CES26 = 68 | CES51 = 87 | CES76 = 64 |
| CES02 = 63 | CES27 = 91 | CES52 = 84 | CES77 = 79 |
| CES03 = 31 | CES28 = 87 | CES53 = 78 | CES78 = 67 |
| CES04 = 71 | CES29 = 72 | CES54 = 86 | CES79 = 87 |
| CES05 = 50 | CES30 = 86 | CES55 = 84 | CES80 = 85 |
| CES06 = 52 | CES31 = 75 | CES56 = 75 | CES81 = 68 |
| CES07 = 42 | CES32 = 67 | CES57 = 74 | CES82 = 94 |
| CES08 = 41 | CES33 = 81 | CES58 = 76 | CES83 = 91 |
| CES09 = 29 | CES34 = 79 | CES59 = 84 | CES84 = 89 |
| CES10 = 77 | CES35 = 89 | CES60 = 90 | CES85 = 73 |
| CES11 = 60 | CES36 = 92 | CES61 = 81 | CES86 = 59 |
| CES12 = 66 | CES37 = 88 | CES62 = 90 | CES87 = 77 |
| CES13 = 43 | CES38 = 95 | CES63 = 78 | CES88 = 79 |
| CES14 = 74 | CES39 = 97 | CES64 = 66 | CES89 = 65 |
| CES15 = 72 | CES40 = 93 | CES65 = 67 | CES90 = 80 |
| CES16 = 48 | CES41 = 94 | CES66 = 63 | CES91 = 80 |
| CES17 = 50 | CES42 = 89 | CES67 = 61 | CES92 = 55 |
| CES18 = 57 | CES43 = 79 | CES68 = 68 | CES93 = 72 |
| CES19 = 73 | CES44 = 99 | CES69 = 77 | CES94 = 48 |
| CES20 = 67 | CES45 = 85 | CES70 = 63 | CES95 = 67 |
| CES21 = 87 | CES46 = 81 | CES71 = 62 | CES96 = 76 |
| CES22 = 80 | CES47 = 88 | CES72 = 86 | CES97 = 81 |
| CES23 = 92 | CES48 = 74 | CES73 = 57 | CES98 = 76 |
| CES24 = 91 | CES49 = 80 | CES74 = 93 | CES99 = 64 |
| CES25 = 73 | CES50 = 86 | CES75 = 66 |            |



### Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)